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Abstract

Credit Unions have a number of advantages to offer customers relative to many banks and one of the reasons may be due to the way that their employees work. This paper will investigate whether employees at credit unions are more productive than bank employees. Theoretical arguments as to why this may be expected from a credit cooperative will be explored and then a look at the practice at the macro and micro levels will be explored. Data will be drawn from a sample from the Hurricane Katrina ravaged area gathered by the author through a questionnaire, interviews and available online sources. An analysis of national data on U.S. banks and credit unions from 1994-2006 complements this micro data set. The findings from the micro data set are confirmed in the national survey. Knowing the relative strengths of credit unions could help to develop new resources for credit union members and help keep a competitive advantage.

Journal of Economic Literature Classification Numbers: P0, P13, L21, G14, G21

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Section I: Introduction

This paper will compare employee productivity of credit union employees with employees who work at commercial banks. Credit unions being financial cooperatives and by law circumscribed in their financial practices may be expected to behave somewhat differently than other financial institutions. Banks and credit unions in the United States are fierce competitors, but many times service different niches as intermediaries. I originally became interested in this topic when comparing the resiliency of financial institutions after the Hurricane Katrina disaster that struck New Orleans and the Mississippi coast in August 2005. After comparing banks and credit unions in the heavily affected region the evidence pointed to an advantage that credit unions have in that their employees often are responsible for a greater number of assets. The evidence from this relatively small database will be presented and discussed later in the paper. This led me to wonder whether the same type of advantage existed across the whole country. To assess whether the productivity advantage found in the micro data set was a fluke that was in part due to the circumstances surrounding the devastation or for other regional causes or something more common, data was gathered on all credit unions and banks in the United States from 1994 to 2006. Assets per employee for both types of institutions were correlated with a number of factors and controls. Using a variety of specifications the results indicate that credit unions make more efficient use of their employees. The exact cause of this greater efficiency when controlling for a number of exogenous factors is not clear, but the cooperative institutional structure surely may be a part. The post-Katrina behavior of credit unions highlighted the strength of feelings that often made employees, members and other credit unions go “the extra mile” to help out. This

internal cohesion and network potency made it possible to offer services that would have otherwise been unavailable.

A number of the factors that may explain this productivity advantage are difficult to gauge. Overtime hours, volunteer hours, aid given from local or national sources, strength of working networks, etc. are just a few of the items that even at the micro level were difficult to get meaningful data on. When considering the national level and banks as well, this data becomes almost impossible to find. By constructing a large panel over time a number of controls for locality and size allow a comparison bank and credit union performance on a broad basis. Even at the national level credit unions were consistently found to have a positive impact on employee productivity using a variety of techniques and specifications.

The second section will look at theories of corporate forms in the financial industry. The third section will look at the data gathered and the empirical approach. The fourth section will discuss the results from the data and the final section will discuss policy implications and future research.

Section II: Theory

There are a number of reasons in the literature of the firm to suggest why we might expect a higher marginal or average product of labor from firms that are cooperative in nature. The Ward-Vanek-Domar model, sometimes referred to as the Illyrian firm, conjectures that a workers' cooperative would maximize income per worker. This maximization of income per worker results theoretically at the peak of the average product of labor. This result would typically mean a higher marginal product of labor than would be found in a typical profit maximizing firm. There have been quite a few criticisms of some of the predictions from this model such as a

backward bending output supply curve and inelasticity, but this model has formed the basis for many cooperative models and there has been quite a bit of supporting evidence for low output and input elasticity (e.g., Craig and Pencavel 1995 and Bermen 1967). Certainly it would not be appropriate to characterize credit unions as worker cooperatives, but their relatively small size typically and democratic structure allow for some similarities in practice (e.g., lower CEO to base pay ratios).

Probably the most interesting literature related to the difference in performance between cooperative firms and traditional firms comes from the literature on high performance human resource practices. Studies by Jones et al (2006), Ichniowski et al (1997) and Whyte and Whyte (1991) are part of a large literature looking inside the firm to compensation, management structures and innovative labor practices. Companies that offer innovative compensation and participatory schemes that reach out to almost all employees are typically found to be more productive. Credit unions, being democratically structured and often smaller institutions, may provide a framework where not only employees, but also customers feel like they "own" the institution. This feeling of ownership may improve morale and quality among employees and in the case of credit unions encourage greater reliance upon new technologies by customers that may otherwise be shunned for being a bit risky (e.g., internet banking). Credit unions are not the only ones that have tried innovative human resource practices. Outside of high technology companies banks have been among the quickest to offer ownership and variable pay incentives.[2]

Social networks between employees, customers, employees and customers and even between institutions are clearly important sources for loyalty and sometimes needed support. Measuring the degree of social networks, or social capital as it is sometimes referred to, is often quite difficult. In some respects credit unions are at an initial advantage in that typically they are smaller and often

[2] Corey Rosen (2002)

have close common bonds as part of their original charter. This is evidenced by large numbers of members actually volunteering to help run the credit union.[3] Democratic decision-making is reinforced in many cases by the close proximity in where they live between credit union members and staff. This more organic growth due to social networks may allow for an information advantage as well. The motto of the credit unions of "People Helping People" and the traditional role of credit unions helping low-income people to gain access to financial intermediation services are at least surface indicators of an attempt to build social capital.

Section III: Data and Empirical Approach

There are two main data sets used in this paper. The first one is much smaller and looks at the total population of banks and credit unions in the area that was heavily damaged by Katrina, the twelve southern counties of Mississippi and New Orleans. In dollar terms, Hurricane Katrina was the greatest natural to ever hit the U.S. The recovery efforts over two years later are on going. This data was started by a questionnaire and interviews with credit union and bank presidents and employees at both types of institutions. Approximately twenty percent of the banks and credit unions in the affected area responded to the survey by email or through interviews. Data for the remaining institutions that were not interviewed were supplemented with data collected from the Federal Deposit Insurance Corporation (FDIC) and the National Credit Union Administration (NCUA). Matching the data sets required that some useful information in one set could not be used, since there was a lack of corresponding data or proxies in the other.

[3] In the U.S. in 2006 there were about 102,000 volunteers, CUNA (2007).

The second data set covers all credit unions and banks in the United States from 1994 until December 2006, also gathered from the FDIC and the NCUA. Altogether there are 267, 678 observations over the thirteen-year period.

A number of different measures of have been used to measure credit union and bank performance and strength. Asset growth, returns on assets, variants of the value-added approach and assets per employee have all been used in performance studies of financial institutions.[4] Generally the functional forms estimated can be posited as:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \quad (1)$$

The performance indicator, Y_{it}, is the natural logarithm of real assets per employee. The intercept, α_i, captures firm specific factors which may be otherwise unseen, while the X matrix contains policy variables, state dummies, regional and time dummies to capture exogenous contemporaneous shocks. The use of firm specific intercepts helps to eliminate the bias that may be due, for example, to larger firms having the ability to use better technology or stronger market power. Given the time invariance of some of the key variables, the fixed effects estimates of the firm effects would mean these estimates would be unavailable. Using a random effects estimator allows to keep the time invariant variables. The X matrix also contains the natural log of assets to capture scale effects.[5] A dummy for whether the institution was a credit union or a bank was also included (coded one if a credit union). The Huber-White sandwich estimator allowed robust estimates of the standard errors in the presence of suspected heterogeneity over such a diverse

[4] See for example, Greer and Rhoades (1977), Lieberman and Asaba (1997), Berger and Humphrey (1992, 1997) and Park and Weber (2006).

[5] For similar uses of assets as a scale variable see Goddard et al (2002), Huang (2005) and Fried and Lovell (1993).

range of institutions.[6] Potential endogeneity problems may arise from the presence of assets on the right hand side. Where data was available, age of the institution, and whether the institution was federally or state chartered was also included. To correct for possible non-spherical errors terms the instrumental variable technique developed by Hausman and Taylor (1981) is used. This technique partitions the right hand side variables such that equation one can be rewritten as:

$$Y_{it} = \alpha_i + ß\, X_{it} + \gamma\, Z_{it} + \varepsilon_{it} \qquad (2)$$

Here X_{it} assumed to be exogenous and Z_{it} contains elements that may be endogenous. Using a generalized instrumental variable estimator on this equation gives statistics that are asymptotically valid. This method allows estimation of the primary variable examined here, the time invariant dummy for whether the institution is a credit union or a bank.[7]

Section IV: Empirical Results

Summary statistics for the data set on the Hurricane Katrina impacted area are reported in Table 1. The data here represent just time periods, May 2005 and May 2006. This period straddles the hurricane that happened on August 29, 2005. Data here is for institutions that survived and for which data is available for both periods. The number of institutions changed over the period as well. There were 16 fewer credit unions a year later due to either closures or mergers, all but one of these was in New Orleans. Even though there is a national trend toward fewer institutions, this represents a far higher percentage of decline. There was also one new bank following the storm in New Orleans. Although the death toll of 1,836 has been surpassed

[6] White (1980).
[7] Woolridge 2006, p. 327, Baltagi and Khanti-Akom (1990) and Baltagi (2005).

by other natural disasters,[8] the insured costs and government assistance are in excess of 135 billion dollars, over double the amount for the 2001 terrorist attacks.[9] The mean amount of assets for the 98 credit unions in the sample is 46.9 million dollars (2006 dollars) versus 1,630 million dollars for the 56 banks in the sample. Clearly with about 35 times the average assets banks are larger, in fact the largest bank in the sample has 29.9 billion dollars, which is more than the combined assets of all the credit unions. A result similar in relative terms to assets is found with employees. The mean number of employees at credit unions is approximately 17 versus about 27 times that number in banks at about 459. It is interesting to note that the minimum number of employees for the credit unions is zero. This low number and overall lower figure for credit union employment is partly a reflection of the service given by volunteers. Given the large difference in assets, it is not surprising that assets per employee for credit unions at about 2 million dollars are less the than 3.2 millon dollars per employee found in banks.

Table 2 reports the summary statistics for the period 1994 to 2006 for U.S. credit unions and banks. The figures in this table in many ways mirror the statistics in Table 1. The mean amount of assets for the 135,244 credit union observations (averaging 10,403 per year over the thirteen years) in the sample is 53 million dollars (2006 dollars) versus 864 million dollars for the 132,434 bank observations in the sample (averaging 10,187 per year over the thirteen years), giving a ratio of asset for banks to credit unions of 17 to 1. Similar to the micro data in Table 1, there are a number of individual banks with more assets than all the credit unions combined, e.g.,

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[8] The death toll figures are argued by many to be quite conservative due the fact that a large number of fatalities occurred due to the storm but were attributed to ill health. An example would be people who died due to the lack of power in intensive care units or people who died due to the lack of relatively routine medical care in the weeks following landfall.

[9] Insurance Information Institute, 2006, http://www.iii.org/media/facts/statsbyissue/catastrophes/. Congressional Budget Office, 2006, http://www.cbo.gov/ftpdocs/70xx/doc7027/01-26-BudgetOutlook.pdf#page=127.

the maximum asset figures for bank is at 1.2 trillion dollars versus in 2006 a combined 726 billion dollars for all credit unions in the same year. The mean number of employees at credit unions is approximately 20 versus about 10 times that number in banks at about 191. Assets per employee for credit unions at about 2.1 million dollars are less the than 6 millon dollars per employee found in banks. Given that there are economies of scale, it is not surprising that banks with much larger assets on average have higher ratios of assets per employee. What will become clear in later tables is that this advantage does not hold up when considering institutions of comparable size and other characteristics.

The regressions in Table 3 use the data from pre and post Katrina. This micro data set shows consistently that size matters for efficiency. The coefficient on the natural log of real assets shows up as significant in all the specifications. The parameter estimates for the credit union dummy are all positive and typically strongly significant. The time coefficient is estimated to positive and is significant. This is to be expected after discussions with credit union and bank presidents about the large influx of insurance money that was deposited in individual accounts before actually rebuilding for many took place. The slow pace of rebuilding along the coast continues to this day, especially for residential neighborhoods. Higher insurance rates, when insurance is even available, uncertainty about building codes and supporting infrastructure have caused many to put off rebuilding or decide to move to other locations.

Suspecting possible endogeneity of real assets in the equation, the Hausman-Taylor random effects estimates are reported in column 5 of Table 3. Correlations of the exogenous variables all appeared fairly strong with the instrumented variable, real assets, except for time. The IV estimators, as expected show higher larger standard errors.[10] The Durbin-Wu-Hausman chi-

[10] Woolridge 2006, p. 516.

square test for possible endogeneity of real assets is negative (χ^2 of 0.71 with one degree of freedom and a p value of 0.398); hence the random effects model in column 6 where assets is treated as an exogenous variable of Table 3 is preferred over column 5. The results in column 6 for the key variables are almost identical. Whether the firm was in Mississippi or New Orleans and the age of the firm did not show up as significant. Having a federal charter showed up as significant, perhaps there was greater federal aid given to these institutions.

Table 4 contains a number of specifications that use the 1994-2006 data set for credit unions and banks.[11] Table 4 uses a number of controls (unbalanced firm level effects for 27, 588 credit unions and banks, time effects, region and state dummies), to try to capture unobserved variables that may relate to managerial efficiency, income of the area, variations in technology, macroeconomic shocks, etc. Similar to the findings in the micro data set reported in Table 3, the coefficients on real assets and credit unions are positive and significant in all specifications. The Durbin-Wu-Hausman chi-square test for possible endogeneity of real assets is positive (χ^2 of 367.17 with one degree of freedom and a p value of 0.000); hence the random effects model in column 5 where assets is treated as an endogenous variable of Table 4 is preferred over column 4. The estimates in column 5 are similar in magnitude, sign and significance to those in the other columns. The evidence from this regression, the strongest in statistical terms, shows that once you hold constant other factors, such as size and location, that each credit union employee handles about $22,934 more a year in assets.[12] Given that in 2006 the total full time employment

[11] It should be noted that some credit unions had a listing of zero employees. As mentioned earlier this is most likely a result of volunteer labor running the institution. Not only would this understate the amount of effort seen in running the institution, but it would drive to infinity any estimates of assets per employee. In order to preclude this possibility a one was assumed to be the smallest labor input available to the firm.

[12] To be precise the estimate is $22934.4 more per employee per year. This estimate was made at the mean of the sample.

in credit unions in the U.S. was 245,954 this relatively small per person advantage adds up to about 5.6 billion dollars. Dividing this figure by the average asset per employee for the overall sample that includes banks in Table 2, would mean that credit unions would need about 2300 fewer employees to handle the same number of assets.[13] This figure is probably biased down somewhat, given that part-time employee figures for credit unions were treated as full time. Handling of a larger amount of assets with fewer employees is an important source of cost savings. From interviews it was suggested that one reason for this increased efficiency may come from an advantage of electronic services for credit unions, since credit union members may feel more secure than dealing with a larger institution like a bank where they might feel to have less control and also that the average credit union user may be more a sophisticated user of electronics in general (Klinedinst, 2007). Another possible reason is there may be a need for fewer managerial staff to monitor employees due to a stronger identification with the goals of the firm by individual employees in credit unions, something often attributed to helping in the success of the Mondragon Cooperative Corporation.

Section V: Policy Implications

This paper has analyzed two data sets focusing on the efficiency measure of assets per employee to try and answer the question why credit unions, being so much smaller, remain resilient and still are the most numerous financial intermediary in the U.S., even after the collapse of the U.S. housing bubble.[14] The first data set looked at the credit unions and banks in the area heavily affected by Hurricane Katrina, before and after the storm. The second data set looked at all U.S. banks and credit unions from 1994-2006 to try and see if the results found in

[13] More precisely, 5640709036 / 2428531= 2322.68.
[14] See FDIC (2010)

the micro data set collected from interviews, surveys and online sources would be replicated on a much larger scale.

Credit unions and banks and their customers and employees suffered enormous losses through physical damage and personal losses following Katrina. Being more numerous and often serving lower income groups, credit unions based in the sample area, suffered more closures, movements out of the area and mergers (16 out of 63 pre-Katrina credit unions). Assets surged by about 24 percent in the year following Katrina for both banks and credit unions.[15] This large infusion of assets, from in most cases from insurance payouts, helped the institutions remain liquid.

Credit unions actually had a growth of membership of 2.6 percent in the year after the storm, mostly from the Mississippi credit unions from an area where there is higher ground and also because they absorbed a large number of people who were displaced from. The analysis of efficiency in terms of assets per employee (Table 3) showed that size is important. Significantly credit unions, when matched with comparable banks, seem to be able to handle more assets per employee than banks. The heroism that was displayed by employees and customers of both credit unions and banks in response to the disaster was quite impressive. Aid from governmental sources, insurance, non profit groups, other branches of the same institution were all important in helping theses intermediaries come back. What was remarkable was the network support offered to credit unions from other credit unions locally, statewide and nationally. One example of this unusual commitment found with the credit unions was a story told by Charles Elliott, President and CEO of the Mississippi Credit Union Association: a credit union on the coast severely damaged by the storm and unable to offer services through its regular outlets had a manager armed with a 45 revolver hand out cash from the back of a pick up truck. Once he had helped

[15] This is compared to a national growth for both types of institutions in the same period of under ten percent.

those he could at his credit union, he went on to help another credit union in a similar fashion.[16] Help to credit unions hit by the disaster came in the form of liquidity, expertise, counseling, electronic equipment, etc. The social network developed by credit unions both locally, statewide and nationally played a key role in allowing the damaged credit unions to get back to normal operations.

The results for the national sample of credit unions and banks is similar to that found in the micro data set. Size is clearly an important predictor of more efficient operations, as measured by real assets per employee. Allowing for individual institutional circumstances with a random effects estimator and controlling for size, region, state and temporal effects showed that being a credit union gave an over $22,000 dollar per employee advantage in the number of assets handled. This advantage may spring from a variety of sources described in the cooperative and credit union literature. Credit unions have survived continuous competitive conditions for decades and are still able to offer products and services to attract 90 million Americans as member-owners. Further research would help clarify exactly what are the sources of this advantage and commitment. Theoretical and anecdotal evidence point to factors that need to be researched that are internal to the organization of credit unions such as managerial techniques and goals, but many are also external in part, such as member demographics, restrictive legislative practices and credit union support organizations.

[16] Klinedinst (2007)

Table 1

Katrina Area-Summary Statistics[17]

Variable	Mean	St. Dev.	Min	Max	Number
Real Assets (2006 dollars)	630 m. $	3,200 m. $	111,964 $	29.9 b. $	154
Credit Union Real Assets	46.9 m. $	183 m. $	111,964 $	1.4 b. $	98
Banks Real Assets	1,630 m. $	5,110 m. $	22.9 m. $	29.9 b. $	56
Employees (FTE)	177.9	820.8	0	7418	154
Credit Union Employees	17.4	55.1	0	384	98
Banks Employees	458.73	1320.068	12	7418	56
Assets per Employee	2,428,531 $	1,439,164 $	111,964 $	7,327,731 $	153
Credit Union Asset per emp.	1,974,568 $	1,314,219 $	111,964 $	7,327,731 $	97
Banks Asset per emp.	3,214,860 $	1,310,083 $	828,956 $	6,382,334 $	56

[17] New Orleans parish and 12 counties in Mississippi. Counties in Mississippi included were; Hancock, Harrison, Jackson, Pearl River, Stone, George, Lamar, Forrest, Perry, Greene, Jones and Wayne.

Table 2

U.S. Data-Summary Statistics

(Aggregate of the years 1994-2006)

Variable	Mean	St. Dev.	Min	Max	Number
Real Assets (2006 dollars)	454 m. $	8,880 m. $	0	1.2 tr. $	267,678
Credit Union Real Assets	53 m. $	282 m. $	0	27.1 b. $	135,244
Banks Real Assets	864 m. $	1,260 m. $	1,222	1.2 tr. $	132,434
Employees (FTE)	104.1	1,618.8	1	202,936	267,428
Credit Union Employees	19.6	72.9	1	5647	135,244
Banks Employees	190.5	2,298.2	1	202,936	132,184
Assets per Employee	4,046,779 $	12,700 m. $	0	45.1 b. $[18]	267,428
Credit Union Asset per emp.	2,109,315 $	5,790,538 $	0	1.3 b. $	135,244
Banks Asset per emp.	6,029,094 $	180 m. $	1,222	45.1 b. $	132,184

[18] This large number is probably due to a merger or acquisition that left the total number of employees small on the books, but not in reality.

Table 3

Real Assets per Employee-Pre and Post Katrina

(Time periods are May 2005 and May 2006. Dependent variable is the natural log of real assets per employee. Standard errors are parenthesis[19])

	(1) GLS	(2) GLS	(3) GLS	(4) GLS	(5) Endogenous Random Effects	(6) Random Effects
Ln(Assets)	0.279*** (0.036)	0.271*** (0.037)	0.266*** (0.034)	0.264*** (.035)	0.471** (0.179)	0.272*** (0.048)
Credit Union Dummy	0.334** (0.136)	0.334** (0.135)	0.408*** (0.135)	0.408*** (0.140)	1.118* (0.653)	0.436** (0.185)
Time Dummy (1 if 2006)	.172* (0.091)	.172* (0.091)	.172* (0.089)	.172* (0.090)	.146*** (0.034)	.168*** (0.027)
Mississippi Dummy		-.060 (.095)	-.048 (.093)	-.048 (.093)	-.113 (.159)	-.049 (.123)
Federal Charter Dummy			-0.229** (.088)	-0.226** (.089)	-0.180 (.169)	-0.226* (.120)
Firm Age				0.001 (0.002)	0.002 (0.004)	0.001 (0.002)
N	153	153	153	153	153	153
R-sq	0.50	0.50	0.50	0.50	Wald χ^2 86.48	Wald χ^2 130.57

[19] ***, **, and * indicating significance at the 1, 5 and 10 percent level, respectively. Robust standard errors are in columns 1-4.

Table 4

Real Assets per Employee-U.S. Data 1994-2006

(Dependent variable is the natural log of real assets per employee. Standard errors are parenthesis[20])

	(1) Random Effects	(2) Random Effects	(3) Random Effects	(4) Random Effects	(5) Endogenous Random Effects
Ln(Assets)	0.338*** (0.004)	0.342*** (0.004)	0.345*** (0.004)	0.346*** (0.005)	0.384*** (0.002)
Credit Union Dummy	0.115*** (0.012)	0.129*** (0.013)	0.148*** (0.014)	0.159*** (0.014)	0.271*** (0.012)
Time Dummies		yes	yes	yes	yes
Region Dummies			yes	yes	yes
State Dummies				yes	yes
N	267,425	267,425	267,425	267,425	267,425
Number of Groups	27,588	27,588	27,588	27,588	27,588
Wald χ^2	19,050	29,364	29,726	31,648	80,446

[20] ***, **, and * indicating significance at the 1, 5 and 10 percent level, respectively. Robust standard errors are in columns 1-4.

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