ARE CREDIT UNIONS JUST SMALL BANKS?

DETERMINANTS OF LOAN RATES IN LOCAL CONSUMER LENDING MARKETS

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INTRODUCTION AND PREVIOUS LITERATURE

In recent years, economists studying local banking markets have begun to examine the competitive role potentially played by credit unions. However, how to model this competitive discipline remains an open question. Despite differences in organizational form, regulatory regimes, and possible goals, credit unions and banks clearly compete in the market for consumer loans. And while they are often relatively small, many credit unions are larger than some banks with whom they compete. This study both examines common influences on bank and credit union loan pricing and tests for residual differences after accounting for these common influences.

Despite an early study by Navratil [1981] suggesting that credit unions responded to market conditions in much the same way as other financial institutions, and work by Hannan [1984] and Rhoades [1987] on competition between banks and thrifts, only recently has the interaction between banks and credit unions begun drawing sustained attention from economists. Emmons and Schmid [2000], using county-level data, examine 2-way intertemporal linkages between credit union "participation rates" and market concentration of the commercial banking sector to support the view that the two types of institutions compete in the market for consumer deposits;[1] similarly, Feinberg and Rahman [2001] find that credit union and bank rates for two consumer loan products can each be shown to be influenced by the other.

Tokle and Tokle [2000] found a competitive influence of credit unions on bank CD rates offered in Idaho and Montana, while Feinberg [2003] has found impacts of credit unions on consumer loan rates over a broad national sample of local markets[2] – and for individual banks within those markets – in the 1992-1998 period.

What has not been done to date is an examination of the extent to which bank and credit union consumer loan pricing are influenced by common factors, and of differ-

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ences that remain after accounting for these factors. That is the focus of this study; we analyze a combined sample of 100 banks and 187 credit unions in 68 U.S. markets over the 1992-98 period to explain loan rates for two types of consumer loans.

While the number of credit unions has steadily shrunk from the early 1970s until now, they have expanded in terms of their number of members, total deposits, and local market shares. Larger individual credit union size has resulted from an expansion of the customer base and mergers among credit unions. Importantly, credit unions have expanded their service base and now most provide a wide range of retail financial services (including checking accounts, certificates of deposit, consumer and small business loans, and assorted financial transactions) to their members.[3]

This increase in credit union size and broadening of functions suggest a possible similarity in credit union and bank behavior. However, despite their expansion, credit unions have a unique characteristic that makes them different from both banks and thrifts. Credit unions are cooperative non-profit organizations, and their motivation (and hence behavior) may differ from that of profit maximizing banks.[4] They also have cost advantages arising from tax treatment, volunteer labor, and sponsorship by associations or employers.

In this paper, we will try to address this issue from the lending market perspective. We consider two types of loans important to most credit unions (though likely of less importance to banks): 24-month non-credit-card unsecured loans; and 48-month new vehicle loans. These loan types are the only ones for which historical data is available for both banks and credit unions; furthermore, we know of no source of comparable firm-level data for other financial institutions (e.g., savings and loans, for auto loans, or consumer finance companies, for small unsecured loans). The next section discusses the econometric methodology used in the study. The section after that describes the data set and sources. And finally we present empirical findings. The concluding section discusses the results and suggests some policy implications.

ECONOMETRIC SPECIFICATION

A long literature in Industrial Organization (discussed, for example, in Scherer and Ross [1990]) suggests that a profit-maximizing firm's price-cost margin will depend on market share, proxies for the degree of competition in the market (which would include both market concentration and entry conditions), and market-specific effects (as proxies for price elasticity). Given our interest in explaining prices rather than margins, cost proxies also need to be considered.

While the typical oligopoly model discussed in the literature referred to above is a static one, it would not be surprising if pricing decisions by both banks and credit unions are based in some part on past decisions. We allow for a dynamic process by including the one-quarter lagged loan rate as an explanatory variable. In practice, prices often take time to respond to changes in demand, cost and the competitive environment; in particular, some have noted that unpaid credit union boards meet infrequently to consider changing loan rates which would suggest some inertia in these rates.

Let P_t^* be the loan rate predicted according to fundamentals at any period t whereas the actual loan rate is P_t. Then, a standard partial adjustment model can be written as

$$P_t - P_{t-1} = \delta (P_t^* - P_{t-1}) \tag{1}$$

That is, actual one quarter adjustment is some percentage (δ) of predicted adjustment, with lower values of δ reflecting greater inertia in pricing behavior. Substituting in $P_t^* = f(X)$, where X represents the vector of explanatory variables, we have,

$$P_t = \delta f(X) + (1 - \delta) P_{t-1} \tag{2}$$

In regression specifications including lagged loan rates the estimated coefficient of P_{t-1} is $(1 - \delta)$. A regression coefficient estimate closer to one implies an adjustment parameter closer to zero, hence greater inertia. Also implied by this specification is that coefficient estimates of other explanatory variables are the product of their predicted impact on the fully-adjusted price and the adjustment parameter. For policy purposes we may be more interested in the former (what may be seen as a "long-run' impact) and this can be obtained by dividing the estimated coefficient by δ. To deal with dynamics appropriately, we employ for our estimation technique an instrumental variable (IV) random effects generalized least squares (GLS) model corrected for autocorrelation (the IV approach intended to guard against endogeneity of the lagged loan rate).[5]

To explain consumer loan rates by both banks and credit unions we include a number of market and institution-level explanatory variables, with all variables expressed in natural logarithms.[6] These can be viewed as proxies for the cost, market share, and conjectural variation terms in the expression above. Such industrial organization variables have frequently been used in studies of bank and credit union loan and deposit rate setting (see, e.g., Rhoades [1987], Hannan [1984], Gilbert [1984], Hannan and Liang [1995], Tokle and Tokle [2000], Feinberg [2003]).

With respect to cost, we control for the cost of funds (*COF*) by a simple average, varying over time but not cross-sectionally, of the Federal Funds rate and a national average of the credit union cost of funds; while it might be preferable to explain margins of the loan rate over cost, this was not possible given that loan rate observations were available for individual banks while *COF* is simply a national average (included simply to capture macroeconomic trends). Economies of scale available to be exploited by the financial institution are proxied by deposit size (*DEP*) -- total deposits of all branches of the institution within a particular market (while there may also be bank advantages associated with asset size, these should be picked up in part by the bank holding company variable mentioned below). To control for the possible influence of firm-level market power, the local market share of the institution (*MS*), measured in terms of deposits,[7] is included.

It is typical in industrial organization studies to assume that conjectural variation, or more generally the likelihood of collusive behavior in a market, can be roughly captured by market structure measures. We include the combined market share of

the three largest non-credit union institutions operating in that market (*CR3*),[8] with shares based on deposits, predicting a positive impact on loan rates, and as a measure of ease of new entry (and the pro-competitive impact that may have) the state credit union share (*STCUSHARE*) -- the ratio of potential credit union members to adult population of the state where the institution is operating. This latter variable has performed well in previous work [Feinberg, 2003] and is viewed as a proxy for the lack of regulatory or other entry barriers to credit union expansion into markets within that state; we anticipate that a greater state-level credit union share will indicate a greater supply elasticity from potential entrants confronting financial institutions in our sample.

To allow for cross-market impacts of large multibank operations we include a bank holding company dummy variable (*BHC*) which takes a value of one if the institution is a member of one of the ten leading bank holding companies (as of 1996)[9] of the country and zero for all other institutions; a negative sign on this term may suggest holding-company-level scale economies, while a positive sign would be consistent with anticompetitive impacts associated with multi-market contacts among large firms.

Finally, in addition to quarterly dummies included to test for seasonal effects, we include a credit union dummy variable (*CU*) which will help to answer the question posed in the title of this paper. That is, while it is often thought that credit unions charge lower interest rates than banks, we test to see if this remains true when we control for the market and institutional factors mentioned above.

DATA SOURCES AND MEASUREMENT ISSUES

Data on bank loan rates[10] were obtained (via a Freedom of Information Act request) from the Federal Reserve Board's *Quarterly Report of Interest Rates on Selected Direct Consumer Installment Loans*. Credit union loan rates were collected from the National Credit Union Administration web site. Local market structure data were obtained from Sheshunoff Information Services for the 1992-98 period.[11] The two loan rates examined are those for 48-month new auto loans and for 24-month non-credit card unsecured consumer loans; these types of loans are the only ones reported on in both the Fed survey and the NCUA database.

Both loans have obvious limitations for study: the unsecured loans are typically quite small (in the $1,000 to $5,000 range) and are not a significant part of the loan portfolio of most banks or credit unions, leading to the possibility that price determination on these loans reflects broader institutional concerns rather than market- and product-specific economic factors;[12] given the important role of automobile finance companies, often tied to manufacturers, in the market for car loans it is clear that our measures of market concentration and market shares (based only on banks, thrifts, and credit unions) will overstate the true figures.[13] Nevertheless, we expect that these problems will simply make it more difficult to observe impacts of market structure, leading to our results having a somewhat conservative interpretation. As a practical matter, the two loans are the only ones for which historical institution-level data are available for both banks and credit unions.

We included 68 markets in our analysis (listed in Appendix 1), 63 Metropolitan Statistical Areas (MSAs) and 5 rural counties (the imbalance towards MSAs reflects the available data on bank loan rates from the Fed survey). These are not randomly chosen, but rather reflect data availability. The markets vary tremendously in size from Atchison County, Kansas to New York City. From each of these markets up to two large credit unions and one small credit union were included in the sample. From the Fed survey, we have between 1 and 3 banks in each market. The total number of institutions in the sample is 287, of which 100 are commercial banks and 187 are credit unions.

The loan rate data used here are quarterly, from the 2nd quarter of 1992 to the 4th quarter of 1998. For 110 smaller credit unions (with an asset value less than 50 million dollars) data are reported to NCUA semi-annually, and for these – to fill out missing quarters -- we have averaged preceding and following values. We prefer to include these smaller credit unions to have a wider range of institution sizes in our sample. However, given our interest in dynamic effects, and the possibility that this averaging may be biasing the effects of lagged rates, we run the model both with and without these smaller credit unions; our sample size without these smaller credit unions is 177 combined institutions (of which 77 are credit unions). In addition, bank loan rates are reported at the middle of each quarter but credit union data are reported as of the end of the quarter. We have averaged current and one-quarter lagged credit union loan rates to put them on a comparable time basis with bank loan rates. Market structure variables are only available annually; we used smoothing techniques to create quarterly series.[14]

It should be noted that while the dependent variables reflect loan rates on products representing varying shares of each institution's portfolio (and likely quite small for banks), the market structure variables are developed from the institution's deposit position. On the one hand this may be seen as introducing measurement error into the estimation; however, on the other hand, deposit shares may be interpreted as instruments which deal with the potential simultaneity, often noted in critiques of structure-performance studies, between price or profit rates and market shares. In the current context it is hard to imagine a bank's choice of loan rate on unsecured or auto loans having any significant effect on its deposits (while there may be more of a link for credit unions in terms of attracting members the causal impact on deposits is unlikely to be significant).

EMPIRICAL RESULTS

Descriptive statistics (presented separately for banks and credit unions) are presented in Tables 1, 2, and 3 (the latter presenting data on only the larger credit unions reporting quarterly). Note there the tremendous variation both within and across institutional types in size and market shares. In particular, while clearly most banks are larger than most credit unions, there is considerable overlap and it is not uncommon for credit unions in our sample to be larger than some banks in the same and other markets.

TABLE 1
Descriptive Statistics (Banks Only)

	DEP ($million)	CR3	MS	STCUSHARE	USL	NVL
Mean	4323	52.4	16.4	30.6	13.7	8.7
Maximum	83800	89.3	46.9	111.7	22.8	15.0
Minimum	66	24.8	0.13	8.6	5.0	5.9
Observations	2201	2201	2201	2201	2201	2201
Cross sections	100	100	100	100	100	100

TABLE 2
Descriptive Statistics (Credit Unions Only)

	DEP ($million)	CR3	MS	STCUSHARE	USL	NVL
Mean	131.4	53.8	1.0	29.0	13.4	8.0
Maximum	2693.2	92.5	27.8	111.7	19.7	16.0
Minimum	0.16	24.8	0.01	8.6	6.8	5.3
Observations	4530	4530	4530	4530	4530	4530
Cross sections	187	187	187	187	187	187

TABLE 3
Descriptive Statistics
(Credit Unions, including Only those Reporting Quarterly)

	DEP ($million)	CR3	MS	STCUSHARE	USL	NVL
Mean	296.0	51.9	1.8	29.4	13.5	7.8
Maximum	2693.2	81.4	27.8	111.7	19.0	12.4
Minimum	42.8	28.2	0.04	15.2	7.0	5.3
Observations	1908	1908	1908	1908	1908	1908
Cross sections	77	77	77	77	77	77

Table 4 presents our major regression results – estimating the pooled random-effects GLS model (with adjustment for autocorrelation and an instrumental variable for the lagged loan rate) on the combined sample of banks and credit unions to explain unsecured loan rates (*USL*) and new vehicle loan rates (*NVL*).[15] First, note that while institution deposit size has no statistically significant effect on unsecured loan rates, for new vehicle loan rates the effect is negative, consistent with a scale economy argument (though this effect disappears when only the quarterly reporting credit unions are included).[16]

Market concentration has been found in previous empirical work to have an ambiguous effect after firm-level effects have been controlled for; here we find concentration, measured as the deposit market share of the top three institutions, to have a significant positive effect only for *NVL* (and only when all credit unions are included), with significant negative impacts for unsecured loan rates. Institution market shares never have the predicted positive impact on loan rates, and in fact the estimated negative coefficient for unsecured loan rates is statistically significant when only the quarterly reporting credit unions are included. The negative impacts of market concentration and institution-level market shares may be capturing scale economy impacts not picked up by the deposit size measure; in addition, the lack of these "market power" effects may reflect the large number of credit unions in our sample -- their lack of a profit motive may imply no rationale for greater potential market power to translate into higher rates.

TABLE 4
Instrumental Variable Generalized Least Squares Regression Results with Autocorrelation Adjustment (Combined Sample) – Random Effects; All Variables in Logs

	All CUs included		Only quarterly reporting CUs included	
Variables	**USL**	**NVL**	**USL**	**NVL**
Constant	1.158	0.629	1.920	0.818
	(3.44)	(6.02)	(3.89)	(6.16)
Deposit Size	0.0022	-0.0061	0.0077	0.0006
	(0.43)	(2.37)	(0.93)	(0.17)
CR3	-0.052	0.046	-0.084	0.016
	(1.78)	(2.93)	(2.02)	(0.82)
Market Share	-0.0060	-0.0043	-0.0220	-0.0050
	(1.21)	(1.54)	(2.13)	(1.04)
Cost of Funds	0.043	0.205	0.107	0.336
	(3.01)	(16.73)	(5.25)	(23.06)
State CU Share	0.0045	-0.048	0.014	-0.048
	(0.21)	(4.68)	(0.51)	(4.08)
Lag Rate	0.594	0.620	0.288	0.453
	(5.04)	(18.64)	(1.65)	(10.76)
CU Dummy	-0.010	-0.114	-0.032	-0.112
	(0.40)	(9.35)	(1.00)	(7.64)
BHC Dummy	0.052	0.035	0.052	0.030
	(2.53)	(2.79)	(2.30)	(2.48)
QD2	-0.0021	-0.0018	-0.0048	-0.0060
	(0.97)	(1.35)	(1.43)	(3.24)
QD3	-0.0033	-0.0050	-0.0089	-0.0110
	(1.15)	(2.79)	(2.00)	(4.65)
QD4	0.0025	-0.0084	0.0021	-0.0120
	(0.82)	(4.40)	(0.44)	(4.67)
R-squared	0.03	0.29	0.05	0.44
Rho	0.74	0.83	0.70	0.77
Cross sections	287	287	287	287
Observations	6874	6812	4224	4141

z-statistics in parentheses below estimated coefficient

Cost of funds, as expected, has a strong positive coefficient for both loan rates, whether the smaller credit unions reporting semiannually are included or not. A natural concern to raise is that of possible non-stationarity of the loan rate and cost of funds series, and cointegration between them. However, it is important to note the limited time series nature of the panel (with 24 time series observations versus 187 cross sectional observations); furthermore there is little apparent trend in the cost of funds proxy over the time period investigated,[17] and the simple correlation between the loan rate series and cost is fairly modest (0.3) for new vehicle loans, virtually zero for unsecured loans.

The state-level credit union penetration share has no significant effect on unsecured loan rates, but a significant negative impact on new vehicle loan rates (again, with or without the semi-annually reporting credit unions). This result is consistent with the threat of entry helping to discipline pricing for new vehicle loans. The lagged loan rate variable has a large positive statistically significant coefficient for both types

of loans, though somewhat smaller for both when the semi-annually reporting credit unions are excluded.[18] A considerable degree of inertia in rate-setting is suggested for both types of loans, with an implied one-quarter adjustment of between 40 and 70 percent of the optimal adjustment.

Several of the dummy variable coefficients are of particular interest. The quarterly dummies suggest a strong seasonal pattern to new vehicle loans, with rates lowest in the third and fourth quarters (perhaps due to competition from manufacturer-tied auto finance companies pushing to unload end-of-model-year vehicles and promote the new models). The bank holding company dummy variable is positive and significant for both types of loans, for both samples. This finding is consistent with price-increasing impacts of multi-market contact among large firms, as discussed by Alexander [1985], Feinberg [1985], Bernheim and Whinston [1990], and Hannan and Prager [2001], among others.

After controlling for the market and institutional variables discussed above, the estimated coefficient of the *CU* dummy variable should answer the question posed in the title of this paper. That is, given two financial institutions of the same deposit size (in a particular market), having the same cost of funds, and facing the same market structure conditions – including the same share of the market – will consumer loan pricing differ if one is a bank and the other a credit union? For new vehicle loans, the answer seems clearly to be yes, with credit union loan rates on these loans significantly lower (whether or not only the quarterly reporting credit unions are included in the sample). The roughly 11 percent reduction in new vehicle loan rates due to credit union status implies a roughly 0.9 percentage point reduction in new vehicle rates. As noted above, if we divide this by the estimated adjustment parameters, the impact on "fully-adjusted" loan rates of credit union status is between 1.6 and 2.4 percentage points. This result is consistent with the stated objectives of credit unions to pool members' savings and (perhaps by being better able to monitor repayment or by using "moral suasion" to guarantee repayment) extend loans to them at a low cost. However, for unsecured loans we do not find a significant difference between bank and credit union pricing.

While the *CU* dummy variable identifies a *ceteris paribus* effect of credit unions on loan pricing, the model discussed above restricts this effect purely to changing the intercept term of the loan pricing equations. A more general alternative is found in Tables 5 and 6, where we replicate the analysis (dropping certain dummy variables for obvious reasons) on separate sub-samples of banks and credit unions. Comparing the estimated coefficients presented in those tables, we see that banks' response to deposit size is very different than that of credit unions. Increasing bank deposits raises both loan rates, while increasing credit union deposits reduces both loan rates (all effects at least weakly significant). The bank response suggests that bank deposits in a market may reflect market size (and perhaps omitted variables correlated with that – operating expenses such as office rentals may be one) while the credit union impact is consistent with the anticipated scale economy impact.

TABLE 5
Instrumental Variable Generalized Least Squares Regression Results with Autocorrelation Adjustment (Bank Sample) – Random Effects; All Variables in Logs

Variables	USL	NVL
Constant	1.944	0.847
	(2.77)	(5.12)
Deposit Size	0.022	0.010
	(2.30)	(2.37)
CR3	-0.072	0.060
	(1.26)	(2.35)
Market Share	-0.028	-0.0056
	(1.86)	(0.81)
Cost of Funds	0.140	0.384
	(3.23)	(14.24)
State CU Share	0.062	-0.046
	(1.87)	(3.29)
Lag Rate	0.108	0.256
	(0.41)	(4.17)
BHC Dummy	0.052	0.027
	(2.05)	(2.30)
QD2	-0.0077	-0.010
	(1.34)	(3.53)
QD3	-0.016	-0.018
	(2.11)	(4.81)
QD4	0.0038	-0.019
	(0.48)	(4.62)
R-squared	0.10	0.41
Rho	0.65	0.71
Cross sections	100	100
Observations	2318	2235

z-statistics in parentheses below estimated coefficient

Market concentration and market shares have either insignificant or negative effects for both banks and credit unions on loan rates for unsecured loans; for new vehicle loans there is a significant positive impact of concentration for banks, and a mixed effect for credit unions (depending on whether the small "semiannual reporters" are included or not). The state credit union share has the expected negative impact for both bank and credit union new vehicle loan rates (twice as large for banks as for credit unions) but a puzzling positive impact on bank unsecured loans. The coefficient of the cost of funds variable is positive and significant for both banks and credit unions, though larger for banks (perhaps consistent with a more direct response by banks to changes in economic conditions in their loan pricing strategy). For both banks and credit unions, the impact of cost of funds is larger for new vehicle loans than for unsecured loans. The bank holding company dummy variable continues to have a significant positive impact in explaining both loan rates.

Considered separately, we see a much larger coefficient on lagged rates for credit unions than for banks for both types of loans, suggesting greater inertia in decision-making by credit unions. For example, for new vehicle loans, the implied inertia parameter is .74 for banks and between .36 and .43 for credit unions (i.e., 21 percent

of optimal adjustment made in actual one-quarter price changes by banks vs. roughly 40 percent by credit unions). This may result from volunteer credit union boards meeting only infrequently to discuss changes in loan rates, or less of a perceived need to respond to market conditions by credit unions, rather than the more immediate response to changing market conditions expected to emerge at banks.

TABLE 6
Instrumental Variable Generalized Least Squares Regression Results with Autocorrelation Adjustment (Credit Union Sample) – Random Effects; All Variables in Logs

	All CUs included		Only quarterly reporting CUs included	
Variables	**USL**	**NVL**	**USL**	**NVL**
Constant	1.348	0.670	1.833	1.224
	(5.18)	(5.72)	(3.20)	(6.61)
Deposit Size	-0.0048	-0.013	-0.025	-0.029
	(1.58)	(4.31)	(1.58)	(3.71)
CR3	-0.017	0.034	-0.060	-0.062
	(0.56)	(1.80)	(1.13)	(2.10)
Market Share	0.0014	-0.0014	-0.0066	-0.0025
	(0.34)	(0.47)	(0.47)	(0.38)
Cost of Funds	0.035	0.161	0.063	0.246
	(2.69)	(12.27)	(2.82)	(12.57)
State CU Share	-0.046	-0.044	-0.057	-0.025
	(1.77)	(3.35)	(1.35)	(1.31)
Lag Rate	0.563	0.636	0.542	0.567
	(7.12)	(19.29)	(2.83)	(12.98)
QD2	-0.0010	0.0003	-0.0015	-0.0008
	(0.78)	(0.25)	(0.64)	(0.40)
QD3	0.0003	0.0000	-0.0022	-0.0058
	(0.15)	(0.01)	(0.66)	(2.07)
QD4	0.0002	-0.0028	-0.0017	-0.0076
	(0.12)	(1.40)	(0.49)	(2.56)
R-squared	0.02	0.18	0.07	0.30
Rho	0.87	0.87	0.85	0.84
Cross sections	187	187	77	77
Observations	4556	4577	1906	1906

z-statistics in parentheses below estimated coefficient

CONCLUSIONS

This paper finds that, despite common influences on their pricing, banks and credit unions behave differently in local markets for consumer loans. Controlling for market and firm-level factors, credit union new vehicle loan rates are roughly 2 percentage points lower than bank loan rates, after a full adjustment is made to changed economic conditions. This is not surprising as credit unions are non-profit organizations and the nature of competition between credit unions and banks may be somewhat complicated for that reason. Another major difference observed -- the apparently greater inertia in pricing by credit unions -- is likely the result of their organizational form, as is the weaker link between market concentration and new vehicle loan rates. Understanding the causes of these differences in behavior will require further study.

Another result of interest is that market and institutional variables seem to have less predictable impacts – for both banks and credit unions – in explaining unsecured loan rates than in explaining new vehicle loans. This may be due to the relative unimportance to banks (and even to larger credit unions) of unsecured loans; in fact, these loans may be viewed by financial institutions (especially banks) more as a convenience to depositors than as product on which a return should be earned (considered separately from other institutional products). From this perspective, our results support the argument of Gilbert [1984] and other researchers that interest rates should be analyzed individually – with each having different sets of determinants.

Our results have important implications for policy. On the one hand, as previous work has noted, banks and credit unions are substitutable in the market for consumer loans, suggesting that considering the credit union presence in a market when evaluating antitrust implications of bank mergers is essential.[19] On the other hand, the fact that credit unions and banks do seem to have unique determinants of loan rates emphasizes that these institutions are not *perfect substitutes*, and antitrust and banking overseers should not assume that the potential competition from credit unions (and by analogy other smaller financial institution types) will be *sufficient* to provide competitive discipline in banking markets.

APPENDIX 1
List of included markets

Albany, NY
Amarillo, TX
Anchorage, AK
Atchison County, KS
Atlanta, GA
Baton Rouge, LA
Billings, MT
Birmingham, AL
Boston, MA
Buffalo, NY
Burlington, VT
Charlotte, NC
Chicago, IL
Cincinnati, OH
Cleveland, OH
Columbus, OH
Dallas, TX
Dayton, OH
Denver, CO
Des Moines, IA
Detroit, MI
El Paso, TX
Evansville, IN
Fargo, ND
Ford County, KS
Fort Wayne, IN
Fort Pierce-Port St. Lucie, FL
Grand Rapids, MI
Greensboro, NC
Hartford, CT
Houston, TX
Huntington, WV
Indianapolis, IN
Johnstown, PA
Lafayette, LA
Little Rock, AR
Louisville, KY
Lynchburg, VA
Macon, GA
Mansfield, OH
Marquette County, MI
Memphis, TN
Milwaukee, WI
Minneapolis, MN
Nacogdoches County, TX
Nashville, TN
New York, NY
Oklahoma City, OK
Omaha, NE
Peoria, IL
Philadelphia, PA
Pittsburgh, PA
Portland, ME
Providence, RI
Reno, NV
Richmond, VA
Roanoke, VA
Rochester, NY
St. Louis, MO
Salt Lake City, UT
San Francisco, CA
Seattle, WA
Sioux City, IA
Sussex County, DE
Tulsa, OK
Victoria, TX
Wichita, KS
Youngstown, OH

NOTES

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1. Emmons and Schmid [2004] develop a model of bank/credit union interaction and identify empirically local economic factors influencing the nature of the competition between the two types of institutions.
2. While innovations in technology have led some to the view that all lending markets are national, Simons and Stavins [1998] present evidence suggesting that banking markets are still predominately local in nature. They point to the Federal Reserve Board's 1992 Survey of Consumer Finances which shows that 94.1 percent of households using a financial institution identified a local institution as their primary provider of financial services; both deposit accounts and sources of credit were primarily local in nature. More recently though, Amel and Starr-McCluer [2002] have noted (examining more recent versions of that survey) that consumer loans – especially new-vehicle loans – became less locally limited during the 1990s.
3. A better discussion of credit union growth and evolution can be found in Burger and Nacil [1992].
4. Hart and Moore [1998] have a detailed analysis of the differences in objective functions and governance structures between non-profit and for-profit firms.
5. Instruments used were two lagged values of the cost of funds. The results without instrumenting for the lagged loan rates were quite similar.
6. A preliminary investigation of the data found the new vehicle loan rates to be approximately log-normally distributed (while the unsecured loan rates were a bit closer to being distributed normally). In preliminary work we also tried a measure of state-level personal income growth as a proxy for the state of demand; this variable did not seem to play an important role in loan rate determination.
7. While *MS*, *DEP* and *CR3* are all based on deposits within a market, they are not highly correlated with each other due to the pooling of institutions of varying size in markets of varying size over time. Over the entire sample, the correlation coefficient of *CR3* with *DEP* is -0.06, with *MS* it is +0.07. The correlation coefficient between *DEP* and *MS* is higher, at 0.40, and this may suggest that disentangling separate influences may be difficult, but given the large sample size this should not be a major problem.
8. In the micro banking literature authors have alternatively used *CR2*, *CR3*, and the Herfindahl Index to measure market power – results are generally not sensitive to the choice of market power variables.
9. They are Chase Manhattan, Citicorp, BankAmerica, JP Morgan, Nations bank, First Union, First Chicago NBD, Bankers Trust, Bank One and Norwest. As banks were acquired during the period by these bank holding companies, there is some variation in this dummy variable over time.
10. These are for commercial banks, both federally and state chartered, and the loan rates are specific to the particular market in question (i.e., *NationsBank* is not asked for a single loan rate for all markets in which they operate).
11. We must acknowledge some difficulty in accurately determining credit union market shares and deposit size; all deposits are allocated to local markets in which their main offices are found (as opposed to the bank deposit data which is specific to branches in a particular market). However, some credit unions have branches in multiple local markets – we have tried to deal with this by deleting from our sample credit unions which we expect to have significant deposits outside home markets, and some markets in which such credit unions would distort deposit market shares.
12. Anecdotally, an economist for a major bank (encountered in an airport check-in line) claimed that small unsecured loans are provided more as a convenience to customers than as a direct contribution to profits.
13. A similar problem for unsecured loans results from the omission of consumer finance companies and pawnshops.
14. We initially distributed the annual figure for all four quarters, and then applied a 3-quarter centered moving average. This has the practical effect of making the second and third quarter values equal

to the annual figure while 1st and 4th quarter values are averages of current and past or future year values.

15. As noted above, we do not have measures of actual bank cost of funds, but rather just a national average proxy for this, so calculating a price-cost margin or spread variable (as an alternate dependent variable) is not possible.
16. Hannan and Liang [1995] also found some evidence in support of scale economies in explaining both unsecured and secured loan rates.
17. An Augmented Dickey Fuller test on the full 24 observations of cost narrowly fails to reject non-stationarity, but rejects this at 5 percent if the first two quarters of data are dropped.
18. We expect that our adjustments for autocorrelation, combined with the instrumental variables approach to endogeneity of the lagged loan rate term should produce consistent estimates. However, preliminary estimates using the Arellano-Bond linear dynamic panel estimator, a Generalized Method of Moments approach, yielded similar results – we did not report those results because the required first-differencing of data eliminated the credit union dummy variable of particular interest to us.
19. Furthermore, results showing ease of credit union entry to discipline bank loan rates also argue for regulatory policies reducing barriers to entry of financial depository institutions of all types.

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