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CEO Gender and TARP: Evidence from Credit Unions

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Abstract

In this paper, I examine the role of CEO gender and TARP on the behavior and financial performance of credit unions following the financial crisis. Credit Unions provide a unique sample of firms from which to study the role that gender plays in particular as women CEOs run the majority of credit unions (52%). Further, the TARP program that was extended to a small set of qualifying credit unions following the 2008 financial crisis allows this study to analyze the role that CEO gender played in how those funds were used and how the institution fared over the long-run. The results suggest that CEO gender and TARP distribution did not make a difference in terms of credit union survival, performance, or CEO turnover.

Keywords: credit unions, tarp, CEO gender

CEO Gender and TARP: Evidence from Credit Unions

Past literature has shown that executive gender matters. Palvia, Vahamaa, and Vahamaa (2015) find that female bank CEOs tend to be more conservative in terms of holding capital relative to assets than their male counterparts and that female-lead banks during the financial crisis were less likely to fail compared to male-lead banks. Other studies, such as Barber and Odean (2001) and Watson and McNaughton (2007), suggest that women exhibit less risky behavior in personal finance decisions and are more risk averse than men. Krishnan and Parsons (2008) find that female-headed firms make more conservative decisions than firms with male leaders do. Huang and Kisgen (2013) find that female CEOs head firms that are less likely to make acquisitions than male CEO firms are. Of course, there are studies suggesting that stereotypes exist regarding women in leadership roles. Elsaid (2015) reports that female leaders are seen as being communal and striving to make everyone feel included (to a greater degree than their male leaders). Less attractive stereotypes of women also exist such as that of women appearing to be being less confident, less consistent, and less analytical than their male counterparts are.

However, as noted by Van Rijn (2019), research on executive gender suffers from sample selection bias; only six percent of Fortune 500 companies have a female CEO and only five percent of bank CEOs are women. In order to look at the issue of executive gender and firm performance, this study examines a group of firms that have a much higher population of female executives: credit unions. Recent data show that a female CEO heads over 50% of credit unions (CUNA 2018). Female CEOs dominate the small credit union (< $250 million in assets) landscape.

This study specifically looks at how men and women executives behave around a particular event in credit union history: the distribution of TARP funding. Although credit unions were not impacted as severely as banks by the 2008 financial crisis, the importance of credit unions, particularly those credit unions serving underbanked populations, was deemed important enough to salvage. In 2010, 48 credit unions were granted TARP funding totaling $69.91 million. This money represented the last of the government's financial bailout program following the financial crisis. The purpose of the TARP funds for these credit unions was to promote lending in underserved communities, many of which were hit hard by the crisis.

The credit union TARP funding event provides a natural experiment in which to test whether the performance and outcome of a firm is influenced by executive gender. Further, this study is able to examine the performance of TARP in a non-bank population, which has not been analyzed broadly in the literature.

The main research question is does executive gender and TARP make a difference in the long-run performance of a credit union? Specifically, the study analyzes whether CEO gender and TARP are related to a credit union's long-term survival, performance, and CEO turnover. Using the full population of credit unions that received TARP in 2010 (and comparable credit unions that did not receive TARP) the institutions are followed over an eight year period to address these questions.

The findings suggest that gender and TARP did not make a difference concerning the long-term performance of credit unions during this timeframe. This is not consistent with the idea that female leaders are somehow inherently different than males (risk averse, less overconfident, etc.) but does agree with recent research that suggests that men and women leaders are more alike than not. Further, the goal of TARP was to encourage lending and availability of financial services to hard hit populations following the financial crisis; from the evidence here it appears that TARP did not do this but nor did it discourage these outcomes.

The results and inferences from this paper are especially important for the credit union industry itself. The credit union industry is large and growing. According to the NCUA, as of the third quarter of 2019 total assets in the industry reached $1.54 trillion and federally insured credit unions continue to add members. Currently, credit unions serve over 100 million members, which is over 40% of the economically active population in the United States. The number of credit unions with a low-income designation rose to 2,615 in the third quarter of 2019 from 2,561 one year earlier. The number of credit unions has declined over time, but this is generally consistent with the consolidation pattern in the financial industry. Further, the results here have implications to the literature on female leadership. Any assertions made about women executives from studies involving small female proportionate samples should be viewed in a less certain light. In addition, this study adds to the literature on TARP and in particular on the less-analyzed subject of credit unions and TARP.

Background and Hypotheses Development

The Troubled Asset Relief Program was signed into law by President George W. Bush October 2008 and the corresponding Capital Purchase Program (commonly referred to as the banking bailout, CPP for short) is fairly well-known and widely studied. For instance, Li (2013) finds that TARP had a positive influence on the economy. He finds that banks increased their loan supply as a result of TARP distributions and reports that there is little evidence suggesting these loans were of lower quality than those by non-TARP banks. Cornett et al. (2013) report that the healthiest banks to receive TARP were those looking for a cheap source of financing while the least healthy banks used the funds to weather the economic storm and become stronger.

The CPP was the largest of the TARP components. Once CPP was underway, there was a push for a smaller program to be developed in order to specifically help banks and credit unions that played a vital role in serving low-income communities. Although credit unions did not, as a whole, experience the decline and hardship of many financial institutions following the financial crisis some institutions were challenged more than others. Credit unions designated as Community Development Financial Institutions (CDFI) in particular are closer to the original credit union purpose – serving small communities tied together through a common bond that might not be able to access government-insured financial products otherwise. At the time, there were almost 200 credit unions listed as Community Development Financial Institutions (CDFIs) and these were the pool of credit unions that had access to the new Community Development Capital Initiative funds (this paper will refer to the CDCI funds as TARP for simplicity so as not to confuse the acronyms). Out of the 200 CDFI credit unions, 48 ended up receiving TARP funds from Treasury. Pana and Wilson (2012) show that political influence may have played a role in which credit unions received funding. The funding closed within a short window of three weeks so all funds were granted by the end of 2010. Ultimately, these 48 firms collected about $70

million from Treasury through subordinated debentures with an interest rate of 2% and a maturity of eight years. This was a much smaller program compared to the CPP, and the participating institutions were small in comparison as well.

Using the population of CDFI credit unions in 2010 and the 48 recipients of the TARP funding, this study aims to analyze how those funds were used and in particular how the credit unions fared over a long period of time. Sorting by CEO gender, one can determine whether executive gender plays a role in how these credit unions performed following TARP (both the CDFIs that received TARP and those that did not). Again, the regularity of women in leadership roles at credit unions make this a strong population in which to study gender differences in business performance.

The prevalence of female leadership in the CU industry can attributed to the fact that CUs were founded on progressive ideals and have generally focused on serving the underserved banking populations. However, the shift in the industry and its customer base/demographics undoubtedly changes this paradigm. Indeed, the Center for Credit Union Leadership notes that female leadership has been declining over the past several years (2017). Within the population of CUs lead by female CEOs, we are already seeing the impact that the industry consolidation is having on female leadership. Just 14% of CUs with over $1 billion in assets are led by female CEOs compared with 66% of CUs with less than $50 million in assets. In other words, women tend to dominate the leadership roles at small CUs, but small CUs are disappearing with larger, consolidated CUs taking their place.

Shifts in the credit union industry may moderate the effect of gender on CU performance. The credit union industry has followed the path of the financial institution industry as a whole seeing, over the past decade in particular, a shift from local/community-run banks and CUs to larger, geographically sprawling institutions. This shift has mostly come through mergers, acquisitions, and deregulation. The credit union industry itself has grown with an increase in shares drafts (membership accounts) up over 25% in just the past four years (53 million accounts in 2014 to 66 million in 2018). However, the CDFI credit unions are more closely linked to the original purpose of credit unions in that they provide financial services to generally low-income, underserved households and communities.

Table 1

Credit Union Leadership

TARP Sample

femalelead	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Yes	37	77.08	37	77.08
No	11	22.92	48	100

CEO_gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Male	23	47.92	23	47.92
Female	25	52.08	48	100

President_gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Male	35	72.92	35	72.92
Female	13	27.08	48	100

Non-TARP Sample

femalelead	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	113	83.09	113	83.09
1	23	16.91	136	100

CEO_gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	62	46.62	62	46.62
1	71	53.38	133	100

missing 3 (no CEO name)

President_gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	95	71.43	95	71.43
1	38	28.57	133	100

Frequency distributions on CU leadership gender are reported in Table 1. As of 2010, a female CEO headed 53% (96) of the 181 CDFI credit unions. Twenty-eight percent of the CDFI credit unions had a female president (51). Seventy-seven percent of the TARP credit unions had both a female CEO and President (femalelead = 1). For the non-TARP sample of CDFI credit unions this was much lower at 17%. For the non-TARP CDFIs, 53% had a female CEO and 29% had a female president. This compares to 52% of TARP recipients with a female CEO and 27% female president.

Based on earlier studies of financial institutions demonstrating gender differences on risk preferences and risk management, the central hypothesis here is that female-lead credit unions are more conservative than their male-led counterparts. In the context of TARP, the expectation is that female CEOs should be less likely to lead their credit union into failure over several years following TARP disbursement. In addition, TARP should enable credit unions to survive longer relative to non-TARP recipient credit unions, all else being equal, since TARP represents additional funds that credit unions were able to access in order to build and sustain their business.

H1a: Credit unions with female CEOs are more likely to survive in the years following the financial crisis relative to credit unions with male CEOs.

H1b: Credit unions that received TARP are more likely to survive in the years following the financial crisis relative to credit unions that did not have TARP access.

Further, since the goal of TARP for these CDFI credit unions was to increase loan and share growth over the years following the disbursement from Treasury, the expectation is that female-led credit unions would be more likely to adhere to these goals and less likely to squander the funds on non-goal related activities. TARP itself should encourage loan and share growth in credit unions that received the funds compared with credit unions that did not receive funding.

H2a. Female-led credit unions that received TARP should see higher loan and share increases relative to male-led TARP-recipient credit unions.

H2b: TARP-recipient credit unions in 2010 are likely to see higher loan and share increases relative to credit unions that did not receive TARP.

Finally, CEO gender and TARP may change CEO turnover decisions. CEO gender has been linked to CEO turnover as seen in Cooper (2017). Credit unions receiving TARP are under more scrutiny than non-TARP credit unions. For this reason, I expect that TARP will increase the likelihood of CEO turnover when financial performance weakens.

H3a: Female CEOs at credit unions are less likely to be replaced compared to male CEOs.

H3b: TARP-recipient credit unions are more likely to experience CEO turnover than non-TARP-recipient credit unions.

Data and Methodology

To begin, the study examines 181 credit unions that were recognized as CDFIs as of September 30, 2010.[2] These credit unions are matched with call report data as of third quarter 2010 found on the National Credit Union Association (NCUA) website. The NCUA makes available call report data for all federally insured credit unions. Annual call report data for the same firms is collected over the following eight years (up to third quarter 2018).

From the population of CDFI credit unions, those credit unions that received TARP funding at the end of 2010 are flagged. This list of 48 firms is provided by the Treasury Department. It is not known which credit unions applied for funds, so it is not clear how or why these particular institutions were selected for the program. While comparisons are made to the broad CDFI sample, a matched sample is created (by size) of CDFI credit unions that did not receive TARP. This way, additional comparisons for validation purposes can be made between the TARP and non-TARP samples.

Financial information is collected as well as data on credit union leadership including the CEO and President name. The gender of the credit union CEO is not noted in the data, so a variable is manually created called "CEO gender" by looking at the first name of each executive. When it was difficult to determine whether the executive was a male or female, the website genderchecker.com is utilized, which is a database of over 100,000 authenticated gender-tagged names. In addition, where gender was difficult to determine based on name, the credit union website itself was accessed to verify, where possible, CEO or president gender. For the credit unions that did have websites, the gender was consistent with genderchecker.com's determination. This process was sufficient to identify gender of all names over the eight-year time-period. Also, if there was turnover in leadership over this time, the data is flagged.

[2] Thank you to Dr. Keldon Bauer for supplying the list of CDFIs

Table 2

Descriptive Statistics

Variable	N	Mean	Median	Std Dev	Min	Max
CEO_gender (= 1 if female)	181	0.53	1.00	0.50	0.00	1.00
President_gender (= 1 if female)	181	0.28	0.00	0.45	0.00	1.00
total assets (100K$)	184	59.05	11.58	1577.96	1.25	16989.92
shares_to_assets	184	0.78	0.84	0.16	0.10	0.98
np_loans_to_assets	184	0.04	0.03	0.04	0.00	0.26
prov_loan_losses_to_assets	184	0.00	0.00	0.01	-0.01	0.05
co_to_assets	184	0.01	0.00	0.01	0.00	0.09
total_loans ($100K)	184	41.80	74.13	1223.65	0.07	13652.52
loans_to_assets	184	0.62	0.66	0.19	0.04	1.00
ir_cc_loans (%)	83	11.59	11.63	2.29	7.66	16.90
ir_other_unsec_loans (%)	181	12.57	12.25	2.79	4.99	19.92
ir_new_vehicle (%)	169	6.90	6.50	1.82	3.89	14.90
ir_used_vehicle (%)	172	8.68	8.43	2.73	3.89	16.00
ir_mortgage (%)	127	6.43	6.20	1.24	4.25	12.00

Average total assets (size) for the sample of CDFIs was $59,047,383. The size of the credit union varied widely over the sample with a standard deviation of $157,795,774. Average share-to-asset ratio (total amount of shares divided by total assets) was equal to 78% with a median of 84% (with a wide range of outcomes – the minimum at about 10% and maximum 98%). This ratio provides a helpful way to analyze the performance of a credit union in terms of membership (equity) relative to size. Provisions for loan and lease losses relative to assets, a measure of credit quality, was 0.50% with a median ratio of 0.20%. This is in line with industry averages at the time. Additionally, charge-offs-to-assets ranged from 0 to almost 10%. Average total loans for the CDFI credit unions was $41,801,908. Average loans-to-assets ratio was 62%. This is consistent with industry averages.

The average interest rates on various loan categories across the sample are also reported in Table 2. These rates are reported in order to get a sense of how homogenous the credit unions are from the loan level perspective. Credit unions must report interest rates for various loan categories including credit card, other non-secured loans, new and used vehicle, and mortgage. The sample size is smaller when looking at various loan rates as not all credit unions offer all types of loans. For this reason, these variables are not used when analyzing the data on a multivariate level. Out of the 83 credit unions that offered credit cards, the average interest rate on those loans was approximately 11.6%. The average rate on all other unsecured loans (offered by almost the full spectrum of CDFI credit unions) was 12.57%. New vehicle loans had an average rate of 6.9% and used vehicle loans were slightly higher at an average rate of 8.7%. Out of the 127 credit unions offering mortgage loans, the average rate was 6.43%. These rates are consistent across the sample of credit unions and in line with industry averages and risk

premiums at the time. Table 3 reports descriptive statistics of both the TARP and non-TARP samples separately for comparison to the full CDFI sample described in Table 2.

Table 3

Descriptive Statistics

Panel A. TARP Sample

Variable	N	Mean	Median	SD	Min	Max
CEO_gender	48	0.52	1.00	0.50	0.00	1.00
President_gender	48	0.27	0.00	0.45	0.00	1.00
log_assets	48	16.61	16.87	1.71	12.33	19.40
net_worth_ratio	48	0.78	0.81	0.15	0.36	0.94
np_loans_to_assets	48	0.03	0.02	0.03	0.00	0.16
prov_loan_losses_to_assets	48	0.00	0.00	0.00	0.00	0.02
co_to_assets	48	0.01	0.00	0.00	0.00	0.02
ir_cc_loans	48	677.38	937.00	604.33	0.00	1690.00
ir_other_unsec_loans	48	1244.73	1250.00	328.20	0.00	1800.00
ir_new_vehicle	48	589.90	610.00	251.19	0.00	1100.00
ir_used_vehicle	48	737.83	750.00	324.99	0.00	1500.00
ir_mortgage	48	504.77	556.00	288.13	0.00	1050.00
total_loans (100K$)	48	292.96	97.96	423.69	0..13	2156.02
shares_to_assets	48	0.78	0.81	0.15	0.36	0.94
loans_to_assets	48	0.60	0.61	0.18	0.04	0.91

Panel B. Non-TARP CDFIs

Variable	N	Mean	Median	SD	Min	Max
CEO_gender	133	0.53	1.00	0.50	0.00	1.00
President_gender	133	0.29	0.00	0.45	0.00	1.00
log_assets	136	16.17	15.94	1.98	11.74	21.25
net_worth_ratio	136	0.78	0.84	0.16	0.10	0.98
np_loans_to_assets	136	0.04	0.03	0.05	0.00	0.26
prov_loan_losses_to_assets	136	0.01	0.00	0.01	-0.01	0.05
co_to_assets	136	0.01	0.00	0.01	0.00	0.09
ir_cc_loans (bp)	136	468.32	0.00	588.75	0.00	1650.00
ir_other_unsec_loans (bp)	136	1233.60	1212.00	317.53	0.00	1992.00
ir_new_vehicle (bp)	136	649.45	649.50	259.02	0.00	1490.00
ir_used_vehicle (bp)	136	837.32	840.00	342.73	0.00	1600.00
ir_mortgage (bp)	136	421.92	569.00	322.42	0.00	1200.00
total_loans (100K$)	136	462.16	55.72	1400.00	0.07	13652.52
shares_to_assets	136	0.78	0.84	0.16	0.10	0.98
loans_to_assets	136	0.63	0.67	0.20	0.06	1.00

Table 4 reports univariate t-tests. First, all CDFIs as of 2010 are analyzed and these credit unions are separated by those that received TARP and those that did not. As can be seen in Table 4, the only variable that is statistically significantly different between the samples is provision for loan losses divided by assets. The rate is slightly higher for the non-TARP sample (0.005) versus the TARP-recipient sample (0.003). No other variables are statistically significantly different between those credit unions that received TARP versus those that did not. Notably, CEO gender, President gender, and female lead (if CEO and president are both female) are all relatively close when comparing across samples. Fifty-two percent of TARP credit unions had a female CEO compared with 53% of the non-TARP sample. "Exist" is a variable denoting whether the credit union survived eight years after TARP. Again, there are no notable differences between the TARP and non-TARP CDFIs.

Table 4

Univariate T-Tests

Class: TARP (Sample: CDFI CUs)			
Variable	**TARP**	**No-TARP**	**Difference**
CEO Gender (= 1 if female)	0.5208	0.5338	-0.013
	(48)	(133)	(0.15)
President Gender (=1 if female)	0.2708	0.2857	0.0149
	(48)	(133)	(0.20)
Femalelead (=1 if yes)	0.2292	0.1691	0.06
	(48)	(133)	(0.92)
total assets ($)	43362836	64583106	-21220269
	(48)	(136)	(0.80)
shares_to_assets	0.7752	0.7838	0.0085
	(48)	(136)	(0.32)
np_loans_to_assets	0.0317	0.0412	-0.0095
	(48)	(136)	(1.33)
prov_loan_losses_to_assets	0.0029	0.0054	-0.0025
	(48)	(136)	(2.00)**
co_to_assets	0.005	0.0065	-0.0014
	(48)	(136)	(0.75)
total_loans ($)	29295288	46216009	-16920721
	(48)	(136)	(0.82)
loans_to_assets	0.5967	0.6326	-0.0359
	(48)	(136)	(1.10)
Exist to 2018 (=1 yes)	0.7447	0.6889	0.0558
	(47)	(135)	(0.72)

C+G8:J25r (Sample: TARP CUs)			
Variable	**CEO Female**	**CEO Male**	**Difference**
President Gender (=1 if female)	0.44	0.087	0.353
	(25)	(23)	(2.93)***
Femalelead (=1 if yes)	0.44	0	0.44
	(25)	(23)	(4.16)***
total assets ($)	23197246	6528195	-42084711
	(25)	(23)	(2.68)**
shares_to_assets	0.7557	0.7964	-0.0407
	(25)	(23)	(0.92)
np_loans_to_assets	0.0375	0.0255	0.012
	(25)	(23)	(1.28)
prov_loan_losses_to_assets	0.0022	0.0036	-0.0014
	(25)	(23)	(1.35)
co_to_assets	0.0056	0.0045	0.0011
	(25)	(23)	(0.84)
total_loans ($)	15166975	44652149	-29485174
	(25)	(23)	(2.55)**
loans_to_assets	0.5902	0.6038	-0.0136
	(25)	(23)	(0.25)
Exist to 2018 (=1 yes)	0.7917	0.6957	0.096
co_to_assets	(25)	(23)	(0.74)

In the second part of Table 4, the t-test statistics are reported for the sample of TARP recipient credit unions by CEO gender. Here the sample size is lower (25 of the 48 TARP-recipient credit unions had a female CEO) but there are statistically significant differences noted between the samples. For instance, credit unions lead by female CEOs are much more likely to have a female president (44%) relative to those credit unions run by male CEOs. This difference is statistically significant at the 1% level. Credit unions run by female CEOs are smaller than those run by male CEOs. This is in terms of total assets ($23 million versus $652 million, respectively) and total loans ($15 million versus $45 million, respectively). This result in line with current data showing that although the credit union industry is much more diverse in terms of gender leadership relative to non-credit unions, we still see the majority of the female

leadership at the smaller institutions. However, the other variables are not statistically significantly different between the female/male CEO samples of TARP credit unions.

The t-tests are also run on the full sample of CDFI credit unions by gender for validation purposes (results not reported). The results are in line with what is reported using the TARP-recipients in Table 4; in particular, female CEOs are generally found at the smaller credit unions. Charge-offs to assets is slightly higher (0.76%) at the female CEO credit unions compared to male CEO credit unions (0.46%). This difference is statistically significant at the 10% level.

Next, the data is analyzed in a multivariate setting. First, the study looks at whether TARP and leadership gender make a difference in terms of credit unions' survival eight years after TARP distribution. Following Bayazitova and Shivdasani (2012) and Black and Hazelwood (2012), the model is as follows:

$$Exist = \beta_0 + \beta_1 TARP + \beta_2 CEO\_Gender + \beta_3 TARP \times CEO\_Gender + \beta_4 Controls + \varepsilon;$$

where "Exist" is a dichotomous variable equal to 1 if the credit union still exists in the eight years following TARP (Q3 2018) and 0 otherwise. The variable "TARP" is equal to 1 if the credit union received TARP in 2010, 0 otherwise. The variable "CEO_Gender" is set equal to 1 if the CEO is female (in 2010), 0 if male. An interaction between "TARP" and "CEO_Gender" will allow us to see whether CEO gender makes a difference in the outcome of credit unions that receive TARP funding. The following control variables are used: the log of total assets, non-performing loans to total assets, provision for loan loss and leases to assets, and charge-offs to assets. All of the controls are as of 2010, when TARP was distributed. This analysis is done for both the full sample of CDFI credit unions and for the matched sample (TAPR versus no-TARP, matched by total assets). Specifically, the analysis looks at whether (1) TARP and (2) CEO gender makes a difference in the long-run survival of credit unions following the Great Recession. The results will test Hypotheses 1a and 1b.

Second, an analysis on the performance of CDFI credit unions in the eight years following TARP is conducted. Since credit union performance, especially in the case of CDFIs, is measured on the basis of membership (shares) and loans provided, loans-to-assets and shares-to-assets are used as the dependent variables in the performance models, similar to Bauer (2015). These performance variables are analyzed four and eight years after the distribution of TARP. Specifically, the performance model is as follows:

$$Performance = \beta_0 + \beta_1 TARP + \beta_2 CEO\_Gender + \beta_3 TARP \times CEO\_Gender + \beta_4 Controls + \varepsilon;$$

Here, "Performance" is equal to loans-to-assets in 2014 and 2018, and shares-to-assets in 2014 and 2018. The variable "TARP" is equal to 1 if the credit union received TARP in 2010, 0 otherwise. The variable "CEO_Gender" is set equal to 1 if the CEO is female (in 2010), 0 if male. An interaction between TARP and CEO_Gender will allow us to see whether CEO gender makes a difference in the performance of credit unions that receive TARP funding. The following control variables are used: the log of total assets, non-performing loans to total assets, provision for loan loss and leases to assets, and charge-offs to assets, and loans to assets. All of

the controls are as of 2010, when TARP was distributed. This regression is analyzed using the full sample of CDFI credit unions as well as the matched TARP/no-TARP samples.

The same regression is run over the same periods and with the same samples using shares to assets as the performance variable. Shares to assets as of 2014 and 2018 are the dependent variables in this series of regressions, while shares to assets in 2010 is used as a control variable. These tests will address Hypotheses 2a and 2b.

Third, CEO turnover is addressed. Here, the dependent variable is whether, over the 8 years following TARP, the credit union CEO was replaced. Specifically, the variable "new_ceo" is equal to 1 if a new CEO replaces an outgoing CEO at the credit union, and 0 otherwise. In this logistic regression model, all independent variables are lagged one year prior to the "new_ceo" variable with credit union and year fixed effects. Based on Van Rijn (2019), the model is as follows:

$$New\_CEO_t = \beta_0 + \beta_1 TARP + \beta_2 CEO\_Gender_{t-1} + \beta_3 TARP \times CEO\_Gender_{t-1} + \beta_4 Controls_{t-1} + \varepsilon$$

Here the test is whether TARP and CEO gender predict changes in the CEO over the eight years following TARP. This will address Hypotheses 3a and 3b.

Results

For the first series of regressions, the dependent variable is "exist," which is equal to 1 if the credit union survives over the eight year timeframe following TARP dispersion. Panel A of Table 5 reports results for the full sample of CDFI credit unions. Of particular interest is whether TARP makes a difference in a credit union's persistence over the long term, and whether CEO gender partially determines a credit union's survival. The coefficients on both TARP and CEO_Gender are not statistically significant; therefore one cannot conclude that TARP or CEO gender determines the long term survival of a credit union. It would be expected that credit unions receiving TARP would fare better in the long run relative to those similar credit unions that did not, but this does not seem to be the case. Bauer (2016) finds that CDFI credit unions are more likely to fail relative to non-CDFI credit unions; however, here the finding is that among CDFIs, those that received TARP had no difference in long-term outcome relative to CDFIs that did not receive TARP. Further, while past studies show that female CEOs are more conservative and less likely to take on risks that could endanger a firm, here there is no evidence that CEO gender plays a role in long-term firm existence. In fact, from Panel A it seems that only the size of the credit union helps to determine the likelihood of credit union existence in the long run – larger credit unions are more likely to survive relative to smaller credit unions.

Table 5

Logistic Regression of Survival Rates

Panel A: Full CDFI sample

Parameter	Estimate	Standard Error	Wald Chi-squared
Intercept	-4.0034	1.6619	5.8033***
TARP	-0.4169	0.5774	0.5213
CEO_gender	0.297	0.4298	0.4775
tarpxfemaleceo	0.6932	0.8363	0.6872
log_assets	0.335	0.1018	10.8326***
np_loans_to_assets	-7.6864	3.9895	3.712*
prov_loan_losses_to_	-22.3833	30.8705	0.5257
co_to_assets	-32.1583	26.1463	1.5127
sample size	179		
Likelihood ratio	29.2087***		

Panel B: Matched TARP and no-TARP samples based on total assets

Parameter	Estimate	Standard Error	Wald Chi-squared
Intercept	-6.4131	2.8817	4.9529**
TARP	-1.1982	1.048	1.3072
CEO_gender	-0.1661	1.0329	0.0259
tarpxfemaleceo	1.2255	1.2971	0.8927
log_assets	0.5282	0.1733	9.2859***
np_loans_to_assets	-3.4874	9.4427	0.1364
prov_loan_losses_to_	-68.5979	63.5895	1.1637
co_to_assets	-29.932	42.9404	0.4859
sample size	92		
Likelihood ratio	17.1796**		

Next the same model is analyzed but this time using a matched sample based on size; specifically, in Panel B of Table 5, results are reported from the regression using the population of TARP credit unions matched to CDFIs that did not receive TARP based on closest size proximity. Here the finding is that TARP and CEO gender are not statistically significant in the model determining credit union survival. Size is the only statistically significant variable in determining the likelihood of credit union survival. So far there is no evidence that TARP makes a difference in long-term performance, nor does CEO gender. This does not support Hypotheses 1a and 1b. Next, the analysis turns to whether TARP and CEO gender make a difference in the performance of the credit unions over the long-term.

Table 6

Regression Analysis

Panel A: Full sample of CDFI credit unions

Variable	Parameter Estimate	Standard Error	t Value
Intercept	0.2189	0.0959	2.28**
TARP	-0.0202	0.0330	-0.61
CEO_gender	-0.0184	0.0246	-0.75
tarpxfemaleceo	-0.0040	0.0442	-0.09
log_assets	0.0004	0.0061	0.07
np_loans_to_assets	-0.1211	0.3457	-0.35
prov_loan_losses_to_assets	-2.9629	2.1913	-1.35
co_to_assets	5.2687	2.0017	2.63**
loans_to_assets	0.6170	0.0618	9.98
N	142		
Adj. R-squared	49.76%		

Panel B: Matched sample by TARP/no-TARP

Variable	Parameter Estimate	Standard Error	t Value
Intercept	0.0599	0.1424	0.42
TARP	0.0472	0.0396	1.19
CEO_gender	0.0417	0.0384	1.08
tarpxfemaleceo	-0.0302	0.0504	-0.60
log_assets	0.0062	0.0090	0.68
np_loans_to_assets	-1.1892	0.4747	.0154**
prov_loan_losses_to_assets	2.1389	5.0974	0.42
co_to_assets	-1.6786	3.9591	-0.42
loans_to_assets	0.6657	0.0800	8.32***
N	80		
Adj. R-squared	57.33%		

Panel C: Full sample of CDFI credit unions

Variable	Parameter Estimate	Standard Error	t Value
Intercept	-0.0276	0.1226	-0.23
TARP	-0.0014	0.0419	-0.03
CEO_gender	-0.0546	0.0309	-1.77*
tarpxfemaleceo	-0.0105	0.0567	-0.19
log_assets	0.0290	0.0077	3.77***
np_loans_to_assets	-0.6215	0.4359	-1.43
prov_loan_losses_to_assets	-9.7101	2.9871	-3.25***
co_to_assets	8.8842	3.2319	2.75***
loans_to_assets	0.3620	0.0792	4.57***
n	126		
Adj. R-squared	36.86%		

Panel D: Matched sample by TARP/no-TARP

Variable	Parameter Estimate	Standard Error	t Value
Intercept	-0.0119	0.2285	-0.05
TARP	0.0199	0.0564	0.35
CEO_gender	-0.0344	0.0548	-0.63
tarpxfemaleceo	0.0027	0.0732	0.04
log_assets	0.0234	0.0140	1.67
np_loans_to_assets	-1.7602	0.6871	-2.56**
prov_loan_losses_to_assets	0.6832	7.0590	0.1
co_to_assets	4.8116	6.1600	0.78
loans_to_assets	0.4726	0.1209	3.91***
n	71		
Adj. R-squared	34.30%		

Table 6 reports results from multiple regressions using loans-to-assets in 2014 as the dependent variable. Panel A reports results from the full sample of CDFI credit unions; in Panel B, the matched sample. In both cases, the coefficients on TARP, CEO gender, and TARPxCEO_Gender are not statistically significant. This means that TARP and CEO gender are not determinants of a credit union's loan to asset ratio four years after TARP was distributed. Since one of the goals of TARP was to have financial institutions increase lending, this result does not show that the credit unions that received TARP actually increased lending as a percentage of assets relative to credit unions that did not receive TARP over this period. Further,

female CEOs were no different in terms of financial performance over this time versus their male counterparts.

The same analysis is run using 2018 loan to asset ratio as the dependent variable in Panels C and D of Table 6. The results are much in line with what is reported in Panels A and B. However, using the full sample of CDFI credit unions the coefficient on CEO gender is found to be positive and statistically significant at the 10% level. This means that female CEOs seem to have better four-year loan-to-asset outcomes versus their male counterparts. However, this result does not hold when using the matched sample of TARP/no-TARP firms (Panel D). Further, in Panels C and D we do not see any significance in the coefficients on TARP or the interaction of TARP and CEO gender. Again, results here show that TARP did not push credit unions to make long-term changes to their loan-to-asset ratios. It seems, in all Panels of Table 6, that there is a persistence in loan-to-asset ratio (the original value from 2010 is highly significant in each model) and that credit unions do not deviate far from this ratio despite differences in outside funding (TARP) and leadership gender (CEO gender). The results thus far from Table 6 do not support Hypotheses 2a and 2b.

Table 7

Regression Analysis

Panel A: Full sample of CDFI credit unions

Variable	Parameter Estimate	Standard Error	t Value
Intercept	0.0753	0.0729	1.03
TARP	-0.0287	0.0250	-1.15
CEO_gender	0.0117	0.0188	0.62
tarpxfemaleceo	0.0196	0.0337	0.58
log_assets	0.0093	0.0047	1.98*
np_loans_to_assets	0.7444	0.2548	2.92***
prov_loan_losses_to_assets	3.4193	1.6796	2.04**
co_to_assets	-3.4988	1.5296	-2.29**
shares_to_assets	0.6838	0.0584	11.7***
n	142		
Adj. R-squared	60.45%		

Panel B: Matched sample by TARP/no-TARP

Variable	Parameter Estimate	Standard Error	t Value
Intercept	-0.0262	0.0887	-0.3
TARP	-0.0060	0.0254	-0.24
CEO_gender	0.0319	0.0238	1.34
tarpxfemaleceo	0.0062	0.0318	0.19
log_assets	-0.0004	0.0056	-0.07
np_loans_to_assets	0.8419	0.2954	2.85***
prov_loan_losses_to_assets	5.3827	3.2832	1.64
co_to_assets	-6.0854	2.5661	-2.37**
shares_to_assets	0.9933	0.0662	15.0***
n	80		
Adj. R-squared	79.14%		

Panel C: Full sample of CDFI credit unions

Variable	Parameter Estimate	Standard Error	t Value
Intercept	0.4337	0.0756	5.74***
TARP	0.0002	0.0258	0.01
CEO_gender	-0.0141	0.0192	-0.73
tarpxfemaleceo	0.0086	0.0350	0.25
log_assets	-0.0049	0.0048	-1.02
np_loans_to_assets	0.4333	0.2597	1.67*
prov_loan_losses_to_assets	-1.4576	1.8524	-0.79
co_to_assets	-0.7462	1.9987	-0.37
shares_to_assets	0.5753	0.0619	9.29***
n	126		
Adj. R-squared	44.06%		

Panel D: Matched sample by TARP/no-TARP

Variable	Parameter Estimate	Standard Error	t Value
Intercept	0.4556	0.1281	3.56***
TARP	0.0171	0.0317	0.54
CEO_gender	-0.0148	0.0299	-0.5
tarpxfemaleceo	0.0186	0.0407	0.46
log_assets	-0.0135	0.0075	-1.8*
np_loans_to_assets	0.4366	0.3820	1.14
prov_loan_losses_to_assets	-1.4288	4.0389	-0.35
co_to_assets	-6.3576	3.5097	-1.81*
shares_to_assets	0.7360	0.0932	7.9***
n	71		
Adj. R-squared	49.79%		

Table 7 reports regression results for models with future shares-to-assets as the dependent variable. As in Table 6, variables from 2014 and 2018 are used to measure mid-range and long-term performance. Shares-to-assets is important to look at from the credit union perspective, as the goals for a non-profit institution are to expand membership and equity. Given TARP, one might assume that these credit unions could expand membership at a greater rate than those credit unions not given TARP funding. This does not seem to be the case. Much like in Table 6, there is no evidence that there is a difference between the TARP and non-TARP samples when it comes to shares-to-assets in 2014 and 2018. Specifically, in Table 7 Panels A and C, for the full sample of CDFI credit unions the coefficient on TARP is not statistically significant. Further, using the matched sample of TARP, non-TARP institutions by size (Panels B and D) the coefficient on TARP is also not statistically significant.

CEO gender is also not suggestive of future shares-to-asset performance. Again, throughout Table 7, the coefficient on CEO_Gender is not statistically significant. This suggests that CEO gender is not a determinant factor of membership growth in credit unions. Further, the interaction term between CEO_Gender and TARP is not statistically significant.

Overall, the models in Table 7 are highly predictive of the dependent variable; much of the variability in the dependent variable is the original ratio of shares-to-assets in 2010. This suggests that much of the performance in terms of membership and equity change over time is persistent over time. Outside factors, such as TARP, may not have the desired impact on credit unions as it would, perhaps, on a profit-motivated institution like a bank. Further, CEO gender does not seem to differentiate performance-level variables in credit unions as might be evident in other industries. This may be because of a self-selection bias. People who decide to work for credit unions may be different from those choosing to work for a profit-driven financial institution, for example, and may be more alike across genders. Alternatively, perhaps differences in gender previously reported in other studies do not paint a full picture because of the sample size variation when looking at male versus female CEOs in other industries.

Table 8

Logistic Regressions

	Model 1	Model 2	Model 3	Model 4
Intercept	0.5126	0.4695	0.4938	0.4328
	(1.0177)	(1.0289)	(1.0708)	(1.0878)
loans_to_assets	-0.4817	-0.5471	-0.4817	-0.5485
	(0.9842)	(0.9888)	(0.9847)	(0.9894)
CEO_gender	-0.0326	0.0031	-0.0172	0.0327
	(0.2750)	(0.2805)	(0.3392)	(0.5937)
L/A x CEO_gender		-0.0001		-0.00003
		(0.00002)*		(0.00002)*
TARP x CEO_gender			-0.0519	-0.097
			(0.5896)	(0.5937)
TARP	-0.0647	-0.0787	-0.0380	-0.0287
	(0.2876)	(0.2878)	(0.4121)	(0.4145)
log_assets	-0.1523	-0.1475	-0.1517	-0.1461
	(0.0766)**	(0.0773)*	(0.0775)	(0.0784)*
co_to_assets	14.1580	13.5452	14.1989	13.6113
	(12.9623)	(13.0239)	(13.0745)	(13.1402)
loans_to_deposits	0.0001	0.00003	0.00002	0.00003
	(0.0001)***	(0.00003)***	(0.00006)***	(0.00003)***
n	670	670	670	670
Psuedo R-squared	3.73%	3.90%	3.73%	3.90%
Wald Chi-squared	22.49***	185.84***	22.40***	187.16***

The study next turns to whether CEO gender and/or TARP plays a role in credit union CEO turnover. Table 8 reports the results of logistic regression models where the dependent variable is equal to 1 if the CEO is new, 0 if not. The sample here is over the entire eight-year timeline (2010 to 2018) using time and firm fixed effects. The results suggest that it is the size of the credit union and the loans relative to deposits that has any predictive power in determining the likelihood of whether a CEO is replaced. In all four models, total assets is negative and statistically significant, suggesting that smaller institutions are more likely to replace a CEO than larger credit unions. The coefficient on loans-to-deposits is positive and statistically significant across all four models at the 1% level. This suggests that CDFI credit unions with higher loan-to-deposit ratios are more likely to see a change in the CEO, holding all else constant.

Turning to the variables of interest, the coefficients on TARP and CEO_Gender are not statistically significant. There is no evidence to suggest that in this population of CDFI credit unions that TARP makes a difference in the likelihood of CEO turnover. Further, female CEOs are no more likely to be replaced than male CEOs. However, the coefficient on the interaction between loans-to-assets and CEO_Gender is positive and statistically significant at the 10% level in Models 2 and 4. This suggests that at higher loan/asset ratios, female CEOs are more likely to be replaced relative to male CEOs. The interaction variables with TARP are not statistically significant. Overall, it appears that financial factors underlying the credit union are apt to explain variation in CEO replacement; TARP has little to do with that decision and nor does CEO gender. These results provide mixed support for Hypotheses 3a and 3b.

Conclusion

In this paper, the impact of CEO gender and TARP on credit union survival, performance, and CEO turnover is analyzed. Using a sample of CDFI credit unions provides significant benefits over samples of other types of firms and industries. These credit unions allow for more thorough understanding of the role that CEO gender might play in how managerial decisions are made as credit unions have a much higher population of female executives, including CEOs, relative to other types of financial and non-financial institutions. Also, in 2010, this type of credit union was availed to TARP funding under a specific and short-term program offered by Treasury. This natural experiment allows for study of the effects of TARP in a closed population.

Using the full population of CDFI credit unions as of 2010, evidence here suggests that TARP and CEO gender do not significantly affect the survival, performance, and executive turnover in the eight years following the TARP distribution. This is contrary to studies that suggest that CEO gender should predict differences in outcomes amongst firms because of perceived differences in females versus males. More research should be conducted on why this is the case: perhaps it is because of a self-selection bias into the credit union industry (executive males and females may be more alike in this industry than in others) or perhaps it is due to a small sample size of female executives in other studies that skew the results.

While the data and scope of this study are somewhat limited, results here might indicate that TARP did not make a difference in how credit unions performed. Several reasons for this may be explored; for instance, given the small amounts of funds used by CDFI credit unions (relative to bank TARP recipients), the funds may not have made much of a difference overall in the health or survival of the credit unions. Also, since we do not know how these particular CDFIs were chosen to receive TARP, it may be the case that they would have fared worse without the funds. As we move forward with new programs aimed at helping businesses and individuals through financial institutions, these results could be helpful in that implementation.

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