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# Interest rate risk at US credit unions

Grant Rosenberger and Peter Zimmerman\*

January 30, 2024

## Abstract

Rising interest rates have prompted concerns about losses on bank assets, especially following the failure of Silicon Valley Bank (SVB) in March 2023. In this working paper, we examine whether US credit unions could be subject to similar losses as banks and analyze how their regulatory capital would be affected. We estimate that after realizing losses from assets that have decreased in value and not yet been sold the overall net worth of the credit union industry would have fallen by 40 percent in 2023:Q1. Unrealized losses were most severe at the largest credit unions. Nonetheless, the bulk of deposits at credit unions were insured, suggesting limited risk of an SVB-style run. In addition, credit union deposit rates are relatively insensitive to market interest rates, providing credit unions with a hedge against a rising rate environment. Overall, credit unions' balance sheet positions seemed to be more resilient to unrealized interest rate risk than banks'.

**Keywords:** credit unions, deposit franchise, interest rate risk.

**JEL codes:** G21, G28

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## Introduction

Financial institutions often make loans at fixed nominal interest rates. When market interest rates rise, these fixed rate loans tend to fall in value, because the income they provide is worth less compared to other sources of fixed income. The same is true of securities. Indeed, an important factor in the failure of Silicon Valley Bank (SVB) in March 2023 was large losses on its holdings of long-term securities. This working paper contributes to the growing body of work on interest rate risk by focusing on credit unions.

Why is interest rate risk problematic for financial institutions? Typically, financial institutions are not required to book losses arising from market movements into their accounts immediately, unless the asset is to be sold in the near future. Ostensibly, if the institution plans to continue to hold the asset, this delay does not seem to pose any difficulties; however, it does mean that accounts and regulatory returns may suggest that the institution is better capitalized than is actually the case. This is a problem for at least three reasons:

- *Depositor runs:* If a financial institution suffers a depositor run, it may need to pay withdrawing depositors by selling assets at market prices. Doing so forces it to recognize unrealized losses, so there is a bad equilibrium in which runs occur. In contrast, if unrealized losses are small, there is no reason for rational depositors to run, and there is no run equilibrium.
- *Permanence of interest rate rises:* If the rise in interest rates were likely to be short-lived, then so would the losses, a situation which could justify not recognizing the losses. But if higher interest rates are expected to persist, then the current market price of assets may be a truer reflection of their worth than is the face value.<sup>1</sup>
- *Misallocation of capital:* If reported accounts give a misleading picture of the institution's solvency, investors and depositors may not have the information they need to allocate their capital efficiently.

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<sup>1</sup> For example, as of January 4, 2024, the yield on 20-year US Treasury securities is about 1.7 percentage points higher than it was before the Federal Reserve began raising rates in March 2022, suggesting the market anticipates higher interest rates for the foreseeable future. See Board of Governors of the Federal Reserve System (2023c).

We focus on credit unions because, although the credit union industry is smaller than the banking industry, its solvency could impact US financial stability through several channels:<sup>2</sup>

1. *Credit unions are important providers of financial services to US households and firms:* As of 2023:Q1, credit unions accounted for 11 percent of all time and savings deposits in private depository institutions and about one-third of total automotive financing.<sup>3</sup> Problems at credit unions could, therefore, transmit losses and disrupt the flow of credit to US households.
2. *The larger credit unions are substantive:* More than 20 credit unions had above \$10 billion in assets as of 2023:Q1, comparable to the asset size of regional banks.<sup>4</sup>
3. *Confidence effects:* A failure of a group of small non-systemic financial institutions, such as credit unions, could shake confidence in the wider financial system.

Our data is for 2023:Q1, which captures the most intense recent period of financial market distress. We note that interest rate risk was among the supervisory priorities of the National Credit Union Administration (NCUA) for 2022, 2023, and 2024, so regulators continue to address the issue (see NCUA, 2022a, 2023, and 2024).

Our paper contributes to recent work on interest rate risk at financial institutions; see, for example, Abdymomunov et al. (2023), Chang et al. (2023), Dick-Nielsen and Thimsen (2023), Flannery and Sorescu (2023), and Jiang et al. (2023).<sup>5</sup> We also add to understanding of the deposit franchise as a hedge against interest rate risk; see Berry et al. (2019), Drechsler et al. (2017, 2021), and Gerlach et al. (2018). Finally, we contribute to research on credit unions, see, for example, DeYoung et al. (2022), Karels and McClatchey (1999), and Wheelock and Wilson (2011).

## Data

### *Overview of credit unions' balance sheets*

Credit union assets grew from \$1.4 trillion in 2018:Q1 to \$2.2 trillion in 2023:Q1, an increase of around 56 percent. For comparison, commercial bank assets grew by 37 percent over the same period. Figure 1 reports the share of credit union industry assets for each major asset category as of 2023:Q1, when Silicon Valley Bank collapsed.

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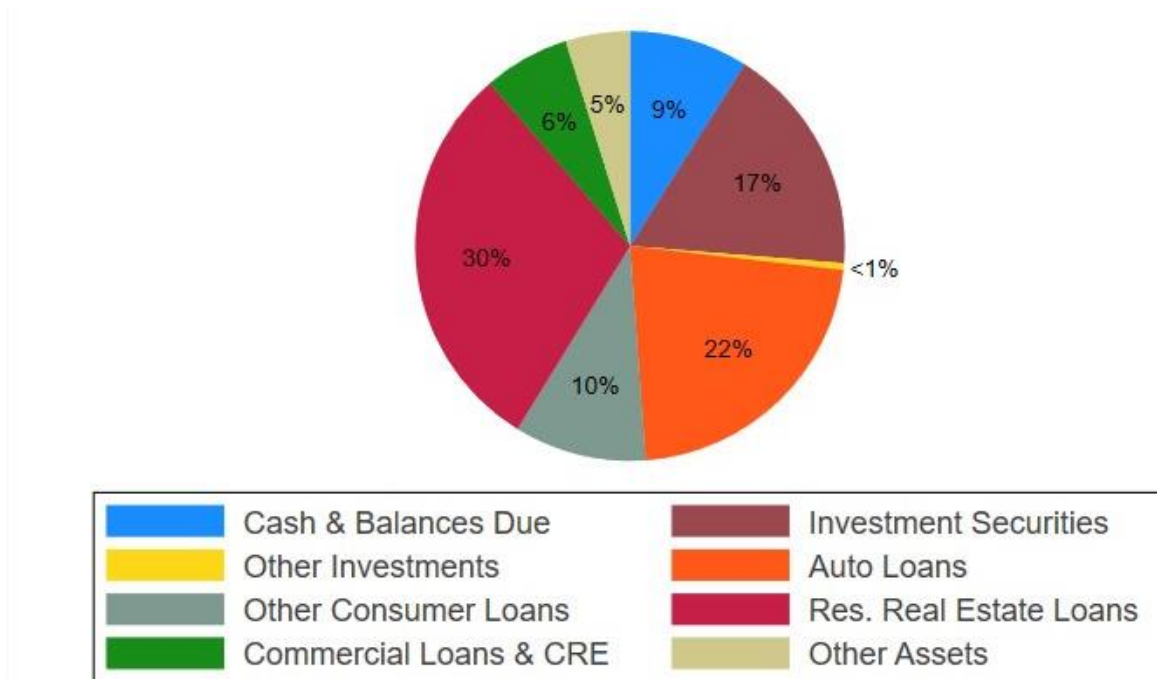
<sup>2</sup> As of 2023:Q1, the median commercial bank had \$317 million in assets, while the median credit union had only \$55 million.

<sup>3</sup> See Board of Governors of the Federal Reserve System (2023d) for deposits. See Board of Governors of the Federal Reserve System (2023a,b) for auto loans.

<sup>4</sup> The Federal Reserve classifies regional banks as having between \$10 billion and \$100 billion in assets. See Board of Governors of the Federal Reserve System (2021).

<sup>5</sup> Interest rate risk is not limited to depository institutions. For example, Henning et al. (2023) and Bell et al. (2023) discuss pension funds and central banks, respectively.

FIGURE 1 – Credit union assets, 2023:Q1



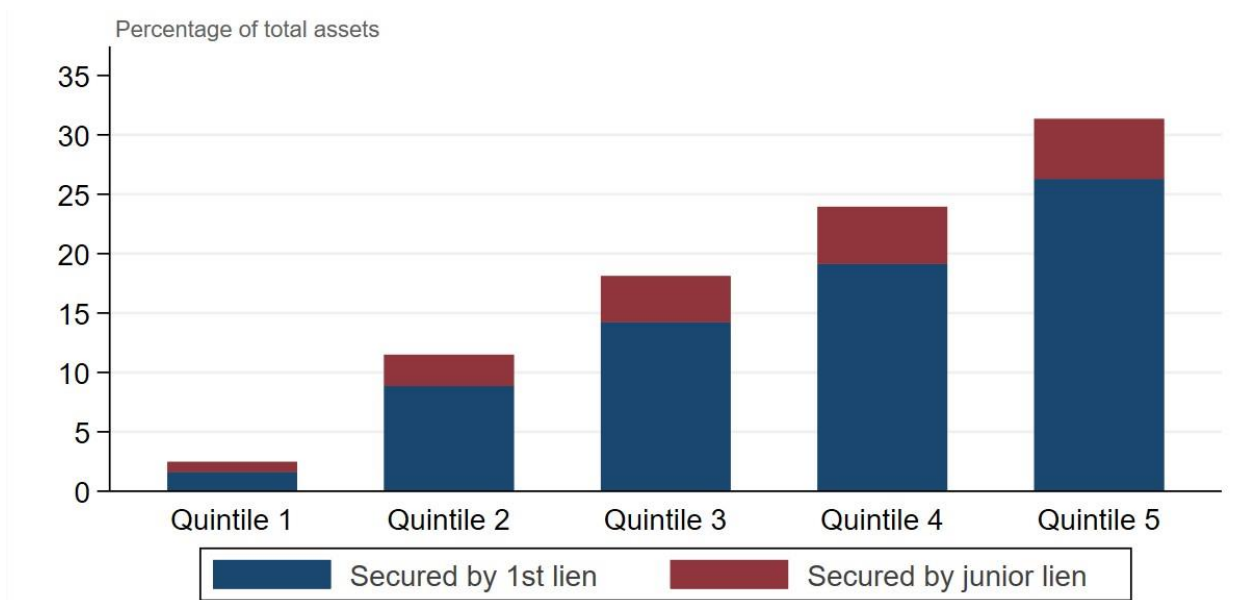
Sources: Call Report Form 5300 and authors' calculations.

Note: Allowance for loan and lease losses (ALLL) is assumed to be distributed proportionately across loan categories, so the amount in each loan category has been reduced by the ALLL share of total loans.

As of 2023:Q1, more than half of total credit union industry assets comprise loans against residential property and vehicles. Lending against residential real estate tends to be longer-term and at a fixed rate, making it more sensitive to interest rate risk. This risk is especially apposite for larger credit unions, which tend to have higher exposure to residential real estate lending (Figure 2). For the smallest quintile of credit unions, residential real estate loans account for less than 5 percent of total assets but this share rises to above 30 percent of total assets for the largest fifth of credit unions.<sup>6</sup>

<sup>6</sup> Throughout this paper, we use “loans” as shorthand for “loans or lines of credit.”

**FIGURE 2: Credit unions' residential real estate lending by asset size quintile, 2023:Q1**



Sources: Call Report Form 5300 data.

Note: Each bar shows the sum of residential real estate lending for all credit unions in that quintile, divided by their total assets. Size quintiles are based on credit unions' total assets as of 2023:Q1.

## Methodology

### *Computing unrealized losses*

We estimate losses at US credit unions that have arisen because of rising interest rates but not yet recognized. We use data from credit unions' call report forms, following the approach of Flannery and Sorescu (2023) – henceforth “F&S” – who carry out a similar exercise for banks. We use the rise in the yield curve between 2021:Q4 and 2023:Q1 to estimate unrealized losses. Taking 2023:Q1 as our end point means that we estimate losses during the period of most intense banking distress in 2023.<sup>7</sup>

For loans, the F&S methodology can best be explained by an example. Consider a residential mortgage loan in 2023:Q1 that has 180 months remaining until maturity. We estimate losses as follows:

<sup>7</sup> F&S are restricted to 2022:Q4 data. If we use 2022:Q4 data, we actually find slightly higher unrealized losses than in the current paper, but still below those that F&S estimate for banks.

1. In 2021:Q4, the loan had 195 months remaining. A fair interest rate at that time was 4.99 percent, which is equal to the 195-month risk-free rate in 2021:Q4 (1.81 percent), plus a risk premium equal to the prime rate (3.25 percent) minus the federal funds rate (0.07 percent).<sup>8</sup>
2. Suppose the remaining mortgage balance in 2021:Q4 was \$100,000. A rate of 4.99 percent implies a monthly installment of \$749. If a borrower is up to date, we would expect \$94,845 of the initial principal to remain by 2023:Q1. This is the *face value* of the loan.
3. In 2023:Q1, a fair interest rate is 6.79 percent, based on a 180-month risk-free rate of 3.62 percent, a prime rate of 8.00 percent, and a federal funds rate of 4.83 percent.
4. From 2023:Q1, the lender expects to receive 180 remaining monthly instalments of \$749 each. At a discount rate of 6.79 percent, these payments have a total present value of \$84,455. This is the *fair value* of the loan.
5. The fair value of the mortgage loan is \$10,390 lower than the face value. This implies a loss of 10.95 percent on the asset.

We repeat the exercise for each type of loan, calculating a haircut based on the residual maturity and repayment schedule.<sup>9</sup>

For securities, the process is simpler. Credit unions can designate securities as either held-to-maturity (HTM) or available-for-sale (AFS). While HTM securities are generally reported at amortized cost, the call reports also contain data on fair values, so we can assign a loss equal to the difference.<sup>10</sup> For AFS securities, credit unions disclose gains or losses accrued to date, so we can easily apply these adjustments.<sup>11</sup>

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<sup>8</sup> By “fair” interest rate, we mean the rate that a loan originated at that time might typically require. The risk-free rate is the cost of lending money before factoring in credit risk, which is estimated as the risk premium of prime minus the federal funds rate. Risk-free rates are calculated using the Nelson–Siegel–Svensson methodology, as explained in Müller (2005). We thank Nick Fritsch for help computing these. As in F&S, assuming that loans were fairly priced in 2021:Q4 – when interest rates were low – tends to bias the haircuts upward.

<sup>9</sup> Following F&S, we do not assume loans are prepaid early. If we were to allow prepayments, the haircut numbers would be somewhat smaller. For example, a residential mortgage loan with 120 months remaining would have a haircut of 8.15 percent. Deng et al. (2000) find that just over half of mortgage principal is prepaid within 10 years, although prepayment rates vary over time and are likely to be lower in a rising rate environment.

<sup>10</sup> In some cases, the fair value exceeds the amortized cost, so the credit union earns an unrealized gain.

<sup>11</sup> Specifically, we take each credit union’s reported accumulated unrealized gains or losses on AFS debt securities. Consistent with F&S, we do not include net gains or losses on cash flow hedges. Unrealized gains or losses from equity securities and trading debt securities are already recognized through net income, so we assume those are already included in net worth.

### *Applying the methodology to credit unions*

All “natural person” credit unions in the United States are required to submit Call Report Form 5300 to the NCUA.<sup>12</sup> These data are made public with a short delay. We use call report data for 2023:Q1 with a reporting date of March 31, 2023.

Compared to banks’ call reports, Form 5300 contains somewhat less detailed data on assets and residual maturities. For example, for the category “loans/lines of credit secured by first lien on a single 1–4 family residential property,” we know the residual maturity and the rate basis (that is, whether the borrower pays a fixed, balloon, or adjustable rate). The residual maturity is assigned to one of two buckets (less than or greater than 15 years for fixed rate loans and five years for balloons). By contrast, banks assign their loans to one of six different residual maturity buckets. And for some asset categories, such as auto loans, we have no maturity information. These information gaps mean that our estimates of unrealized losses are subject to greater error than those of F&S. We follow their strategy of erring on the side of understating, rather than overstating, losses.

Table 1 shows our assumptions about residual maturity of each asset category. Consistent with F&S, when we know an asset has a remaining term of more than X years, we assume it is exactly X years as of 2023:Q1. And when we know the remaining term is less than X years, we assume it is equal to half of X as of 2021:Q4.

For commercial loans, Call Report Form 5300 provides the amount secured by commercial real estate (CRE) that matures or reprices within the next five years, so we can infer the amount of such loans that matures or reprices sometime after five years.<sup>13</sup>

Call Report Form 5300 provides no information on the remaining maturity of vehicle loans. Instead, we use loan-level data from FRBNY/Equifax Consumer Credit Panel (CCP) on the residual maturity of auto loans held by credit unions.<sup>14</sup> For all other assets, we know neither the duration nor the interest rate basis, so we take a conservative approach and apply a haircut of zero. For this reason, our estimated haircuts may underestimate the true scale of unrecognized losses, so it is possible that risks to credit unions arising from higher interest rates are greater than those we estimate.

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<sup>12</sup> A “natural person” credit union is one which primarily serves “natural persons,” or individuals, rather than, for example, associations or corporations. Our analysis does not include corporate credit unions, which submit a different call report form.

<sup>13</sup> For those less than five years, we assume a haircut of zero. There are 10 credit unions that appear to report a negative amount of CRE lending more than five years; we apply no haircut in these cases.

<sup>14</sup> The FRBNY/Equifax CCP is a nationally representative anonymous random sample from Equifax credit files, which tracks all consumers with a US credit file residing in the same household from a random, anonymous sample of 5 percent of US consumers with a credit file. FRBNY/Equifax CCP includes information on auto loans originated by credit unions, but we do not know the identity of each lender. We take a representative sample of these loans, compute the weighted average haircut (2.18 percent), and apply that to each credit union’s reported auto loans. Where the loan term is missing, we follow An et al. (2020) and back it out using an amortization function.



TABLE 1 – Residual maturity assumptions for credit union assets, 2023:Q1

Asset category	Reported term	Assumed remaining term at 2023:Q1	Estimated haircut
Fixed rate residential property loans, first lien	> 15 years	180 months	10.95%
	≤ 15 years	75 months	5.91%
Balloon/hybrid residential property loans, first lien	> 5 years	60 months	9.27%
	≤ 5 years	15 months	4.17%
Fixed rate residential property loans, junior lien	Not disclosed	45 months	4.35%
Commercial loans backed by CRE	> 5 years	60 months	5.14%
Auto loans	Not disclosed	Reconstruct distribution using public data on auto loan issuance	2.18%
HTM securities	-	Recognized at fair value	-
AFS securities	-	Net gains/losses recognized	-
All other assets	Not disclosed	Zero haircut	0%

Source: Authors' calculations.

Each credit union reports an allowance for loan and lease losses (ALLL), meaning they have already recognized some losses. To account for this, we assume ALLL is distributed proportionately across all loan categories and reduce our loss figures accordingly. There are eight credit unions that report a negative ALLL figure. We drop these credit unions from our analysis.

There are two other minor differences between our approach and that of F&S. First, credit unions are tax exempt, so we need not consider tax treatment of the losses. Second, Call Report Form 5300 has no separate treatment of securities reclassified from AFS to HTM, so we take the reported holdings of and unrealized losses on AFS and HTM securities as current and correct.

### *Reporting our results*

We describe our results with reference to the NCUA's capital adequacy categories, summarized in Table 2. The net worth ratio (NWR) is calculated as the net worth divided by total assets expressed as a percentage rounded to two decimal places.<sup>15</sup> This metric is comparable

<sup>15</sup> Additionally, complex credit unions, defined as those with more than \$500 million in assets, are subject to a risk-based capital ratio that is comparable to the capital ratio in Basel 3 (NCUA, 2022b). We focus on the net worth ratio so that we can compare results across all US credit unions.

to a simple leverage ratio. As of 2023:Q1, the average net worth ratio (unweighted mean) was 12.85 percent, and the median was 11.04 percent.<sup>16</sup> Table 2 suggests that larger credit unions tend to be better capitalized.

**TABLE 2 – Net worth ratio classifications before recognizing unrealized losses, 2023:Q1**

NCUA classification	Net Worth Ratio	Number of credit unions	Assets (millions of \$)	Percentage of credit unions	Percentage of industry assets
Well Capitalized	7% or greater	4,659	2,226,776	97.00%	99.68%
Adequately Capitalized	6% to 6.99%	107	6,015	2.23%	0.27%
Undercapitalized	4% to 5.99%	31	1,078	0.65%	0.05%
Significantly Undercapitalized	2% to 3.99%	6	62	0.12%	0.00%
Critically Undercapitalized	0% to 1.99%	0	0	0.00%	0.00%

Sources: Call Report Form 5300 data and authors' calculations.

The NCUA assigns each credit union to one of five categories depending on its NWR. Those with an NWR of 7 percent or more are deemed “well capitalized”; as Table 2 shows, the vast majority of credit unions fall into this category. Credit unions with NWRs below this are subject to dividend restrictions; see NCUA (2022c) for more details. We regard “significantly undercapitalized” (that is, NWR below 4 percent) as a critical point below which conservatorship becomes a possibility (see NCUA, 2015).<sup>17</sup>

## Results

### *Aggregate Losses*

Using our methodology, Table 3 shows the aggregate losses for each broad asset class as a percentage of total assets. The final row is the estimated NWR after applying all

<sup>16</sup> The numerator of the NWR is cumulative retained earnings. The denominator of the NWR excludes loans pledged to the Federal Reserve’s Paycheck Protection Program Liquidity Facility (PPPLF) and includes the CECL Transition Provision. For our calculations, we use total assets at quarter end. But, for the regulatory NWR computed in the call reports, credit unions can choose how they want to calculate total assets in the denominator. For example, they can use an average over the quarter. Because of this, our computed NWRs may differ slightly from those computed in the call report forms. In more than 99 percent of cases, our NWR calculation is within 0.5 points of the NCUA’s.

<sup>17</sup> The NCUA definition of “well capitalized” also requires the credit union to score well on other capital metrics that we do not consider in this paper. In addition to the credit unions in Table 2, there was one insolvent credit union on March 31, 2023. It was liquidated on April 3 so is not included in our analysis.

unrecognized losses.<sup>18</sup> Each column aggregates the losses in a different way: the first is a simple mean in which each credit union is weighted equally, the second weights each credit union by assets, and the third is an equal-weighted median. As expected, loans are the main sources of unrealized losses. About half of the unrealized losses from loans come from fixed-rate residential property loans with more than 15 years remaining.

After recognizing these unrealized losses, the simple average NWR drops from 12.85 percent to 10.32 percent; given this figure, most credit unions remain well-capitalized. However, looking at the second column, the weighted average NWR falls from 10.71 to 6.40 percent, suggesting that the industry as a whole would lose 40 percent of its net worth and drop into the “adequately capitalized” category. The difference between simple and weighted average is a result of larger credit unions’ tending to have relatively larger unrealized losses from both securities and loans.

**TABLE 3 – Average impact of recognizing unrealized losses by asset category, relative to current reported assets, 2023:Q1**

Effects of Estimated Losses			
Unrealized losses	Simple mean	Weighted mean	Median
<b>Original Net Worth Ratio</b>	<b>12.85%</b>	<b>10.71%</b>	<b>11.04%</b>
Losses on Available for Sale Securities	-0.68%	-1.51%	0.00%
Losses on Held to Maturity Securities	-0.33%	-0.22%	0.00%
Losses on Loans	-1.68%	-2.77%	-1.46%
Losses on Loans + AFS + HTM	-2.69%	-4.50%	-2.32%
<b>After all losses recognized</b>	<b>10.32%</b>	<b>6.40%</b>	<b>8.57%</b>

Sources: Call Report Form 5300 data and authors’ calculations.

### *Results by capital category*

Table 4 shows the impact on capital classifications from recognizing unrealized losses. After recognizing unrealized losses in NWR, around 65 percent of credit unions, representing about 30 percent of industry assets, would remain well-capitalized. We estimate that 436 credit

<sup>18</sup> Losses are given relative to reported assets, excluding PPPLF-pledged loans and including the CECL Transition Provision. Simply adding the losses to the original NWR produces a smaller number than the actual final NWR, because losses reduce both the numerator and denominator of the ratio. If a credit union left blank any loan or security categories, we assume those missing values are zero.

unions, representing about 13 percent of industry assets, would have NWRs below 4 percent, suggesting a risk of conservatorship. Of these, 15 would actually have negative NWRs.<sup>19</sup>

Capital adequacy problems resulting from unrealized losses are more likely at larger credit unions. While call report data suggest larger credit unions tend to be better capitalized than smaller ones (Table 2), the situation is reversed after accounting for unrealized losses (Table 4). This is because larger credit unions tend to have relatively higher exposure to mortgage loans (Figure 2) and to securities. Of the top 20 credit unions by assets, only three remain well-capitalized after recognizing these losses.

**TABLE 4 - Net worth ratio classifications after recognizing unrealized losses, 2023:Q1**

<b>Classification</b>	<b>Net Worth Ratio</b>	<b>Number of credit unions</b>	<b>Assets (millions of \$)</b>	<b>Percentage of credit unions</b>	<b>Percentage of industry assets</b>
Well Capitalized	7% or greater	3,114	656,732	64.83%	29.40%
Adequately Capitalized	6% to 6.99%	508	565,245	10.58%	25.30%
Undercapitalized	4% to 5.99%	745	716,902	15.51%	32.09%
Significantly Under Capitalized	2% to 3.99%	341	265,276	7.10%	11.87%
Critically Undercapitalized	0% to 1.99%	80	27,559	1.67%	1.23%
Insolvent	less than 0%	15	2,217	0.31%	0.10%

Sources: Call Report Form 5300 data and authors' calculations.

Although Table 3 suggests that securities are not the main source of unrealized losses in aggregate, there are a small number of credit unions for which they are very important. If we were to recognize only gains or losses resulting from fair valuation of securities without adjusting loan valuations, about 86 percent of credit unions would remain well-capitalized, but there would be a tail of 102 credit unions that would be classified as significantly under-capitalized or worse (NWR below 4 percent). A few would have a negative net worth and thus be insolvent on a mark-to-market basis, though these represent only 0.03 percent of industry assets.

Broadly speaking, it appears that unrealized losses are a greater problem for banks than credit unions, at least in aggregate. F&S estimate that more than half of US banks would fail to meet regulatory capital requirements if all losses were recognized, while Table 4 suggests the

<sup>19</sup> The final column of Table 4 weights credit unions by unadjusted assets before recognizing unrealized gains or losses.

corresponding number for credit unions is about one-third. Interestingly, F&S find that, for banks, losses are evenly spread across size categories, while we find a concentration of unrealized losses at the largest credit unions. This difference may be because smaller credit unions typically have assets with shorter durations than those of larger credit unions (see Figure 2). However, we should be careful about comparing our results directly with those of F&S because of differences in call report disclosure and the definition of regulatory capital.

## **Mitigating factors**

In the spirit of F&S, our methodology is deliberately conservative, so it may be that we underestimate unrealized losses. On the other hand, the nature of credit unions' liabilities points to several mitigating factors. Most importantly, the majority of credit union deposits are insured, reducing the likelihood of a run. In addition, individual credit unions may have hedges against losses from interest rate risk in the form of either derivatives positions or the value of their deposit franchises. We discuss these mitigating factors in more detail below.

Credit unions have two main types of liabilities: deposits and shares. A "share" for a credit union is an ownership stake that often pays a promised rate of interest, so we consider it more akin to a bank deposit than to bank stock. In particular, shares at credit unions may be insured against loss, just like deposits at banks are insured by the FDIC. Therefore, when we discuss deposit insurance and deposit franchises in this section, we include both deposits and shares.

## *Deposit insurance*

Banks experienced problems in 2023 not only because of unrealized losses on their assets, but also because of a reliance on uninsured deposits (Jiang et al., 2023). When a financial institution experiences a depositor run, it may need to sell assets to obtain cash to pay them. If the selling price is less than the amortized cost, the institution will be forced to recognize unrealized losses upon sale. When a financial institution has a large amount of uninsured deposits, there can be self-fulfilling beliefs about a run: depositors fear losses if others run, so they rationally withdraw their deposits, thus causing a run (Diamond and Dybvig, 1983). But insured depositors do not face the same incentives to run because they know the deposit insurance scheme will pay them in full even if the institution fails. If deposit insurance is credible, then there may be no equilibrium in which the financial institution is forced to recognize unrealized losses.

The NCUA's Share Insurance Fund provides deposit insurance to federally chartered credit unions up to \$250,000 per depositor (Harper, 2023).<sup>20</sup> According to 2023:Q1 Call Report Form 5300 data, about 90 percent of all deposits in credit unions are insured. Individually, 90 percent of credit unions have at least 90 percent of their deposit base insured, and 50 percent

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<sup>20</sup> Most credit unions obtain deposit insurance from the NCUA. Some state-chartered credit unions arrange deposit insurance privately. The numbers and figure in this section relate only to NCUA-insured credit unions, not those which exclusively obtain insurance privately. Where a credit union obtains insurance from both sources, our statistics include the total amount insured.

have at least 97 percent insured. This high level of coverage suggests that credit unions are resilient to runs, at least in aggregate, which mitigates concerns about unrealized losses.<sup>21</sup>

We introduce a simple metric to quantify the vulnerability of individual credit unions to runs: the ratio of the dollar value of uninsured deposits to the value of assets after recognizing unrealized losses. This metric measures the ability of a credit union to pay its uninsured depositors. A ratio of 100 percent or less means that the credit union has sufficient assets to pay out all uninsured depositors if they were to run and force assets to be liquidated at our estimated fair value. Even if all the losses were to be recognized, all depositors would be paid in full – either from asset sales or from the deposit insurance fund – so they have little reason to run and force the credit union to realize those losses. The lower the ratio, the less risk of a run arising from concerns by uninsured depositors about unrealized losses.

Our ratio is not the same as capital adequacy; for example, a credit union could have a run vulnerability ratio well below 100 percent but be unable to pay its insured depositors, who would be compensated in full by the deposit insurance fund. Thus, while a low ratio suggests that a run may not be rational for depositors, it does not guarantee survival of the credit union if a run were nonetheless to occur.<sup>22</sup>

Figure 3 shows the distribution of our run vulnerability ratio across credit unions. Our ratio is very small for most credit unions, suggesting that they are relatively resistant to the risk of a run. The median ratio is 2.5 percent and the highest that we observe is about 60 percent.<sup>23</sup> Over 1,100 credit unions had zero dollars of uninsured deposits in 2023:Q1, so their run vulnerability ratios are zero.

The NCUA requires credit unions with more than \$250 million in assets to have access to federal emergency liquidity, either at the NCUA or the Federal Reserve. Federally insured credit unions may also be eligible for the Bank Term Funding Program which began on March 12, 2023 and is scheduled to end on March 11, 2024. These liquidity programs can help a credit union promptly pay withdrawing depositors but, as they can only provide temporary relief from unrealized losses, they do not affect our assessment of run vulnerability.<sup>24</sup>

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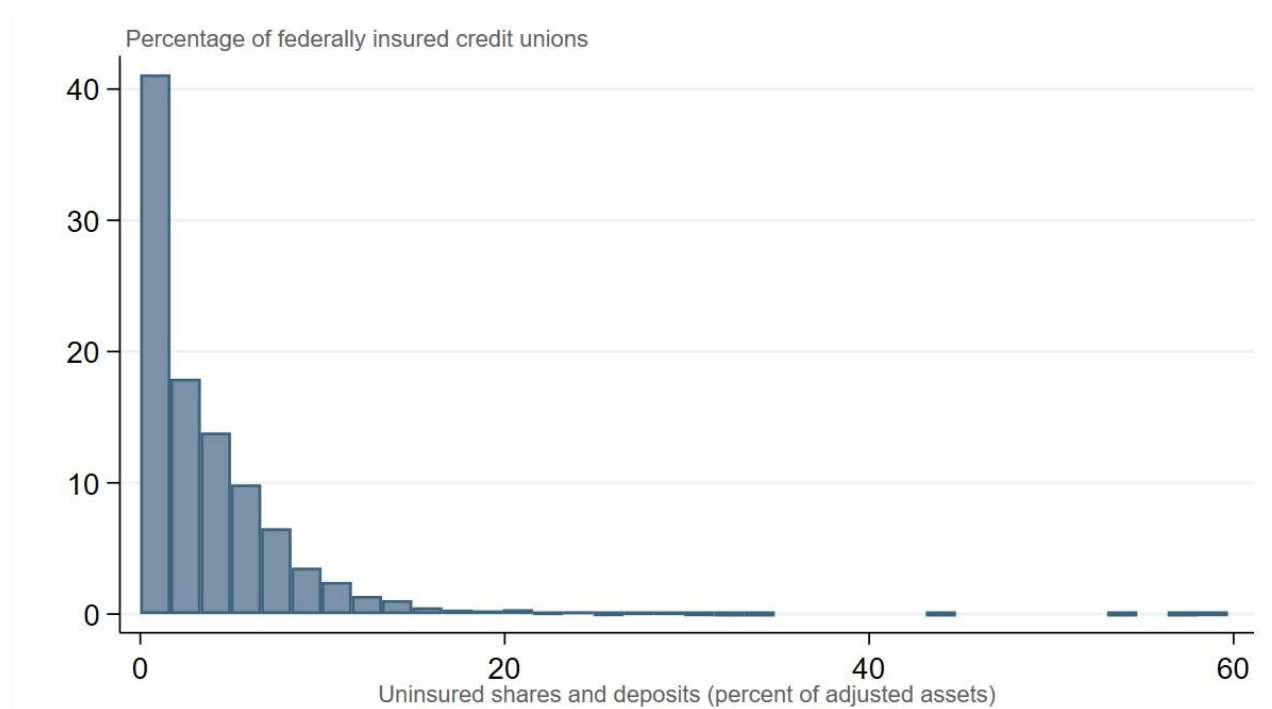
<sup>21</sup> By way of contrast, about 45 percent of domestic deposits issued by commercial banks were uninsured in 2023:Q1 (source: Call Report Forms FFIEC 031,041, and 051). Note, however, that banks with less than \$1bn in assets do not provide estimates of uninsured deposits.

<sup>22</sup> Even a ratio below 100 percent could be compatible with a run equilibrium, for several reasons. First, depositors may believe unrealized losses are larger than those we estimate. Second, if the credit union is fire-selling assets into a stressed market, it may not be able to achieve the economic fair value of the assets. Third, insured depositors may decide to withdraw too rather than wait to be paid out by the deposit insurance fund.

<sup>23</sup> For comparison, we estimate that Silicon Valley Bank had a run vulnerability ratio of at least 75 percent in 2022:Q4, the last quarter of data available before its failure. This estimate uses losses from HTM securities but not loans, so the true ratio is likely higher.

<sup>24</sup> Federally insured credit unions with more than \$250m in assets are required to have access to at least one of these official liquidity facilities. In addition, some smaller credit unions have chosen to establish access. Those that have not must plan contingency liquidity sources. See Matz (2013).

**FIGURE 3 – Run vulnerability ratio for NCUA-insured credit unions, 2023:Q1**



Sources: Call Report Form 5300 data and authors' calculations.

### *Hedging*

The results so far do not take into account that some credit unions may have hedges in place against interest rate risk. For example, a credit union may have an interest rate swap that allows it to pay a fixed rate in exchange for an income indexed to a floating rate. Given that we find the larger credit unions tend both to be more exposed to interest rate risk and hold more securities, we could be overstating the losses they face. It seems plausible, though by no means guaranteed, that a well-managed credit union facing substantial unrealized losses from rising interest rates might have put hedges in place.

The evidence for hedging is limited. Call Report Form 5300 contains data on credit unions' interest rate derivatives holdings. Both notional and net fair value amounts are provided. Only 60 credit unions report a non-zero net fair value of interest rate derivative holdings. Unfortunately, we do not have data on the nature of these derivatives or the direction of any hedging. If credit unions have strategically hedged against interest rate risk, we should expect the fair value of interest rate derivative holdings to increase with estimated unrealized losses. Indeed, for these 60 credit unions, there is a slight positive correlation between fair value of positions and unrealized losses, suggesting some strategic hedging. But these hedges are insufficient to fully mitigate losses.<sup>25</sup>

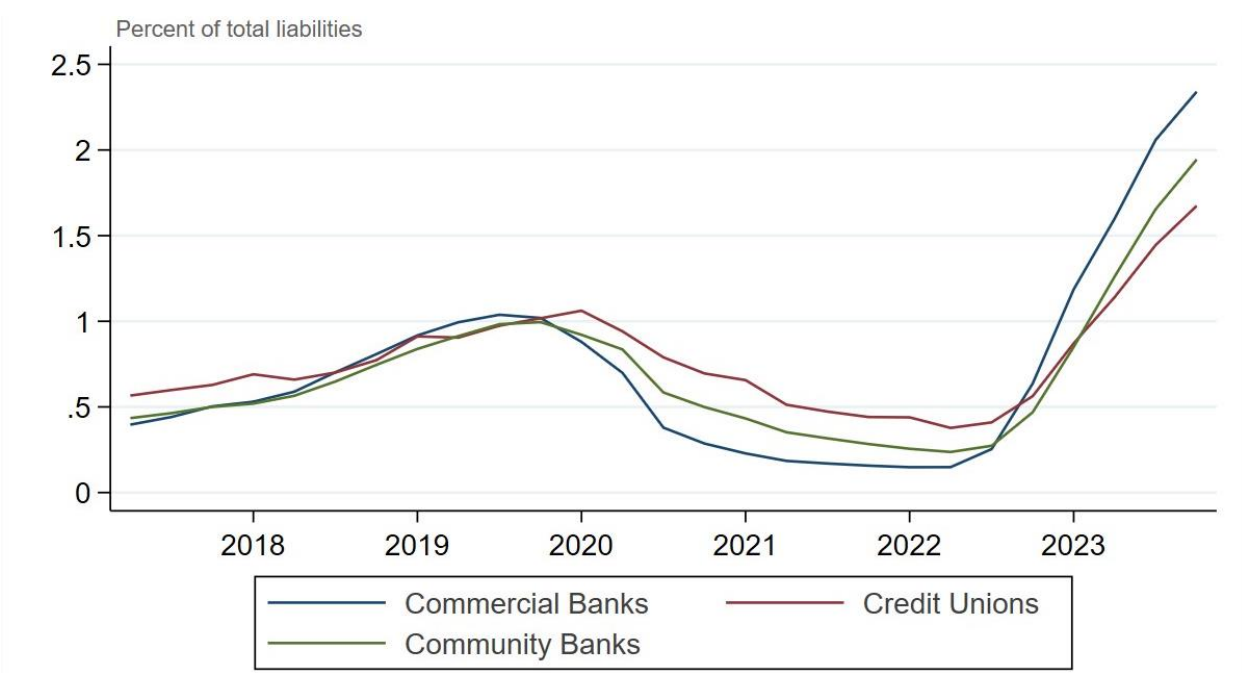
<sup>25</sup> The net fair value of interest rate derivatives is less than 10 percent of unrealized losses.

*Value of the deposit franchise*

Banks can effectively hedge interest rate risk by paying deposit rates that are less sensitive to market interest rates than their lending rates are (see Drechsler et al., 2021). This means that while their assets fall in value as interest rates rise, the cost of their liabilities falls by more, increasing the net value of the bank. This is known as the “deposit franchise.” Our paper contributes to recent research on the deposit franchise by studying credit unions.

We find evidence that credit unions’ deposit franchises may hedge interest rate risk better than banks’ because their interest expenses are less sensitive to changes in market interest rates. Figure 4 shows the annualized interest expense paid by commercial banks and credit unions per dollar of total liabilities in recent years. Differences in the liability structures of banks and credit unions make it difficult to compare the graphs directly, so we focus on the relative changes over time.<sup>26</sup> During this period, credit unions’ interest expenses are less responsive than banks’ to changes in market interest rates, suggesting they have not found it necessary to raise their deposit rates as much as banks have since the FOMC began raising rates. This lower sensitivity implies that credit unions’ deposit franchises may be a better hedge than banks’ against interest rate risk on their assets.

**FIGURE 4 – Interest expense over time of banks and credit unions, 2017:Q1 to 2023:Q3**



Sources: Data from Call Report Form 5300 and FFIEC Forms 031, 041, 051 and authors’ calculations.

<sup>26</sup> Figure 4 plots total interest expenses for both commercial banks and credit unions, relative to total liabilities. For credit unions, total interest expenses are those on deposits, member shares, and any borrowed money.



It is not clear why credit unions' interest expenses are less sensitive to the cycle than banks'. To some extent, this insensitivity could be explained by the fact that credit unions serve local communities and sectors rather than national ones. But the same is true of community banks (that is, those with less than \$10 billion in assets) and, as Figure 4 shows, credit unions' interest expenses are even less cyclical than those of community banks. DeYoung et al. (2022) suggest that credit unions have tax and legal advantages over banks that are partially passed onto depositors; to the extent these advantages are not interest sensitive, they could explain some of the difference.<sup>27</sup>

## Conclusion

Our analysis suggests that US credit unions bore a significant amount of unrealized losses in 2023:Q1. While in aggregate the industry would have remained well-capitalized even after recognizing these losses, some individual credit unions, especially larger ones, could have experienced capital adequacy problems. However, the size of the problem appears to have been smaller than that facing the banking industry for two reasons. First, credit unions' unrecognized losses were lower than those of banks. Second, credit unions' depositors were more likely to be insured than are banks' depositors, making them less likely to run and force losses to be recognized.

## References

- Abdymomunov, Azamat, Jeff Gerlach, and Yuji Sakurai. 2023. "Interest Rate Risk in the U.S. Banking Sector." Working paper. <https://doi.org/10.2139/ssrn.4395529>.
- An, Xudong, Larry Cordell, and Sharon Tang. 2020. "Extended Loan Terms and Auto Loan Default Risk." Working paper 20-18. Federal Reserve Bank of Philadelphia. <https://doi.org/10.21799/frbp.wp.2020.18>.
- Bell, Sarah, Michael Chui, Tamara Gomes, Paul Moser-Boehm, and Albert Pierres Tejada. 2023. "Why Are Central Banks Reporting Losses? Does It Matter?" BIS Bulletin No. 68. <https://www.bis.org/publ/bisbull68.htm>.
- Berry, Jared, Felicia Ionescu, Robert Kurtzman, and Rebecca Zarutskie. 2019. "Changes in Monetary Policy and Banks' Net Interest Margins: A Comparison across Four Tightening Episodes." FEDS Notes. <https://doi.org/10.17016/2380-7172.2352>.
- Board of Governors of the Federal Reserve System. 2021. "Community & Regional Financial Institutions." September 15, 2021. <https://www.federalreserve.gov/supervisionreg/community-and-regional-financial-institutions.htm>.
- Board of Governors of the Federal Reserve System. 2023a. "Credit Unions; Consumer Credit, Auto Loans; Asset, Level [BOGZ1FL473066403Q]." FRED, Federal Reserve Bank of St. Louis. Accessed August 16, 2023. <https://fred.stlouisfed.org/series/BOGZ1FL473066403Q>.

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<sup>27</sup> Other possible explanations are the different liability structures of banks and credit unions (in particular credit unions have no joint stock equity); differing risk preferences of depositors at banks and credit unions; or credit unions trying to compete for deposits at different times in the cycle to banks.

Board of Governors of the Federal Reserve System. 2023b. "Households and Nonprofit Organizations; Consumer Credit, Automobile Loans; Liability, Level [BOGZ1FL153166400Q]." FRED, Federal Reserve Bank of St. Louis. Accessed August 16, 2023. <https://fred.stlouisfed.org/series/BOGZ1FL153166400Q>.

Board of Governors of the Federal Reserve System. 2023c. "Market Yield on U.S. Treasury Securities at 20-Year Constant Maturity, Quoted on an Investment Basis [DGS20]." FRED, Federal Reserve Bank of St. Louis. Accessed August 15, 2023. <https://fred.stlouisfed.org/series/DGS20>.

Board of Governors of the Federal Reserve System. 2023d. "Time and Savings Deposits [L.205]." FRED, Federal Reserve Bank of St. Louis. Accessed August 15, 2023. <https://fred.stlouisfed.org/release/tables?rid=52&eid=808872>.

Chang, Briana, Ing-Haw Cheng, and Harrison G. Hong. 2023. "The Fundamental Role of Uninsured Depositors in the Regional Banking Crisis." Working paper. <https://doi.org/10.2139/ssrn.4497863>.

Deng, Youngheng, John M. Quigley, and Robert van Order. 2000. "Mortgage Terminations, Heterogeneity and the Exercise of Mortgage Options." *Econometrica* 68 (2): 275–307. <https://doi.org/10.1111/1468-0262.00110>.

DeYoung, Robert, John Goddard, Donal G. McKillop, and John O. S. Wilson. 2022. "Who Consumes the Credit Union Subsidies?" QMS Research Paper 2022/03. <https://doi.org/10.2139/ssrn.3429208>.

Diamond, Douglas W., and Philip H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91 (3): 401–19. <https://doi.org/10.1086/261155>.

Dick-Nielsen, Jens, and Christoffer Thimsen. 2023. "The Blind Spot of Unrealized Losses." Working paper. <https://doi.org/10.2139/ssrn.4497480>.

Drechsler, Itamar, Alexi Savov, and Philipp Schnabl. 2017. "The Deposits Channel of Monetary Policy." *Quarterly Journal of Economics* 132 (4): 1819–1876. <https://doi.org/10.1093/qje/qjx019>.

Drechsler, Itamar, Alexi Savov, and Philipp Schnabl. 2021. "Banking on Deposits: Maturity Transformation without Interest Rate Risk." *The Journal of Finance* 76 (3): 1091–1143. <https://doi.org/10.1111/jofi.13013>.

Flannery, Mark J., and Sorin M. Sorescu. 2023. "Partial Effects of Fed Tightening on U.S. Banks' Capital." Working paper. <https://doi.org/10.2139/ssrn.4424139>.

Gerlach, Jeffrey R., Nada Mora, and Pinar Uysal. 2018. "Bank Funding Costs in a Rising Interest Rate Environment." *Journal of Banking and Finance* 87:164–186. <https://doi.org/10.1016/j.jbankfin.2017.09.011>.

Harper, Todd M. 2023. "Remarks at the Credit Union Leadership Convention." National Credit Union Administration. July 27, 2023. <http://ncua.gov/newsroom/speech/2023/ncua-chairman-todd-m-harper-remarks-credit-union-leadership-convention>.

Henning, Lydia, Simon Jurkatis, Manesh Powar, and Gian Valentini. 2023. "Lifting the Lid on a Liquidity Crisis." *Bank Underground* (blog). July 18, 2023. <https://bankunderground.co.uk/2023/07/18/lifting-the-lid-on-a-liquidity-crisis/>.

Jiang, Erica Xuwei, Gregor Matvos, Tomasz Piskorski, and Amit Seru. 2023. "Monetary Tightening and U.S. Bank Fragility in 2023: Mark-to-Market Losses and Uninsured Depositor Runs?" Working Paper 31048. National Bureau of Economic Research. <https://doi.org/10.3386/w31048>.

Karels, Gordon V. and Christine A. McClatchey. 1999. "Deposit Insurance and Risk-Taking Behavior in the Credit Union Industry." *Journal of Banking and Finance* 23 (1): 105–134. [https://doi.org/10.1016/S0378-4266\(98\)00074-0](https://doi.org/10.1016/S0378-4266(98)00074-0).

Matz, Debbie. 2013. "Guidance on How to Comply with NCUA Regulation §741.12 Liquidity and Contingency Funding Plans." National Credit Union Administration. October 1, 2013. <http://ncua.gov/regulation-supervision/letters-credit-unions-other-guidance/guidance-how-comply-ncua-regulation-ss74112-liquidity-and-contingency-funding-plans>.

Müller, Robert. 2005. "A Technical Note on the Svensson Model as Applied to the Swiss Term Structure." In *Zero-Coupon Yield Curves: Technical Documentation*. BIS Papers, No. 25. <https://www.bis.org/publ/bppdf/bispap25.htm>.

NCUA. 2015. "Risk-Based Capital, A Rule by the National Credit Union Administration." *Federal Register* 80 (209). <https://www.federalregister.gov/documents/2015/10/29/2015-26790/risk-based-capital>.

NCUA. 2022a. "NCUA's 2022 Supervisory Priorities." National Credit Union Administration. January 2022. <http://ncua.gov/regulation-supervision/letters-credit-unions-other-guidance/ncuas-2022-supervisory-priorities>.

NCUA. 2022b. "Risk Weights at a Glance." National Credit Union Administration. April 14, 2022. <http://ncua.gov/regulation-supervision/regulatory-compliance-resources/risk-based-capital-rule-resources/risk-weights-glance>.

NCUA. 2022c. "Prompt Corrective Action Frequently Asked Questions." National Credit Union Administration. November 17, 2022. <http://ncua.gov/regulation-supervision/regulatory-compliance-resources/net-worth-ratio-plan-and-prompt-corrective-action-resources/prompt-corrective-action-faqs>.

NCUA. 2023. "NCUA's 2023 Supervisory Priorities." National Credit Union Administration. January 2023. <http://ncua.gov/regulation-supervision/letters-credit-unions-other-guidance/ncuas-2023-supervisory-priorities>.

NCUA. 2024. "NCUA's 2024 Supervisory Priorities." National Credit Union Administration. January 2024. <https://ncua.gov/regulation-supervision/letters-credit-unions-other-guidance/ncuas-2024-supervisory-priorities>.

Wheelock, David C. and Paul W. Wilson. 2011. "Are Credit Unions Too Small?" *The Review of Economics and Statistics* 93 (4): 1343–1359. [https://doi.org/10.1162/REST\\_a\\_00121](https://doi.org/10.1162/REST_a_00121).