International Journal of Business and Social Research
Volume 05, Issue 08, 2015

Acquired Credit Unions: Drivers of Takeover[1]

R. Raymond Sant[2]; Stephen B. Carter[3]

ABSTRACT

In this paper we study acquired credit unions and analyze their financial performance up to six years prior to merger, on a quarterly basis. The primary focus is on balance sheet (asset liability management) and profitability variables (return on assets). We find that acquired credit unions during the period 2008 (third quarter) to 2014 (first quarter) experienced negative return on assets for several quarters prior to their takeover. This was the result of a declining loan portfolio and increasing charge offs. In spite of decreasing lending activity, such credit unions continued to increase their deposits, i.e., adding to their cost base. Due to declining loans, their net interest margin as a proportion of deposits was also in decline. We argue that this is an indicator of poor management ability. Furthermore, our analysis finds that operating expenses were increasing over time, something that has been documented in previous literature also for smaller credit unions and is attributable to lack of economies of scale. The average asset size of the acquired credit unions in our sample is about $22 million just before acquisition. We attribute our findings to poor business strategy followed by such credit unions. We also conclude that signs of trouble are evident up to two years before merger on average and regulatory policy may have to become more proactive to manage the consolidation challenge faced by the credit union industry in general.

Keywords: ALM, asset liability management, charge-offs, credit unions, mergers.
JEL Codes: C12, C13, C14, L11, G21.
Available Online: 30th August, 2015.

1.0 INTRODUCTION

The credit union industry in the U.S. has traditionally been dominated by small credit unions (under $50 million in assets) in terms of numbers but not in terms of total assets, whose population is in a steady decline[4]. Credit unions, as part of their mission, do not pursue profit as a financial goal but maximize their

[1] The authors would like to thank Regina W. Schroeder for her insightful comments and an anonymous referee for suggesting that regressions be included to demonstrate existence and significance of statistical relationships present in our sample. The remaining errors are the authors'.
[2] Associate Professor, Department of Finance, St. Edward's University, Austin TX. E-mail: raysant@stedwards.edu.
[3] Austin, TX. E-mail: brycecarter@gmail.com

members' utility by keeping lending rates low and deposit rates high (Bauer, 2008). This adds a new dimension of challenge to the credit unions' ability to generate earnings which are required for growth. Credit unions mainly depend upon their members' shares for capital with the only other source being earnings or surplus from operations. A credit union focused on minimizing its lending rate and maximizing its deposit rate for the benefit of its members is handicapped when it comes to creating enough internal surplus for aggressive growth of its business. This observation was first articulated by Taylor (1977). It was further argued that under such conditions, a credit union would undergo a margin squeeze, i.e., the difference between its lending and borrowing rates which is also referred to as net interest margin (NIM), would narrow. This conundrum between growth and earnings driven capital growth presents unique challenges to credit unions. Sant and Schroeder (2012) present a strategic framework for credit union growth while balancing capital against risk exposure arising from a financial institution's decisions regarding the asset class mix in its portfolio.

Wheelock et al, (2011) study credit union economies of scale and report existence of substantial evidence of increasing returns to scale suggesting a strong likelihood of ongoing industry consolidation and growth in the size of the average credit union. Fried et al. (1993), when analyzing credit union performance, find that large credit unions ($100 million and over in assets) outperform all other credit unions in terms of radial efficiency criterion - a proxy for productive efficiency, consistent with the result found by Wheelock et al.

Several studies have directly studied credit union mergers with a focus on productive, operational and cost efficiency as well as benefits accruing to various stakeholders. Fried et al. (1999), study the impact of mergers on members of acquiring and acquired credit unions as well as compare successful and unsuccessful mergers. Their results, averaged over the period: 1989-1994, document that members of acquired credit unions benefit from the merger but those of acquiring credit unions do not. Statistics provided in their paper show that acquired credit unions had average loan to deposit ratio of seventy percent; delinquent loans were at 5.2% of total loans, and loan charge-offs amounted to 1.2% prior to a merger. Return on assets averaged 0.06% and deposits to total assets averaged eighty-eight percent[5]. The average asset size of an acquired credit union was $2.5 million which was less than 1/30th the size of an average acquiring credit union. The acquired credit unions had much lower average return on assets but higher charge-off and delinquency ratios compared with the acquiring credit unions. The focus of the Fried et al. paper was on services provided to members and determinants of merger success. The paper does, however, note that acquired credit unions are more likely to benefit from mergers if they have room to improve in the form of a weak loan portfolio and a high ROA (return on assets).

Wheelock and Wilson (2000) analyze bank mergers and failures, and find that the lower a bank's capitalization ratio the greater the likelihood that it would be subject to an acquisition. However, the probability of acquisition declines with higher ROA ratios. Contrary to expectations that an inefficiently managed bank would be a good takeover candidate, on average, high cost inefficiency reduces takeover probability as the high cost of restructuring an inefficient bank may discourage such an outcome. Bauer et al. (2009) find support for the thesis that most mergers are done at the behest of the regulators to prevent an insurance fund (NCUSIF) bailout of a failing institution. Similar to Fried et al. (1999) they also find that while the performance of an acquiring credit union is affected little, it is the members of the target credit union that experience gains from improved performance and markedly higher financial stability of the combined institution.

Our paper analyzes the reasons why a credit union is taken over. These reasons are explored along the lines of the credit unions' business strategies. This study investigates the metrics of financial performance in terms of loans, deposits, operating costs, profitability and capital ratio. It is different from the existing literature in that its focus is on developing an understanding of the role played by management ability as well the financial variables that drive a credit union into a takeover situation. One of the primary distinguishing features of this study is its longitudinal perspective. We analyze the financial performance

[5] Calculated ratio based on data provided in the paper.

and strategy variables over a period of up to twenty-three quarters (nearly six years) prior to the merger of a credit union. The study by Fried et al. (1999) cited above, does not present longitudinal data by quarter or by year leading up to the date of merger for the acquired credit unions, which prevents drawing of conclusions about their trends or strategic behaviors prior to an acquisition. Our paper fills that gap with additional insight into the strategic business factors that are critical to a financial institution's survival and growth.

The rest of the paper is organized as follows: Section 2 describes the data, its sources, and methodology; Section 3 provides the analysis of acquired credit unions; and, Section 4 concludes this paper with a summary.

2.0 DATA AND METHODOLOGY

Merger data was obtained from NCUA under the Freedom of Information Act (1967) for the period: 2008 (3rd Quarter) to 2014 (1st Quarter). A total of 1,735 acquired credit unions were obtained. Financial data for the credit unions was obtained from the Call Repots available on the NCUA web site[6]. For each credit union, data was obtained going back twenty-four quarters. In order to analyze the pre-merger financial performance of merged credit unions, we adopted the event-study approach commonly used in empirical finance to study the impact of an event on stock prices or some other observable variable of interest[7].

After obtaining the NCUA Call Reports data for twenty-four quarters before the merger quarter, the list of merged credit unions shrank to 789 credit unions. Of these 785 credit unions had complete data for twenty-three quarters prior to merger. Results reported in this paper are based on this data set. Table 1 presents the summary statistics for asset size, loans, deposits, net-worth and charge-offs for the sample.

Table 1: Summary statistics of acquired credit unions, one quarter prior to merger

(Dollars)	Mean	Median	Standard Deviation
Assets	21,857,237	4,045,102	73,700,296
Loans	13,018,246	1,909,505	50,679,236
Deposits	19,523,130	3,618,795	64,293,800
Net -worth	1,863,351	352,403	7,390,308
Charge-offs	46,231	0	254,135

3.0 ANALYSIS: LONGITUDINAL PRE-MERGER FINANCIAL PERFORMANCE

3.01 ASSET LIABILITY MANAGEMENT: BALANCE SHEET VARIABLES

All financial institutions pay close attention to managing their balance sheet, which is often known as asset liability management (ALM). Therefore, we first analyze the balance sheet variables of the acquired credit unions. Such credit unions experienced a 13.17% increase in total assets from twenty-three quarters before to one quarter before merger. Over this period, the average asset size grew from $19.3 million to $21.9 million (Table 2). The asset growth was reflected in their deposit growth as well which grew from $16.7 million to $19.5 million on average, reflecting an increase of 16.83% over the same period, exceeding the asset growth by 3.66%. The growth in average loans, however, did not keep pace with the growth in deposits or assets, with the former increasing by only 4.28%, from $12.5 million to $13.02 million.

As a result of the lackluster growth in loans, the average loans to deposits ratio declined from 67.04% to 56.3% over the stated period. This reflects a decrease of 16.02%. The loan to assets ratio showed a similar decline of 13.19% from 56.35% to 48.92%. It is notable that while the acquired institutions were able to

[6] http://www.ncua.org
[7] See Bauer (2008).

attract deposits they were not able to lend those deposits to potential borrowers at the same rate as in the past.

Table 2: Lending and deposit trends

The credit union longitudinal financial results have been obtained directly by aggregating the data reported by every credit union on a quarterly basis to the National Credit Union Administration (NCUA), a regulatory body set up the federal government. All credit unions are required to report their financial and non-financial data to the NCUA which is released to the public on the latter's web site. Results are reported by quarter before the merger. The following table focuses on the balance sheet (ALM) variables. The period covers: 2008 (3rd quarter) to 2014 (1st quarter)[1].

Quarter	Assets	Deposits	Loans	Loans/Deposits	Loans/Assets
-23	19,312,604	16,710,836	12,484,452	.6704	.5635
-22	19,557,357	16,889,584	12,653,238	.6689	.5623
-21	19,793,804	17,079,710	12,798,650	.6688	.5610
-20	20,104,471	17,300,008	12,925,471	.6696	.5617
-19	20,313,641	17,465,338	13,077,967	.6686	.5600
-18	20,522,939	17,647,532	13,137,973	.6686	.5588
-17	20,678,390	17,771,863	13,170,833	.6667	.5563
-16	20,757,672	17,907,139	13,284,681	.6656	.5551
-15	20,936,489	18,109,400	13,327,453	.6623	.5529
-14	21,306,726	18,484,393	13,585,681	.6618	.5525
-13	21,484,296	18,669,713	13,697,847	.6574	.5497
-12	21,520,844	18,751,869	13,754,263	.6527	.5473
-11	21,681,722	18,962,141	13,779,779	.6494	.5454
-10	21,753,022	19,048,662	13,763,080	.6460	.5432
-9	21,814,924	19,145,883	13,692,091	.6363	.5354
-8	21,833,445	19,202,710	13,767,425	.6352	.5349
-7	21,930,324	19,288,301	13,701,728	.6301	.5306
-6	22,005,624	19,391,441	13,671,117	.6217	.5245
-5	22,080,199	19,468,767	13,605,801	.6117	.5173
-4	22,016,359	19,433,194	13,499,215	.6040	.5128
-3	22,027,438	19,506,230	13,367,773	.5931	.5060
-2	21,969,762	19,512,210	13,205,769	.5817	.4999
-1	21,857,237	19,523,130	13,018,246	.5630	.4892
Change	13.17%	16.83%	4.28%	-16.02%	-13.19%

[1] Source of data: Credit unions' 5300 Call Reports as filed with the NCUA. http://www.ncua.gov/dataapps/qcallrptdata/Pages/default.aspx. Bank deposit data was obtained from the FDIC web site: https://www2.fdic.gov/hsob/

The trend in average assets, average deposits, average loans, average loans to deposits ratio and average loans to assets ratio are presented in Figure 1(a-e). As shown in Figure 1(c) (below), total loans as measured by absolute dollar level peaked around eight quarters before the merger and then entered a period of secular decline until the merger. During this period, deposits continued to grow in absolute terms [Figure 1(b)]. The ratio of loans to deposits after peaking around eighteen quarters before the merger started declining monotonically from the seventeenth quarter before the merger. While loans were increasing until the seventh quarter before merger, their rate of growth had fallen behind the rate of growth of deposits.

From the standpoint of profitability, this trend should present the managements of such institutions with a challenge - how to earn enough revenue (interest income) to pay interest on the rising deposit levels? This challenge, unless met successfully, would spell trouble for credit unions who fall into this category. This income challenge is not related to the margin squeeze discussed by Taylor (1977). The challenge to generate interest income would result in a pressure on profitability and the ability of the credit union to generate adequate surplus to maintain its statutory capital levels, and perhaps grow.

Figure 1: Balance Sheet (ALM) variables – trends
These graphs correspond to the data presented in Table 1 above

Figure 1(a)

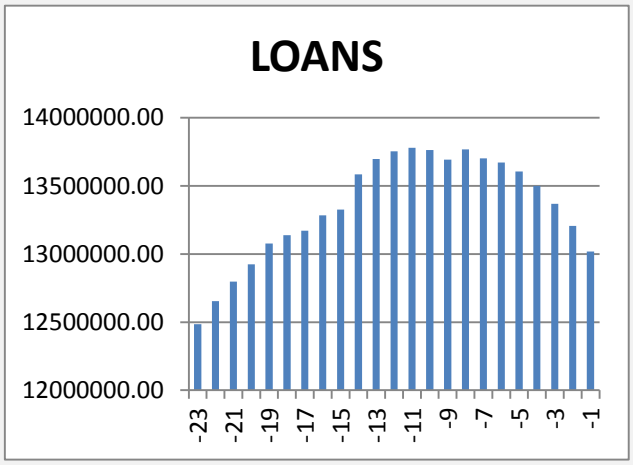


Figure 1(b)

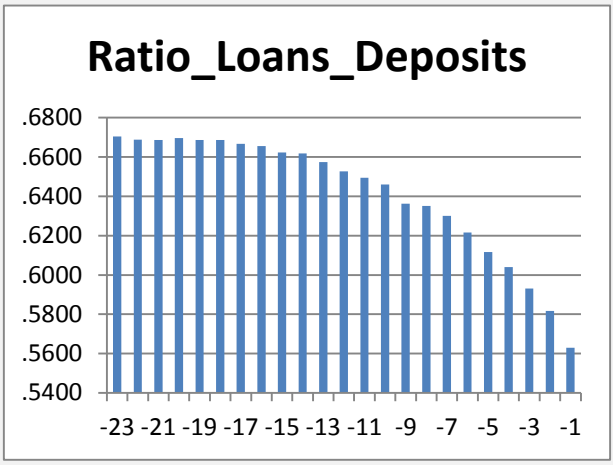


Figure 1(c)

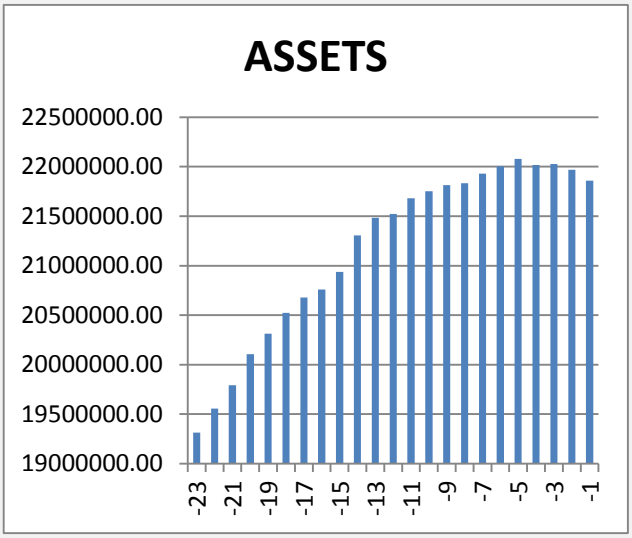


Figure 1(d)

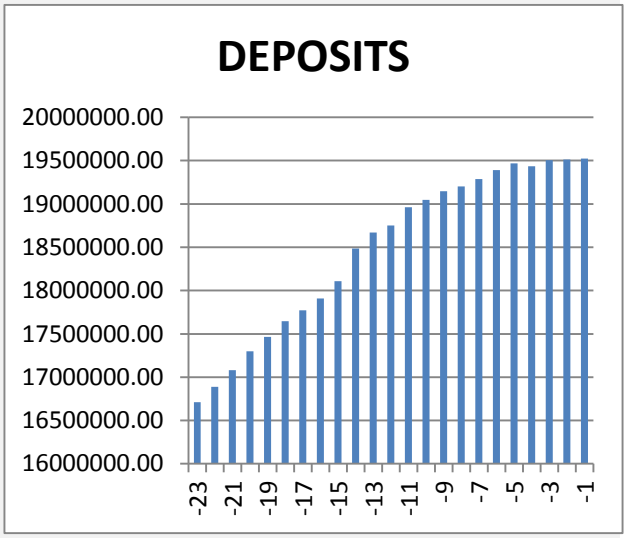
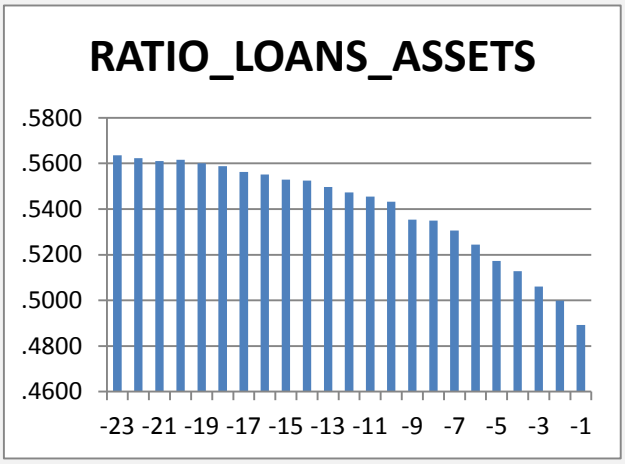


Figure 1(e)



For the acquired credit unions, growth was occurring prior to their acquisition but it was taking place in deposits but not in lending activity. Growing deposits require greater capital. It can be hypothesized that

in the face of declining loans, such credit unions would have been under pressure to maintain minimum capital ratios required by the regulators.

From the standpoint of profitability, this trend should present the managements of such institutions with a challenge - how to earn enough revenue (interest income) to pay interest on the rising deposit levels? This challenge, unless met successfully, would spell trouble for credit unions who fall into this category. This income challenge is not related to the margin squeeze discussed by Taylor (1977). The challenge to generate interest income would result in a pressure on profitability and the ability of the credit union to generate adequate surplus to maintain its statutory capital levels, and perhaps grow. For the acquired credit unions, growth was occurring prior to their acquisition but it was taking place in deposits but not in lending activity. Growing deposits require greater capital. It can be hypothesized that in the face of declining loans, such credit unions would have been under pressure to maintain minimum capital ratios required by the regulators.

3.02 CAPITAL AND SURVIVAL: PROFITABILITY MEASURES

There are several indicators of profitability for a financial institution. We first introduce the commonly used measure - return on assets (ROA). This equals earnings over total assets.

Table 3: Profitability trends

The following table presents quarterly profitability across all credit unions that were acquired and present in our sample. The period covers: 2008 (3rd quarter) to 2014 (1st quarter)[1].

Quarter	ROA	NIM[2]/Loans	NIM/Deposits	Rolling Average: NIM/Deposits
-23	.0033	.0543	.0309	
-22	.0033	.0568	.0329	
-21	.0027	.0503	.0296	
-20	.0029	.0543	.0313	.03118
-19	.0025	.0551	.0306	.03111
-18	.0022	.0642	.0323	.03097
-17	.0019	.0533	.0293	.03090
-16	.0019	.0537	.0310	.03082
-15	.0016	.0507	.0303	.03076
-14	.0013	.0544	.0320	.03067
-13	.0010	.0481	.0285	.03047
-12	.0009	.0511	.0299	.03018
-11	.0004	.0509	.0292	.02990
-10	.0002	.0553	.0311	.02967
-9	-.0002	.0499	.0277	.02946
-8	-.0002	.0511	.0292	.02930
-7	-.0006	.0514	.0283	.02907
-6	-.0007	.0559	.0299	.02878
-5	-.0013	.0504	.0267	.02853
-4	-.0019	.0513	.0281	.02826
-3	-.0023	.0524	.0273	.02801
-2	-.0037	.0542	.0272	.02734
-1	-.0116	.0281	.0198	.02561
Change		-0.18%[3]	-11.98%[3]	

[1] Source of data: Credit unions' 5300 Call Reports as filed with the NCUA. http://www.ncua.gov/dataapps/qcallrptdata/Pages/default.aspx. Bank deposit data was obtained from the FDIC web site: https://www2.fdic.gov/hsob/

[2] Net Interest Margin

[3] Based on Quarter -2 and Quarter -23

The merged credit unions were profitable as measured by a positive ROA until ten quarters before their acquisition. Then they dipped into negative territory and stayed there until they were acquired. However,

their ROA was in decline over a majority of the period starting with twenty-one quarters prior to their merger. The ROA declined from 0.33% to -1.16% over the entire period of study (see Table 3).

The trend in ROA over twenty-three quarters is presented in Figure 1a. As can be seen from the chart, acquired credit unions were making losses starting about nine quarters before the merger. As mentioned previously, absolute amount of loans outstanding started declining around seven quarters before the merger. This indicates that acquired credit unions had begun running into survival challenges about two years on average before the actual merger.

While the declining trend in ROA is consistent with the hypothesis about profitability presented in the previous sub-section, it is important to understand the driving factors behind this trend. These factors include, but are not limited to: net interest margin (NIM), charge-offs, and operating expenses. To put these in perspective of a typical business' income statement, NIM is akin to gross profit, charge-offs reflect losses due to bad debts, and operating expenses are similar to sales, general and administrative expenses or overhead. Any business whose gross margin is under pressure will feel its impact on its bottom line unless operating and other expenses can be reduced.

In order to understand the reasons for the decline in ROA, we analyze the drivers of success for a financial institution. We analyze NIM as a percentage of loans and deposits, charge-offs as a percentage of loans, and, operating expenses as a percentage of assets and deposits. These results are also presented in Table 3 above. The acquired credit unions maintained a fairly even NIM to loans ratio. It only declined by 0.18% from 5.43% to 5.42% starting from twenty-three quarters before to two quarters before the merger. The last quarter before merger was different in that the NIM to loans ratio declined significantly from 5.42% to 2.81%. We attribute this drop to accruals for earned interest but not yet received and discuss it in conjunction with loan charge-offs later in this paper.

Figure 2: Profitability trends
These graphs correspond to the data presented in Table 2 above

Figure 2(a)

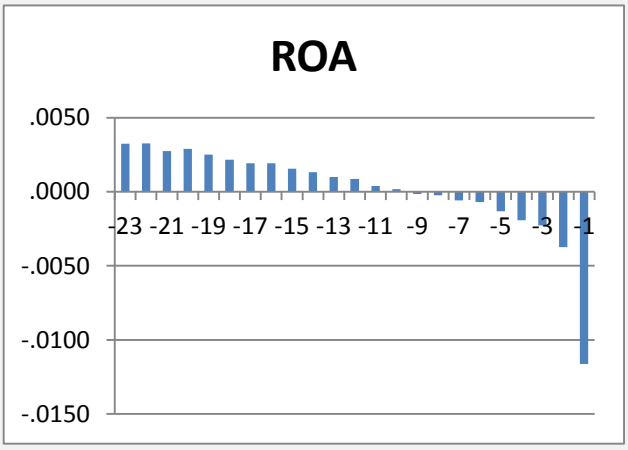


Figure 2(b)

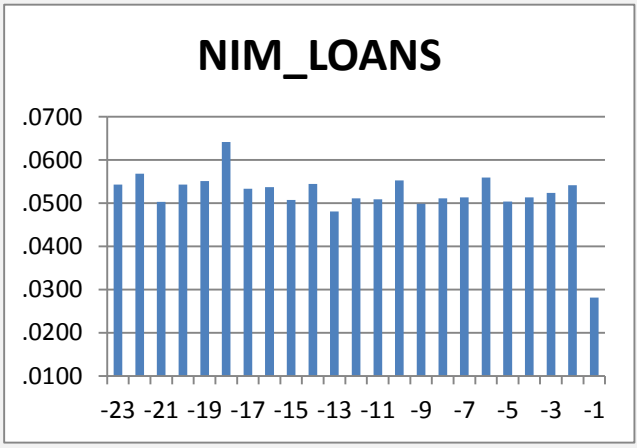
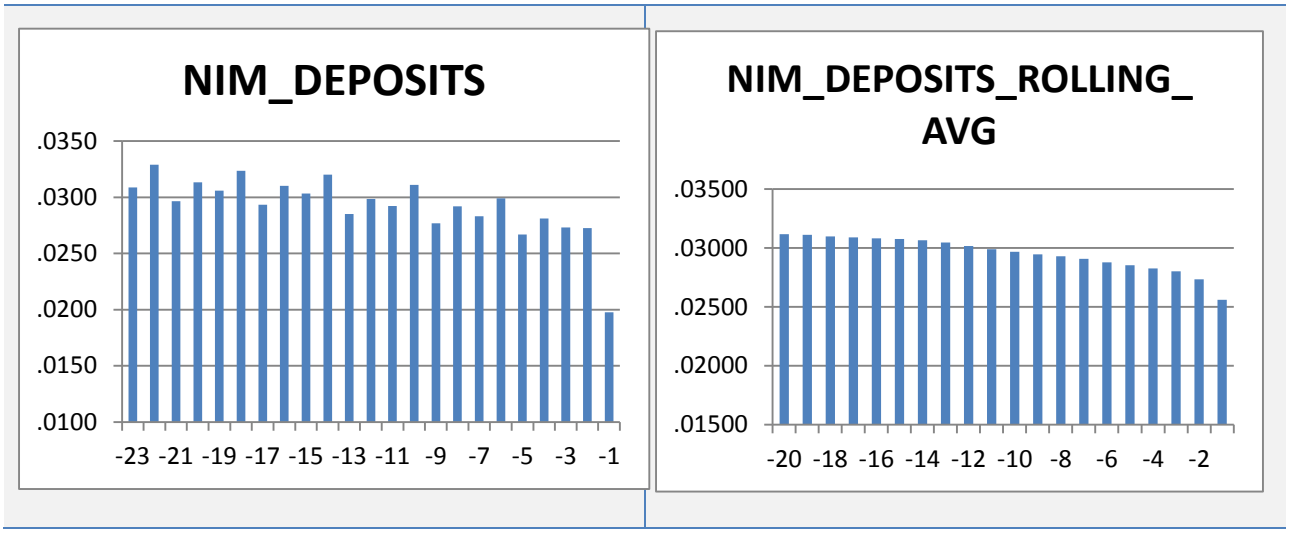


Figure 2(c)

Figure 2(d)



While the ratio of NIM to loans was fairly steady over the period studied, the ratio of NIM to deposits was in a decline. Over the same period, it declined by 11.98% from 3.09% to 2.72%. This ratio is also presented as a rolling four-quarter average and declines from 3.12% (twenty quarters before merger) to 2.73% (two quarters before merger). These trends are also shown in Figure 2(b-d). It seems that while loan activity was declining, the managements of acquired credit unions were focused on managing the NIM to loans ratio which remained steady as shown above. However, the ratio that should be of interest is the NIM to deposits ratio which captures the fact that loan interest income is used to pay not just the interest on deposits that fund the loans but interest on all deposits, whether loaned out or not. In our view, this distinction, as documented by the divergence between the two ratios, is critical to understanding the ability of the managements of the acquired credit unions. The difference between the two ratios suggests that instead of managing the NIM to loans ratio, if the management had managed NIM to deposits ratio, the outcome might have been different. We discuss this in greater detail in the next sub-section.

Table 4: Expense and capital ratios, and membership trends

The following table presents quarterly profitability across all credit unions that were acquired and present in our sample. The period covers: 2008 (3rd quarter) to 2014 (1st quarter)[1].

Quarter	Charge-offs/Average Loans	Optg. Exp./Assets	Optg. Exp./Deposits	Rolling Average: Optg. Exp./Deposits	Capital (Net worth) Ratio	Membership
-23	.002189	.0249	.0300		.1491	3,276
-22	.002302	.0269	.0323		.1502	3,279
-21	.002056	.0242	.0293		.1497	3,261
-20	.002279	.0260	.0312	.03071	.1508	3,257
-19	.003220	.0256	.0309	.03095	.1511	3,216
-18	.001082	.0274	.0332	.03116	.1519	3,204
-17	.001834	.0248	.0303	.03139	.1521	3,205
-16	.002060	.0267	.0322	.03165	.1518	3,204
-15	.002547	.0263	.0319	.03189	.1514	3,201
-14	.002618	.0282	.0343	.03216	.1510	3,223
-13	.002702	.0253	.0308	.03230	.1502	3,220
-12	.002726	.0273	.0328	.03243	.1495	3,210
-11	.002282	.0270	.0324	.03257	.1486	3,184
-10	.002410	.0290	.0349	.03274	.1483	3,181
-9	.002151	.0261	.0316	.03295	.1466	3,178
-8	.002722	.0282	.0338	.03320	.1463	3,166
-7	.002630	.0275	.0330	.03334	.1448	3,159
-6	.003712	.0290	.0348	.03330	.1440	3,116

-5	.003094	.0268	.0324	.03348	.1418	3,125
-4	.004098	.0294	.0350	.03379	.1393	3,091
-3	.003473	.0288	.0342	.03408	.1363	3,066
-2	.005061	.0313	.0367	.03456	.1294	3,038
-1	.009832	.0333	.0386	.03612	.1180	2,989
Change	131.16%[2]	33.73%	28.67%		-20.86%	-8.76%

[1] Source of data: Credit unions' 5300 Call Reports as filed with the NCUA. http://www.ncua.gov/dataapps/qcallrptdata/Pages/default.aspx. Bank deposit data was obtained from the FDIC web site: https://www2.fdic.gov/hsob/

[2] Based on Quarter -2 and Quarter -23

The next business driver we analyze is charge-offs to loans ratio (Table 4). This ratio was quite stable until about seven quarters prior to merger and spiked significantly in the last quarter before merger after rising for a few quarters. The ratio increased from 0.22% (twenty-three quarters before) to 0.51% (two quarters before), for an increase of 131.16%. This indicates that the ROA was driven down by an increasing loan charge-off ratio reflecting the deteriorating quality of loans over time. Recall that over the same period, lending activity had also started to decline around seven quarters prior to the merger. The charge-off ratio spiked noticeably in the last quarter before merger to 0.98% from 0.51% in the prior quarter.

Figure 3: Expense and capital ratios, and membership trends
These graphs correspond to the data presented in Table 3 above

Figure 3(a)

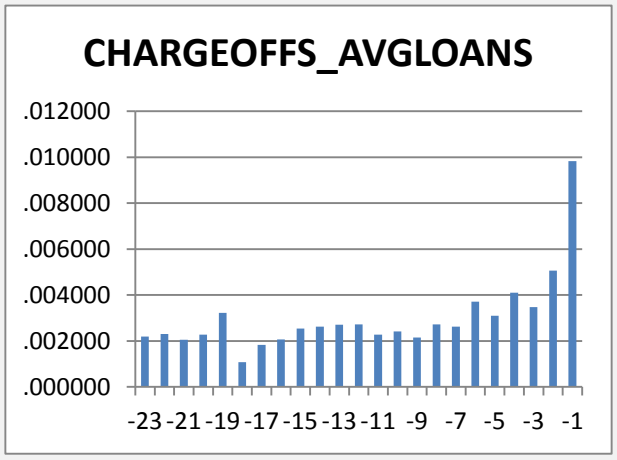


Figure 3(b)

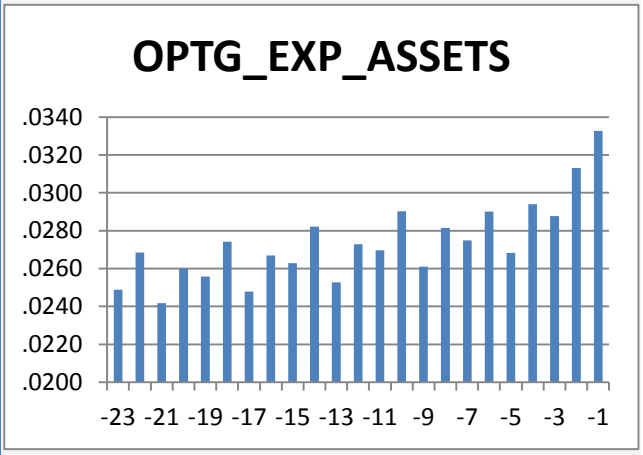


Figure 3(c)

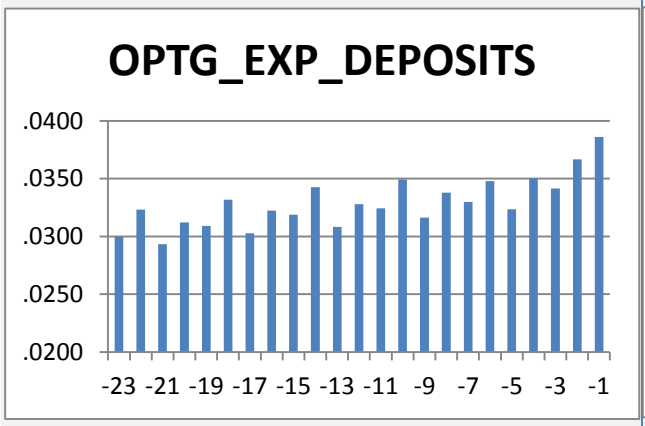


Figure 3(d)

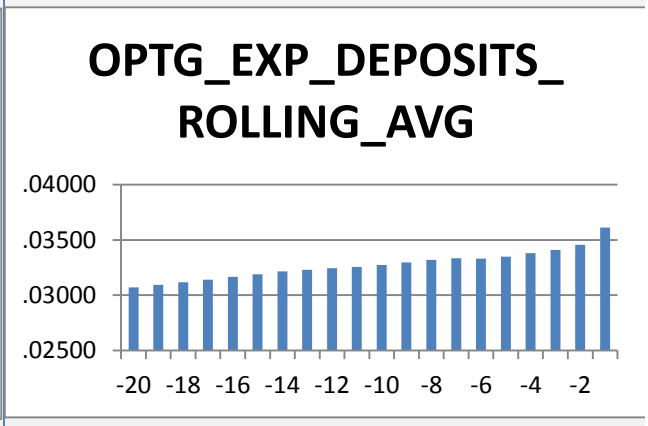
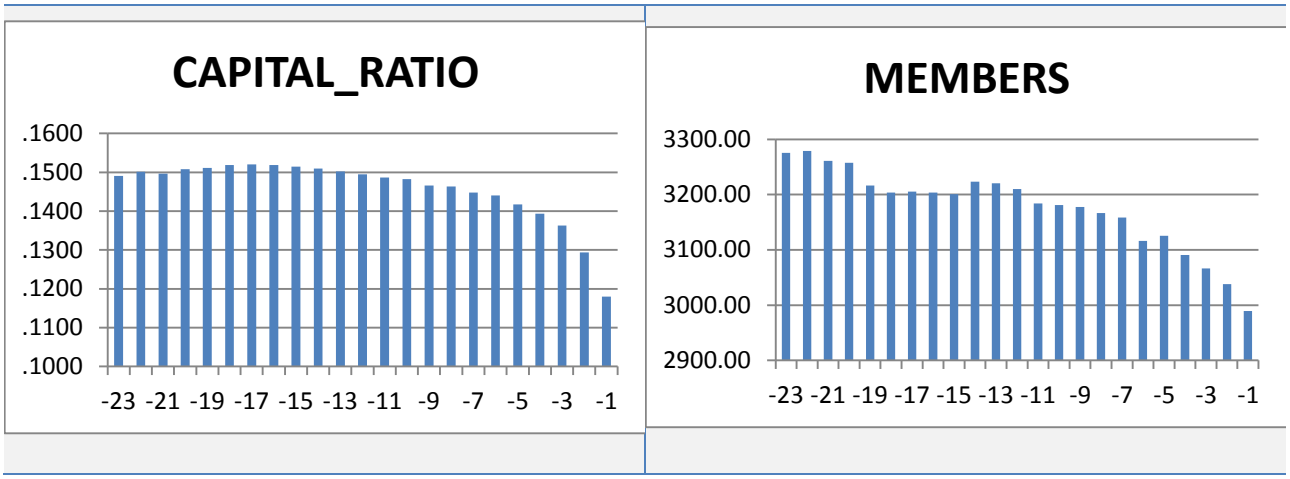


Figure 3(e)

Figure 3(f)



The charge off ratio trend is shown in Figure 3(a). When the last quarter spike of charge-off ratio to 0.98% is considered along with the substantial decline of NIM to loans ratio of 2.81% in the quarter before merger from 5.41% in the previous quarter, the evidence is consistent with what we refer to as the "clean up" hypothesis. Bauer et al. (2009) conclude that mergers between financial institutions usually occur at the behest of the regulators. If such is indeed the case, it is reasonable to assume that the acquiring financial institution would not like to be burdened by the past mistakes of the acquired institution's management. There is a "cleaning up" of the balance sheet of the acquired credit union just prior to the merger so that legacy issues are not carried over to the acquiring credit union. This clean-up or dressing up effect is consistent with the acquired credit union's management being forced to reclassify erstwhile delinquent loans on their books as uncollectible and recognize a large one time charge off just prior to the merger. The precipitous drop in NIM to loans ratio in the last quarter is also consistent with the same clean up hypothesis where interest income accrued from loans that were ultimately charged off, was also written off resulting in a decline in the NIM to loans ratio in the last quarter before merger. Hence, we have treated this quarter differently from the previous quarters.

The third driver investigated in this paper is the ratio of operating costs to assets as well as deposits. Operating costs as a percentage of assets increased from 2.49% (twenty-three quarters before merger) to 3.33% (one quarter before merger), representing an increase of 33.73% over this period. We also compute the ratio of operating expenses to deposits, and it displayed a similar behavior, increasing by 28.67% over the period. These results, along with a rolling four quarter average of the ratio, are presented in Table 4 with trends shown in Figure 3(b-d).

We can now complete the discussion about the reasons for a declining ROA trend right from the beginning of the period studied. The acquired credit unions had declining NIM to deposits ratio, rising charge-off ratio as well as a rising operating expense ratio. A confluence of these three trends led to these credit unions being unable to sustain themselves on a long-term basis and required regulatory intervention to salvage their business and assign it to a credit union with superior management skills and perhaps economies of scale.

The erosion in profitability, whether measured by ROA, or charge-off and operating expense ratios, led to a decline in the capital ratio (net worth as a percentage of assets) for such credit unions. This ratio is presented in Table 4 and charted in Figure 3(e). The capital ratio held steady or even rose slightly until about ten quarters before merger. Thereafter, is started to decline and the decline accelerated about seven quarters prior to the merger. Over the entire period, it declined from 14.91% to 11.80%, a cumulative decrease of 20.86%. The declining capital ratio along with negative ROA and rising charge-off ratio as well as rising operating cost ratio probably left no other door open to the management. Consistent with trends quoted earlier in the paper, being small in size (average assets about $22 million at the time of merger), these credit unions had been losing members for bulk of the period under study. Their average membership level declined from 3,276 members to 2,989 members, a total decline of 8.76% [Figure 3(f)].

It should be noted that despite this membership decline, these credit unions were able to increase their total deposits over the period of the study.

4.0 DISCUSSION OF RESULTS: BUSINESS STRATEGY AND REASONS FOR MERGER

While the credit union industry is predicated on a stated mission to serve its members without a profit motive, it is important to understand that in order to serve its members over the long term a credit union must survive and grow in order to meet the needs of the market. A credit union is under pressure to generate adequate surplus or earnings, even though such earnings are not taxed and members benefit from such tax savings, in order to survive and compete. If members' deposits grow then adequate regulatory capital is required to support such growth. Even without the profit motive, a credit union needs to be analyzed with a paradigm based on sound business principles.

Table 5: Takeover timing

The following table presents regression of the quarter-from-merger when ROA turned negative for a credit union. It measures the time lag between merger and the observation of negative ROA which is regressed against other independent variable to analyze what determines the time lag to merger.

Dependent variable	Quarter from Merger
Independent variable	
Ratio of Loans to Deposits	1.965
	(0.092)*
Return on Assets	134.946
	(0.000)
Natural Log of Capital Ratio	1.451
	(0.012)
Naturnal Log of Assets	-0.156
	(0.377)
Adjustej R-sq	0,046
F-ratio	9.481
* p-Value	

We analyze the time between a credit union started experiencing negative ROA and the acquisition. The time to merger or acquisition is measured in quarters and is regressed against explanatory variables: (1) loans to deposits ratio, (2) return on assets, (3) natural log of capital ratio, and (4) natural log of assets. The variables are measured as of the quarter when the ROA turns negative. Our results show that higher the return on assets and higher the loans to deposits ratio, the longer it takes for a credit union to be acquired. While assets do not have an impact on the time to merger, capital ratio is positively related to length of time to merger. Higher the capital ratio longer it takes for a credit union to get acquired. These results support our earlier findings.

The ultimate success driver of a financial institution is its ability to make loans to generate income by keeping defaults to a minimum. The interest income so generated is applied to interest paid out on deposits and operating expenses. The difference between revenues and expenses, known as earnings, is added to the capital base to support the deposit base. In essence, this is a closed loop process because credit unions cannot access capital markets if they want to grow. Growth has to be funded internally.

The acquired credit unions in our study suffered from missteps on all four fronts critical to a financial institution: (1) loans to deposits, (2) charge-offs, (3) operating costs, and (4) capital ratio. While some of the results in our study can be explained with the help of inefficient management hypothesis, other factors, inimical to small credit unions cannot be ignored. Thus, this paper also serves as a caution to other smaller credit unions who may be struggling with some or all of these issues.

When it comes to management ability, raising deposits (equivalent to raw material in a manufacturing firm) and lending money to borrowers (akin to selling goods and services in a manufacturing or service firm) are critical to the success of a financial institution. The managements of the acquired credit unions

seem to have come up short in their ability to manage this challenging balance. Such credit unions seem to have been chasing deposits even after realizing that they could not lend what deposits they already had, as seen by the declining loans to deposits ratio. Furthermore, the portfolio of loans that they had on their books was deteriorating steadily as seen by the rising charge-off ratio. The declining NIM ratio points to a potential solution. Such credit unions had the option of reducing their deposit growth or even reducing deposits in the face of declining loans. While this strategy would not have guaranteed long term growth and survival it could have bought them some time to fix their problems. In a nutshell, the lending function, which is critical to a financial institution, was not a strong suite for such credit unions. Furthermore, instead of managing the NIM to deposits ratio, they seem to have been managing the NIM to loans ratio.

While their revenues were in decline, the operating expenses were rising for most of the period studied. Wheelock et al, (2011) argue that existence of economies of scale and increasing returns to scale suggest a continuing trend toward industry consolidation. Technology platforms and their costs play an important role in such economies of scale in today's shift toward Internet based banking which is fast transitioning into mobile banking. Smaller credit unions are challenged in terms of resources and knowhow available when it comes to leveraging technology. Absent economies of scale, they are doomed to an increasing cost structure or loss of business or both. While some of the operating costs may be controllable, it cannot be ruled out that the acquired credit unions were running against time when it comes to economies of scale, even though their assets were increasing. Our findings, especially those related to operating costs, are consistent with Wheelock et al. (2011).

We also conducted a regression analysis with ROA and Capital ratio as dependent variables and loans to deposits, charge-offs to loans, NIM to deposits, operating expenses to assets, and natural log of assets as independent variables. The results are presented in Table 6 below.

Table 6: Multiple regression results

The following table presents regression results by quarter as well as for average of twenty-three quarters. Panel A employs return on assets (ROA) as the dependent variable and Panel B employs capital ratio as the dependent variable.

Panel A					
Dependent Variable	ROA				
	Quarter -2	Quarter -3	Quarter -4	Quarter -5	23-Quarter Average
Independent Variable					
Constant	-0.022 (0.000)*	-0.022 (0.000)	-0.025 (0.000)	-0.021 (0.000)	0.024 (0.288)
Loans to Deposits	0.006 (0.000)	0.002 (0.077)	0.000 (0.999)	0.003 (0.004)	-0.019 (0.114)
NIM to Deposits	0.497 (0.000)	0.626 (0.000)	0.699 (0.000)	0.495 (0.000)	1.268 (0.000)
Operating Expenses to Assets	-0.649 (0.000)	-0.734 (0.000)	-0.773 (0.000)	-0.601 (0.000)	-0.844 (0.002)
Charge-offs to Loans	0.050 (0.000)	0.015 (0.112)	0.018 (0.065)	-0.006 (0.587)	-0.280 (0.635)
LN(Assets)	0.001 (0.000)	0.001 (0.000)	0.002 (0.000)	0.001 (0.000)	-0.002 (0.173)
Adjusted R-sq	0.897	0.783	0.804	0.660	0.03
F-Ratio	1366.661	568.088	644.870	305.111	5.868
No. of Obs.	784	784	784	784	784
* p-Value					
Panel B					
Dependent Variable	Capital Ratio				
	Quarter -2	Quarter -3	Quarter -4	Quarter -5	23-Quarter Average
Independent Variable					
Constant	0.467 (0.000)*	0.436 (0.000)	0.439 (0.000)	0.423 (0.000)	0.293 (0.000)

Loans to Deposits	0.009 (0.536)	-0.006 (0.640)	-0.007 (0.591)	-0.036\ (0.005)	-0.080 (0.000)
NIM to Deposits	0.341 (0.001)	2.189 (0.000)	2.159 (0.000)	3.210 (0.000)	5.411 (0.000)
Operating Expenses to Assets	-0.991 (0.000)	-1.946 (0.000)	-1.564 (0.000)	-2.550 (0.000)	-3.709 (0.000)
Charge-offs to Loans	-0.796 (0.000)	-0.303 (0.028)	-0.192 (0.156)	-0.068 (0.652)	-1.349 (0.041)
LN(Assets)	-0.021 (0.000)	-0.020 (0.000)	-0.020 (0.000)	-0.018 (0.000)	-0.010 (0.000)
Adjusted R-sq	0.208	0.259	0.254	0.346	0.368
F-Ratio	42.129	55.749	54.450	83.839	92.301
No. of Obs.	784	784	784	784	784
* p-Value					

We ran the regression in two ways. First we regressed the variables across the twenty-three quarter by averaging the variables. Second, we repeated the regressions for four quarters, starting with two quarters prior to merger and going back to five quarters before the merger. The quarter just prior to merger was not included due to its special characteristics as identified above. ROA was negatively affected by operating expenses and positively impacted by NIM to deposits ratio in the average regression, as we have discussed above. Size was not a significant variable. When we look at the quarterly regressions, loans to deposits ratio affects ROA positively in three out of four quarters and size also has a strong positive effect, both being statistically significant at traditional p-values. Positive size co-efficient confirms the presence of economies of scale among credit unions.

The regression of capital ratio against the same regressors shows that while loans to deposits ratio is statistically significant it has a negative effect based on the twenty-three quarter average. The same effect is not observed consistently across the four quarters. Operating expenses have a consistently negative and significant effect on capital ratio. Size affect also exhibits the same pattern - negative and significant effect on capital ratio. NIM to deposits ratio has a significantly positive effect on capital ratio across all regressions. To encapsulate, NIM to deposits ratio has a positive impact on both ROA and capital ratio and operating expenses to assets ratio has a significant negative impact on both the dependent variables. The size effect, and loans to deposits ratio have a positive impact on ROA with the latter confirming our earlier findings based on observation of trends over the twenty-three quarters prior to merger. Surprisingly, while asset size has a positive relation with ROA it has a negative relationship with capital ratio, implying that larger credit unions were lagging behind in capital ratio compared to smaller credit unions. Charge-offs to loans did not display a consistent relationship with the dependent variables. It shows a positive relationship with ROA in quarters close to the merger suggesting that credit unions with higher ROA were more likely to take a loan charge-off. The regressions also show that close to the merger, higher charge-offs seem to be driving capital ratios down.

In essence, lower loans to deposits ratio and rising charge-offs point to a poor business strategy and managerial inefficiency associated with the acquired credit unions. Rising operating costs were probably the final nail in their coffin from which there was probably no escape. Mismanagement and lack of economies of scale resulted in a declining ROA at first which then turned negative and eroded the capital base, leading to regulatory pressure to merge with possibly a larger credit union (Fried et al. 1999). One of the policy implications of these results is that regulators need not wait until a credit union has descended into a severe profitability crisis to initiate a merger. Merger should be discussed early on since signs of decline appear to have emerged up to two years before the final merger in our study. Such a proactive approach toward consolidation would be a departure from a reactive approach where merger becomes a last resort with the only other alternative being closure of a credit union.

5.0 SUMMARY AND CONCLUSIONS

In this paper we examine the managerial performance of acquired credit unions in the period 2008 (third quarter) to 2014 (first quarter). The results are based on an investigation of financial variables: loans to

deposits ratio, growth of deposits and loans, return on assets (ROA), net interest margin (NIM) as a percent of loans and deposits, net charge-offs as a proportion of assets, operating costs as a percent of assets and deposits and capital ratio (net worth to assets). The analysis is conducted longitudinally on a quarter by quarter basis beginning with twenty-three quarters before merger to one quarter before merger.

The study finds that the average asset size of acquired credit unions was about $22 million just prior to the merger. They were losing money as borne out by a negative ROA at the time of takeover which had been declining throughout the period of our study. Such credit unions were growing their deposits even when their loan production had started to decline about seven quarters before the takeover. The loans to deposits ratio had been in continuous in decline and exacerbated around seventeen quarters before the takeover. In addition to declining lending activity, the charge-offs to loans increased over the period of the study. The declining and eventually negative ROA put pressure on their capital ratio which declined by about twenty-one percent over the period. The declining and then negative ROA was chiefly caused by three factors: declining net interest margin to deposits, increasing charge-offs and rising operating costs, both as a percentage of assets.

We argue that the takeover of credit unions in our sample was a result of poor management ability. Management was focused on growing deposits when their lending ability was failing. This raised the cost of funding the loans which were declining in proportion to deposits. The data shows that managements were on average concerned about maintaining NIM to loans ratio while the NIM to deposits ratio was in a decline reflecting higher total cost of funds being lent out. It is further argued that given the small size of the average acquired credit union, and due to lack of economies of scale, growing operating costs were perhaps beyond the control of the management. However, signs of lending problems and decline in profitability rose about two years prior to the merger. As a matter of regulatory policy, it may be necessary to proactively intervene much earlier when such signs become apparent.

REFERENCES

Bauer, K. (2008), Detecting abnormal credit union performance, *Journal of Banking and Finance* 32, 573–586.

Bauer, K. J., Miles, L. L., & Nishikawa, T (2009), The effect of mergers on credit union performance, *Journal of Banking and Finance* 33, 2267–2274.

Berger, A. N. (2003), The economic effects of technological progress: Evidence from the banking industry, *Journal of Money, Credit, and Banking* 35, 141–76.

Dywer, H. J., Gould, J. S., & Lopez, R. H. (1999), Optimum Capital/Asset Ratios in the Credit Union Industry: A Managerial Perspective, Lubin School of Business, Pace University, Faculty Working Papers, No. 183.

Emmons, W. R., & Schmid, F. A., (1999), Credit Unions and the Common Bond, Federal Reserve Bank of St. Louis, Review, September/October 1999.

Ferguson, C & McKillop, D., (1997), The Strategic Development of Credit Unions, John Wiley and Sons, Chichester.

Frame, W. S. and T. Coelli (2001), U.S. financial services consolidation: The case of corporate credit unions, *Review of Industrial Organization* 18, 229–242.

Frame, W. S., G. V. Karels, and C. A. McClatchey (2003), Do credit unions use their tax advantage to benefit members? evidence from a cost function, *Review of Financial Economics* 12, 35–47.

Fried, H. O., C. A. K. Lovell, and P. V. Eeckaut (1993), Evaluating the performance of U.S. credit unions, *Journal of Banking and Finance* 17, 251–265.

Fried, H. O., C. A. K. Lovell, and S. Yaisawarng (1999), The impact of mergers on credit union service provision, *Journal of Banking and Finance* 23, 367–386.

Goddard, J. A., D. G. McKillop, and J. O. S. Wilson (2002), The growth of U.S. credit unions, *Journal of Banking and Finance* 26, 2327–2356.

Goddard, J. A., D. G. McKillop, and J. O. S. Wilson (2007), Consolidation in the U.S. credit union sector: Determinants of failure and acquisition. Unpublished working paper, Bangor Business School, University of Wales, Bangor, United Kingdom.

Goddard, J. A., McKillop, D. G. and. Wilson J. O. S,. (2008), The diversification and financial performance of U.S. credit unions, *Journal of Banking and Finance* 32, 1836–1849.

Leggett, K. J. and Strand, R. W., (2002), Membership growth, multiple membership groups and agency control at credit unions, *Review of Financial Economics* 11, 37–46.

McAllister, P. H. and McManus, D., (1993), Resolving the scale efficiency puzzle in banking, *Journal of Banking and Finance* 17, 389–405.

McKillop, D.G., Glass, J.C. and Ferguson C., (1998), Investigating the Cost Performance of UK Credit Unions Using Radial and Non-Radial Efficiency Measures, Working paper, Queen's School of Management Queen's University Belfast, Belfast, N. Ireland.

Mitchell, K. and Onvural N. M., (1996), Economies of scale and scope at large commercial banks: Evidence from the Fourier flexible functional form, *Journal of Money, Credit, and Banking* 28, 178–199.

Moody, J.C & Fite, G.C., (1984), Credit Union Movement: Origins and Development 1850-1980, 2nd Edition, Kendall/Hunt Publishing Company, Iowa.

National Credit Union Administration (NCUA), http://www.ncua.gov/about/History/Pages/History.aspx

Porter, M., (1985) *Competitive Advantage*, The Free Press, NY.

Sant, R. R., and Schroeder, R. W. (2012), Credit Unions and Capital Adequacy: Managing Growth and Risk, *International Journal of Business and Social Research* (IJBSR), Volume -2, No.-6, November.

Sant, R. R., and Carter S. B., (2015), U.S. Credit Unions: Size, Growth and Business Strategy, St. Edwards University Working Paper, *Academy of Business Research Conference*, San Antonio, TX, October 2015 (forthcoming).

Sibbald, A., and Mcalevey, L., (2003) Examination of economies of scale in credit unions: A New Zealand Study, *Applied Economics*, Vol 35 (11).

Sibbald, A., Ferguson, C., And Mckillop, D., (2002), An examination of key factors of influence in the development process of credit union industries, *Annals Of Public And Cooperative Economics*, 73:3 2002.

Smith, D. (1984), A theoretic framework for the analysis of credit union decision making, *Journal of Finance 69, 1155–1168.*

Taylor, R.A., 1977. Credit unions and economic efficiency. *Rivista Internationale di Scienze Economiche e Commerciali* 24, 239–247.

Theriault, A.D., (2000), Converted and Converting Credit Unions are Discovering New Opportunities and Business Niches to Better Serve their Customers and Communities as Mutual Savings Institutions, *Community Banker*, May 2000, pp 30-34.

Walter, J. R. (2006), Not your father's credit union, *Federal Reserve Bank of Richmond Economic Quarterly* 92, 353–377.

Wheelock, D. C. and Wilson P. W., (1995), Explaining bank failures: Deposit insurance, regulation, and efficiency, *Review of Economics and Statistics* 77, 689–700.

Wheelock, D. C. and Wilson, P. W., (1999), Technical progress, inefficiency, and productivity change in U. S. banking, 1984–1993, *Journal of Money, Credit, and Banking* 31, 212–234.

Wheelock, D. C. and Wilson, P. W., (2000), Why do banks disappear? the determinants of U.S. bank failures and acquisitions, *Review of Economics and Statistics* 82, 127–138.

Wheelock, D. C. and Wilson, P. W., (2009), Robust nonparametric quantile estimation of efficiency and productivity change in U. S. commercial banking, 1985–2004, *Journal of Business and Economic Statistics* 27, 354–368.

Wheelock, D.C. and Wilson, P.W., (2013), Are Credit Unions Too Small? *Review of Economics and Statistics*, November 2011, Vol. 93, No. 4, pp. 1331-1342.

Wheelock, D.C. and Wilson, P. W., (2013), The evolution of cost-productivity and efficiency among U.S. credit unions, Journal of Banking and Finance, 37, 75–88.

Wilcox, J. A. (2005), Economies of scale and continuing consolidation of credit unions, Federal Reserve Bank of San Francisco Economic Letter.

Wilcox, J. A. (2006), Performance divergence of large and small credit unions, Federal Reserve Bank of San Francisco Economic Letter.

Williams, S., (2010), Best Practices in Credit Union Efficiency - A White Paper Commissioned CUNA's Community Credit Union Committee. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=0CDUQFjAD&url=http%3A%2F%2Fwww.cuna.org%2FStay-Informed%2FCUNA-Initiatives%2FDownLoads%2FEfficiency_BestPractices%2F&ei=R105VZmwLIrusAXikYGYBg&usg=AFQjCNEWzQrOZeboSPogGhwLNh1cEUv04w&bvm=bv.91427555,d.b2w

Wolff, H. W., (1910), People's Banks: A Record of Social and Economic Success, P.S. King & Son, London, 1910, pp. 37-38.