CREDIT UNIONS vs. BANKS

The Myth of the Uneven Playing Field

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Introduction & Executive Summary

The purpose of this paper is to evaluate proposals of commercial bank critics that credit unions are *de facto* operating as commercial banks and should be treated as such, especially in regards to corporate income taxation. Our approach is to consider both theoretical and empirical evidence regarding the fairness and efficiency of such proposals, including the likely effects on competition and, ultimately, consumer benefits.

Background

Credit unions and commercial banks have historically differed in important ways, including their organizational form, regulation, and tax treatment. These differences are the genesis of a long-standing debate about the vigor and fairness of competition between the two classes of institutions.

For example, because credit unions are organized as not-for-profit consumer cooperatives, they are not subject to corporate income taxation as are commercial banks.

The repeal of the 1933 Glass-Steagall Act in 1999 greatly expanded already greater bank powers, by removing constraints on the ability of banks and bank affiliates to engage in securities activities.

In the 1980s and 1990s, the concept of *communities* as one of the definitions of a member population with a common bond was advanced. Although a 1998 US Supreme Court ruling temporarily re-imposed traditional definitions of common bond, the Credit Union Membership Access Act (CUMAA), unanimously passed the same year

by Congress, restored the use of community in defining what constituted membership with a common bond. From the commercial banks' point of view, the CUMAA unfairly tilted the landscape in favor of credit unions, further amplifying the long-standing exemption of credit unions from corporate income taxation.

Today, advocates for commercial banks point to trends in credit union market share and other performance measures as evidence that credit unions have acquired *de facto* full banking powers. They assert that credit unions are "just small banks" and should be taxed accordingly. Commercial banks see such changes as necessary to restore a "level playing field" on which the two types of institutions can compete.

Our Approach

In our view, the difference in organizational forms of credit unions and commercial banks, the asymmetry of powers enjoyed by the respective institutions, and the trends in credit union development are not consistent with the claim that credit unions enjoy unfair competitive advantages. Our approach is to review the theory and historical performance of credit unions, then to statistically test if there is a comparative performance difference based on the adoption of the community common bond membership criterion, or the exemption from corporate income taxation.

- We begin first by summarizing the arguments and evidence offered by critics of credit unions.
- We then review the history and theoretical literature regarding the genesis and performance of the credit union movement.
- We employ the theoretical implications of this review to test these implications empirically using econometric and other statistical analyses.

Our Conclusions

All of the major claims made by critics of the credit union industry are unsubstantiated. Specifically, contrary to the claims of their critics:

- Credit unions' share of consumer deposits have not been growing for more than a decade.
- There is no evidence that either the community bond designation or corporate tax policy has had any positive statistical effect on deposit or institution share trends.
- Credit unions' growth and consolidation is mainly a response to the risk and inefficiency of reduced scale revealed by credit union liquidations in the 1970s and 1980s not a consequence of changes in common bond designation or tax policy.
- Untaxed credit union net income is not going to higher credit union labor compensation.
- Consistent with the theory of cooperative banking, credit unions continue to provide superior deposit and loan rates, in addition to greater protection from portfolio risk relative to outside-ownership commercial banks.
- The channeling of free cash flow to savers and borrowers means that free cash flow does not go untaxed.
- Credit unions have not abandoned small account holders.

THE ECONOMICS OF CREDIT UNIONS

In this section, we discuss the origins and economics of consumer cooperatives in the banking market. This background is necessary to understand the extent to which differences in organizational form may affect the performance and consumer acceptance of financial institutions of varying organizational forms–independently of tax or regulatory policy differences.

CONSUMER COOPERATIVES

Credit unions belong to a class of organizations known as consumer cooperatives. In a consumer cooperative, the members democratically control the institution. There are many examples of consumer cooperatives, operating in a variety of industries and coexisting with investor-owned corporations.

There is a large body of literature that supports the equivalent or superior economic efficiency of cooperatives depending upon market conditions and the structure of the cooperative. Economists have offered theory-based views on many aspects of cooperatives' behavior and performance. For example:

- Economists theorize that one-member, one-vote cooperatives offer better outcomes than organizations with votes weighted by capital ownership.[1]
- Cooperatives are especially successful in consumer-oriented industries with low physical capital needs.

[1] Svend Albæk and Schultz, Christian (1998). "On the relative advantage of cooperatives," *CIE Discussion Papers*, University of Copenhagen, Denmark.

- Consumer cooperatives with members with similar preferences can offer superior consumer benefits relative to investor-owned corporations. This is because an outside owner typically makes inefficient decisions that are not well tailored to the average customer.[2]

In the particular case of US credit unions, consumer deposits or "shares" fund the organization. Each member is accorded one vote on credit union matters and decisions regardless of the size of the members' accounts. Members may also become borrowers. Members thus are at risk as depositors, and as borrowers, imposing risk on other members.

Commercial banks, in contrast, are organized as investor-owned corporations. Determination of deposit-taking and lending practices is made by outside owners whose objective is maximization of ownership (equity) value. This is received in the form of appreciation of their equity stake and/or distribution of profits through dividend payments.

Thus, the important distinction is that banking cooperatives are organized to maximize the risk-adjusted benefits to members (as depositors and borrowers) rather than the profits distributed to outsiders, as in the case of commercial banks. Consumer cooperatives in banking are thus not-for-profit organizations, by definition. Deposit and loan rates are set to maximize benefits to members, with any income net of expenses being used primarily to capitalize the institution to buffer against loan losses.

History of US Cooperative Banking

Technically speaking, in the US, credit unions were preceded by mutual savings banks and mutual savings and loan associations. Importantly, though there are some distinctions, these too are quasi consumer cooperatives, and the broader term is used initially in this discussion.

The cooperative banking movement in the United States arose in the presence of investor-owned commercial banks in the 19th and early 20th

[2] Hart and Moore (1998).

centuries. The early investor-owned banks were notoriously risky, the outside owners' focus on their own prospects tended to bias the banks' behavior toward risky investments and even exploitative treatment of the banks' liability holders. This was manifest in high failure rates and losses to note-holders of the banks.

In the first half of the 19th century, approximately 50 percent of the banks formed each decade failed within 15 years of formation.[3] The reason for this poor performance was that even experienced outsiders had limited ability to monitor the internal behavior of banks, and thus limit the risks to which lenders to banks (note-holders or depositors) were exposed. In economics parlance, deposit markets in banking in the first half of the 19th century suffered from severe "information asymmetry". That is, the inside-investor behavior could not be reliably monitored by outside depositors and note-holders. In this setting, inexperienced and small savers were particularly reluctant to leave their funds with investor-owned banks. At the time, however, they had few options for institutionalized saving.

Conversely, investor-owned banks were reluctant to lend to individuals because of a similar informational asymmetry–the difficulty of appraising the credit-worthiness and honesty of borrowers who were unknown outsiders from the investor-owners' perspective. Unless the borrowers were well known to the investor-owners, this informational asymmetry created a moral hazard problem in loan markets—the result was that bank credits were adversely selected and risky[4]. This problem remains today despite a complex overlay of prudential regulations—commercial bank loan non-performance rates exceed those of credit unions.

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[3] See, for example, Paul B. Trescott, *Financing American Enterprise: The Story of Commercial Banking* 19 (1963) and Elvira and Vladimir Clain-Steffanelli, *Chartered for Progress: Two Centuries of American Banking* 51 (1975).

[4] See, for example, Steven A. Sharpe, 1989. "Asymmetric information, bank lending, and implicit contracts: a stylized model of customer relationships," *Finance and Economics Discussion Series 70*, Board of Governors of the Federal Reserve System (U.S.). Sharpe finds that commercial banks exploit long-term borrower relationships to subsidize risky, new borrowing relationships.

Mutual savings banks (and mutual savings and loan associations) came into existence as a means of addressing both of these information asymmetries. The mutual savings banks were not-for-profit, depositor cooperatives, often capitalized with charitable contributions. Mutual savings and loan associations were initially formed to save and loan for the temporary mutual benefit of members only, although they evolved away from this narrow model. Whatever the form, however, the depositor-owner-managers had superior familiarity with individual potential borrowers. Coupled with the mutuality of the risk that the depositor-owners bore, this offered better control over the two forms of information asymmetry that plagued the investor-owned banks. The result was institutions that were simultaneously more attractive to small depositors, and more capable of controlling the moral hazard problem that kept banks from making loans to individuals.

By the end of the 19th century, the mutual savings banks dominated savings gathering. In 1880, for example, outsider-owned commercial banks held only 12 percent of all time deposits. Mutual savings banks held 87 percent and mutual savings and loan associations held 1 percent.[5] What is important to note is that the dominance of commercial banks by not-for-profit cooperatives in deposit gathering occurred in the absence of regulatory or tax incentives favorable to the mutuals. In fact, the corporate income tax was not even levied in the US until 1909.[6]

Bank Regulation and Cooperative vs. Investor-Owned Competition

In the last decades of the 19th century, bank regulation was introduced to contain commercial bank risk-taking, and derivatively, to reduce depositor paranoia about risks to their deposits. State and federal authorities both took steps to regulate capital and take other measures to limit risk taking. As a result, by 1925, investor-owned banks had a 52 percent market deposit

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[5] John Lintner, Mutual Savings Banks in the Savings and Mortgage Markets 473 (1948), as reported in Henry Hansmann (1996). *The Ownership of Enterprise*. Kindle Edition, p. 352. See also, Oliver Hart and Moore, John (1998). "Cooperatives vs. Outside Ownership," NBER Working Paper 6421.

[6] Jack Taylor (2002), "Corporation Income Tax Brackets and Rates, 1909-2002," US Internal Revenue Service data release, p 284.

share–a doubling of their share in 1880. This increase came at the expense of the cooperatively managed entities, despite a 13-fold increase in the corporate income tax rate between 1909 and 1925. The impact of the government providing a regulatory infrastructure selectively for commercial banks was significant:

"*…regulation was evidently sufficiently effective to deprive the mutual banks of their decisive competitive advantage over investor-owned banks in attracting consumer savings deposits, and permitted investor-owned banks to come to dominate savings [markets] …*"[7]

In 1934, as a result of the passage of the Banking Act of 1933, the capital and other prudential regulations of commercial banks were further augmented by the introduction of deposit insurance. It is accurate to say that deposit insurance, too, was relatively more important to investor-owned banks than to credit unions. The organizational form of the latter already protected it against excessive risk-taking to a large degree, whereas the provision of deposit insurance to investor-owned banks was crucial to protect depositors from the excessive risk-taking by outside-owned banks. This shifted demand for deposits to commercial banks.

Ironically, however, because deposit insurance increases further the inattention of depositors to the way investor-managed banks are managed, it has the effect of increasing deposit shares of commercial banks at the expense of greater societal risk-taking–the benefits of which redound to the outside investors if successful.

Using data from the 1980s, Pozdena found, for example, that when banks operated without national deposit insurance, prudential capital ratios were twice that of insured US banks.[8] Numerous studies support the notion that deposit insurance depresses commercial bank capital, increases risk, and

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[7] Hansmann, *op cit.* p 255.

[8] Randall J. Pozdena (1991), "Danish Banking: Lessons for Deposit Insurance Reform," *Journal of Financial Services Research*, 5:289-298. The Danes reluctantly embraced deposit insurance as a requirement of joining the European Union.

increases scale. Scale may increase to the point that banks enjoy a "too-big-to-fail" status that further enhances the wealth of investor-owned commercial banks that enjoy that status, and depresses the wealth of those institutions that do not enjoy that status.[9] [10] [11]

Credit Unions as Consumer Cooperatives

Credit unions are depositors' cooperatives, using member deposits to fund loans to member borrowers. They are distinguished from other cooperatives by chartering statutes that require credit unions to gather deposits from members of the cooperative and by one-member-one-vote control. New Hampshire was the first to charter credit unions (in 1909), but was followed by other states and federal chartering in 1934.

Credit unions' organizational form preserves similar forces that allowed mutual banks and mutual savings and loan associations to contain information asymmetries. Credit unions, as not-for-profit financial cooperatives, enjoyed growth throughout the 20th century. They were simply, a superior organizational mechanism for controlling information asymmetry and risk. Indeed, Hansmann argues that the credit union form even better preserves the cooperative's risk-containment function relative to regulated, investor-owned banks:

"…since the common bond requirement is maintained by law, credit unions have generally avoided the fate that befell the [mutual savings and loan associations], i.e. to evolve into institutions in which there are no personal ties between the institutions' borrowers and its depositors, and which therefore

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[9] Michael C. Keeley (1990), *The American Economic Review*, Vol. 80, No. 5 , pp. 1183-1200.
[10] Maureen O'Hara and Shaw, W. (1990), Deposit Insurance and Wealth Effects: The Value of Being "Too Big to Fail", *The Journal of Finance*, Vol. 45, No. 5 (Dec.), pp. 1587-1600.
[11] Ioannidou, Vasso P. and Penas, María Fabiana (2010), "Deposit insurance and bank risk-taking: Evidence from internal loan ratings," *Journal of Financial Intermediation*, Elsevier, vol. 19(1), pages 95-115.

impose little more restraint on borrowers' opportunistic behavior than could an investor-owned bank." [12]

From this perspective, the assertion that expansion of the common bond to the broader notion of community and credit unions' exemption from federal corporate taxation engenders unfair competition versus commercial banks is questionable. It is expected that credit unions value the gains from lower information asymmetry, and will therefore scale to an optimal level to take advantage of the organizational structure.

Critics claim that enlargement to community common bond, versus smaller populations such as employers, unions, and other associations, impairs the purpose and function of the common bond. The modern "theory of crowds" provides empirical evidence that processes that consider the collective opinion of a group of individuals (rather than a single "expert") is more accurate in most settings than the expert opinion. Thus, even imperfect familiarity with a particular policy issue or empirical question can yield superior guidance.[13] Although credit union deposits today enjoy insurance coverage analogous to that of deposits in commercial banks, the need to better control the information asymmetry problem remains, even if deposit insurance helps resolve (albeit redundantly in the case of credit unions) the information asymmetry problem in the deposit market.

It is similarly unclear that freedom from taxation of net income creates an uneven playing field on balance. Even if, hypothetically, the corporate tax exemption resulted in excess free cash flow, everything else being equal, in a well-functioning cooperative, it would be distributed in a manner that benefited members, since they are the embodiment of the objectives of a cooperatively owned enterprise. Thus, it would be distributed in the form of higher deposit rates and/or lower loan rates, both of which may increase member tax exposure at the personal level. Alternatively, the excess cash

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[12] Hansmann, *Op cit.* p.359.

[13] Examples of this phenomenon are presented in James Surowiecki (2004). *The Wisdom of Crowds: Why the Many Are Smarter Than the Few and How Collective Wisdom Shapes Business, Economies, Societies and Nations* (Doubleday).

flow could be used to increase employee compensation (where it also would be taxed). However, this is unlikely in a member-centric management setting, and is a testable hypothesis.

The issue of whether credit unions enjoy some comparative competitive advantage because of their exemption from Community Reinvestment Act (CRA) regulations is also questionable. Over their long history, cooperative banking institutions have been a sanctuary for risk-averse or inexperienced savers. Members' mutual familiarity with other members drawn from the same industry, employer or community allied them to offer saving and borrowing opportunities that were not forthcoming from investor-owned banks. The fact that, rightly or wrongly, Congress saw fit to redress a shortcoming of the commercial banking industry through the passage of CRA does not mean that the credit union movement needed CRA regulation that was redundant to the movement's innate behavior.

In summary, it is not at all clear that credit unions enjoy any unalloyed policy advantage over commercial banks. Although their not-for-profit charters exempt them from corporate income taxation, they also are unable to sell outside equity. The move away from homogeneous membership groups to broader communities is supported by the theory of crowds—information asymmetry and collective risk is reduced when members have individual opinions that are not highly correlated to the decisions of other group members. Finally, it is not at all clear that the balance of regulatory burdens on credit unions is lighter than that on commercial banks, considering the redundancy of some regulation and the comparative narrowness of powers and protections that are afforded commercial banks.

ANALYSIS OF CREDIT UNION BEHAVIOR

The earlier discussion of the history and theory of consumer banking cooperatives challenges critics' claims that credit unions enjoy a policy environment that unfairly, and without social benefit, tilts the competitive playing field in their direction. Rather, the theory and historical experience makes the case that cooperative form of organization offers superior means of dealing with problems of asymmetrical information that otherwise impair the ability of financial intermediates to attract deposits and contain the risks associated with lending.

The fact that cooperatives outperformed investor-owned banks in the early years until the provision of commercial bank regulation and deposit insurance confirms strongly that credit unions have the potential to outperform commercial banks under conditions of information asymmetry in either the deposit market or loan market, or both.

Similarly, although the regulatory burden of compliance with the CRA falls selectively on commercial banks, any competitive imbalance in this regard must be weighed against the superior powers afforded commercial banks. The adoption of the community as the common bond is not of obvious or unalloyed benefit to the credit union. Were the credit unions to expand the notion of community to the point that the common bond function (i.e., the ability to better manage information asymmetry) is lost, this would weaken, not strengthen, the ability of credit unions to compete with regulated commercial banks. Similarly, credit unions are unlikely to abandon smaller, inexperienced savers and borrowers since these members are differentially

benefited by the resolution of the information asymmetries afforded by joining a community of members who can speak for them.

Although theory is sufficient, in our view, to call into question critics' claims that credit unions compete favorably on an uneven playing field, it is possible and necessary to go further. Specifically, one can look at the empirical behavior of credit unions relative to commercial banks and (1) examine whether certain policy treatments have statistically significant influence on this behavior and (2) see if the relative trends in performance are consistent or at odds with critics' claims.

Statistical Methods

There are several ways to bring statistical analysis to bear on the level playing field debate. The first of these, which we will call the Multiple Regression Approach, utilizes statistical representations to determine whether it is possible to explain the trends in relative performance with one or more so-called explanatory variables. The logic of using this approach here is to see if one can explain the relative behavior of credit unions and commercial banks, and test whether incorporating tax policy or common bond classification in that "model" contributes in a statistically significant manner to explaining historical trends (and in the manner asserted by critics).[14]

The second, related approach is to examine specifically whether a *causal* relationship can be detected between changes in policies toward credit unions and changes in their behavior. It is possible for there to be a statistically significant coincident association, but one that is not causal in nature. The fact that cold temperatures are associated with snowfall, for example, does not mean that snowfall causes cold temperatures. On the contrary, theory and statistical causality testing reveals that cold temperatures are causal of snowfall. Econometricians have developed tools that are suitable for testing for causality. The method is called the Granger

[14] As the introduction to this section points out, a case might be able to be made, for example, that adoption of community common bond designations impairs, rather than improves, credit unions' competitive stance vis a vis commercial banks.

Causality Testing (after the economist who developed the technique). Granger testing also uses methods related to regression analysis, but focuses on whether the changes in performance tend to *follow* changes in policy, or vice versa, or neither.

A third approach is to examine statistical trends directly and determine whether the trends are consistent with the expectations of theory. For example, the theory of the consumer cooperatives leads to several, strong hypotheses that can be tested using the assembled data:

- A credit union should employ relatively more labor per dollar of deposits or assets than a commercial bank. This is because its access to capital is poorer than that of an investor-owned bank, leading to substitution of labor for capital.
- Deposit rates should be higher and/or loan rates lower than at commercial banks because their operating objective is to maximize the benefits to members. This is in contrast to the objective of investor-owned commercial banks whose goal is to maximize the market value of investor shares.
- Compensation per employee should be lower than in commercial banks. This, too, is expected because of the focus on maximizing benefits to members, not employees, and because of the more intimate scrutiny and influence members have over organizational compensation matters.
- We anticipate that a well functioning cooperatively owned bank should experience lower incidence of loan non-performance than a commercial bank. Although regulation of commercial banks does, to some degree, compensate for their inferior ability to monitor and manage information asymmetries, it is hard for regulators to simulate the borrowing and lending discipline afforded by more intimate knowledge and reputational bonding among members of a community of savers.
- Although member deposits are insured in most of today's credit unions, credit unions can also be expected to maintain other defenses against loss

of member deposits. In particular, it is likely that credit unions would maintain higher prudential capital levels than commercial banks.

It is possible under some circumstances to combine these examinations. However, the nature and quantity of the data available seldom make this possible. Also, there are some questions that can be best addressed looking at the credit union and commercial banking sectors from a national perspective, and others that require state or even county-level data to be implemented.

The Data Collected

With these considerations in mind, the authors developed national, state and county-level data on credit union and commercial banking variables. This data was then used in statistical procedures to test for association and causal influence of putatively-influence policy factors such as the corporate income tax exemption and adoption of community common bond designations.

Banking Data

Commercial bank and credit union data was compiled at the national level for the years 1934 through 2011[15], and at the state and county level for the years 1995 through 2012[16]. Commercial bank data was assembled from the Federal Deposit Insurance Corporation (FDIC), the Federal Financial Institutions Examination Council (FFIEC)[17] and from the Thomson Reuters Bank Insight[18] data service. Credit union data was obtained from the Credit Union National

[15] The national data sample for the period between 1934 and 2011 was compiled from NCUA and FDIC data to hold constant the deposit insurance and associated prudential regulatory environment of federally insured commercial banks and credit unions. The long-series national data sample thus excludes non-federally insured and state chartered credit unions, as well as savings and loan and other thrift institutions.

[16] The commercial bank data for the 1995-2012 sample does not include savings and loan associations, but does include all other banks (community and others).

[17] https://cdr.ffiec.gov/public/PWS/DownloadBulkData.aspx.

[18] http://bankinsight.thomsonreuters.com.

Association (CUNA), the National Credit Union Association (NCUA)[19] and from Thomson Reuters Bank Insight.

Commercial bank branch location information and deposit amounts were available for the 1995-2012 periods. Credit union branch location information, however, was only available from 2007 through 2012. Credit unions do not report the deposits at the branch level; therefore two methodologies were constructed in order to compare branch deposit level changes between commercial banks and credit unions over time.

Figure 1: CU Count by # of Operating States and Counties

# of Counties	Count	Percentage	Cum. Percent
1	5505	72.85%	72.85%
2	1120	14.82%	87.67%
3	424	5.61%	93.28%
4	182	2.41%	95.69%
5	92	1.22%	96.90%
6	60	0.79%	97.70%
7	49	0.65%	98.35%
8	39	0.52%	98.86%
9	22	0.29%	99.15%
10	15	0.20%	99.35%
11	11	0.15%	99.50%
12	6	0.08%	99.58%
13	10	0.13%	99.71%
14	3	0.04%	99.75%
15	1	0.01%	99.76%
16	2	0.03%	99.79%
17	2	0.03%	99.81%
18	1	0.01%	99.83%
19	1	0.01%	99.84%
20	3	0.04%	99.88%
21	3	0.04%	99.92%
23	2	0.03%	99.95%
24	1	0.01%	99.96%
27	1	0.01%	99.97%
99	1	0.01%	99.99%
107	1	0.01%	100.00%
total	7557		

# of States	Count	Percentage	Cum. Percent
1	7053	93.33%	93.33%
2	374	4.95%	98.28%
3	68	0.90%	99.18%
4	26	0.34%	99.52%
5	9	0.12%	99.64%
6	8	0.11%	99.75%
7	4	0.05%	99.80%
9	3	0.04%	99.84%
10	3	0.04%	99.88%
11	2	0.03%	99.91%
12	2	0.03%	99.93%
13	1	0.01%	99.95%
14	1	0.01%	99.96%
15	1	0.01%	99.97%
21	1	0.01%	99.99%
32	1	0.01%	100.00%
total	7557		

The first methodology employed was applied to the entire sample (1995-2012) of the credit union data. All credit union deposits were attributed to the county in which the institutional headquarters are located. The second methodology was applied to the period between 2007 and 2012 for which credit union branch location information was available, and ECONorthwest estimated branch deposits.[20]

In order to test the validity of the methodologies used to distribute the credit union deposits to the branch level, the distribution of credit union branches was investigated. (See Figure 1.) The vast majority

[19] http://www.ncua.gov/DataApps/QCallRptData/Pages/default.aspx.

[20] Credit Union deposits were attributed to the various branches based on county population totals for each of the counties where Credit Union branches were located. For example, if Credit Union X had two branches A and B, and institution level deposits of $10 million—if branch A was located in a county with a population of 1 million and branch B was located in a county with a population of 500,000—branch A would be attributed $6.6 million in deposits and branch B would get the remaining $3.3 million.

(93.33%) of credit unions nationally operate in a single state; in fact only 27 institutions operate in more than 5 states.

The breakdown of credit unions by county was also calculated—73% of credit unions operate only in one county, 93% of all credit unions operate in 3 or fewer counties. The high concentration of credit unions operating in a single state validates the aggregation of credit union data at the state level, and the relatively high distribution of credit unions operating in only a single county validates the attribution of all institutional deposits to the county headquarters location. It should be noted that both methodologies applied to attributing credit union deposits to the branch level likely overestimate the concentration; all findings are therefore biased and overstate the strength of credit unions in a given market.

Economic and Demographic Data

Economic and demographic data was gathered at the national, state and county levels. At the national level, data was collected for the years 1934 to 2011 for macroeconomic and tax variables, including personal income, population, employment, unemployment rates, and corporate and personal income tax rates.[21] Data at the state and county level was collected for the years 1995 through 2012. Population data was obtained from the U.S. Census Bureau[22], and employment data was taken from the Bureau of Labor Statistics[23], the unemployment rate as well as the number of employed and unemployed was obtained at the county level for each year of the sample. Per capita income data was collected at the county level for each year of the sample from the Bureau of Economic Analysis.[24] Personal and corporate tax rates were also gathered at the state and national levels for each year of the sample.[25]

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[21] Statutory rates were assembled from Tax Foundation and IRS publications. The effective, national corporate tax rate levied on commercial banks is computed from FDIC data.

[22] http://www.census.gov/popest/data/index.html.

[23] http://www.bls.gov/lau/home.htm.

[24] http://www.bea.gov/regional/.

[25] QuantEcon, Inc. provided its database of statutory rates, by state, year and tax type.

WHAT EVIDENCE DO THE CRITICS PRESENT?

Numerous articles have been written arguing that credit unions operate ostensibly as commercial banks and therefore should be subject to corporate income tax. None of these studies have employed rigorous statistical analysis attempting to identify correlated variables or causal factors. In a recent article[26] entitled "Oregon's Credit Unions: Growing, Consolidating, and Often Indistinguishable from Commercial Banks", Marvin Umholtz argues that credit unions are indistinguishable from commercial banks, and should therefore be taxed in the same manner. Umholtz states that his report "provides a data-driven overview", but the report does not conduct statistical analysis of any sort, nor does it compare any of the credit union data to commercial bank data to establish a basis for comparison. For example, Umholtz states that credit union assets have increased by a factor of over 80 times since 1970, but provides no comparison to commercial bank asset growth over the same period.

Umholtz echoes the common argument that the tax-exempt status of credit unions is a "competitive advantage" that allows credit unions to unfairly increase market share at the expense of commercial banks.[27] No studies of market share are presented in the study, merely the growth of credit union assets over time. Another argument is that the community "field of membership" (FOM) common bond designation allows credit unions to increase their geographic reach in deposit gathering and lending. No data, however, is presented that differentiates the growth based on the type of FOM.

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[26] http://www.oregoncreditunionfacts.com/wp-content/uploads/Umholtz_Report.pdf.

[27] In a recent report prepared for the Oregon Bankers Association, Conerly states similarly that the tax exemption "fuels further [credit union] growth", calculating the potential revenue that could be generated by the state of Oregon if certain credit unions were taxed. See William B. Conerly, "Revenue Potential from Taxation of Credit Unions," Conerly Economics, February 2013, p.3.

Earlier studies have made similar claims of unfair competition, including a study authored by John Tatom for the Tax Foundation.[28] Tatom makes some of the same arguments advanced by Umholtz and others, including that the community bond designation allowed credit unions to grow more rapidly than banks. Additionally, the study argues that credit unions are not passing on tax savings to their members in the form of higher interest payments on deposits, or lower interest rates on loans, but rather the tax exemption is leading to higher employee wages than at commercial banks. A final claim made by Umholtz is that credit unions do not serve low and moderate-income populations to any greater extent than commercial banks.

Findings from Statistical Analysis

Multiple Regression Analysis and Granger Causality Testing was applied variously to national time series data, a 50-state pooled time-series panel, and a 3140-county panel with a short time series of available measures. We use aggregate national data to examine differences in behavior that evolve over time, and the state panel data to exploit measuring behavior as it varies with policy variations both over time and across differently-situated states. Finally, county level deposits data was assembled to permit examination of issues related to local markets where, for example, any accretion of monopoly power would be worrisome.

Analysis of Market Share Trends: National Data

Critics claim that credit unions' deposits and assets have been growing at the expense of commercial banks as a result of credit unions' favorable corporate tax treatment and the use of the community common bond. We examine this claim using Multiple Regression Analysis.

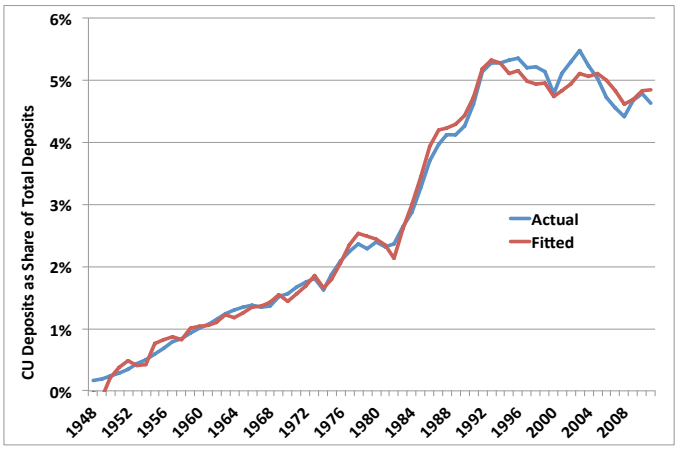
We first used an aggregate national time series, and use regression analysis to examine the factors that explain the share of credit union deposits relative to total (credit union plus commercial bank) deposits. The national data

[28] John Tatom (2012). "Competitive Advantage: A study of the Federal Tax Exemption for Credit Unions" retrieved from http://taxfoundation.org/article/competitive-advantage-study-federal-tax-exemption-credit-unions.

spanned the period 1948 to 2011–over six decades. During this time period, the effective corporate income tax rate levied on banks varied, as did the utilization of community common bond designations by the credit union industry. If the relative performance of credit unions is related, as claimed, to these policies, it should be possible to demonstrate that relationship using Multiple Regression Analysis, Granger Causality Analysis or other techniques.

The graphic in Figure 2 displays the actual trend in the credit union deposit share variable, along with the values fitted to a model that does not include the corporate tax rate or the community common bond share. As the figure illustrates, the relative trend in credit union versus commercial bank deposit shares can be explained without invoking policy variables. Indeed, the non-policy variables explain 99 percent of the variation in relative deposit shares over the history represented in the national data series.

Figure 2: CU Deposits as Percent of Total Deposits, 1948-2011

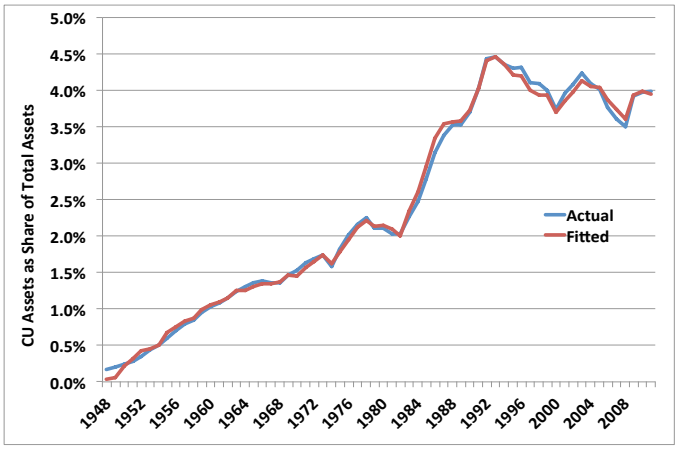


The key explanatory variables are demographic variables, such as personal income per capita, population, the employment rate, the personal income tax rate, and the relative average asset size of credit unions versus commercial banks. Including the corporate income tax variable yields a statistically insignificant[29] result. Even if one ignored its statistical insignificance, the coefficient on the corporate tax rate variable implies an impact of a few hundredths of a percent in deposit share. This result is clearly contrary to the claim the credit union tax exemption is a crucial factor explaining credit union market shares. Moreover, as Figure 2 illustrates, the share of credit union deposits of total deposits, indeed, trended upward in the 20th century until the early 1990s. However, contrary

[29] Technically, the coefficient is not distinguishable from zero in the estimated regression equation.

to the critics' assertion of a persistent trend, the actual share has since been stable, or even declining.

Figure 3: CU Assets as Percent of Total Assets, 1948-2011



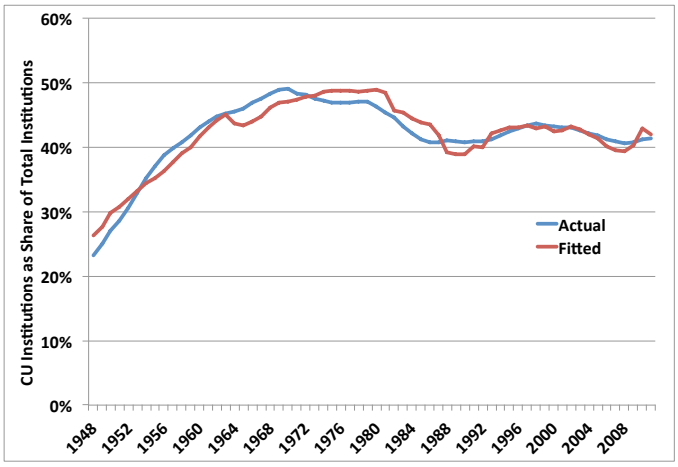
Not surprisingly, a similar effect is observed if market share is measured using assets rather than deposits as illustrated in Figure 3. Credit union total assets grew rapidly in the late 1960s, but have since been stable or declining as a share of total assets of the combined institutions. Once again, the values obtained from fitting a regression model to the data are able to very closely replicate the actual trend in the credit union share of assets without using corporate tax or community common bond indicators. Again, when the corporate tax rate is introduced, it yields insignificant effects that are inconsistent with the claims of critics.[30]

We also examined another indicator of recent changes in credit union growth–the share of *institutions* that are credit unions. If the corporate income tax exemption or enlargement of the common bond population were making credit unions inexorably more successful financially, it should be reflected in an increase in the share of credit union institutions relative to the total of credit union and banking institutions.

As Figure 4 indicates, however, the share of credit union organizations had been rising as credit union shares of deposits and assets rose in earlier decades, but have been falling or level since the 1970s. Credit unions are clearly not poised to dominate commercial banks in either share of deposits and assets or in the number of institutions.

[30] The data history on the share of credit unions with community common bond designations is too short (18 years) to be included in the analysis of market share trends. Although we address this issue later using state data, in available national data, the correlation between the share of community common bond and credit union deposit share is *negative*, contrary to the relationship asserted by critics of credit unions.

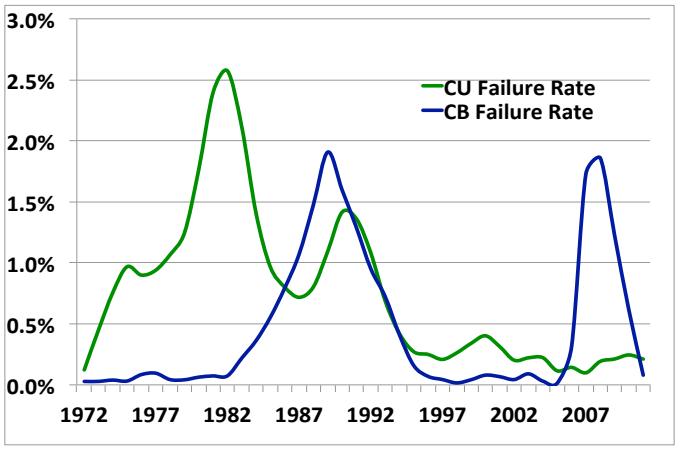
Figure 4: CU Institutions as Share of Institutions, 1948-2011



The regression exercises suggest that what has been happening is that credit union scale (i.e., the average size of credit union institution) has been growing. Indeed, the relative size of credit unions is a key explanatory variable in the Multiple Regression Analyses of deposit and asset shares, and the number of institutions.

This interpretation is also consistent with the decline in credit unions as a share of banking institutions since the 1970s, as displayed in Figure 4. Put differently, what explains the increase in the average size of credit union organizations since that time? In our view, the answer lies in the notion of "minimum efficient scale". In economics, minimum efficient scale is the smallest organizational scale that allows the organization to participate and survive in the marketplace. A financial institution that does not enjoy operations at the minimum efficient scale is at risk of closure under adverse economic conditions or from competition from organizations that are more appropriately scaled.

Figure 5: CU vs. CB Institution Failure Rate, 1971-2012

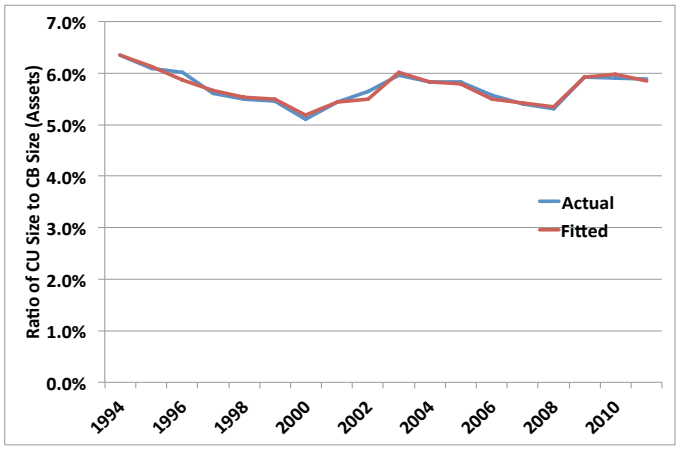


The nature of credit union charters is such that the common bond phenomenon, though beneficial in terms of containing information asymmetries, can limit the organizational scale since the size of the union, employer, or other traditional common bond population is inherently limiting. These traditional charter restrictions make the credit union organization more vulnerable to so-called systematic risk. Risks are systematic when all of the participants in a financial arrangement face the same risk at the same

time–i.e., they lack diversification. This can lead to failures of organizations that lack the minimum scale to achieve diversification of the fortunes of their members, and is an incentive to consolidate these smaller institutions. This scenario is consistent with the institutional failure rates for credit unions versus commercial banks as presented in Figure 5.

Credit unions had relatively high failure rates even under economic conditions that did not precipitate failures for commercial banks in the 1970s, but also had high failure rates in the aftermath of the 1981 recession. Under these conditions the less-than-efficient scale credit unions were likely to be consolidated into larger, more durably sized entities. Indeed, as Figure 6 illustrates, since the 1990s, credit unions generally have operated at a stable–albeit small–size relative to commercial banks. Nevertheless, credit unions demonstrated greater durability in the 2007 recession consistent with the notion that they achieved an efficient scale.

Figure 6: Relative CU vs. CB Asset Size 1994-2012



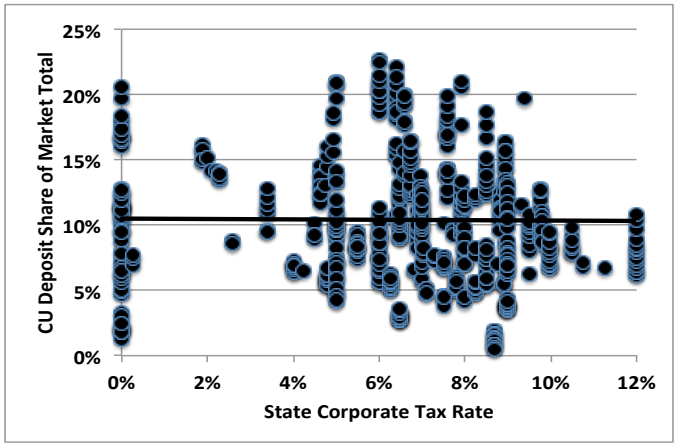
The Multiple Regression Analysis behind Figure 6 confirms the hypothesis that credit union size trends, relative to commercial banks, were driven by economic trends and prior high failure rates– not credit union tax or common bond policy.[31] The trend toward credit union organizations achieving minimum efficient scale, in turn, appears to drive the trends of credit union deposit and asset shares. The previous figures demonstrate that it is possible to build a statistical model of credit union deposit, asset and institution shares that closely fits the actual, historical trend despite the insignificance or absence of tax and common bond variables.

[31] Per capita income, population, the employment rate, the personal income tax rate, and prior credit union failure rates explain 95 percent of this trend. The corporate tax rate is, again, not statistically significant or of meaningful size, and the sign on the community common bond share does not support critics' claim that this policy is behind credit union growth trends.

Analysis of Market Share Trends: State-Level Data

Although the implications of the analysis using the national data time series are clear, and statistically consistent, state-level data was also developed to exploit the additional variation in corporate and personal tax rates that exists across states. We now turn to that effort. The state-level data is available only for the 1995 to 2012 time period. Nevertheless, we repeated the analyses performed on the national data. This allows us to exploit the variation in income tax rates across states. The analysis is performed using the 50 state cross-section/time series pooled data. Such a dataset is referred to as a "panel" dataset.

Figure 7: State Corp Tax Rates vs. CU Deposit Share



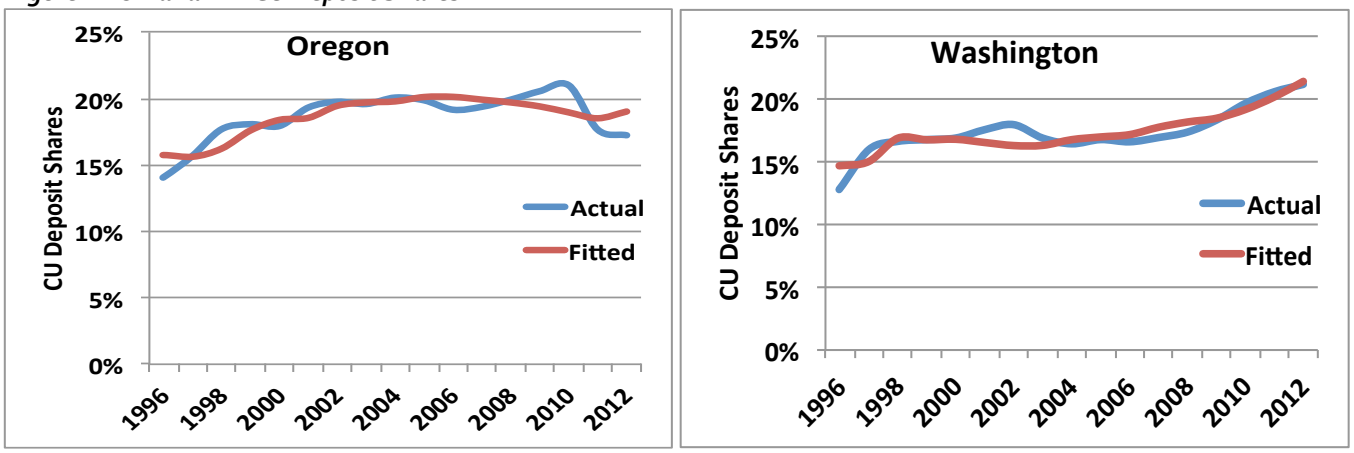
Although the federal corporate tax rates did not change significantly during the 1995-2012 period of the state dataset, state corporate tax rates varied across states and over time. As Figure 7 indicates, however, even the simple correlation between the state corporate income tax variable and the credit union share of total deposits is zero across the various states and years in the 50-state panel. We find no statistically significant effect of corporate tax rates on credit union deposit shares, over time and across states.

The community common bond variable could not be constructed at the state level due to data limitations, but otherwise similar variables were implemented at the state level using the Multiple Regression Technique to confirm the implications of the simple correlation displayed in Figure 7. Figure 8 shows the respective trends of Oregon and Washington and the fitted values. The modeling approach allows states to have "fixed" or idiosyncratic effects[32] unrelated to other factors to account for missing measures of differences in policy, geography, and other persistent factors not

[32] In technical terms, the panel regression modeling was implemented using cross-sectional fixed effects.

measured directly. Qualitatively, the tax impact findings summarized here were not sensitive to whether fixed effects were implemented in the model.

Figure 8: OR and WA CU Deposit Shares



In addition to subjecting the search for a tax effect to a larger, more variable database, the state level analysis also allows exploration of the ability of the model to fit individual states' circumstances.

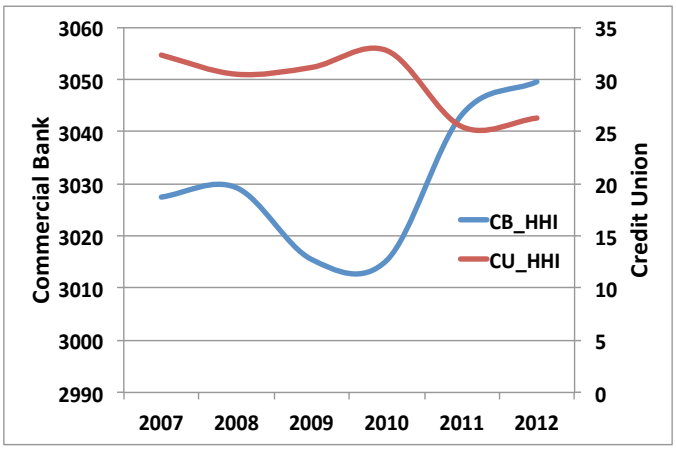
Oregon and Washington both display higher credit union deposit shares, despite Washington having no corporate income tax and Oregon having one that since 2008 is one of the highest in the nation. The relatively short time series limits explanatory statistical analysis of these states to determine the causes of the higher relative presence of credit unions in these states. We can only speculate that the presence of a few, relatively large industries and major employers in both states make it easy to identify and serve common bond populations. Indeed some of the credit unions in both states have origins in these industries and firms. The more important implication is that the panel regression analysis seems to be able to replicate the states relatively faithfully.

Analysis of Market Share Concentration: County-Level Data

A county-level dataset was developed to permit analysis of the impact of credit unions on local market deposit share *concentration*. This is a different measure than the simple deposit share. Specifically, market share

concentration measures the extent to which the holding of deposits is concentrated in the hands of a few credit unions or banks versus being relatively evenly held across all firms participating in the relevant market. Economists believe that the more concentrated is the control of a market, the greater is the chance of anti-competitive ("monopolistic") expression of *market power*.

Figure 9: CU vs. CB Contribution to HHI (Population Weighted)



The US Department of Justice ("DoJ"), the Federal Reserve System ("Fed") and the Federal Trade Commission ("FTC") oversee antitrust policy. These agencies' policies believe that the relevant geography of banking competition is at the county or at most the multicounty (metropolitan area) in nature.[33] In analyses of market competition, the measure that is used to detect undue concentration of market power is the Herfindahl-Hirschman Index (HHI).[34] A market that is a perfect monopoly (one banking firm) has an HHI of 10,000. A market is considered *unconcentrated* if the HHI is less than 1500, *moderately concentrated* if the HHI is between 1500 and 2500, and *highly concentrated* if the HHI is above 2500.[35] Figure 9 shows the respective contributions of credit unions and commercial banks to the national average county HHI, on a population-weighted basis.

What is clear from Figure 9 is that the market share concentration in local, county markets is dominated by commercial banks' contribution to the

[33] The Federal Reserve System defines the market geography using either counties or Ranally Metro Areas–a propriety definition of Rand McNally & Co. In our analysis, we employ only the county level measures, since so much of the US and the presence of credit unions is outside of metro areas.

[34] The HHI is computed by taking each firm's share of deposits in the relevant geographic market as a non-decimal percent (e.g. 10 percent), squaring it and summing it over all firms present in that geographic market–a county, in our case.

[35] Generally, if any combination of firms or other even results in a change of 250 points or more in a highly concentrated market, that transaction will be subject to antitrust scrutiny.

concentration, not credit unions. Moreover, the contribution of commercial banks is rising currently, while that of credit unions is falling. Thus, not only are credit unions not gaining undue overall deposit share, but they make virtually no contribution to the level of concentration and market power at the county level.

Granger Causality Testing

One final type of study, Granger causality testing, was conducted. Two investigations were made in this regard. First, for both the national and state analyses of credit union market share trends, the Granger Causality Test was applied to see if changes in the corporate tax variable were causally related to changes in deposit trends. This test was performed using both national and state panel data. There were no cases in which the corporate tax rate was found to be a *cause* in this statistical sense with regard to any of the credit union relative share measures–deposits, assets or institutions.

A second investigation employed a formulation of the multiple regression analysis that reveals the dynamic interaction between two or more related variables. In this case, we examine the respective responses of a positive increase ("shock") to credit union growth on commercial banks, and vice versa. If the growth of credit union deposits, for any reason, is occurring at the expense of bank deposit growth, it can be revealed by this special study.[36] These interactions are called "dynamic impulse responses".

The results are depicted in the two panels of Figure 10. What these figures reveal is that a standardized positive shock[37] in deposit gathering capability by commercial banks will lead, after 10 years, to roughly a 3 percent reduction in deposit growth by credit unions. In contrast, a positive shock in

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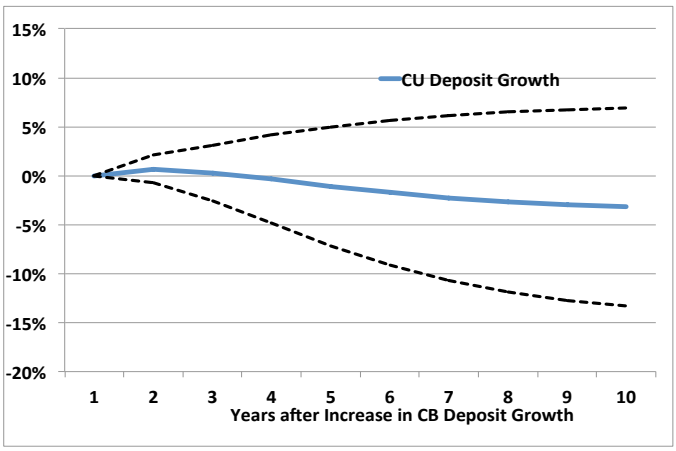
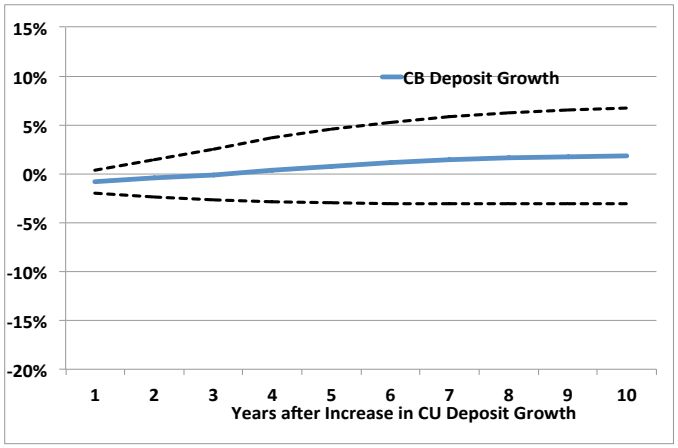
[36] This study is called vector autoregression (VAR) analysis and it allows one to test what the effect of a sudden increase in deposit gathering by one institution has on the rate of deposit gathering by the other.

[37] The shocks are equal to one standard deviation of the historical variability of the respective growth rates of credit union and commercial bank deposit growth.

deposit gathering by credit unions appears to be *positively* related to the subsequent deposit growth of commercial banks of about 2 percent or so after 10 years.

Figure 10: Dynamic Effect of each Institution on the Other





It should be noted there are error bands (confidence intervals) around these findings, represented by the dashed lines.[38] Their wide range suggests that the mutual influence of the two institutions is not strong. However, the fact that credit union growth positively affects commercial bank growth may reflect a tendency for credit union customers to transition to a relationship with commercial banks offering a different range of services. In any case, the dynamic analysis suggests that the credit union industry poses no dynamic threat to commercial bank deposit growth in the long run under current conditions.

[38] The dashed lines represent the range over which one can be 95 percent confident that the actual effect will fall in that range.

IS CREDIT UNION PERFORMANCE CONSISTENT WITH THEORY?

In the previous sections of this report, we have elaborated upon the theory of credit unions and reviewed the opinions of the critics of credit unions. We then performed statistical testing to examine the central notions that differences in tax treatment and the adoption of community common bond definitions tilt the market playing field in favor of credit unions.

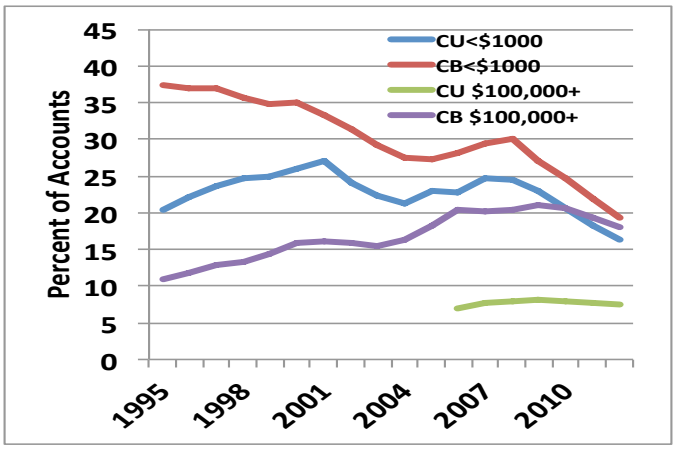
In this section we use available statistics on various aspects of credit union performance to answer the question, "Are credit unions behaving as the theory of credit unions would suggest?" This is an important, final aspect of investigation because if the incentives of credit unions are distorted only by comparative tax and regulatory policies, then we should not observe their behavior looking like that of a true, consumer cooperative (with the benefits to members as the primary objective).

HAVE CREDIT UNIONS ABANDONED SMALL SAVERS?

Credit unions and its other cooperative predecessors were formed in part to provide a safe haven from the risks that attend outside-owned financial intermediaries. The information asymmetries that made both banks and savers wary were clearly better resolved by the cooperative movement, small and inexperienced savers were differentially attracted to and served by this movement. Some allege, however, that credit unions have abandoned their historical roots in this regard, although the argument is frequently couched as

abandonment of the poor, rather than the operative characteristics of small and financially inexperienced account holders.

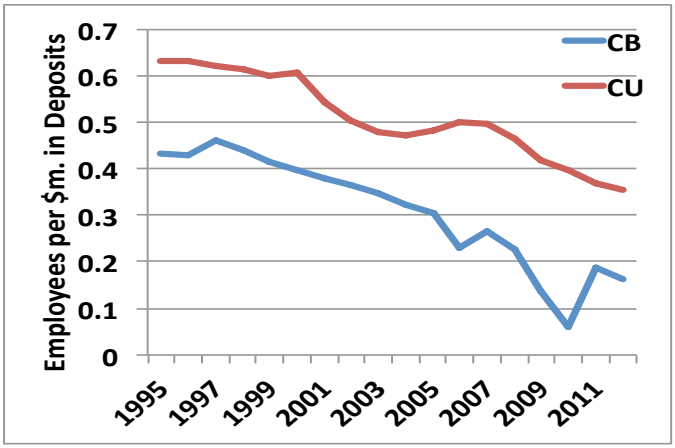
Figure 11: Trends in Account Size, CU vs. CB



This criticism is a mischaracterization of what theory and practice says will differentially attract certain types of members. As Figure 11 amply illustrates, credit unions have a smaller share of large accounts than do their commercial bank counterparts. Commercial banks' share of small accounts has been decreasing more rapidly than credit unions since 1995[39]. Commercial banks have decreased their share of small accounts at more than double—48% compared to 21%—the rate compared to credit unions. The consistency of the empirical record in this regard reinforces the notion that credit unions are performing as a distinctive organization type.

Do credit unions use more labor than commercial banks?

Figure 12: Employees per $m. of Deposits, CU vs. CB



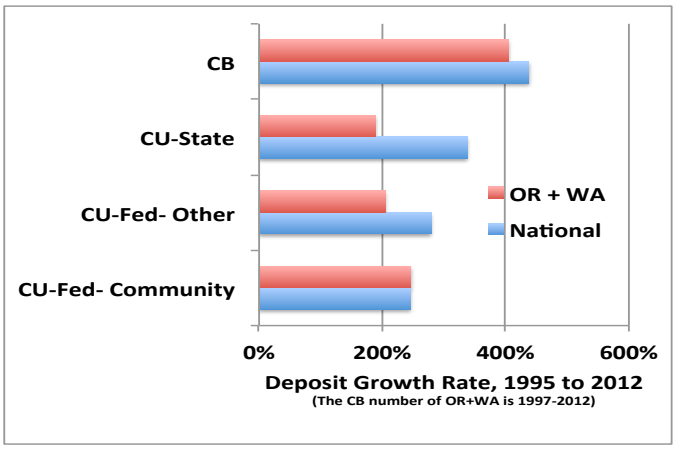
Theory suggests that credit unions' not-for-profit charter limits their access to capital funding. This constraint, if still binding, should be reflected in the substitution of labor for capital–i.e., more use of labor per dollar of deposits. The evidence suggests that, indeed, credit unions employ more labor per dollar of deposit than do commercial banks. (See Figure 12.) Although the comparatively smaller scale of credit unions could be

[39] It should be noted that the share of accounts is represented in nominal terms, therefore in real terms; $663 in 1995 is approximately equal to $1000 in 2012 dollars.

influencing this phenomenon, the effect is to provide the potential for a higher level of personalized service, which would be consistent with the member orientation of consumer cooperatives.

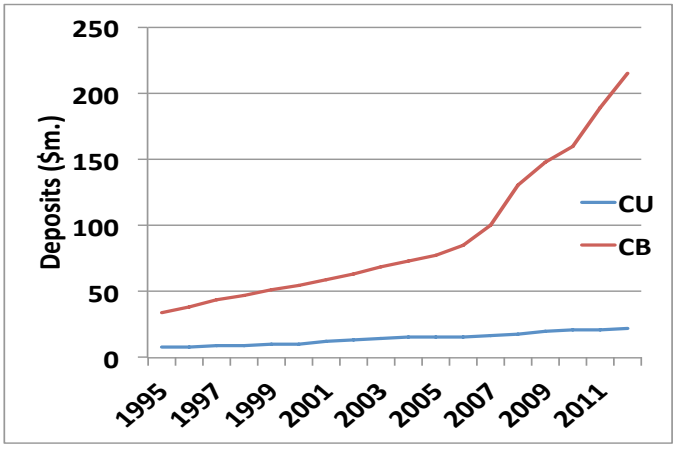
ARE CREDIT UNIONS GROWING FASTER THAN COMMERCIAL BANKS?

Figure 13: Comparative Growth Rates CUs versus CBs



The second prediction of limited access to outside capital, relative to investor-owned banks is that credit unions should grow more slowly. Credit Unions' primary source of capital comes from earnings they can retain after serving members' goals. Figure 13 suggests that credit unions of all types, both at the national level and in Oregon and Washington, are growing considerably more slowly than commercial banks. In addition, at a national level, the federally-chartered credit unions that have adopted community common bond policies are growing more slowly not only than commercial banks, but also non-community federal credit unions and state-chartered credit unions.

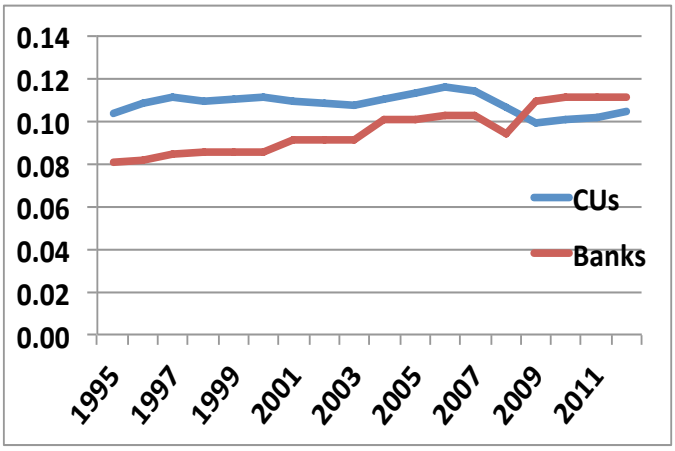
Figure 14: Branch Deposit Growth, CUs vs. CBs



Capital restrictions also have an effect at the branch level. The capital and technology a branch can purchase, for example, may be an explanation for the much higher growth trend rates in bank deposits gathered per branch, as is illustrated in Figure 14. This is at least partial confirmation of credit unions being capital constrained.

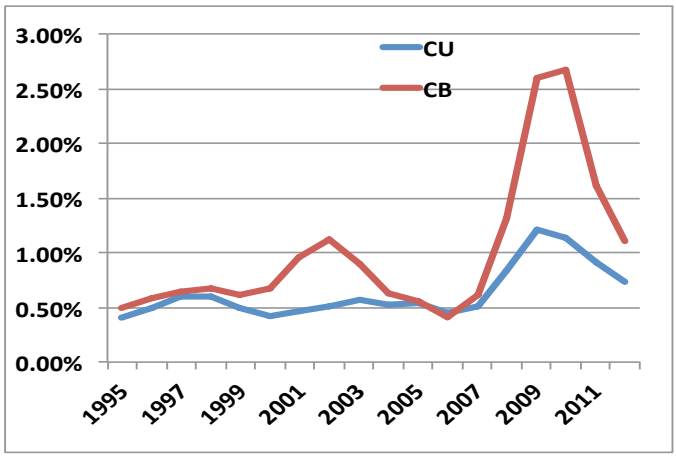
ARE CREDIT UNIONS CAPITALIZED AND OPERATED CONSERVATIVELY?

Figure 15: Capital Ratios, CUs vs. CBs 1995-2012



Theory suggests that a credit union will take various steps to manage the information asymmetry and risk issues that plague all financial intermediaries. Maintaining higher capital levels is one such additional protection. Figure 15 indicates that since 1995, credit unions have maintained higher capital ratios than commercial banks with the exception of in the post-2007 recession period. However, in this latter period, commercial banks came under greatly increased scrutiny—regulatory forces likely raised commercial bank capital levels. Credit union failure rates were a fraction of commercial bank failure rates during this period; there may have already been greater prudential control in place at credit unions.

Figure 16: Loan Charge-Off Rates, CUs vs. CBs, 1995-2012



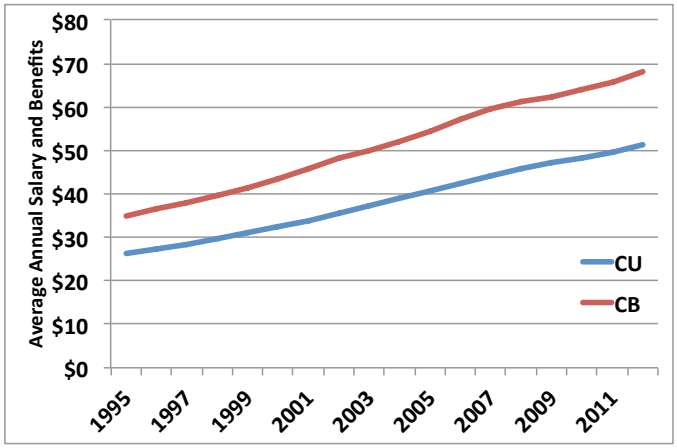
The theory of the consumer cooperative is that the cooperative organizational form enjoys more intimate informational opportunities to manage loan risk. Figure 16, which shows the comparative loan charge-off rates between 1995 and 2012, indicates that credit unions were less exposed to credit risk than commercial banks, especially after the housing boom.

Although credit union charge-off rates more than doubled from the pre-2007 levels, bank charge off rates increased by more than a factor of five during this same period. Although we have not obtained separate mortgage charge-off rates, it is likely that credit unions

were more prudential in their mortgage lending during the housing boom period than their rivals in the marketplace.

Do credit unions dissipate income on higher employee compensation?

Figure 17: Employee Salary + Benefits, CU vs. CB ($000)



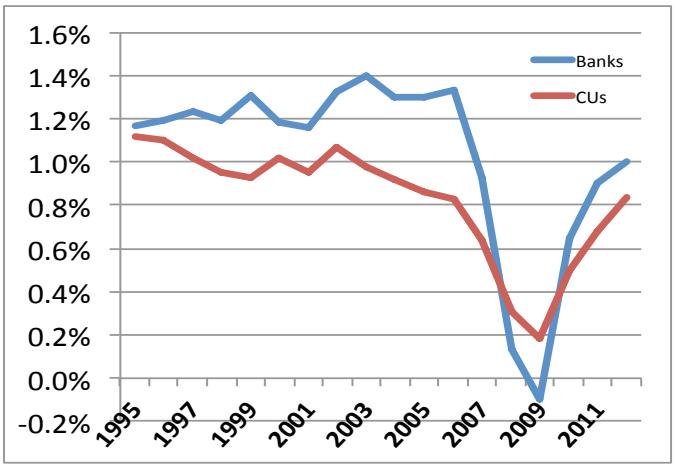
Critics of credit unions assert that the organizations have come under the control of professional management, in effect, and not the member share holders. If this were true, then one might expect higher compensation to be paid to all "insider" employees, management and line staff alike.

The evidence presented is not consistent with this assertion. On average, across all employees, credit unions pay less in salary and bonus than commercial banks. It is difficult to control for differences in skill and job requirements across the two institutions, and make strong statements about the relative compensation levels. Nonetheless coupled with the alignment of so many other characteristics of credit union behavior with the underlying theory of their operation, the data is at least consistent with free cash flow not being diverted to "insider" employees at credit unions–as theory would suggest.

Do credit unions enjoy greater pre-tax net income?

Part of the argument advanced for taxing the incomes of credit unions is that they accrete high net incomes. However, if the cooperative is operating so as to maximize benefits to its members, it can be expected to channel net income to its members in the form of lower loan rates and higher deposit rates. These flows of income out of the cooperative influence personal tax obligations, so credit unions create income tax revenues for federal and state governments despite exemption from corporate income taxation.

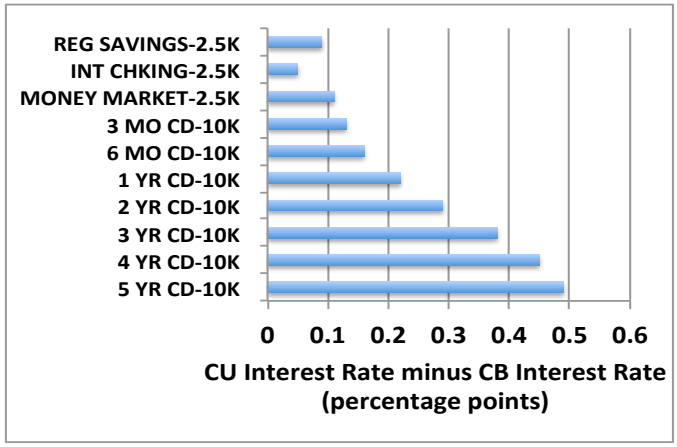
Figure 18: Net Income Ratio, CU vs. CB



Indeed, the argument could be made that, although dividend payments in an investor-owned commercial bank are, indeed, doubly taxed (once at the corporate level, and again when distributed as dividends) it is not at all clear that the net tax obligation of affected parties is lower under a cooperative setting (See Figure 18). Although earnings retention is taxed, outside investors enjoy favorable capital gains tax treatment and the opportunity to time the realization of capital gains. John Walter at the Federal Reserve Bank of Richmond concludes, "The bottom line is that the tax advantage may be smaller than one might imagine."[40]

Indeed, the presumption of a tax advantage ignores the necessity of the credit union to provide member benefits in order to retain members, and manage the deposit and loan information asymmetries that are performing an important economic function by making banking, overall, less risky.

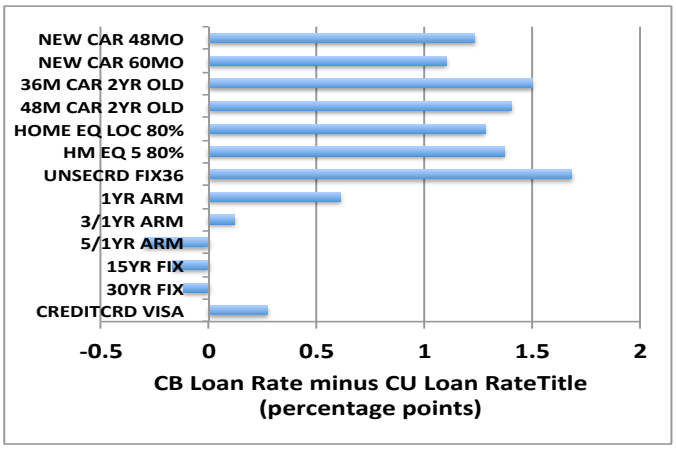
Figure 19: CU Deposit Rates Exceed CB Rates



The available evidence suggests that credit unions do, in general, pay higher deposit rates and charge lower loan rates to members than commercial banks to their customers, as shown in Figure 19 and Figure 20 that summarize the national average difference in credit union and commercial bank rates paid on deposit instruments of various types, and charged on loans of various types, respectively[41].

[40] See, John Walter (2006), "Not Your Father's Credit Union, "Federal Reserve Bank of Richmond *Economic Quarterly* Volume 92/4 Fall issue.

Figure 20: CB Loan Rates are Higher than CU Rates



On the deposit-rate side, the rate advantage of credit unions is as much as 50 basis points on some products. Loan rate advantages can be large, especially on auto and unsecured loans, two high-risk lending categories that require careful management of informational asymmetries.

However, fixed rate mortgage rates appear to be higher at credit unions than at commercial banks, at least during the period for which the data was prepared. However, mortgage instruments have many elements and simple rate-to-rate comparisons are difficult. Origination fees, title and recording fees, pre-payment of interest through "points", etc. all make simple rate comparisons difficult.

The secured nature of mortgage lending and the opportunity afforded large lenders to enjoy greater geographic diversification and processing efficiencies than smaller lenders may contribute to the rate differential. However, the large commercial banks in the country stumbled in this marketplace during the housing boom. The fact that banks offer lower mortgage interest rates than credit unions may be an expression of investor-owned banks' greater willingness to take on risk in this market and/or their comparative advantage in securitizing the mortgages they issue, and moving risk to government-sponsored mortgage intermediaries or other holders of mortgage backed securities.

[41] The data was provided to the National Credit Union Administration for June 2012 by Rate Watch, Inc.

CONCLUSION

Our review of the theory, data, and formal statistical analysis does not offer support for disturbing the tax policy and provides room for charter enhancements of credit unions. Indeed, to disturb the tax policy and limit the charter evolution of the not-for-profit cooperative may eliminate a small, but important class of institutions that theory says should be able to better manage risk and provide benefits to consumers than investor-owned commercial banks under the right operating conditions.

The industry, in our view, is operating at an overall efficient scale at the institutional level. Having at least partly shed the overly small and risk-concentrating entities, the slightly larger remaining participants provide an alternative to the investor-owned commercial banking firms.

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TECHNICAL APPENDIX

This appendix provides information regarding the statistical procedures employed in this study. These procedures are used to produce the graphical and other statistical demonstrations provided in the body of the text.

Exhibit A presents the Multivariate Regression Analyses. These analyses were performed using eViews® statistical analysis software, versions 5.1 and 8.0. Stata® version 12 software was used to manage the information database and produce work files for statistical analysis.

Exhibit B and Exhibit C present Granger Causality Test results. These analyses examine the tendency for one variable to be affected by a prior change in another variable as a means of demonstrating causality. These tests require long time-series data to discover the timing of impacts that determines Granger Causality.

Exhibit B presents simple, bivariate studies of whether one variable causes another. Exhibit C does the testing with a regression model called a Vector Auto Regression (VAR) model. This latter type of testing is most useful when a long history ("time series") of data is available, and dynamic interactions among multiple variables are being explored. In this case, the deposit growth rate of credit unions and commercial banks respectively, as well as the effective corporate tax rate levied on commercial banks, are the three variables in the VAR. The null hypotheses of no causal influence cannot be rejected except for hypothesis that commercial bank growth affects credit union deposit growth, where there appears to be a statistically significant causal effect (but not in the reverse direction). This effect is likely that displayed in in the body of the text.

Exhibit A: Regression Analysis of Statistical Significance in Market Share Models

Type of Regression	Time Series	Time Series w. Lag	Time Series	Panel	Panel Fixed Effects	Panel	Panel Fixed Effects
Date Range	1948-2011	1948-2012	1994-2011	1995-2011	1995-2011	2009-2011	2009-2011
Geography	National	National	National	50-State	50-State	50-State	50-state
Dependent Variable: Credit Union Share of Total Deposits							
Observations (n)	64	64	18	850	850	150	150
Constant Term	Yes	Yes	No	Yes	Yes	No	No
Lagged Dependent Varial	–	Yes	–	–	–	–	–
Income per Capita	Yes	Yes	Yes	Yes	Yes	No	No
Population	Yes	Yes	Yes	Yes	Yes	No	No
CU/CB Relative Size	Yes	No	Yes	Yes	Yes	Yes	Yes
Employment Rate	Yes	Yes	No	No	Yes	No	No
Personal Tax Rate	Yes	Yes	No	No	Yes	Yes	Yes
Corp Tax Rate	No	*No*	No	*No*	*No*	No	No
Community FOM Share	–	–	No	No	*No*	No	No
R-squared	0.99	0.99	0.93	0.95	0.95	0.66	0.99
Dependent Variable: Credit Union Share of Total Assets (see Note 2)							
Observations (n)	64	64	–	–	–	–	–
Constant Term	Yes	Yes	–	–	–	–	–
Lagged Dependent Varial	–	Yes	–	–	–	–	–
Income per Capita	Yes	Yes	–	–	–	–	–
Population	Yes	Yes	–	–	–	–	–
CU/CB Relative Size	Yes	Yes	–	–	–	–	–
Employment Rate	Yes	No	–	–	–	–	–
Personal Tax Rate	Yes	Yes	–	–	–	–	–
Corp Tax Rate	No	*No*	–	–	–	–	–
Community FOM	–	–	–	–	–	–	–
R-squared	0.99	0.99	–	–	–	–	–
Dependent Variable: Credit Union Share of Institutions (see Note 2)							
Observations (n)	64	64	–	–	–	–	–
Constant Term	Yes	Yes	–	–	–	–	–
Lagged Dependent Varial	–	Yes	–	–	–	–	–
Income per Capita	Yes	Yes	–	–	–	–	–
Population	Yes	Yes	–	–	–	–	–
CU/CB Relative Size	Yes	Yes	–	–	–	–	–
Employment Rate	No	No	–	–	–	–	–
Personal Tax Rate	Yes	Yes	–	–	–	–	–
Corp Tax Rate	No	No	–	–	–	–	–
Community FOM	–	–	–	–	–	–	–
R-squared	0.91	0.99	–	–	–	–	–
Dependent Variable: Credit Union Average Asset Size Relative to Commercial Banks (see Note 2)							
Observations (n)	64	64	18	–	–	–	–
Constant Term	Yes	Yes	Yes	–	–	–	–
Lagged Dependent Varial	–	Yes	–	–	–	–	–
Income per Capita	Yes	No	Yes	–	–	–	–
Population	No	No	Yes	–	–	–	–
CU/CB Relative Size	–	–	–	–	–	–	–
Employment Rate	Yes	No	Yes	–	–	–	–
Personal Tax Rate	Yes	Yes	–	–	–	–	–
Corp Tax Rate	No	*No*	No	–	–	–	–
Community FOM	–	–	*No*	–	–	–	–
CU Failure Rate	–	–	Yes	–	–	–	–
R-squared	0.94	0.99	0.93	–	–	–	–

Note 1: Where noted, the Panel Fixed Effects are applied to the cross-section (state) dimension.

Note 2: Since institutions and assets are not allocable to states, panel analysis cannot be used.

Note 3: The length of the Community FOM share variable is short, and reduces the number of observations.

Note 4: A "Yes" entry indicates an effect that is signficant at the 95%+ level and of a theoretically reasonable sign.

Note 5: A "No" entry indicates an effect that is not significant at the 95%+ level.

Note 6: Where a "No" entry is italicized, it means that the coefficient was insignificant and/or of the wrong sign.

Note 7: The term "w. lag" refers to introduction of a lagged dependent variable to control for first order autocorrelation.

Note 8: The dash indicates an excluded variable, because of insufficient data or a measure is not available.

Exhibit B: Bivariate Granger Causality Testing

	Null Hypotheses	Obs	Probability that the null hypothesis cannot be rejected:
1	CU deposit growth does not cause CB corporate tax rates	74	86%
2	CB corporate tax rates do not cause CU deposit growth	74	75%
3	CB deposit growth does not cause CB corporate tax rates	75	51%
4	CB corporate tax rates do not cause CB deposit growth	75	49%
5	CB deposit growth does not cause CU deposit growth	74	18%
6	CU deposit growth does not cause CB deposit growth	74	20%

Exhibit C: In-Equation VAR Granger Causality Testing

Null Hypotheses	Obs	Probability that the null hypothesis cannot be rejected:
CU deposit growth does not cause CB corporate tax rates	74	97%
CB corporate tax rates do not cause CU deposit growth	74	27%
CB deposit growth does not cause CB corporate tax rates	75	59%
CB corporate tax rates do not cause CB deposit growth	75	19%
CB deposit growth does not cause CU deposit growth	74	8%
CU deposit growth does not cause CB deposit growth	74	76%