A causality test of the relationship between bank and credit union lending rates in local markets

Robert M. Feinberg*, A.F.M. Ataur Rahman

Department of Economics, American University, Washington, DC 20016-8029, USA

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Abstract

This article investigates the relationship between banks and credit unions using the Granger-causality technique. For two types of consumer loans in 33 local markets in the US both credit union and bank loan rates are found to cause the other. © 2001 Elsevier Science B.V. All rights reserved.

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JEL classification: G21; L2

1. Introduction

Historically, banks and credit unions have co-existed in an uncomfortable competitive relationship, with banks focusing attention on tax advantages granted to credit unions and credit unions concerned with removing legislative or regulatory barriers to their expansion. Until recently, though, little study has been done on the competitive interactions of the two types of institutions. In this paper we adopt a new strategy for investigating the issue, examining the extent to which banks and credit unions, in their rate setting decisions, consider prices of the other group of institutions.

In the language of a literature beginning with Granger (1969), we attempt to determine if bank loan rates ‘Granger-cause’ credit union loan rates, and vice versa. This is an empirical question for two basic reasons: (1) different classes of customers for the two types of financial institutions may imply limited competition between them and hence little causality between rates (even for the same category of loan); (2) non-profit-maximizing motivations of credit unions may lead them to focus less than might otherwise be thought on bank pricing, while banks may view certain categories of consumer...
lending as tangential to their major operations and hence pay relatively little attention to credit union behavior in those categories.

2. Previous related literature

While there is a voluminous literature on the impacts of local market structure on bank pricing behavior (see Berger and Hannan (1989), Rhoades (1997) and Humphrey and Pulley (1997) for a sampling), this has until very recently ignored the potential competitive role of credit unions. Feinberg (2001), using a pooled panel of relatively small metropolitan areas and rural counties nationwide, found strong evidence of increasing credit union influence reducing interest rates charged by banks on selected consumer loans. In a similar vein, Tokle and Tokle (2000) find — in a study of local markets in Idaho and Montana — that higher credit union market shares have a positive influence on bank interest rates paid on certain categories of deposits.

A more direct approach is to utilize the Granger causality technique. Starting with Granger (1969), this method has been often applied to explore the relationships between data series. While macroeconomic phenomena have been more often studied in this way, there have been some applications in the study of particular industries (for a recent example in the micro-banking literature, see Berger and DeYoung (1997)).

3. Data

After obtaining bank loan rate data from the Federal Reserve Board’s Quarterly Report of Interest Rates on Selected Direct Consumer Installment Loans, metropolitan areas of one million or more in 1990 population (where it was expected credit unions would play less of a role) and those without data for the full sample period of 32 quarters from 1991-2nd quarter to 1999-1st quarter were eliminated. This left 36 markets; however, three of these markets had the atypical feature of a single credit union among the top three local depository institutions. We chose to exclude these markets with ‘dominant credit unions’ from our analysis. Of the remaining 33 markets — listed in Appendix A — 29 are metropolitan statistical areas (MSAs) ranging in size (based on 1990 population figures) from Casper (Wyoming) — with a population of 61,226 — to Oklahoma City (Oklahoma) — with 958,839 in population. The other four are rural counties ranging in size from Atchison County (Kansas) — 16,932 — to Sussex County (Delaware) — 113,229. The median 1990 population for the 33 markets was 278,990 (Evansville, Indiana).

Where more than one bank in a market was surveyed in a given period, a simple average was used. The two loan rates (reported for the second week of February, May, August, and November) are for 48-month new auto loans and for 24-month non-credit card unsecured consumer loans, for which banks are requested to report their ‘most common rate’.

\[1\] These are for commercial banks, both federally and state chartered, and the loan rates are specific for the particular market in question.

\[2\] No other information besides these two numbers is reported so, for example, one does not know the importance of each type of loan or the average size of the loans outstanding.
average rates for the same two types of loans — were obtained from the National Credit Union Administration (NCUA), based on call reports.\(^3\)

4. Methodology

A stationary test on the four data series was done using the Augmented Dickey Fuller (ADF) test procedure (Dickey and Fuller, 1979). The variables were found not stationary in their levels so we performed the ADF test on the first differences of these variables. We found all the variables stationary at a 95% level of significance in their first differences. After compiling the data set causality testing was performed. The widely used and stylized definition of causality first employed by Granger (1969) is adopted here. That is, if the variance of any variable is not better explained by adding the lagged values of some second variable to a regression specification already containing lagged values of the first variable, then the second variable is not considered to `cause' the first variable. The test was done using both one and two lags (for each variable) with the assumption that the interest rates offered by banks and credit unions are unlikely to affect each other beyond a period of 6 months. The null hypotheses tested here were that credit union loan rates do not ‘Granger-cause’ bank loan rates (in the same market) and vice versa. The tests were done for both sets of loan rates, and each market was analyzed separately, producing 33 sets of results.

5. Results

The overall causality results comprising all 33 markets are summarized in Table 1.

Here the proposition indicates the specific hypothesis that we are testing. For instance the figure in the 2nd row and 3rd column (31/33) tells us the hypothesis that the bank unsecured loan rate does not Granger-cause the credit union unsecured loan rate with one lag rejected in 31 out of the total 33 cases tested. The figures in parentheses simply express the fraction in percentage terms. A quick look at the results suggests that a causal relationship, in both directions, is quite common, occurring for at least

<table>
<thead>
<tr>
<th>Variables</th>
<th>Bank rate causes CU rate (1 lag)</th>
<th>Bank rate causes CU rate (2 lags)</th>
<th>CU rate causes Bank rate (1 lag)</th>
<th>CU rate causes Bank rate (2 lags)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsecured</td>
<td>Yes</td>
<td>31/33 (93.94%)</td>
<td>29/33 (87.88%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2/33 (6.06%)</td>
<td>4/33 (12.12%)</td>
<td></td>
</tr>
<tr>
<td>New vehicles</td>
<td>Yes</td>
<td>29/33 (87.88%)</td>
<td></td>
<td>33/33 (100.00%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>4/33 (12.12%)</td>
<td>0/33 (0.00%)</td>
<td></td>
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</tbody>
</table>

\(^3\)The credit union rates are reported for end of quarters while the bank rates are for mid-quarter observations; to make these comparable, the credit union loan rate used for, as an example, the third quarter of 1993, is the average of the end of second quarter and end of third quarter rates.
88% of the markets. The length of lag taken into consideration seems not to dramatically affect the results, with acceptance of no causal relationship quite low in both the 1 and 2 lag cases.\footnote{While the Granger test does not address this, the direction of causal influence is positive; i.e. lower credit union rates seem to pull down bank rates and vice versa.}

A result worth noting is that when markets were sorted by market share held by credit unions, no specific patterns emerge in the outcomes of the causality tests. This apparently simple result has a very strong implication, that the existence (not to be confused with the magnitude) of an effect of credit union rates on bank loan rates and vice versa does not depend on the relative market share of the credit union in that market.

6. Conclusion

The results presented here complement previous findings from the Industrial Organization literature suggesting a competitive relationship between banks and credit unions. Whatever other motivations credit unions may have, they seem to take account of bank loan rates in their own rate-setting decisions. Similarly, banks apparently pay careful attention to credit union rates (and this is of course consistent with the intense lobbying efforts by banks attempting to limit credit union expansion). While the results found here are hardly surprising — two groups of money lending institutions working in the same market should be expected to influence each other’s ‘price’ — it is notable also that this causal influence seems not to depend on the share of credit unions in the local market.

Acknowledgements

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Appendix A. List of 33 markets

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<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Fort Pierce-Port St. Lucie, FL MSA</td>
</tr>
<tr>
<td>2</td>
<td>Atchison County, KS</td>
</tr>
<tr>
<td>3</td>
<td>Victoria, TX MSA</td>
</tr>
<tr>
<td>4</td>
<td>Lafayette, LA MSA</td>
</tr>
<tr>
<td>5</td>
<td>Fargo, ND MSA</td>
</tr>
<tr>
<td>6</td>
<td>Sioux Falls, SD MSA</td>
</tr>
<tr>
<td>7</td>
<td>Casper, WY MSA</td>
</tr>
<tr>
<td>8</td>
<td>Youngstown, OH MSA</td>
</tr>
<tr>
<td>9</td>
<td>Little Rock, AR MSA</td>
</tr>
</tbody>
</table>

\footnote{While the Granger test does not address this, the direction of causal influence is positive; i.e. lower credit union rates seem to pull down bank rates and vice versa.}
10. Reno, NV MSA
11. Richmond, VA MSA
12. Sioux City, IA MSA
13. Ford County, KS
14. Louisville, KY MSA
15. Sussex County, DE
16. Roanoke, VA MSA
17. Huntington, WV MSA
18. Evansville, IN MSA
19. Omaha, NE MSA
20. Grand Rapids, MI MSA
21. Des Moines, IA MSA
22. Burlington, VT MSA
23. Wichita, KS MSA
24. Tulsa, OK MSA
25. Amarillo, TX MSA
26. Billings, MT MSA
27. Macon, GA MSA
28. Fort Wayne, IN MSA
29. Oklahoma City, OK MSA
30. Baton Rouge, LA MSA
31. Portland, ME MSA
32. Marquette County, MI
33. Albuquerque, NM MSA

References