Cobbler, stick to thy last: the disciplining of risky growth in credit unions

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This version: September 25, 2017

ABSTRACT

In this paper we analyze whether credit unions (CUs) are subject to market discipline mechanisms by their members and, more specifically, whether the business loan granting activity is explicitly disciplined. Credit union regulation traditionally considered CUs to be at a disadvantage in the selection and management of business loans and limited the ability of credit unions to grant such loans: if indeed CUs are disadvantaged with respect to business loans, strategies of expansion of the business loan portfolio could be subject to discipline by credit union depositors. Using data from the universe of US credit unions, we show descriptive evidence of discipline mechanisms by credit union members but, more importantly, of a significant disciplining of business loans: we then implement quasi-experimental analyses to show results highly suggestive of causality from increased business loan activity to reductions in deposits. We finally explore whether indeed business loans lead to increases in the risk profile of the loan portfolio of the credit union and show robust evidence that this is the case. Our results that CUs are subject to discipline mechanisms by their member depositors and that depositors discipline risky growth strategies by financial institutions have important policy implications regarding the regulation of financial institutions.

Keywords: depositor discipline, risky growth, credit unions, business loans.
JEL Classification: M41, G12.

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* Corresponding author: amesa.1@alumni.unav.es. We appreciate helpful comments and suggestions from Claudia Girardone, Jose Berrospide, Martin Cihak, Nadia Massoud, James Wilcox, Keldon Bauer and participants at IWFSAS 2016, especially our discussant Vikas Mehrota; ICA 2016 Almeria; XXIV Foro de Finanzas, especially our discussant Javier Suarez; I PhD Workshop at the Universidad de Navarra. We would also like to thank David B Nichols from the NCUA for his help with our questions about credit unions and NCUA regulations. Andrés Mesa Toro acknowledges financial support from "Asociación de Amigos – Universidad de Navarra". Germán López-Espinosa acknowledges financial support from the Spanish Ministry of Education through project ECO2012-33619 and ECO2016-78254. Javier Gomez-Biscarri acknowledges financial support from the Barcelona GSE and the Spanish Ministry of Economy and Competitiveness through the Severo Ochoa Program for Centers of Excellence in R&D (SEV-2015-0563) and from the Spanish Ministry of Economy and Competitiveness through project ECO-2014-55488-P.

1. Introduction

Market discipline of financial institutions is one of the pillars of the Basel Committee on Banking Supervision and it has been considered a key factor which reinforces and supports the effects of explicit regulation and supervision: financial markets have the ability to monitor bank performance and influence risk-taking in the financial system by punishing banks who take excessive risks or whose fundamentals deteriorate. This disciplining process, carried through reduced access to financing or through an increase of interest rates on deposits, gives banks incentives to limit risk or to take corrective actions (see Nier and Baumann, 2006) which, in turn, lead to increased stability of the financial system. Given the importance of market discipline as an instrument or incentive to improve financial stability, research has focused on showing evidence of its existence and on describing the channels and mechanisms through which it is exercised.

Besides the disciplining effect that equity markets may exercise over public banks, deposit markets have also been shown to be a major source of discipline for financial institutions which rely on deposit financing: when bank fundamentals deteriorate, depositors react by leaving or by demanding higher interest rates. This reaction gives incentives to take ex-post corrective actions in case of excessive risk and to limit ex-ante risk-taking. There is by now abundant empirical evidence of depositor discipline both in domestic and international contexts (see Berger and Turk-Ariss, 2015; Calomiris and Powell, 2001; Cook and Spellman, 1994; Macey and Garret, 1988; Martinez Peria and Schmukler, 2001; Park and Peristiani, 1998, among others). This literature, however, is still lacking in some areas. First, it has mostly focused on bank depositors. The evidence regarding discipline in other financial institutions is scarce and we lack systematic studies on the existence of depositor discipline, for example, in CUs, and on how the peculiarities of these other institution may affect how this discipline works.[1] Second, most of the discipline literature has focused on depositor reaction to bottomline fundamentals (earnings, capital, volatility) but analyses which have looked at depositor discipline of other bank strategies like growth or diversification are quite scarce. One example is Bertay et al. (2013), who show that big systemic banks are subject to higher market discipline. Indeed, size is generally assumed by default to have a potential impact on bank risk and returns (see, e.g., Berger and Mester, 1997 or Demsetz and Strahan,1997, Deng et al. 2007) and therefore most of the literature on depositor discipline has used size or growth in assets as a control variable (see Arnold et al., 2016; Barajas and Steiner, 2000; Berger and Turk-Ariss, 2015; Maechler and McDill, 2006,

[1] There is some scattered evidence of discipline in credit unions in international settings: Arnold et al. (2016) or Murata and Hori (2006).

Goldberg and Hudgins, 2002, among others), but without attempting to go further in the analysis of whether indeed depositors actively discipline the strategies followed by banks in order to grow.

In this paper, we contribute to filling these two gaps in the literature. In particular, we analyze depositor discipline in credit unions (CUs), placing special emphasis on the disciplining of a particular growth strategy, namely, the expansion of the loan portfolio through member business loans. The contribution of this analysis is twofold. First, there is so far little evidence on whether or not market discipline plays a role in monitoring credit unions and, if so, how this discipline works. This issue is of particular relevance given the peculiarities of credit unions, especially the owner/creditor dual role of CU members and the restrictions placed by field of membership regulations. Second, credit unions are generally constrained in the type of services they can offer, and only under restrictive conditions they can expand their asset portfolios into alternative products such as business loans. This expansion represents a type of growth strategy which changes the risk profile of the credit union: it has been traditionally considered that CUs are less proficient at managing the credit risk of the business loan portfolio. Thus, even though at first sight the CU fundamentals may not deteriorate when business loans expand significantly, depositors may perceive this as a risky growth strategy and penalize the credit union accordingly.

We use these considerations to focus our analysis of depositor discipline in the US credit union sector and attempt to understand whether there is indeed a significant discipline exercised by CU members. We place our emphasis on the disciplining by depositors of the expansion strategy of granting business loans. Specifically, we are interested in answering the following questions:

• Do CU members exercise discipline on credit unions with bad fundamentals or which have riskier balance-sheets?
• In particular, is the strategy of growth via business loans penalized by CU members? Is this discipline justified on the basis of risk? (i.e., are CUs less proficient at controlling the risk of the business loan portfolio?)
• Are other growth strategies similarly penalized?

The answers to this set of questions have important policy implications. First, understanding the way credit union depositors react to CU strategies should help design policies aimed at controlling CU risk taking: some recent regulations have relaxed the requirements for CU expansion of business loans, so it is key to understand if indeed this relaxation is conducive to a stable financing of the CU. Second, given the special features of CUs, which differentiate them from other financial institutions, the disciplining mechanisms may work differently and, as a consequence, regulation of credit unions and banks might need to diverge further.

To carry out these ambitious objectives, we put together a large database of U.S. credit union accounting information. The data cover all credit unions with data available at the NCUA and assets larger than $50 million. Our sample period covers 1994Q1-2014Q4, yielding a maximum of 152,761 quarterly observations which correspond to 2,248 CUs. We use both regression analyses and quasi-experimental methods and deliver three main sets of results.

We first show the existence of depositor discipline in CUs by relating deposit growth to a set of CU fundamentals and risk indicators while controlling for idiosyncratic and macroeconomic factors: we show how CU members withdraw their shares and deposits when fundamentals deteriorate or the CU increases its risk-taking. We stress some results where discipline differs from previous findings for banks (such as the lack of discipline of total loans) and relate those differences to the peculiarities of credit unions. In particular, we note that CU members seem to react negatively to the presence of business loans in the CU's loan portfolio. This result becomes the starting point of our subsequent analyses.

We then look deeper into the disciplining of business loans: we carry out two semi-experimental studies around two "exogenous shocks" which allowed for increased risk-taking by CUs through increases in the capacity to grant business loans. Using quasi-experimental methods (matching methods and diff-in-diff estimators) we estimate parameters of depositor response which may be given a causal interpretation. In both cases we find significant evidence that depositors react negatively to the implementation of regulations which increase the risk-taking capacity -through expansion of business loans- of the CU relative to well-designed control groups. The results in this second part may be especially relevant for regulatory purposes: regulations which allow the increase of risk-taking capacity of CUs may, in fact, have unwanted consequences for stability of the financing of the CU.

A third set of results shows how growth through business loans seems to be an alternative to growth through increasing the customer base via expansion of the field of membership. We then show evidence that, indeed, business loans are a growth strategy which significantly increases the future risk of the credit union. These results, we believe, provide a justification to the disciplining of business loans uncovered in the previous sections.

To our knowledge, our analysis is the first to show comprehensive results of depositor (member) discipline in CUs and, also, it is the first to examine depositor discipline of particular growth strategies of a financial institution. Thus, our paper contributes in two main areas. First, our findings contribute significantly to the depositor discipline literature by focusing on the peculiarities of the relationship between CUs and their members. We show that CU members indeed react differently

than bank depositors to some of the CU fundamentals: we link these differences to the dual character of CU members as depositors and owners. Second, our results expand the discipline literature by showing that the growth strategies of financial institutions may also be penalized, if they are perceived to change (increase) the future risk profile of the asset side. Admittedly, our analyses focus on a particular type of financial institution and a specific growth strategy but we believe their implications may extend to broader contexts and are, therefore, of general interest.

The remainder of the paper is organized as follows. In Section 2, we justify the context of our analysis by presenting the peculiarities of credit unions and of business loan regulation in credit unions. In Section 3, we describe our data. In Section 4 we show the first set of results, which uncover the main mechanisms of depositor discipline of business loans in credit unions. In Section 5 we show the results of two quasi-experimental settings which allow us to draw conclusions indicative of causality effects. In Section 6 we show how business loans can be considered a risky strategy for growth, a result which provides a motivation for the disciplining of such loans. In Section 7 we offer some concluding remarks.

2. Risky growth and market discipline: business loans in credit unions

Credit unions are financial intermediaries which have several differentiating features. First, they are cooperative associations which serve a limited group of members according to a defined "field of membership" (Black and Dugger, 1981; Ely, 2014; Frame et al., 2003; Goddard et al., 2008). The National Credit Union Administration (NCUA) defines three forms of membership: community, occupation (including being employees of a specific employer) and association. This requirement effectively restricts the scope of a CU's operations and strategies and the CU's capacity to grow. Credit unions may be chartered by the federal government or by their state government. Federally chartered credit unions may serve a single bond membership or several groups (multiple bond of membership) whereas for state-chartered credit unions the possibility of serving more than one field of membership depends upon state regulations. Second, CUs have a unique structure, compared with other financial intermediaries such as banks, in that CU members play a dual role as both owners and depositors (Leggett and Stewart, 1999; Smith et al., 1981; Smith, 1984): member shares are treated as deposits for which members receive a dividend rate. CU members receive both shares and deposits protection by the National Credit Union Share Insurance Fund (NCUSIF), which provides deposit insurance to federally chartered credit unions and to most state-chartered credit unions. Finally, CUs are much more saver/borrower oriented than other financial institutions: CUs provide, in general, higher rates on deposits (as pointed above, this constitutes a way to remunerate CU

members/shareholders: Bauer, 2008; Leggett and Stewart, 1999; Smith et al., 1981; Smith, 1984) and/or lower rates on loans, which typically lead to larger percentages of consumer and personal loans than in other financial institutions and makes CUs competitors of the banking industry in the area of consumer financing (Feinberg, 2001; Hannan, 2003; Tokle and Tokle, 2000).

The credit union sector in the US has undergone a period of continuing growth in the most recent years. In 1994, US credit unions (CUs) had around $295B assets, $260B in shares and deposits, $179B in loans and $66 million members. These figures rose to $1,140B assets, $950B shares and deposits, $712B loans and 101 million members in 2014 (See Figure 1). Thus, CUs account for approximately 9.81% of the deposits and 9.22% of the total loans in the financial sector. By December 2014, there were 6,402 credit unions in the US, of which 3,927 were federally chartered and 2,475 were state chartered. Given the restrictions on field of membership, growth of a credit union can be achieved mostly through expanding the field-of-membership (thus becoming a multiple field-of-membership CU) so that the CU has access to an increased number of potential members, or by expanding the type of services (loans, mostly) that the CU can provide to its members.[2] In this paper we focus on a particular case of the latter, namely, business loans. Member business loans, as defined by Part 723 of the NCUA Rules and Regulations, generally include any loan, line of credit, or letter of credit (including unfunded commitments) where the borrower uses the proceeds for commercial, corporate, or other business investment property or venture, or for agricultural purposes.[3] These loans are considered a risky expansion of CU activities and the US Congress imposed in 1998 a ceiling on the amount of business loans a CU could grant. This limit, in its current wording, prevents a CU from making any member business loan that would result in a total amount of such loans outstanding equal to more than the lesser of 1.75 times the actual net worth of the credit union or 1.75 times the minimum net worth required for a credit union to be well capitalized (7% of total assets). Thus, the regulation imposes in practice a cap of business loans at 12.25% of total assets. The rationale behind the setting of this limit is twofold. First, business loans are considered to be generally riskier than personal loans (see the report by the US Department of treasury to the US Congress in January 2001).[4] Second, the lower experience of CUs in granting business loans and an adverse selection problem (in that the pool of applicants includes lower quality applicants who did not have access to the more experienced banking system) might put them at a disadvantage in

[2] See Leggett and Strand, 2002; Goddard et al., 2002, Wilcox, 2006 among others. Goddard et al., 2002 find that "the ability to increase business with existing members" is one of the determinants of growth of credit unions.
[3] The most recent update (81 FR 13530 of March 14. 2016, applicable from January 1, 2017 on) of regulation 12CFR Chapter VII Part 723 of NCUA regulations introduces the definition of a commercial loan, mostly equivalent to a member business loan (though there are exceptions to the equivalence): statutory limits on commercial lending are set on member business loans so we will generally use the term "business loans" hereafter.
[4] https://www.treasury.gov/about/organizational-structure/offices/Documents/Jan2001CreditUnionReport.pdf

identifying good business loans and lead to riskier loan portfolios (Howell-Best, 2003).[5] This limit does not apply to CUs chartered for the explicit purpose of making business loans or to CUs with a low-income designation or which are community development financial institutions: we take advantage of one of these exceptions in our analyses below.

The peculiarities of this regulation of business loans for CUs provide us with an interesting context to analyze how financial institution depositors discipline growth strategies. In particular, we use the idea implicit in this regulation that business loans represent a growth strategy which diversifies into "unknown territory" and should, therefore, be limited to understand how depositors react to risky expansionary strategies. Most of the work done on the effects of bank diversification (Baele et al., 2007, Deng et al., 2007) has found positive effects from the perspective of stock holders and debt holders: the arguments here rest on the traditional link between diversification and a reduction of idiosyncratic risk (Demsetz and Strahan,1997). However, for a CU expansion into business loans seems to be considered a growth strategy that increases the overall risk of the CU's asset composition and, therefore, it is unclear whether CU member depositors will react positively to such strategy.

We build our analysis in three steps. We first show some baseline descriptive analyses of depositor discipline in the CU sector, where we estimate traditional regressions of deposit growth on CU fundamentals. These descriptive analyses allow us to elaborate on possible differences between discipline in banks and in CUs, which we link to the dual character of CU members. We then focus our attention on the disciplining of business loans as a growth strategy. We take advantage of the regulation on business loans and use two regulatory shocks to design quasi-experimental analyses which examine in detail whether CU members discipline the CU for (growing by) increasing business loan activity. Finally, we offer evidence of the fact that this discipline may indeed be penalizing growth because it leads to a riskier composition of the loan portfolio of the CU.

3. Data

We collected quarterly data from the CU call reports available from the NCUA. These call reports contain detailed financial information for each CU that operates in the United States. We selected credit unions with assets greater than 50 million dollars (peer groups 4, 5 and 6). This subsampling strategy is justified because before 2002Q3 only CUs in these groups reported quarterly financial statements, while smaller CUs reported semiannually. Our sample period covers 1994Q1-2014Q4, yielding a maximum of 152,761 quarterly observations which correspond to 2,248 CUs. The list of variables we collect is shown in Appendix A. Our main dependent variables of interest throughout

[5] Indeed, Part 723.4 requires credit unions with commercial lending programs to adopt and implement a comprehensive written commercial loan policy and establish detailed procedures for commercial lending.

most of the analyses are the growth rates of shares and of total shares and deposits, the distinction being that "Total shares and deposits" includes also non-member deposits, which some CUs are allowed to accept.[6] The other variables we use are CU balance-sheet and income statement characteristics which describe the investment strategies and performance of the CU. We describe these variables as we include them in our analyses. In order to avoid problems with outliers, CU variables which are continuous are winsorized at the 0.5% level in each tail. Given that several mergers and acquisitions occurred during our sample period, and the accounting numbers are affected by these transactions, we exclude the CU-quarter observations which correspond to the quarter in which a merger or acquisition took place. This reduces our sample to 141,276 CU-quarter observations. In addition to CU-specific variables, we collect information on macroeconomic variables that may affect deposit growth (Arnold et al., 2016; Barajas and Steiner, 2000; Maechler and McDill, 2006). Considering that most CUs concentrate their operations in one state, we use macroeconomic data at the state level: information on state-level personal income and unemployment was obtained from the Federal Reserve of Saint Louis (FRED). For inflation, we collected inflation rates at the regional level extracted from the Bureau of Labor Statistics.

Additional information that we collect or process for specific analyses is:

- Data on location of CU branches (available from the NCUA since 2010). This information is used to establish a proxy for the CUs that operate in more than one state.
- Information on CU field of membership and whether the CU has the low-income designation.

Table 1 shows descriptive statistics and correlations of the main variables used in our analyses. We do not comment on these statistics, which are mostly self-explanatory.

4. A descriptive look at discipline in credit unions

In this section we start our analysis of (member) depositor discipline in CUs. We proceed in two steps: first, we show some baseline results –parallel to those in the depositor discipline literature- on the reaction of CU deposits to business loans and to other CU fundamentals which reflect the performance and risk taking of the CU. Second, we look at the effect of some proxies of asymmetric information on the intensity of member discipline. These descriptive results are, to our knowledge, new and serve to motivate our subsequent analyses and to offer some comments on potential differences in the behavior of depositors in CUs relative to banks.

[6] Note that under the generic name "shares" the following items are included: share drafts, regular shares, money market shares, share certificates, IRA/KEOGH accounts and all other shares contributed by CU members.

4.1 The relationship between CU deposits and fundamentals: initial evidence of discipline and reaction to business loans.

Evidence of market discipline in the US banking system suggests that depositors react to bad bank fundamentals and to the bank's risk-taking indicators. Since the CU financial statements are publicly available and easy to obtain, a similar reaction should be expected of CU members, especially given two factors which reduce even more the potential asymmetry of information: a) the closeness of members to their CU (stemming from field of membership restrictions); b) the unique character of CUs, where depositors are also shareholders. In order to give a first descriptive look at whether there is significant member discipline in CUs and, if so, how this discipline works, we use regressions similar to those in the literature (see, e.g., Maechler and McDill, 2006; Martinez Peria and Schmukler, 2001) and relate growth in CU shares and deposits to CU fundamentals (including business loans) which reflect the risk-taking and performance of the CU. One of our main regressors of interest is the amount of business loans over total assets (*BL*): significant increases in such loans can be interpreted as the CU attempting to grow by expanding the loan portfolio into riskier assets (our analyses in Sections 5 and 6 will focus on how and why depositors penalize this growth strategy). We also include in the regression a set of additional risk indicators, some of which have been previously used in the literature of discipline in banks (Barajas and Steiner, 2000; Berger and Turk-Ariss, 2015; Calomiris and Powell, 2001; Martinez Peria and Schmukler, 2001) and some of which are specific to credit unions (Bauer et al., 2009; Frame et al. 2003). These indicators are: net worth over assets of the CU (*NWA*), non-performing loans (*NPL*), charge-offs over loans (*ch-offs*), loans over assets (*loansta*), net interest margin (*NIM*), return on assets (*ROA*) and the standard deviation of past ROAs (*sdROA*), a measure of past losses (*PL*) and its interaction with *sdROA* and, lastly, disposable reserves (*DRES*).[7] We also include a measure of size (*size*, natural log of assets). In order to account for CU reaction to shocks (i.e., the "tools" the CU may implement to prevent depositor flight) we include two final variables: first, we control for interest rates on deposits (*intrates*), measured as the average interest rate that the credit union paid on shares and deposits (Maechler and McDill, 2006);[8] second, we include the (lagged) quarter-on-quarter growth of average salaries paid by the CU, *chsalary*: this variable controls for alternative adjustment mechanisms available to owners

[7] The NCUA rules and regulations allow CUs to use undivided earnings to pay dividends. However, if this account is depleted a well-capitalized CU may use regular reserves as long as the amount of dividends paid does not cause the net worth classification to fall below the "adequately capitalized" category (*NWA* between 6% and 6.99%; see: 702.403 Payment of Dividends). Hence, given that total reserves (undivided earnings + regular reserves + other reserves) is part of Net Worth, we calculate *DRES* as the amount of total reserves that exceeds the 6% of the Net Worth over assets ratio (scaled by total assets). We subtract this amount from the NW/assets ratio and measure *NWA* = NW/assets – *DRES*.

[8] Interest rates on shares and deposits = (ACCT_380 (Dividends on shares) + ACCT_381 (Interest on deposits)) / ACCT_018 (Total shares and deposits). See Bauer (2008).

which may affect the strength of deposit-based discipline.[9] In order to ameliorate problems of endogeneity, in our regressions we use one-quarter lagged values of the risk indicators.[10] Appendix A describes all our variables in more detail. Our baseline regression is as follows:

$$\Delta S\&D_{it} = \beta_1 BL_{it-1} + \beta_2' RISK_{it-1} + \beta_3' tools_{it-1} + \beta_4' ST_{it} + u_i + d_t + \varepsilon_{it,} \quad (1)$$

where $\Delta S\&D$ is the quarter-on-quarter growth in total shares and deposits (in some specifications, only total shares or subsets that include only those CUs that grant business loans), *BL* is the amount of business loans over total assets, *RISK* is the vector which collects other fundamentals and risk indicators and *tools* is the vector which contains *chsalary* and *intrates*, the two variables which may be used by the CU as a reaction to shocks. ST_{it} is a vector which contains macroeconomic variables of the state or region in which credit union *i* operates. Finally, u_i and d_t are CU and time (quarter) effects, respectively.

Results from our regression model are reported in Table 2 along with our predicted signs for the response coefficients. Panel A contains the baseline results for both shares growth (*Δshares*, columns 1-2) and total shares and deposits growth (*ΔS&D*, columns 3-4). The results for both dependent variables are pretty similar, so we comment on them jointly. Columns 1 and 3 estimate the baseline model with the full sample. The results show that shares and total shares and deposits react positively to indicators of financial health: note the positive and significant coefficients of *ROA*, *NWA*, *NIM* and *DRES*. Interestingly, note the much larger magnitude of the coefficient on *NWA* compared to that of *DRES*: CU members give much more importance to the minimum required levels of net worth than to disposable reserves. Estimates of the coefficients on "bad fundamentals" are also consistent with depositor discipline: the estimated coefficients on both delinquent loans and charge-offs are negative and significant. This suggests that when CU members observe signs of negative performance, they withdraw (or increase at a lower rate) their shares and deposits. For the standard deviation of ROA (*sdROA*) we expected a negative coefficient but obtain a non-significant positive coefficient. However, the coefficient on the interaction of *sdROA* with past losses (*PL*) is indeed negative and significant: depositors penalize (discipline) the volatility which comes from bad news, a result which makes intuitive sense. Regarding the *tools* variables, the results are consistent with our expectations: first, higher interest rates lead to higher deposit growth; second, wage changes are negatively related to depositor discipline. This latter result suggests that, indeed, wage adjustment

[9] Pencavel and Craig (1994) showed that the owner-worker duality in cooperatives makes them more inclined to respond to shocks by adjusting wages. This adjustment could be seen as a fitting response to bad fundamentals and, therefore, could lead to reduced discipline from owner-depositors.

[10] Our analyses in Section 4 use "precedence in time" to uncover the reaction of depositors to fundamentals. In Section 5, however, we use quasi-experimental methods and try to isolate exogenous variation in the determinants of depositor behavior.

reduces the strength of depositor discipline.[11] Large CUs have lower share growth rates: possible interpretations of this negative coefficient are that larger CUs have a harder time growing (as they are limited in their growth strategies by field of membership and business loan restrictions) or that growth is penalized by depositors. We come back to the issue of size and CU growth in Section 6. The results for *BL* are noteworthy: we find a negative and significant coefficient (-0.010, -0.007, -0.009,-0.007, t-stats of -2.06, -1.89, -1.84, -1.73), which suggests, as hinted above, that business loans are considered by depositors as a risk-taking growth strategy. It is interesting to note that, while reacting negatively to business loans, members and depositors react positively to loans (*loansta)* in all the specifications (coefficients of 0.036, 0.034, 0.038 and 0.037 with t-stats of 13.55, 12.99, 14.57 and 14.25). Our expectation (and findings in the prior literature for banks: see Barajas and Steiner, 2000; Calomiris and Powell, 2001) was to find a negative coefficient. The result, however, is consistent with theoretical studies on CUs. Given that CU members benefit directly from loans granted by the CU, it is reasonable to expect that they do not punish the CU for the amount of loans granted. On the contrary, they expect an active behavior by CU managers in terms of granting loans without taking too much risk (thus the penalization of business loans and of bad loan indicators). The positive estimated coefficient of *loansta* may stem from this borrower orientation preference by CU members.[12] The negative coefficients of *NPL* and *ch-offs* show that, although high levels of loans are viewed positively, members still expect that the CU has the ability to select and monitor the loans granted. The results in columns 2 and 4 of Panel A correspond to re-estimation of the baseline regressions using only the sample of CUs with positive business loans (condition *HASBL* = 1). Note that the size of the sample is reduced by almost 40%, since many CUs do not offer business loans. Most of the estimates are similar, except that the reaction to *BL* seems somewhat diminished (the estimated reaction coefficients go down slightly, as do the t-stats).

In order to understand why this may be the case, we go one step further and in Panel B we estimate a selection model where we first explain the decision to offer business loans as a function of some of the CU fundamentals including two indicators of whether the CU has a multiple FOM and the low income designation (low income-designated CUs are not subject to the 12.25% limit on business loans). The observation equations we estimate relate shares and shares and deposit growth to the CU fundamentals used in Panel A. The results on the selection equation are all reasonable: size, volatility, a low net worth and a bad loan portfolio (*NPL*) are all positive determinants of the decision to grant business loans. Also, having a low income designation increases significantly the probability of

[11] An alternative explanation for this result would suggest that wage increases are penalized by depositors. Given the owner-depositor character of CU members, we believe the explanation is not conceptually different.

[12] This terminology comes from Smith (1984) and Smith et al. (1981), who showed that CUs might have a depositor orientation, offering higher deposit rates, a borrower orientation, giving loans at lower rates or a neutral orientation.

granting business loans. It is interesting to note that multiple FOM CUs are less likely to grant business loans, an issue to which we come back in Section 6. Once we account for selection, the results on share reaction to business loans are again significant and negative, and of higher magnitude than in the baseline regressions of Panel A. Thus, business loans seem to be penalized by CU members even (or, better, especially) after accounting for the determinants of the expansion of CU activities to business loans.[13]

4.2. Some drivers of the intensity of depositor behavior.

In this section we complement our previous results and examine some factors which might affect the intensity of depositor (member) discipline of business loans. These results have independent interest but also allow us to develop some of our subsequent analyses. Specifically, we look at variables which are related to the capacity of the CU to grow and diversify (see Goddard et al., 2002; Leggett and Strand, 2002) but also at variables which represent an increase in the asymmetry of information between CU managers and members regarding the CU's risk-taking. We construct several variables which are potential determinants of the strength of depositor discipline:

(1) *MFOM* (multiple field of membership) is a dummy which takes value one if the CU has a multiple field of membership. Frame et al. (2003) suggest two effects of adopting a MFOM, both of which may lead to a reduction of the disciplining of the CU (and of its business loan activity). First, expansion of the field of membership represents a growth strategy which may be seen as reducing concentration risk (we also use this implication in our analyses in Section 6). Second, adopting a MFOM may lead to lower informational advantages stemming from a common bond.

(2) *com* (community) identifies CUs that operate in a "geographically well-defined local community or neighborhood" or in a rural district.[14] Community CUs are geographically less dispersed. This physical proximity leads to potential informal links between members and managers (who are probably also residents) which may reduce the asymmetry of information and lead to higher discipline.

(3) Finally, given the importance of informational issues, we expect that more sophisticated investors will exercise higher levels of discipline.[15] We proxy for financial sophistication using two alternative

[13] Note that the coefficient on the Mills ratio suggests that CUs who grant business loans tend to have lower deposit growth rates.
[14] 12 CFR Part 701 - NCUA.
[15] The literature has shown that higher financial literacy increases the ability of people to make sound financial decisions (Campbell, 2006; Lusardi and Mitchell, 2011; Klapper et al. 2013; Van Rooij et al. 2011). Also, Davenport and McDill (2006) found that more sophisticated depositors (those with uninsured deposits) react more intensely and faster to signals. of bank failure. Widdowson and Hailwood (2007) suggest that financial literacy reduces risk-taking in the financial system since people with higher financial knowledge exercise higher depositor discipline.

measures of personal income.[16] *pcincome* is a weighted average of the percentile of the income of the states where the CU operates; *hi* (high income) is a dummy which takes value one if the state where the CU is located is above the median in terms of personal income, zero otherwise.

We introduce each of these variables and their interaction with *BL* separately in our baseline regressions. The results are shown in Table 3, where for simplicity we omit the coefficients on the rest of controls. Panel A of the table shows the results of regressions which use the full sample whereas Panel B uses only the set of CUs with positive business loans and accounts for the selection implicit by using a sample selection correction: the results are, in any case, quite comparable. The evidence in Table 3 is in line with our predictions. The estimates in column 1 (*MFOM*) show that when a CU has a multiple field of membership the discipline of business loans is significantly reduced or eliminated (the sum of the coefficients on *BL* and on the interaction is not significantly different from zero in either of the two panels). The results in column 2 (*com*), on the other hand, suggest that the disciplining of business loans is much larger in community CUs (note the negative and significant coefficient on the interaction $com \times BL_{t-1}$). Regarding the two proxies for financial sophistication, the estimates in columns 3 and 4 suggest that CUs which operate in higher income states are subject to higher depositor (member) discipline: note the negative and significant coefficients on the interactions between *pincome* and *BL* (-0.045 and -0.080, t-stats of -3.26 and -2.64) and, less robust, between *hi* and *BL* (-0.011 and -0.007, t-stats of -2.20 and -0.59).

The analyses in Tables 2 and 3 are descriptive in nature: we have shown correlations between CU fundamentals (especially the levels of business loans) and depositor behavior which are highly suggestive of depositor (member) discipline. In particular, some of the correlations shown are difficult to justify as being the automatic effect of a common factor which generates a correlation between the fundamental and deposit growth (for example, the negative coefficient on *BL*). However, if we want to show evidence of causality (from business loans to depositor behavior) we need an alternative empirical analysis where we can isolate variation in business loans that may be exogenous to depositor behavior. We do that in the next section, where we take advantage of two regulatory "shocks" to the capacity of CUs to grant business loans which credibly are unrelated to depositor behavior.

5. Do CU deposits really react to increased levels of business loans? Looking for causal links

[16] Dhar and Zhu (2006) find a relation between income level and financial decisions; specifically, they show that high-income individuals display a lower disposition effect. This result, along with the evidence in Davenport and McDill (2006), suggests that income might be used as a proxy for financial literacy.

In Section 4 we have shown evidence that CU members react to CU fundamentals, and to business loans in particular, in manners suggestive of discipline: not only the baseline analysis in Table 2 but the qualifications from Table 3 are in line with disciplining mechanisms and some of the correlations we show (especially related to our main interest, namely, the disciplining of business loans) do not necessarily arise as mechanical relationships stemming from the effect of common factors. However, these analyses are correlational in nature and our only control for endogeneity was to use a time lag between risk indicators and depositor behavior. In this section we attempt to show that our results are suggestive of a causal mechanism from risky growth of the loan portfolio of the CU (i.e. initiation or expansion of the business loan activity) to lower deposit growth. In order to do that, we carry out two semi-experimental analyses around two "exogenous regulatory shocks" in the US credit union sector which led to higher capacity of CUs to move into riskier loan strategies by granting larger levels of business loans: the first of these shocks increased significantly the number of CUs subject to the exemption of the business loan limits; the second corresponds to an explicit regulatory change which significantly relaxed the requirements and conditions for granting business loans. We believe both shocks provide us with valid contexts in which to uncover whether growth by riskier loan portfolios leads to negative effects on deposit growth.

5.1. The LIDI "experiment"

Our first "shock" corresponds to the Low Income Designation Initiative (LIDI) carried out by the NCUA in the third quarter of 2012.[17] This initiative consisted in expediting and pre-approving the low-income designation for eligible credit unions and contacting CUs which were eligible but had not applied for the designation in order to inform them about this approval.[18] This initiative led to a sharp increase in the number of low-income CUs in the quarter of implementation: within our sample, the number of low-income CUs rose from 218 at the end of June 2012 to 425 at the end of September 2012 (Figure 2). As mentioned above, the low-income designation gives greater flexibility to CUs and, among other measures, it exempts CUs from the statutory limits to grant business loans and allows them to accept nonmember deposits. This provides us with a unique exogenous shock to the ability of those CUs to increase the size (and risk) of the business loan portfolio. We estimate the effects of the LIDI shock using two alternative empirical strategies.

We first construct a quasi-matching estimator where we define our treatment group as the CUs that, as a consequence of the LIDI, adopted the low-income designation between June and September

[17] http://www.cdcu.coop/ncuas-low-income-designation-initiative-brings-new-capacity-focus-to-building-financially-independent-communities-through-cus/

[18] NCUA regulation states that "a credit union serving predominantly low-income members *may* be designated as a low-income credit union." (Section 701.34 of NCUA's Rules and Regulations.).

2012 (207 CUs) and as control groups we use those CUs that already had the low-income designation and maintained it for some time (specifically, CUs that had the designation in March 2011 and kept it at least until December 2013: this corresponds to a total of 194 CUs). This design gives treatment and control groups that are similar in size and that, in fact, are directly comparable: note that the CUs that adopted the designation because of the LIDI were already eligible and, therefore, should be similar in their fundamentals to those that had the designation. Given this definition of treatment and control groups, we use simple t-tests and compare the differences in total shares and deposits growth between the treatment and the control group around the moment of the change in designation. First, however, since the low income designation implies more flexibility to grant business loans, we test that indeed the CUs who changed their designation because of the LIDI took advantage of this flexibility and increased their business lending. To that end, we conduct tests of the difference in *BL* growth between the treatment and control groups at the periods around the designation change. In particular, we examine *BL* growth in t, t+1, t+2, t+3 and t+4, where *t* is the LIDI quarter. We also look at cumulative growth between quarters t and t+1 to t+4. The results are reported in Table 4, panel A, and, indeed, they suggest that CUs affected by LIDI reacted to the new condition and increased business lending faster than the control group. Note that the coefficients are positive and significant for t and t+2 as well as for 0 and 2 to 4 cumulative quarters.[19] Given this evidence that LIDI led to significant increases in business loans for the CUs affected by the initiative, we examine next the difference in deposit growth between the treatment and control groups. Table 4, panel B, reports the results. As expected, total shares and deposits growth around LIDI is significantly lower in the treatment group with respect to the control group (despite the fact that the LID in principle should lead to higher deposit growth, given that, among other things, it allows the CU to receive nonmember deposits). We find a significant negative difference in deposit growth in t+1 (-0.0038, p-value of 0.046). We also find significant negative differences in the cumulative growth at quarters t+1 and t+2 (-0.0054 and -0.0061, p-values of 0.046 and 0.082).[20] These results suggest that CU members react negatively (the effect is estimated at around 0.4%-0.6% lower growth of deposits) to the adoption of the low-income designation at the moment of the change compared to what could be considered the most similar control group of CUs.

As an alternative empirical strategy, we control for the effect of possible differences in CU characteristics by using a diff-in-diffs estimator. We use the same definition of treatment and control

[19] The other major implication of the LID is the capacity to accept nonmember deposits. We replicated the analyses in Table 4 Panel A looking at nonmember deposit growth but did not obtain any significant results: note that the CUs which adopted the LID at the time of the LIDI started with zero nonmember deposits, so growth measures on the quarter of impact of the regulation are statistically very poorly behaved.

[20] For the cumulative quarters in t+3 and t+4 we obtain negative but not significant coefficients.

groups as before, but estimate regressions that control for our baseline risk indicators while including a treatment dummy *TA* (defined as one for the CUs which change designation at the LIDI), a "post" treatment dummy (*pt*) defined as a one for the quarters after the LIDI initiative and the interaction of *TA* with *pt*, which is intended to capture the treatment effect. We show in Table 5, panel A, the results using three different windows around the treatment period: column (1) uses only the quarters 2012Q3 (so *pt*=1 for 2012Q4); column (2) uses quarters 2012Q2-2012Q3 (so *pt*= 1 for 2012Q4-2013Q1); column (3) uses quarters 2012Q1-2012Q3 (so *pt*=1 for 2012Q4-2013Q2). The results of these regressions, which control for CU characteristics, are consistent with those of the matched t-tests: we find a negative coefficient for the interaction terms in all three regressions, although the coefficient is only significant for the sample which includes the two quarters after the treatment (coefficient -0.004, representing an effect of -0.4% on deposit growth, and t-stat -1.74). In Panel B, we build on our evidence in Section 4.2 and qualify the results in Panel A by including the possibility that the income level of the state may affect the treatment effect: as seen in Table 3, higher income members exercise more intense discipline. We use our proxies for financial sophistication *pcincome* and *hi* and interact these variables with the *TA* and *pt* dummies. Our coefficients of interest are now those of the interactions *TA* × *pt*, *TA* × *pt* × *pcincome* and *TA* × *pt* × *hi*, where the two triple interactions measure the difference in treatment effect in high-income states. When we use *pcincome* as a proxy for state income the effect is only clear in column 2 and marginally significant (panel B). However, when we split the states by median income (Panel C) the effect of the adoption of a low-income designation is much more noticeable and significant in high-income states. The effect amounts to a decrease in deposits of CUs in high income states around 1.4% larger than in low income states, where we find no significant effect (see the coefficients in columns 1 and 2). This evidence suggest that the effects found in Tables 4, panel B, and Table 5, Panel A, stem mostly from the high-income states, a result in line with asymmetric information (or member sophistication) arguments.

5.2 The relaxation of business loan requirements

We use a second regulatory change as additional evidence of a negative reaction of depositors to CU risky growth of loan portfolios into higher amounts of business loans. In particular, we focus on the introduction of regulation 68 FR 56552 by the NCUA in October 1st 2003. This was the first major change in business loan regulation, and made it easier for federal CUs to grant business loans.[21] The

[21] The changes included: "reducing construction and development loans equity requirements"; allowing regulatory flexible credit unions to ask or not for personal guarantees; "allowing well-capitalized credit unions to make unsecured member BLs (MBL) within certain limits"; "providing that purchases of nonmember loans and nonmember participation interests do not count against a credit union's aggregate MBL limit, subject to an application and approval process"; "allowing 100% financing on certain business purpose loans secured by vehicles"; "providing that loans to credit unions and credit union service organizations (CUSOs) are not MBLs for purposes of the rule"; "simplifying MBL

new rules generated a sustained increase in the business loans to assets ratio of federal CUs, a trend which lasted until the onset of the financial crisis around 2008Q3 (see Figure 3).[22]

In order to test for the effects of this regulatory change, we need to define a treatment and a control group which can be adequately compared. We do these in two ways. First, we devise a matching estimator where we take as treatment group the 10% CUs which experienced a higher increase in business loans in 2003Q4 and 2004Q1 (i.e. in the two quarters after the regulatory change). For the control group we use nearest-neighbor matching where we extract the nearest neighbor from the rest of federal credit unions. In the matching process we require exact matches for the state and field of membership and closest matches based on the same quarter value of *BL*, *size*, *ROA*, *NWA*, *DRES*, *NPL*, *ch-off*s, *loansta*, *chsalary* and *intrates*. In order to control for differences in the matched groups we use the bias-adjusted estimator of Abadie and Imbens (2011). We look at significant differences in the growth in total shares and deposits in t+1 to t+4 as well as for 1, 2, 3 and 4 cumulative quarters after the regulatory change. The results from these matching estimators are reported in Table 6. These results show evidence that total shares and deposits growth is significantly lower for the treatment group in the quarter after the "shock" (1% lower deposit growth) and cumulatively for one, two and three quarters (1%, 1.2% and 1.6% lower deposit growth, respectively).

Second, we use a diff-in-diffs regression where we take the treatment group (*TB*=1) to be the same used in the previous analysis, namely the 10% CUs which had higher increases in business loans. For the control groups (*TB*=0), we use two alternatives. Panel A of Table 7 shows the results of using all other federal CUs (i.e. those below the 10% highest increase in business loans). Panel B of Table 7 shows the results of using as control group the federal CUs with changes in business loans below the 10% lowest, i.e., the CUs which least increased their business loans over the same period. We use four different sampling periods: results in column (1) use a window of one quarter around the change, so *pt*=0 for 2003Q3 and *pt*=1 for 2003Q4; results in column (2) use a window of two quarters, so *pt*=0 for 2003Q2-2003Q3 and *pt*=1 for 2003Q4-2004Q1; results in column (3) use a window of three quarters, so *pt*=0 for 2003Q1-2003Q3 and *pt*=1 for 2003Q4-2004Q2; results in column (4) use *pt*=0 for 2002Q4-2003Q3 and *pt*=1 for 2003Q4-2004Q3.

In both panels we find that the treatment effect (estimated coefficient on the interaction between *TB* and *pt*) is negative and statistically significant in columns 3 and 4. This suggests that indeed there is a negative effect on deposit growth which appears in the two-three quarters after the change in

documentation requirements"; simplifying and removing unnecessary provisions for MBL and allowing CUSO to "originate business loans" (see Federal Register /Vol. 68, No. 190 /Wednesday, October 1, 2003 /Rules and Regulations).

[22] The other major change to the requirements for business loans (81 FR 13530 of March 14. 2016, applicable from January 1, 2017 on) is too recent to allow for a meaningful analysis.

regulation. The magnitude of the effect fluctuates between a 0.4% and a 1.6% decrease in deposits (depending on the horizon and control group chosen).

We believe the takeout from these two experimental settings is that indeed the increase in business loans by CUs has a direct effect on depositor behavior: CU members react to CUs increasing their business loan activity by withdrawing their deposits or by favoring other CUs (or other financial institutions) as a destination for their deposits. This result is similar in spirit to the traditional results on depositor discipline, but in this case CU members seem to be penalizing growth strategies of the asset side of the balance sheet which are perceived to be riskier or where the CU has less of a comparative advantage. In order to provide the last piece of this discipline story we examine now whether indeed there is evidence that business loans represent a growth strategy which increases the overall credit risk of the CU.

6. Business loans as a risky growth strategy

We have shown evidence that CU members react negatively to business loans, a result which is suggestive of discipline, especially in view of the positive reaction of shares and deposits to the overall proportion of loans over assets. We interpret this result as implying that members perceive that the risk profile of the assets of the CU increases when the CU engages in growth through business loans. We now set to analyze if indeed business loans represent a risky growth strategy. In particular, we show how expanding into business loans seems to be a growth strategy which is alternative to expanding the field of membership (which gives access to the CU to a larger pool of members) and that expansion of business loan activity leads to higher risk of the loan portfolio.

6.1. Business loans versus multiple field of membership as alternatives to growth.

The potential customers (members) of the CU are limited by the definition of the field of membership. This effectively limits the capacity of the CU to grow to two potential strategies: expansion of the range of products the CU offers to its members (going into business loans being one particular example) and expansion of the potential members by requesting a multiple field of membership. In the analyses in Section 4 we showed evidence that business loans are penalized by CU depositors whereas having a multiple field of membership did not seem to lead to significant disciplining (and, in fact, seemed to reduce the disciplining of business loans: see Table 3). The question arises of whether these growth strategies are complements or substitutes but, also, whether both strategies imply significant increases in the credit risk of the CU (so disciplining them is justified). In this section we show evidence that suggests that the two strategies are indeed substitutes and leave for Section 6.2 the analysis of whether the strategies lead to increases in the credit risk of the CU.

We first collect some basic statistics on business loan activity, so we can better understand how business loans are related to growth. Table 8 panel A shows the mean value of several CU characteristics for portfolios of CUs formed on the basis of the proportion of business loans over total loans. Some interesting results arise. First, note that the proportion of CUs with a low income designation is higher the larger the percentile. This is to be expected, given the increased flexibility of LID CUs to grant business loans. Second, size is also increasing through the portfolios, suggesting that the focus on business loans is indeed positively related to size. Interestingly, the standard deviation of ROA is also increasing in the proportion of business loans, giving us a first hint that *BL*s may be a risky asset. Finally, and more importantly, note that as the percentage of *BL* increases, the proportion of CUs with a *MFOM* decreases quite noticeably. This suggests that expansion of field of membership may be a substitute of (or an alternative to) growth through business loans. We formalize the results of Panel A by estimating a selection model where we first setup a selection equation for *HASBL* (i.e., we look at the factors which influence the decision to grant business loans) and, subsequently, we analyze the determinants of the amount of *BL* granted. The results of this model are tabulated in Panel B. Note that larger CUs are significantly more likely to grant business loans and to grant larger amounts of such loans. On the other hand, the coefficients of *MFOM* quite clearly suggest that there is a negative relationship between business loans and being a multiple field of membership CU: note the negative and significant coefficients both in the selection equation (-0.323, t-stat of -35.83) and the observation equation (-0.005, t-stat of -4.90). Thus, CUs with a multiple field of membership are both less likely to have moved into business loan activity and, if they have, they offer significantly lower amounts than similar but single FOM CUs.

In Table 9 we look a bit more explicitly at the relationship between multiple field of membership and business loans with size. Panel A shows descriptive statistics of *BL*, *BL/loansta* and *loansta* for the groups of CUs determined by *MFOM*. The panel also includes a significance test for the difference, although given our sample sizes all these tests reject the null. The results show clearly that the average of business loans is between 64% and 71% higher for CUs with a single field of membership (columns *BL* and *BL/loansta*), when in fact these CUs only have around 0.5% more loans in their balance sheets (column of *loansta*). In order to show that this negative relationship with *MFOM* is not a consequence of size, we take another indicator of growth, namely *Mstate*. This variable (which we can only compute from 2010 on) is a one for CUs which operate in more than one state, and therefore it also proxies for size and expansionary strategies of the CU. Contrary to *MFOM*, CUs which operate in more than one state indeed tend to have significantly higher proportions of business loans (around 20% more than single state CUs), a result which contrasts with the fact that the amount of total loans is only higher by 0.4%. In other words, CUs that grow in size seem to offer higher

proportions of business loans, except if they follow a MFOM strategy. Again, we formalize these arguments and show in Panel B of Table 9 the results of regression models where we focus only on the sample of CUs with *HASBL* = 1 and use *BL* as dependent variable. As regressors, apart from our specific set of controls (see table caption) we include *MFOM* and its interaction with *size* in columns 1-2 (the columns differ in the inclusion of controls) and, for comparison, we include the alternative proxy for growth *Mstate* and its interaction with *size* in columns 3-4. The results in columns 1-2 suggest that when *MFOM* credit unions grow, the importance of *BL* in their loan portfolios goes down (note the negative and significant coefficient of the interaction in both columns, -0.003 with t-stats of -4.12 and -8.14). Given the minimum value of *size* in our sample (50 million in assets) the results also can be taken to mean that *MFOM* credit unions have lower levels of *BL* to begin with. These results contrast with those in columns 3-4, where we find the opposite result (although less clearly, given our relatively smaller sample) for the alternative proxy for growth *Mstate*.

Even though descriptive, the results we have just shown are highly suggestive that growth in CUs is achieved through expanding membership via a MFOM or through expanding the range of services (business loans), but these two strategies seem to be somewhat substitutes. The fact that in Section 4 we found significant differences in how members react to (discipline) both strategies seems to suggest that their implications for the risk profile of the CU are different. We show evidence along those lines in the next subsection.

6.2. Business loans, MFOM and the credit risk of the loan portfolio.

We examine now whether the strategy of growing through business loans significantly increases the credit risk of the CU. Given that CUs are heavily specialized in loan activity, we construct a measure of risk of the loan portfolio by constructing two variables *CRISK3Y* and *CRISK5Y* which measure the quality of the loan portfolio of the CU three and five years into the future. In particular, the two credit risk indicators measure the average proportion of quarterly non-performing loans and of charge-offs over total loans (so, in our notation, the sum of our variables *NPL* and *ch-offs*) three and five years into the future.[23] We use these two indicators as dependent variables in predictive models where the explanatory variables are the current levels of business loans as well as two additional variables we construct:

[23] Alternatively, we computed *CRISK3Y* and *CRISK5Y* by subtracting from *NPL+ch-offs* the amounts of loans recovered. This did not change the results at all, but since it leads to a measure of risk less parallel to our analyses in Section 4 we offer these results upon request. Note that our measure is the average risk over all future quarters, so in our regressions we need to adjust the standard errors for this overlap: we use Driscoll-Kraay (1998) standard errors with lag length equal to the horizon of the risk measure.

(1) *BLG* is a dummy equal to one when business loan growth is positive and higher than the growth rate of total loans for a specific quarter, zero otherwise. This variable is capturing CUs which are expanding their business loans faster than their other types of loans.

(2) *LOWBL* is a dummy equal to 1 when the value of *BL* is lower than the median of the sample in the quarter prior to that in which growth is measured. This variable captures CUs which start from low levels of business loans, so that they are "in the process of expanding into business loan activity".

As controls in the predictive regressions we include our regular set of controls (in particular, note that we are controlling for *loansta*) and whether the CU has an MFOM denomination. The results in the two panels of Table 10 are pretty straightforward. The baseline model (column 1 in both panels) shows significant evidence that the level of *BL* is positively related to future risk measures. Note that the regression already controls for the level of loans of the CU, so the coefficient on *BL* refers to the additional effect of having a high proportion of business loans: indeed, business loans seem to have three to four times larger rates of failure (as measured by the sum of both *NPL* and charge offs) than regular loans: compare the estimated coefficients of *loansta*, 0.010 in Panel A and 0.012 in Panel B, with those of *BL*, 0.043 in column 1. There is, on the other hand, little evidence that having a multiple field of membership increases significantly the risk of the assets (although some of the coefficient estimates at the five year horizon are significant at the 10% level: see columns 2 and 4 in Panel B). The specifications in columns 2-4 show models which include *BLG*, *LOWBL* and interactions of the two variables and with *BL*. We run these models to see if the increased future risk stems from CUs where business loans grow too fast or which start from low business loan levels and, therefore, are "expanding via business loans". The results suggest, mainly, that business loans lead to an additional increase of future risk for CUs which start their expansion into business loans and do so very fast: note that the results in columns 2 and 3 seem to suggest that fast *BL* growth (column 2) or starting from a low level of *BL* (column 3) do not add significantly to the future credit risk. However, the estimates in column 4 do show a significant increase in risk for CUs which both start from a low level of *BL* and grow very fast. The coefficient of the triple interaction $BL_{t-1} \times BLG_{t-1} \times LOWBL_{t-1}$ in panel B implies that the level of business loan risk in the longer run increases by approximately threefold for CUs which start with low levels of business loans and increase the importance of business loans as a proportion of total loans. This result comes from the sum of the baseline coefficient of *BL*, 0.034, the coefficient of the two interactions -0.003 and -0.080 and the coefficient of the triple interaction, 0.143: the net effect is a coefficient of 0.094 on *BL* for CUs which start expanding into business loans and grow very fast (as a proportion of total loans) this part of their loan portfolio.

All in all, the results in Table 10 support the conclusion that business loans increase significantly the credit risk of the loan portfolio of the CU, especially for those CUs that start their business loan activity and increase such activity significantly. This result is in line with the concerns that CUs are less experienced in the analysis of business loans: a desire to grow the business loan activity fast may lead to both lower quality thresholds for the granting of these loans, to lower capacity of discriminating good from bad applicants and, indirectly, to a lower overall quality of the pool of applicants (a "lemon" problem). In any case, the results on discipline we show in Sections 4-5 suggest that CU members may be aware of this relative disadvantage of the CU (compared to other financial intermediaries) and act accordingly by disciplining the CU.

7. Concluding remarks

We have analyzed depositor behavior in credit unions by looking at whether CU depositors exercise discipline on the CU by reacting to deterioration of CU fundamentals or to increases in risk-taking. More specifically, we have focused on two issues: first, we have explored the differences in the discipline exercised by CU members with respect to that of bank depositors. The specific result that CU depositors seem to discipline business loans but not regular loans is the motivation for our second question of interest, namely, whether business loans are penalized because they represent a risky growth strategy. The consideration that CUs are at a disadvantage in the granting of business loans was implicit in the early regulation of credit unions which prevented them from taking excessive levels of such loans. We provide the first analysis we are aware of which links business loans to depositor behavior. More importantly, our use of two regulatory changes which occurred in 2003 and 2012 allows us to show results suggestive of causality: CU members indeed react negatively to an increase in the capacity of the CU to grant business loans. Finally, we offer evidence that business loans represent an increase in the credit risk of the loan portfolio of the CU, thus providing a justification for the discipline results.

We believe our paper significantly contributes to the literature on depositor discipline by, first, giving the first broad description of the mechanisms through which this discipline affects CUs and, second, by placing the focus on a particular aspect of discipline, namely, the penalization of risky growth strategies through expansion of business loans.

Apart from the contribution to the literature, out results have important policy implications. Knowing the channels through which market discipline works is key for regulators, given that higher levels of discipline act as automatic stabilizers of the financial system and lead to a reduced probability of systemic episodes. Our results show that different financial institutions are likely to be subject to

different discipline mechanisms, depending on the type of stakeholders (depositors) and their relationship with the depository institution. Also, we show evidence that depositors seem to understand the potential risks of expansionary strategies and actively discipline these strategies. These two sets of results have immediate positive implications for the stability of the financial system, since they point at the presence of strong and sophisticated automatic stabilizers, but also have quite far reaching implications for regulation design. First, regulation of different depository institutions may have to diverge significantly and adapt to the differences in depositor behavior and sophistication. Second, some regulations intended to expand the range of services offered by financial institutions may have negative risk implications. Depositors, however, seem to be able to understand the risk implications of these expansions and behave in a manner that reduces such negative externalities.

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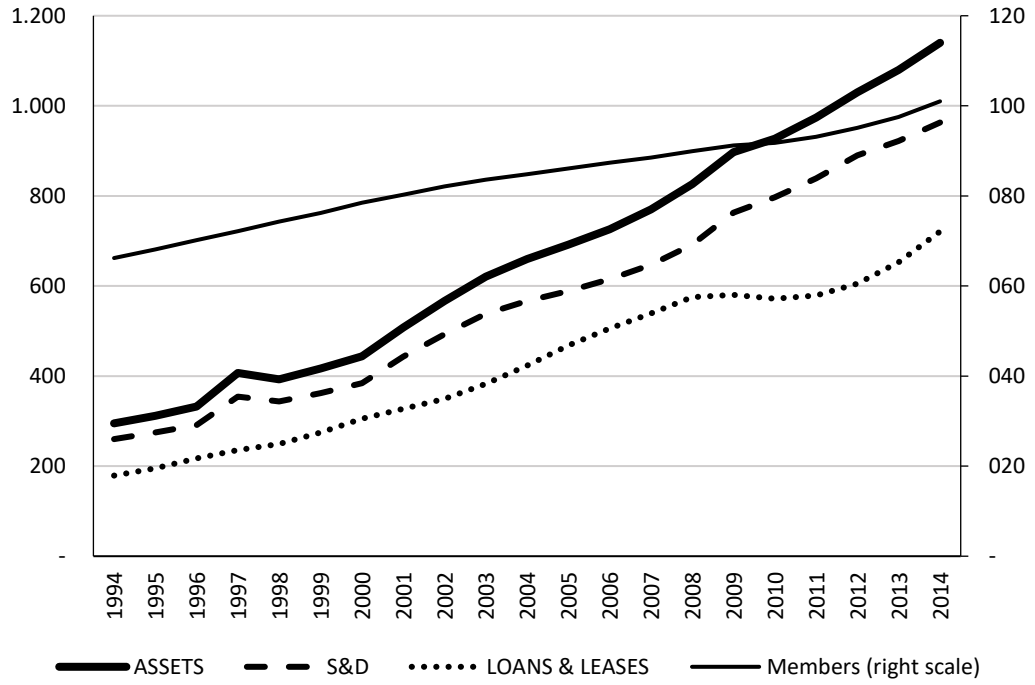
Appendix A: Variable Definitions

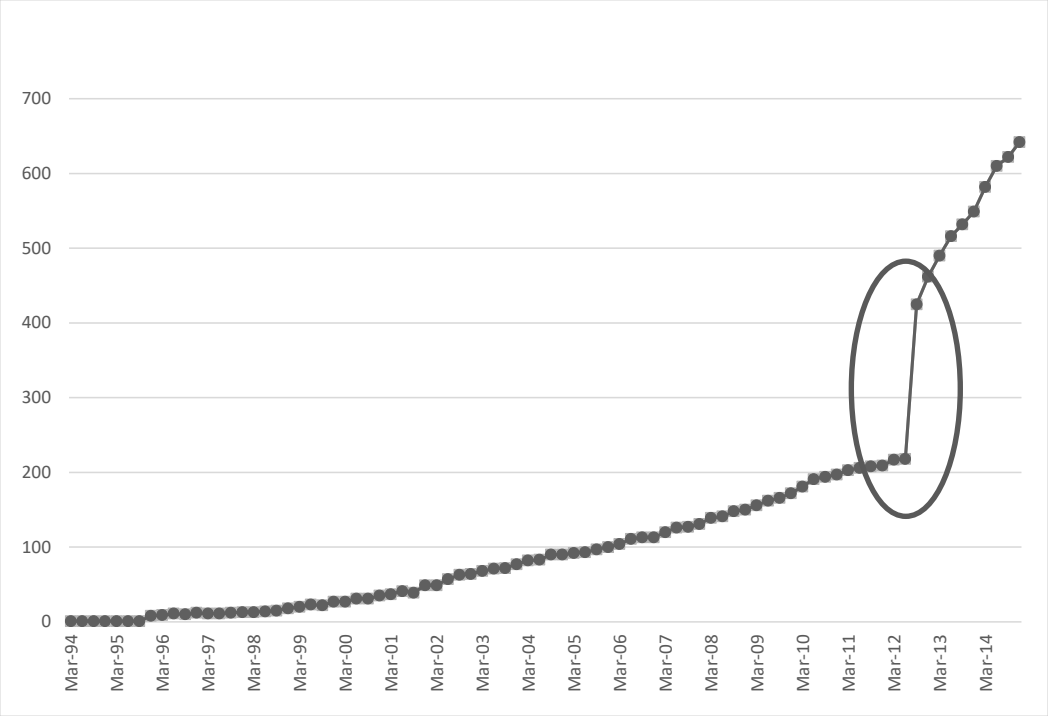
	Variable	Definition
Main dependent variables	*Δshares*	Quarter-on-quarter growth of shares of the CU.
	ΔS&D	Quarter-on-quarter growth of shares and deposits of the CU.
Credit union variables: risk-taking indicators and other characteristics	*BL*	Business loans over total assets of the CU.
	loansta	Total loans and leases over total assets of the CU.
	ROA	Return on assets of the CU.
	sdROA	Standard deviation of *ROA* (calculated over 12 quarters, from t-1 to t-12).
	PL	Past losses of the CU computed as natural logarithm of 1 plus the number of quarters in which the CU obtained losses (from t-1 to t-12).
	NWA	Net worth over total assets of the CU minus *DRES*.
	NPL	Total amount of delinquent loans over total loans and leases of the CU.
	ch-offs	Charge offs over total loans and leases of the CU.
	NIM	Net interest margin of the CU.
	DRES	Reserves (regular reserves, other reserves and undivided earnings) in excess of the 6% of Net Worth over total assets of the CU.
	chsalary	Quarter-on-quarter change in average salary per employee.
	size	Natural logarithm of total assets of the CU.
	intrates	Average interest rates on total shares and deposits paid by the CU computed as (Dividends on shares + Interest on deposits)/Total shares and deposits.
	Mstate	Dummy that takes value 1 when the CU operates in more than one state, 0 otherwise.
	com	Dummy that takes value 1 when the CU is community-based, 0 otherwise.
	MFOM	Dummy that takes value 1 when the CU has a multiple field of membership, 0 if community or single field of membership, 0 otherwise.
	HASBL	Dummy that takes value 1 when the CU has positive business loans, 0 otherwise.
	BLG	Dummy that takes value 1 when business loan growth is positive and higher than loan growth for a specific quarter, 0 otherwise.
	LOWBL	Dummy that takes value 1 when BL is lower than the median of the sample in the quarter prior to that in which growth is measured by BLG, 0 otherwise.
Macro variables	*chinc_s*	Change in quarterly personal income in the state where the headquarters of the CU are located.
	unemp_s	Unemployment rate in the state where the headquarters of the CU are located.
	inf_s	Quarterly inflation rate in the census region where the headquarters of the CU are located.
	pcincome	Weighted average of the income percentile of the states where the CU operates.
	hi	Dummy that takes value 1 if the state where the CU is located is above the median in terms of personal income, 0 otherwise.

Figure 1. Credit union growth, 1994-2014



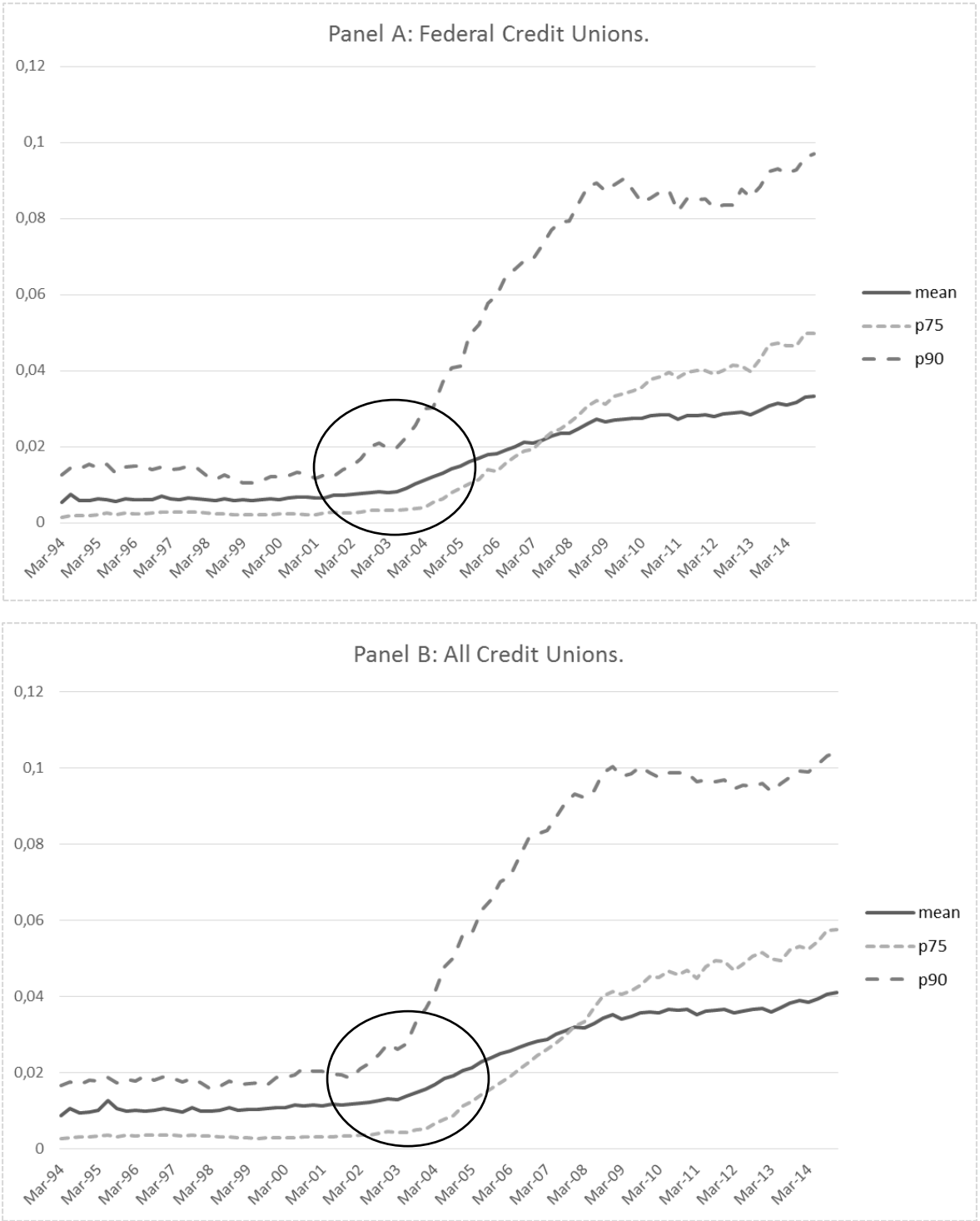
Source: Own calculation from call reports extracted from NCUA (1994 – 2014). Assets, S&D and Loans and Leases are in $billion. Members (right scale) is measured in millions of people.

Figure 2. Number of CUs with the Low-Income Designation



Source: Own calculation from call reports extracted from NCUA (1994 – 2014). The ellipse shows the impact of the LID initiative (Sept-2012).

Figure 3. Ratios of business loans over total assets



Source: Own calculation from call reports extracted from NCUA (1994 – 2014). The circles show the moment of introduction of regulation 68 FR 56552 by the NCUA (October 1st, 2003).

Table 1: Descriptive statistics

Panel A: basic descriptive statistics of the main variables				
Variables		**Mean**	**Median**	**StdDev**
Main dependent variables	*Δshares*	0.015	0.012	0.033
	ΔS&D	0.015	0.012	0.033
Credit union variables: risk-taking indicators and other CU characteristics	*BL*	0.024	0.001	0.069
	loansta	0.623	0.639	0.152
	sdROA	1.239	0.857	0.999
	ROA	0.002	0.002	0.005
	PL	0.482	0.000	0.664
	NWA	0.060	0.060	0.001
	NPL	0.010	0.007	0.009
	ch-offs	0.003	0.002	0.004
	NIM	0.009	0.009	0.002
	DRES	0.048	0.042	0.030
	chsalary	0.014	0.008	0.108
	size	18.896	18.660	0.953
	intrates	0.005	0.005	0.003
	Mstate	0.144	0	0.351
	com	0.192	0	0.394
	MFOM	0.550	1	0.497
	HASBL	0.556	1	0.497
	BLG	0.387	0	0.487
	LOWBL	0.532	1	0.499
Macro variables	*chinc_s*	1.101	1.130	1.188
	unemp_s	6.161	5.700	2.068
	Inf_s	0.561	0.600	0.977
	pcincome	0.563	0.580	0.259
	hi	0.593	1	0.491

Table 1 (continued):

Panel B: correlation matrix													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
ΔS&D	1.00	0.01	0.14	0.12	-0.06	-0.13	0.03	-0.07	0.09	0.08	0.03	0.07	0.06
BL	0.01	1.00	0.23	0.03	0.06	0.03	-0.12	0.13	-0.01	-0.09	-0.13	0.00	0.27
loansta	0.13	0.20	1.00	0.05	0.00	-0.09	-0.28	0.00	0.04	0.52	-0.28	0.01	0.09
ROA	0.08	-0.04	0.10	1.00	-0.28	-0.47	0.16	-0.22	-0.16	0.25	0.14	-0.05	0.10
sdROA	-0.07	0.13	0.01	-0.23	1.00	0.68	-0.08	0.30	0.28	0.03	-0.08	-0.01	-0.03
PL	-0.13	0.12	-0.09	-0.44	0.66	1.00	-0.16	0.31	0.27	-0.11	-0.16	-0.01	-0.06
NWA	0.06	-0.02	-0.00	0.10	-0.15	-0.10	1.00	-0.01	-0.01	-0.01	0.03	0.00	0.01
NPL	-0.08	0.14	0.02	-0.25	0.35	0.35	-0.05	1.00	0.41	0.13	-0.08	-0.01	-0.10
ch-offs	0.06	-0.03	0.06	-0.25	0.37	0.35	-0.11	0.41	1.00	0.26	-0.11	0.03	0.09
NIM	0.08	-0.02	0.48	0.19	0.03	-0.10	-0.09	0.07	0.22	1.00	-0.11	0.02	-0.23
DRES	0.02	0.02	-0.27	0.15	-0.09	-0.15	0.15	-0.05	-0.11	-0.09	1.00	0.00	-0.07
chsalary	0.06	0.00	0.01	-0.05	-0.00	-0.01	0.00	-0.00	0.03	0.03	0.00	1.00	0.00
size	0.04	0.12	0.08	0.07	-0.03	-0.07	0.01	-0.06	0.06	-0.26	-0.09	0.00	1.00

Panel A: See Appendix A for variable definitions. Sample comprises credit unions with total assets higher than $50,000,000 observed through the period Q1 1994 to Q4 2014, excluding the quarter-CU observations in which a CU went through a merger. This yields a total of 149,363 credit union-quarter observations. Credit union variables were winsorized at the 0,5% level in each tail. MFOM information is available for federal and State CUs before 2002; since 2002 it is only available for federal CUs. Panel B: Spearman (Pearson) correlation coefficients of the variables as included in the regression models are shown above (below) the diagonal. Only correlations between CU-level variables are included. All correlations are significant at the 1% level. (1): *ΔS&D*; (2): *BL*; (3): *loansta*; (4): *ROA*; (5): *sdROA*; (6): *PL*; (7): *NWA*; (8): *NPL*; (9): *ch-offs*; (10): *NIM*; (11): *DRES*; (12): *chsalary* ; (13): *size*.

Table 2: Baseline models: the response of shares and deposits to business loans

Panel A: baseline specification not accounting for selection									
Dependent variable		*Δshares*				*ΔS&D*			
		(1)		(2)		(3)		(4)	
Variables	Prediction	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
BL_{t-1}	-	-0.010**	(-2.06)	-0.007*	(-1.89)	-0.009*	(-1.84)	-0.007*	(-1.73)
$loansta_{t-1}$	-	0.036***	(13.55)	0.034***	(12.99)	0.038***	(14.57)	0.037***	(14.25)
ROA_{t-1}	+	0.622***	(7.41)	0.675***	(7.49)	0.646***	(7.47)	0.715***	(7.58)
$sdROA_{t-1}$	-	0.001	(1.40)	0.000	(1.27)	0.001	(1.48)	0.000	(1.35)
PL_{t-1}	-	-0.000	(-0.63)	-0.001	(-1.40)	-0.000	(-0.63)	-0.001	(-1.53)
$PL_{t-1} \times sdROA_{t-1}$	-	-0.001***	(-3.99)	-0.001***	(-3.28)	-0.001***	(-4.09)	-0.001***	(-3.38)
NWA_{t-1}	+	0.974***	(5.61)	1.017***	(5.63)	0.986***	(5.52)	0.995***	(5.38)
NPL_{t-1}	-	-0.196***	(-11.77)	-0.192***	(-11.25)	-0.205***	(-12.75)	-0.203***	(-12.00)
$ch\text{-}offs_{t-1}$	-	-0.374***	(-5.19)	-0.296***	(-3.86)	-0.393***	(-5.51)	-0.313***	(-4.09)
NIM_{t-1}	+	0.449***	(2.86)	0.309**	(2.06)	0.435***	(2.69)	0.266*	(1.67)
$DRES_{t-1}$	+	0.152***	(13.03)	0.171***	(11.31)	0.157***	(13.16)	0.178***	(11.28)
$size_{t-1}$	?	-0.013***	(-12.23)	-0.002**	(-2.14)	-0.013***	(-12.10)	-0.002**	(-2.17)
$chsalary_{t-1}$	-	-0.001**	(-1.99)	-0.014***	(-11.27)	-0.001**	(-2.03)	-0.014***	(-11.00)
$intrates_{t-1}$	+	3.078***	(10.12)	2.635***	(8.05)	2.972***	(9.87)	2.449***	(7.49)
$chinc\_s_{t-1}$	+	0.001***	(3.33)	0.001***	(3.10)	0.001***	(3.29)	0.001***	(3.07)
$unemp\_s_{t-1}$	-	-0.001***	(-3.20)	-0.001***	(-3.26)	-0.001***	(-3.18)	-0.001***	(-3.26)
inf_s_{t-1}	+	-0.002	(-1.52)	-0.001	(-1.09)	-0.002	(-1.51)	-0.001	(-1.02)
Observations		141,276		80,061		141,276		80,061	
CU and Time FE		YES		YES		YES		YES	
HASBL = 1		NO		YES		NO		YES	
Adj. R-squared		0.369		0.358		0.365		0.353	

Table 2 (continued):

Panel B: accounting for selection (HASBL=1)						
Dependent variable	*HASBL* (*Selection equation)*		*Δshares* (*Observation equation)*		*ΔS&D* (*Observation equation)*	
	(1)		(2)		(3)	
Variables	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
BL_{t-1}			-0.013**	(-2.12)	-0.015**	(-2.33)
$loansta_{t-1}$			0.037***	(11.78)	0.040***	(12.71)
ROA_{t-1}	5.486*	(1.70)	0.614***	(4.79)	0.641***	(5.23)
$sdROA_{t-1}$	0.049***	(7.19)	0.001	(1.31)	0.001	(1.25)
PL_{t-1}			-0.000	(-0.84)	-0.001	(-1.01)
$PL_{t-1} \times sdROA_{t-1}$			-0.001***	(-3.19)	-0.001***	(-3.35)
NWA_{t-1}	-47.296***	(-7.73)	1.376***	(6.07)	1.372***	(5.84)
NPL_{t-1}	11.462***	(18.05)	-0.207***	(-9.24)	-0.212***	(-9.53)
$ch\text{-}offs_{t-1}$			-0.251***	(-3.05)	-0.280***	(-3.42)
NIM_{t-1}	18.349***	(3.64)	0.203	(0.93)	0.176	(0.78)
$DRES_{t-1}$	-3.792***	(-32.99)	0.168***	(9.17)	0.175***	(9.30)
$size_{t-1}$	0.418***	(32.93)	-0.019***	(-13.75)	-0.019***	(-13.42)
$chsalary_{t-1}$			-0.002*	(-1.94)	-0.002*	(-1.80)
$intrates_{t-1}$	-27.948***	(-6.36)	3.042***	(8.43)	2.886***	(8.13)
LID	0.475***	(17.42)				
MFOM	-0.323***	(-50.28)				
Lambda (Mills)			-0.0012***	(3.58)	-0.0013***	(3.28)
Observations	85,995		45,399		45,399	
Macro controls	YES		YES		YES	
CU and time FE	NO		YES		YES	

Panel A: Fixed-effects panel regressions of shares and shares and deposit growth on CU characteristics. Columns 2 and 3 include the condition that *HASBL*=1. *HASBL* is a dummy that takes value 1 when the CU has business loans, 0 otherwise (the regression is run only for CUs with BL>0). Panel B: Heckman two-step selection models. Column 1 - Selection equation: Probit model for *HASBL* as a function of *CU* characteristics. Column 2 - Observation equation for *Δshares*: Fixed-effects panel regressions of shares growth on CU characteristics accounting for selection into offering business loans. Column 3 - Observation equation for *ΔS&D*: Fixed-effects panel regressions of shares and deposits growth on CU characteristics accounting for selection into offering business loans. See Appendix A for variable definitions. *t*-statistics are based on standard errors clustered by quarter. *, **, *** denote significance (based on two-tail tests) at 10%, 5% and 1% level.

Table 3: The response of shares and deposits to business loans

Panel A: not accounting for HASBL=1									
Dependent variable		*ΔS&D*							
CU characteristic / Income measure		*MFOM*		*com*		State income (percentile)		High-income state	
		(1)		(2)		(3)		(4)	
Variables	Prediction	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
BL_{t-1}	-	-0.022***	(-3.01)	-0.006	(-1.18)	0.018*	(1.73)	-0.001	(-0.18)
$loansta_{t-1}$	+	0.044***	(13.42)	0.038**	(14.59)	0.038***	(14.30)	0.038***	(14.57)
MFOM	+	-0.001	(-1.00)						
$MFOM \times BL_{t-1}$	-	0.016*	(1.70)						
com	+			0.001**	(2.31)				
$com \times BL_{t-1}$	-			-0.018***	(-3.61)				
pcincome	+					-0.003	(-1.16)		
$pcincome \times BL_{t-1}$	-					-0.045***	(-3.26)		
hi	+							0.001	(1.53)
$hi \times BL_{t-1}$	-							-0.011**	(-2.20)
Observations		86,240		141,276		131,216		141,276	
CU and Time FE		YES		YES		YES		YES	
CU and Macro controls		YES		YES		YES		YES	
Adj. R-squared		0.375		0.365		0.370		0.365	

Table 3 (continued):

Panel B: accounting for selection into HASBL=1									
Dependent variable		*ΔS&D (Observation equation)*							
CU characteristic / Income measure		*MFOM*		*com*		State income (percentile)		High-income state	
		(1)		(2)		(3)		(4)	
Variables	Prediction	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
BL_{t-1}	-	-0.023*	(-3.18)	-0.007	(-0.90)	0.032	(1.58)	-0.010	(-0.98)
$loansta_{t-1}$	-	0.040***	(12.73)	0.040***	(12.71)	0.040***	(12.79)	0.040***	(12.70)
MFOM	+	-0.001*	(-1.78)						
$MFOM \times BL_{t-1}$	-	0.019**	(2.04)						
com	+			0.002**	(2.50)				
$com \times BL_{t-1}$	-			-0.016*	(-1.87)				
pcincome	+					0.002	(0.54)		
$pcincome \times BL_{t-1}$	-					-0.080***	(-2.64)		
hi	+							0.001	(0.80)
$hi \times BL_{t-1}$	-							-0.007	(-0.59)
Observations		45,399		45,399		42,951		45,399	
CU and Time FE		YES		YES		YES		YES	
CU and Macro controls		YES		YES		YES		YES	

Panel A: Fixed-effects panel regressions of shares and shares and deposit growth on CU characteristics. Panel B: Selection models. Selection equations (not shown): Probit model for *HASBL* as a function of *CU* characteristics. *HASBL*: Dummy that takes value 1 when the CU has business loans, 0 otherwise. Columns 1-4 - Observation equation for *ΔS&D*: Fixed-effects panel regressions of shares and deposits growth on CU characteristics accounting for selection into offering business loans. *MFOM*: Dummy that takes value 1 when the CU has a multiple field of membership, and 0 when it has a single field of membership or when it is a community CU. *com*: Dummy that takes value 1 when the CU is a community CU, 0 otherwise. *pcincome* is a weighted average of the percentile of the income of the states where the CU operates. The dummy *hi* (high income) is a 1 if the state where the CU is located is above the median in terms of personal income, 0 otherwise. CU and Macro controls are the same as in Table 2. See Appendix A for variable definitions. *t*-statistics are based on standard errors clustered by quarter. *, **, *** denote significance (based on two-tail tests) at 10%, 5% and 1% level. Results for the selection equations are similar to those obtained in table 2: they are not shown given space constraint but they are available from the authors upon request.

Table 4. The change to a low-income designation: effect on growth in business loans and total shares and deposits of the LIDI "experiment"

Panel A: growth in Business Loans						
Quarter	Prediction	Difference	p-value	Quarter	Difference	p-value
Quarter by quarter effects				Cumulative effects		
t	+	**.0656**	**0.014**	0q	**.0656**	**0.014**
t+1	+	-.0297	0.148	1q	.0339	0.214
t+2	+	**.0821**	**0.009**	2q	**.1212**	**0.025**
t+3	+	-.0027	0.475	3q	**.1427**	**0.040**
t+4	+	-.0308	0.361	4q	**.1516**	**0.070**
Panel B: growth in Total Shares and Deposits						
Quarter	Prediction	Difference	p-value	Quarter	Difference	p-value
Quarter by quarter effects				Cumulative effects		
t+1	-	**-.0038**	**0.046**	1q	**-.0054**	**0.046**
t+2	-	-.0005	0.422	2q	**-.0061**	**0.082**
t+3	-	.0018	0.256	3q	-.0045	0.190
t+4	-	-.0015	0.212	4q	-.0060	0.154

Panel A: t-tests of the difference in growth in business loans between treatment and control groups; Treatment group: CUs that change to low-income designation at the LIDI (June and September 2012); Control group: CUs that were low-income in 2011Q1 and continue to be low-income in 2013Q4. t: present quarter; 0q: effect on the quarter of impact. 1q, 2q, 3q, 4q cumulative effect (3 months, 6 months, 9 months, 12 months ahead). Panel B: t-tests of the difference in growth in Total Shares and Deposits between treatment and control groups; Treatment group: CUs that change to low-income designation at the LIDI (June and September 2012); Control group: CUs that were low-income in 2011Q3 and continue to be low-income in 2013Q4. t: present quarter; 1q, 2q, 3q, 4q cumulative effects (3 months, 6 months, 9 months, 12 months ahead).

Table 5: The change to a low-income designation: diff-in-diffs estimators of the impact on growth in total shares and deposits of the LIDI "experiment"

Panel A: Baseline specification							
Dependent variable		*ΔS&D*					
		(1)		(2)		(3)	
Variables	Prediction	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
TA		0.000	(0.10)	0.002	(1.09)	0.001	(0.65)
pt		0.005	(1.08)	-0.011***	(-5.18)	-0.006***	(-3.74)
TA × *pt*	-	-0.001	(-0.31)	-0.004*	(-1.74)	-0.002	(-0.76)
Control variables		YES		YES		YES	
Observations		801		1,599		2,395	
Adj. R-squared		0.069		0.350		0.276	
Panel B: controlling for income level							
Dependent variable		*ΔS&D*					
		(1)		(2)		(3)	
Variables	Prediction	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
TA		-0.003	(-0.66)	-0.004	(-1.06)	0.000	(0.03)
pt		0.006	(1.02)	-0.014***	(-3.53)	-0.007**	(-1.98)
pcincome		-0.004	(-0.59)	-0.011**	(-2.04)	0.002	(0.31)
TA × *pt*	-	0.007	(1.05)	0.004	(0.77)	0.001	(0.12)
TA × *pcincome*		0.008	(0.86)	0.013*	(1.79)	0.003	(0.43)
pt × *pcincome*		0.000	(0.04)	0.008	(1.09)	0.001	(0.20)
TA × *pt* × *pcincome*	-	-0.018	(-1.46)	-0.019*	(-1.88)	-0.005	(-0.62)
Control variables		YES		YES		YES	
Observations		801		1,599		2,403	
Adj. R-squared		0.072		0.352		0.276	

Table 5 (continued):

Panel C: controlling for income level (2)							
Dependent variable		*ΔS&D*					
		(1)		(2)		(3)	
Variables	Prediction	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
TA		-0.003	(-1.09)	-0.001	(-0.59)	-0.000	(-0.18)
pt		0.005	(1.05)	-0.013***	(-5.03)	-0.007***	(-3.05)
hi		-0.005	(-1.38)	-0.006**	(-2.15)	-0.000	(-0.08)
TA × *pt*	-	0.004	(0.96)	0.000	(0.07)	-0.000	(-0.11)
TA × *hi*		0.010**	(2.07)	0.010**	(2.55)	0.005	(1.60)
pt × *hi*		0.003	(0.63)	0.006	(1.48)	0.000	(0.08)
TA × *pt* × *hi*	-	-0.014**	(-2.12)	-0.014***	(-2.64)	-0.005	(-1.01)
Control variables		YES		YES		YES	
Observations		801		1,599		2,403	
Adj. R-squared		0.074		0.352		0.276	

Panel A: regressions of shares and deposit growth around the LIDI experiment. Regression specifications include only the treatment variable *TA* and "post" variable *pt*. Panel B: regressions of shares and deposit growth around the LIDI experiment the variable. The regression specification distinguishes the effect of *pcincome*, which is a weighted average of the percentile of the income of the states where the CU operates. Panel C: regressions of shares and deposit growth around the LIDI experiment the variable. The regression specification distinguishes the effect of the dummy *hi* (high income), which is a 1 if the state where the CU is located is above the median in terms of personal income, 0 otherwise. Panels A-C: TA: Treatment group, CUs that change to low-income designation at the LIDI 2012Q3); *pt*: post treatment. Column (1): *pt*=1 for 2012Q4, 0 for 2012Q3; column (2): *pt*=1 for 2012Q4-2013Q1, 0 for 2012Q2-2012Q3; column (3): *pt*=1 for 2012Q4-2013Q2, 0 for 2012Q1-2012Q3. Control variables in all panels include ROA_{t-1}, $sdROA_{t-1}$, PL_{t-1}, $PL_{t-1} \times sdROA_{t-1}$, NWA_{t-1}, $DRES_{t-1}$, NPL_{t-1}, $ch\text{-}offs_{t-1}$, NIM_{t-1}, BL_{t-1}, $loansta_{t-1}$, $size_{t-1}$, $chsalary_{t-1}$, $intrates_{t-1}$, $chinc\_s_{t-1}$, $unemp\_s_{t-1}$ and inf_s_{t-1}. See Appendix A for variable definitions*, **, *** denote significance (based on two-tail tests) at 10%, 5% and 1% level.

Table 6. The change in business loans regulation: effect on growth in total shares and deposits

Growth in Total Shares and Deposits						
Quarter	Prediction	Difference	p-value	Quarter	Difference	p-value
Quarter by quarter effects				Cumulative effects		
t+1	-	**-.0106**	**0.016**	1q	**-.0106**	**0.016**
t+2	-	-.0033	0.268	2q	**-.0123**	**0.038**
t+3	-	.0035	0.265	3q	**-.0159**	**0.031**
t+4	-	.0010	0.718	4q	-.0127	0.124

Matching estimators of the difference in growth in Total Shares and Deposits between treatment and control groups; Treatment group: 10 % federal credit unions with higher increase in business loans between October 1st 2003 and March 31st 2004; Control group: matched CUs from the 90% federal credit unions with lower increase in business loans between October 1st 2003 and March 31st 2004. (Number of matches = 1). t: Present quarter; 1q, 2q, 3q, 4q cumulative effects (3 months, 6 months, 9 months, 12 months ahead). Matching variables: BL_t, $size_t$, ROA_t, NWA_t, $DRES_t$, NPL_t, $ch\text{-}offs_t$, $loansta_t$, $chsalary_t$, $intrates_t$. Exact matching: State, FOM (Field of Membership). Estimates shown correspond to the bias-adjusted estimator of the Average Treatment Effect on the Treated of Abadie and Imbens (2011).

Table 7: The change in business loans regulation: diff-in-diffs estimators of the effect on growth in total shares and deposits

Panel A: control group are all federal CUs not in treatment group								
		(1)		(2)		(3)		(4)
Dependent variable		*ΔS&D*		*ΔS&D*		*ΔS&D*		*ΔS&D*
Variables	Prediction	Coefficient	t-statistic	Coefficient	Coefficient	Coefficient	t-statistic	Coefficient	t-statistic
TB		0.000	(0.17)	0.001	(0.71)	0.017***	(18.34)	0.009***	(12.48)
pt		-0.004	(-1.38)	0.005***	(5.96)	-0.002***	(-2.99)	-0.005***	(-7.34)
TB × *pt*	-	-0.000	(-0.01)	-0.002	(-0.75)	-0.016***	(-10.28)	-0.008***	(-6.08)
Controls included		YES		YES		YES		YES	
Observations		3,385		6,706		10,092		13,389	
Adj. R-squared		0.075		0.090		0.241		0.226	
Panel B: control group are the federal CUs with growth in business loans below the 10% lower								
		(1)		(2)		(3)		(4)
Dependent variable		*ΔS&D*		*ΔS&D*		*ΔS&D*		*ΔS&D*
TB10		-0.005*	(-1.80)	-0.002	(-1.25)	0.007***	(4.98)	0.004***	(3.66)
pt		-0.011*	(-1.79)	0.001	(0.59)	-0.009***	(-5.01)	-0.010***	(-6.20)
TB10 × *pt*	-	0.004	(1.11)	0.002	(0.60)	-0.006***	(-2.93)	-0.004**	(-2.14)
Controls included		YES		YES		YES		YES	
Observations		680		1,354		3,237		5,017	
Adj. R-squared		0.072		0.091		0.337		0.298	

Panel A: regressions of shares and deposit growth around the 2003 change in business loan regulation. Regression specifications include the treatment variable TB, the "post" variable *pt* and their interaction, along with a set of controls. Treatment group (*TB*=1): Federal CUs with change in business loans higher than 90% of the population. Control group (*TB*=0): Federal CUs with change in business loans in the 90% lower. Panel B: regressions of shares and deposit growth around the 2003 change in business loan regulation. Regression specifications include the treatment variable TB10, the "post" variable *pt* and their interaction, along with a set of controls. Treatment group (*TB10*=1): equal to *TB*. Control group (*TB10*=0): Federal CUs with a growth in business loans below the 10% lower. Panels A and B: *pt*: post treatment. Column (1): *pt*=1 for 2003Q4, 0 for 2003Q3; column (2): *pt*=1 for 2003Q4-2004Q1, 0 for 2003Q2-2003Q3; column (3): *pt*=1 for 2003Q4-2004Q2, 0 for 2003Q1-2003Q3; column (4): *pt*=1 for 2003Q4-2004Q3, 0 for 2002Q4-2003Q3. Control variables in both panels: ROA_{t-1}, $sdROA_{t-1}$, PL_{t-1}, PL_{t-1}×$sdROA_{t-1}$, NWA_{t-1}, NPL_{t-1}, $ch\text{-}offs_{t-1}$, NIM_{t-1}, BL_{t-1}, $loansta_{t-1}$, $size_{t-1}$, $chsalary_{t-1}$, $intrates_{t-1}$, $chinc\_s_{t-1}$, $unemp\_s_{t-1}$, and inf_s_{t-1}. See Appendix A for variable definitions*, **, *** denote significance (based on two-tail tests) at 10%, 5% and 1% level.

Table 8: Business loan activity and CU characteristics

Panel A: mean value of CU characteristics as a function of the BL percentile

BL percentile	*BL*	*LID*	*MFOM*	*com*	*Mstate*	*size*	*loansta*	*ROA*	*sdROA*	*PL*
0-50%	0	0.070	0.562	0.195	0.132	18.601	0.565	0.0013	1.340	0.616
50%-75%	0.005	0.090	0.521	0.223	0.124	18.842	0.595	0.0013	1.388	0.632
75%-90%	0.059	0.115	0.419	0.281	0.150	19.377	0.655	0.0013	1.511	0.728
>90%	0.182	0.205	0.413	0.204	0.185	19.426	0.705	0.0013	1.521	0.652

Panel B: the determinants of BL

Dependent variable	*HASBL* (*Selection equation*)		*BL* (*Observation equation*)	
	(1)		(2)	
Variables	Coefficient	z-statistic	Coefficient	z-statistic
ROA_{t-1}	5.889**	(2.41)	-0.156	(-1.57)
$sdROA_{t-1}$	0.046***	(8.37)	0.001***	(2.94)
NWA_{t-1}	-45.186***	(-5.99)	-1.798***	(-7.12)
NPL_{t-1}	11.565***	(20.17)	0.443***	(13.29)
NIM_{t-1}	17.401***	(7.33)	2.369***	(15.51)
$DRES_{t-1}$	-3.779***	(-24.47)	-0.114***	(-6.98)
$size_{t-1}$	0.416***	(76.16)	0.030***	(23.54)
LID	0.473***	(28.50)	0.017***	(13.06)
MFOM	-0.323***	(-35.83)	-0.005***	(-4.90)
$intrates_{t-1}$	-27.688***	(-17.78)		
$chinc\_s_{t-1}$	-0.025***	(-6.21)	-0.001***	(-3.81)
$unemp\_s_{t-1}$	0.001	(0.39)	-0.000	(-1.40)
inf_s_{t-1}	-0.007	(-1.56)		
Observations	87,993		46,669	

Panel A: Mean value of CU characteristics. *BL*: Business loans/Total assets. *LID*: Dummy that takes 1 when the CU has the low income designation. *MFOM*: Dummy that takes value 1 when the CU has a multiple field of membership and 0 when it has a single field of membership or when it is a community CU. *com*: Dummy that takes value 1 when the CU is a community CU, 0 otherwise. See Appendix A for other variable definitions. Panel B: Heckman-s two-step selection model. *HASBL*: Dummy that takes value 1 when the CU has business loans, 0 otherwise. *, **, *** denote significance (based on two-tail tests) at 10%, 5% and 1% level. Observation equation includes CU fixed effects and time effects.

Table 9: Multiple FOM, multiple state and business loans as growth alternatives

Panel A: descriptive statistics of BL and loans of CUs

	BL			*BL / loansta*			*loansta*	
	Mean	*P50*	*P75*	*Mean*	*P50*	*P75*	*Mean*	*P50*
MFOM = 0	0.023	0.002	0.025	0.036	0.003	0.040	0.619	0.638
MFOM = 1	0.014	0	0.007	0.021	0	0.011	0.614	0.630
t-test (p-value)	0.000			0.000			0.000	
Mstate = 0	0.023	0.001	0.020	0.035	0.002	0.032	0.622	0.638
Mstate = 1	0.028	0.001	0.027	0.042	0.001	0.044	0.626	0.637
t-test (p-value)	0.000			0.000			0.000	

Panel B: the relationship of BL with size

Dependent variable	*BL*							
	(1)		(2)		(3)		(4)	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
size	0.005***	(11.69)	0.022***	(16.34)	0.006***	(11.92)	0.016***	(7.56)
MFOM	0.037***	(3.20)	0.063***	(8.63)				
size × *MFOM*	-0.003***	(-4.12)	-0.003***	(-8.14)				
Mstate					0.026	(1.06)	-0.042***	(-4.34)
size × *Mstate*					-0.001	(-0.93)	0.002***	(4.85)
Observations	47,733		46,420		28,253		27,952	
CU and Time FE	YES		YES		YES		YES	
HASBL = 1	YES		YES		YES		YES	
Macro and CUcontrols	NO		YES		NO		YES	
Adj. R-squared	0.009		0.257		0.007		0.071	

Panel A: Descriptive statistics of *BL*, *BL/loansta* and *loansta*. P50: Median; P75: Percentile 75%. MFOM: Dummy that takes value 1 when the CU has a multiple field of membership, 0 when the CU has a single field of membership or when it is a community CU. *Mstate*: Dummy that takes value 1 when the CU operates in more than one state, 0 otherwise. See Appendix A for other variable definitions. Panel B: Fixed-effects panel regressions of *BL* on indicators of growth strategies. t-statistics are based on standard errors clustered by CU and time. *, **, *** denote significance (based on two-tail tests) at 10%, 5% and 1% level. Columns 1 and 3 show the results of models with no additional control variables. Columns 2 and 4 show the results of models with the following macro and CU controls: ROA_{t-1}, $sdROA_{t-1}$, PL_{t-1}, NWA_{t-1}, NPL_{t-1}, NIM_{t-1}, $DRES_{t-1}$, $chsalary_{t-1}$, $intrates_{t-1}$, $chinc\_s_{t-1}$, $unemp\_s_{t-1}$ and inf_s_{t-1}. All columns in the table include the condition HASBL=1 (the regression is run only for CUs with BL>0).

Table 10: Business loans and credit risk

Panel A: levels of loan risk (NPL+ch-offs) three years forward									
Dependent variable		*CRISK3Y*							
		(1)		(2)		(3)		(4)	
Variables	Pred.	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
loansta	+	0.010***	(5.53)	0.010***	(5.24)	0.012***	(5.49)	0.010***	(5.29)
BL_{t-1}	+	0.043***	(4.25)	0.038***	(4.34)	0.041***	(4.20)	0.034***	(4.24)
$MFOM_{t-1}$	?	0.000	(1.26)	0.000	(1.46)	0.000	(1.25)	0.000	(1.39)
BLG_{t-1}	+			-0.000***	(-4.09)			-0.000***	(-6.09)
$LOWBL_{t-1}$	-					-0.000**	(-2.13)	-0.002***	(-3.29)
$BLG_{t-1} \times LOWBL_{t-1}$	+							0.001***	(3.19)
$BL_{t-1} \times BLG_{t-1}$	+			-0.005***	(-4.77)			-0.004***	(-4.82)
$BL_{t-1} \times LOWBL_{t-1}$	+					-0.004	(-0.30)	0.026	(0.26)
$BL_{t-1} \times BLG_{t-1} \times LOWBL_{t-1}$	+							0.017	(0.16)
Observations		67,875		33,817		67,505		33,817	
Adj. R-squared		0.319		0.338		0.323		0.341	
Panel B: levels of loan risk (NPL+ch-offs) five years forward									
Dependent variable		*CRISK5Y*							
		(1)		(2)		(3)		(4)	
Variables	Pred.	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
loansta	+	0.012***	(6.81)	0.012***	(6.75)	0.012***	(6.73)	0.012***	(6.66)
BL_{t-1}	+	0.043***	(4.10)	0.035***	(3.41)	0.042***	(4.01)	0.034***	(3.28)
$MFOM_{t-1}$	?	0.000	(1.43)	0.001*	(1.86)	0.000	(1.40)	0.001*	(1.83)
BLG_{t-1}	+			-0.000***	(-2.89)			-0.000***	(-4.63)
$LOWBL_{t-1}$	-					-0.000*	(-2.14)	-0.001	(-1.50)
$BLG_{t-1} \times LOWBL_{t-1}$	+							0.000**	(2.09)
$BL_{t-1} \times BLG_{t-1}$	+			-0.003***	(-3.10)			-0.003***	(-3.14)
$BL_{t-1} \times LOWBL_{t-1}$	+					0.011	(0.84)	-0.080*	(-1.96)
$BL_{t-1} \times BLG_{t-1} \times LOWBL_{t-1}$	+							0.143***	(2.89)
Observations		58,383		27,823		33,817		27,823	
Adj. R-squared		0.332		0.346		0.333		0.346	
CU and Time FE		YES		YES		YES		YES	
CU and Macro controls		YES		YES		YES		YES	

Fixed-effects panel regressions with Driscoll-Kraay standard errors. Panel A Dependent variable is *CRISK3Y*, the average measure of credit risk (NPL + Charge offs) over the following 3 years. Dependent variable is *CRISK5Y*, the average measure of credit risk over the following 5 years. Control variables in both panels: $Mstate_{t-1}$, ROA_{t-1}, NWA_{t-1}, NIM_{t-1}, $DRES_{t-1}$, $loansta_{t-1}$, $size_{t-1}$, $chinc\_s_{t-1}$, $unemp\_s_{t-1}$ and inf_s_{t-1}. *BLG* is a dummy equal to 1 when *BL* growth is positive and higher than loan growth for a specific quarter, zero otherwise. *LOWBL* is a dummy equal to 1 when the value of *BL* is lower than the median of the sample in the prior quarter. *, **, *** denote significance (based on two-tail tests) at 10%, 5% and 1% level.