Credit Union Regulations’ Mysterious Hold on Thrifts and Community Banks

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Abstract

The continued operation of credit unions in the 2008-2010 regulatory framework remained a source of debate in the financial sector. Competing thrifts argued for fair regulatory treatment while credit unions argued for the relaxation of restrictions on their scale and scope of operation. We provide a fresh perspective by building on central place theory and offering a family of location models for the U.S. credit unions. Our results showed that credit unions operated in areas with a low concentration of retail banks. This finding was evidence that credit unions serve niche markets and they were not a significant source of direct competition for thrifts and community banks. This may signal an increase in credit union formation in a post-pandemic world.

Key words: banks, credit unions, location, clustering, central place theory

JEL Classifications: G21, G,210, G340, L39, R30
1 Introduction

Before and after the financial crisis in 2008, many thrifts and community banks complained about competing with credit unions on an uneven playing field. Thrifts and community banks maintained that increased credit union consolidations coupled with the relaxation of the common bond criteria in determining credit union membership eligibility had undermined the justifications for the special status credit unions enjoyed in tax and regulatory code. At the same time, credit unions maintained that limits on the types of services they could provide members placed them at an unfair competitive disadvantage. The “feuding” between credit unions and banks had been ongoing and remained unresolved. For example, the American Bankers Association sued the National Credit Union Association for misuse of regulation in 1999 and although the case was dismissed in 2001, the debate remained heated (Emmons and Schmid 2000, 2003).

Even though credit unions captured only seven percent of the market share in terms of dollar volume, they served one-third of all Americans with 86.8 million members (Deller et al. 2009). With increased merger activity, product expansions, and significant growth in the size of some individual credit unions, many credit unions were beginning to resemble traditional banks (Goddard, McKillop and Wilson 2002; Feinberg 2008). Some studies had suggested that banks competing in the same geographic markets did appear to match lending and deposit rates, and therefore credit unions had a pro-competitive effect (Feinberg 2001; Tokle and Tokle 2000). But does evidence of pro-competitive effect imply an unequal playing field for thrifts and community banks? Or is it simply the social optimum level of competition—as intended by regulation? In this study, we focused on parsing out the social versus private incentives of credit union regulation using observed location patterns.

Organizational differences between credit unions and competing banks make it challenging to verify distortions introduced by regulation. Studies to date have relied on an industrial organization (IO) framework that focus on the market performance—such as market concentration, and more recently efficiency, scale and scope, to measure competition between credit unions and other banks (Bauer et al. 2009; Bauer 2008; Goddard et al., 2002; Fried et al. 1999; Feinberg 2001; Tokle and Tokle 2000; Wheelock and Wilson 2010). The traditional approaches used in this literature, while valid, do not fully account for the monetary and non-monetary aspects of consumer ownership. Competition measured from a pure market structure perspective ignores

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1 As not-for-profit cooperative businesses credit unions file are tax exempt and file under 501c14 tax-status. It is important to note that since it is a cooperative business, members pay taxes on any residual earnings.
strategic behavior to capture market share or rents. In addition, ownership introduces another layer of complexity that limits measurement of market performance in current empirical works. In the credit union context, for instance, switching costs are of singular importance. Depending on the valuation credit union members place on ownership and control rights it may be a captive market. Another behavioral difference could stem from product differentiation. Credit union members play two positions: as funders of capital and as borrowers of capital. At the minimum by bundling both savers and borrower services together consumers-owners may prefer the “one stop service” arrangement.

In the present analysis, we have two broad goals. We begin by asking if there is a way to unearth the entire nature of competition between banks and credit unions so that both the known and unexplored sources of frictions come to the surface. We then use spatial location patterns to examine the unknown sources of competition between banks and credit unions. Drawing insights from spatial competition literature and central place theory that tell us that in a competitive environment firms will tend to “herd” together (Shaffer, et al. 2004). Specifically, with spatial analysis we will address three questions. First, a simple query of did credit union headquarters display herd mentality? If so, were there differences in geographic location patterns that can inform us on the nature of competition? Finally, we asked if socio-economic composition of the geographic region enriched our understanding about competition in the financial sector. Spatial analysis has the advantage in that it generally requires only zip-code information from the banks and when juxtaposed with county level market and socio-demographic information we have a panoramic view of the market and underlined socio-economic factors. With this analysis we also hope to uncover the needed next steps to address limitations from our analysis.

By focusing on the location decisions of credit unions, our work advances the understanding of competition between credit unions and banks in several ways. We draw attention to using multiple measurement tools to accurately characterize market competition during the 2008 financial crisis. We contribute directly to the discernment of the pro-competitive effect of credit unions in the financial sector by using location choice analysis. By using U.S. county level data to approximate local geographic markets we pay closer attention to socio-economic and demographic features data to model spatial competition between credit unions and banks. We address an important deficiency in the literature on the role cooperative business structure play in the market environment. This analysis followed credit unions post the financial crisis in 2008 through 2010. The same concerns are of interest now in a post-COVID-19 world. The
present analysis can be immediately applied to understand competition using location choice analysis for other cooperatively organized businesses such as the farm credit system, rural electric companies, and mutual insurance once the U.S. economy returns to normal.

Beyond these introductory comments, the study is composed of four additional sections. First, we review the current thinking about credit unions and banking competition. We then outline our empirical models and estimation methods which include a simple logit approach to model if a credit union is present in a county and a zero-inflated Poisson estimator to better capture the number of credit unions present in a county. Using data from U.S. counties drawn for the 2000 U.S. Census, the most current City and County Data Book, and the Bureau of Economic Analysis Regional Economic Information System (BEA-REIS) we model credit union location patterns. We discuss empirical results and close the study with a summary of our key findings and a discussion about how these findings may inform a post-COVID-19 competition between credit union, thrifts and community banks.

2 Credit Unions and Bank Competition

Following models from Germany and Canada, the U.S. credit union movement developed in order “to make available to people of small means credit for provident purposes” (Federal Credit Union Act 1934). Credit unions are viewed as member-owned democratic institutions, with an ethos emphasizing self-help and voluntarism especially among the weaker and disadvantaged segments of society. Credit unions pursue a range of social, educational and developmental objectives. Consequently credit unions have traditionally been treated differently to banks. Because credit unions are aimed at providing services to markets under serviced by traditional banks, certain incentives—such as a favorable tax status, were put in place. In essence, banks did not enter certain markets because they viewed them as unprofitable. To encourage credit unions to enter into these markets there needed to be certain incentives put into place.

In 2010, roughly 75 percent of credit unions had total assets of less than $100M, while 80 percent of commercial banks and 85 percent savings institutions had assets greater than $100M. Less than 2 percent of credit unions had assets more than $1B (Deller Sundaram-Stukel, 2010). Credit unions, like retail banks and thrifts, are both federal and state government chartered. There were 5,036 federally chartered credit unions (FCUs) holding $418B in assets and 3,157 state chartered credit unions (SCCUs) holding $336B in assets. While there were a handful
of large credit unions, the typical credit union was modest in size and providing services to a small market. In 2010, there had been a number of credit union mergers and a weakening of the “common bonds of association” that dictated membership eligibility. Coupled with the advent of credit unions offering online banking, branches, and ATM networks, did credit unions still need to retain their federal tax-exemption status?

Pro-competitive effects are traditionally defined as market changes that remove excessive economic profits. Here, the presence of a credit union within a specific geographic market creates competitive pressures on existing banks to improve services. Clearly, credit unions and thrifts/community banks have distinct organizational and regulatory differences. So, validating charges of an uneven playing field mean demonstrating that credit unions had some level of monopoly power, abused the regulatory rules, or that the regulatory status were outdated and no longer enhanced consumer welfare or improved credit access.

Measurement of bank competition is complex and sensitive to research methods and data availability. Looking into the factual differences there are significant organizational differences that include the governance structure and control rights (Table 1). These are “hidden effects” that can fundamentally alter how banks operate which has serious implications on the competitiveness of the financial institution in the market. The manner in which these non-monetary differences contribute to competition between banks and credit unions is a largely left to speculation.

While noting the significant regulatory differences between thrifts and community banks and credit unions we must also recognize that these differences have very little to do with ensuring fair play among banks but rather consumer protection. Regulation exists to minimize risk and uncertainty in financial markets and deter costs associated with bailouts of distressed banks (Carletti, 2008 and Degryse and Ongena, 2008). Like banks credit unions face reserve requirements and mandated insurance coverage to minimize risk and uncertainty. While credit unions benefit from some tax incentives they face restrictions on scale and scope of operation. At its root credit union regulatory framework came into being to safeguard working class Americans so that they could have access to financial services at affordable prices. A secondary motivation behind this regulation is of softening the competition in the financial market.

The credit union regulation has three components and each is a potential source of conflict.

\[\text{In an event of crisis regulation bails out shareholders, directors and depositors; but in the current context we should view regulation as a mechanism to protect consumers}\]
First, credit unions have federal tax exemption status, under the filing clause 501c14, as not-for-profit cooperative institutions. Second, regulation requires credit unions to form under a specified common bond criteria, state and community-chartered credit unions are required to reinvest in the community they serve. Here, the credit union is formed to provide financial services to a group of individuals that are tied through a “common bond of association” such as membership in a labor union. Third, most credit unions have a restricted commercial lending portfolio, to less than 12.5 percent of total assets (NCUA, 2009). The first regulation is a direct subsidy, and most contested by competing banks, and the later two restrict the scale and scope of credit union (such as commercial lending and expansions) activities.

In 1999, the American Bankers Association (ABA) sued the National Credit Union Association (NCUA, 2009) for fraudulent use of regulation. Frame et al. (2003) explore if credit unions misuse their tax-exempt status and found that some credit unions under residential common bond criteria were indeed misusing their tax exempt status. But, credit unions formed under the premise of a residential common bond criterion represent a mere six percent of all credit unions, and these tend to be very small. The ABA case was dismissed in 2001 on the grounds that tax exemption is an integral part of credit union non-profit status. The court’s ruling has not quelled the debate (Emmons and Schmidt 2003, Hayes 2005).

Credit unions have made several appeals to Congress requesting for relaxation of the commercial lending caps (Michael 2009 and Weizorek, 2010). Most of these were rejected on the grounds that it would compromise the cooperative nature and mission of the institution. Put together, credit unions argue that tax exemption is a function of a not-for-profit cooperative form, irrespective of size and scale. To quote CUNA “$7.5 billion savings to consumers is especially significant when measured against the $1.5 billion in lost federal revenue a year that the government says is represented by the credit union tax exemption”. Other than the work of Frame et al. (2003) from a pure regulatory perspective it is not clear that credit unions take advantage of their regulatory status to pursue private gains which should place other banks and thrifts at a disadvantage.

Increased credit union merger activity has added a new dimension to the policy debate.

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3Credit unions maintain their reserve requirements with the National Credit Union Administration and purchase deposit insurance from the National Credit Union Share Insurance Fund. Some Massachusetts credit unions purchase private deposit insurance these are not included in our analysis. Banks maintain their reserve requirements and deposit insurance with the Federal Reserve and the Federal Deposit Insurance Cooperation respectively.

4NCUA, 2009.
between banks and credit unions. Consolidation for banks is said to improve market power or efficiency so as to maximize shareholder value. Non-value maximizing motive would include the role of managers to pursue their own interests (where corporate control is weak), “empire building” to maximize CEO compensation become possible when governance structure are not well defined or not aligned with between the board and CEOs. While the level of mergers between credit unions is small compared to mergers amongst banks, the merger of some larger credit unions coupled with relatively lower losses amongst credit unions from the financial crisis has fueled the debate. On the one hand, thrifts argue that “with all this merger activity and weakening common bond of association, credit unions are just like banks, if only we had the same tax incentives as credit unions—our losses would not be as high” (Michael F., 2009). On the other hand, credit unions counter with “consumer-ownership makes us a good risk so please increase our ability to compete by relaxing our commercial loan limits” (Michael, 2009). In addition, as federal and state regulators are encouraging stronger banks to take-over weaker banks, we see the same occurring among credit unions. From a policy position, the debate appears to be at a stale-mate and the likelihood of significant policy changes affecting credit unions also appears minimal.

Earlier studies on credit union mergers focused on the price and market concentration effects and they found that credit unions did have a pro-competitive effect on loan and deposit rates in local markets (Fienberg 2001; Feinberg and Rahman 2001; Tokle and Tokle 2000). Placing this work in the broader banking literature it is not clear that we can hold onto the conclusion of pro-competitive effect in terms of pricing. For instance, Berger and Hannan (1997) and Berger, et al. (1999) showed that local markets tended to have near “perfect competition” and smaller banks generally were price takers. Radecki (1998) and Berger et al. (1998) find that banks with the high persistent profit margins were seldom from local markets and larger banks tended to set deposit and loan rates for local markets. The evidence between price setting behavior and local market concentration were weak at best. Davis K. (2001) found that high reserve requirements limited the expansionary opportunities of credit unions and tended to grow slower than retail banks and other thrifts. Slower growth opportunities in turn dampened the competitive effect of credit unions. Jones and Critchfield (2008) provide a comprehensive review of consolidation activities in the banking industry, and many studies cited in this review show that small business loan pricing continues to have strong price effects in local markets. This is interesting because thrifts and community banks have a larger commercial lending share than
credit unions. Put together with the banking literature it is hard to conclude that credit unions capture market share/rents as private gains.

Studies find that, post consolidation, there is some evidence to support increased profit and payment system efficiencies, but mixed evidence on cost efficiencies from scale or scope economies (Berger et al. 1997; Berger A. 1998; Hughes et al. 1999, 2003; Prager and Hannan 1998). Credit union specific studies on effect of consolidation suggest that efficiency improves for acquired credit unions (Fried, et al. 1993, Bauer 2008). Bauer et al. (2009) takes this point further to show that the acquiring institution does not show increased efficiency. They also find that most credit union mergers are encouraged by regulators to help distressed credit unions. This is most evident during the most recent financial crisis. Since credit unions are insured with National Credit Union Share Insurance Fund (NCUSIF) mergers reduce pressures on insurance to cover fund shortages and losses and helps maintain confidence in the credit union system—the “too-big-to-fail” effect. We begin to understand that pure market and pricing approaches are insufficient in isolation to conclude that increased credit union merger activity places thrifts and community banks at risk. The argument that private rent seeking motivates drive consolidations would have to demonstrate excessive risk taking or managerial self-interest. While there is evidence to support managerial mischief and increased potential for systematic risk and safety net support amongst traditional banks, we argue consumer-ownership and a volunteer board makes this less likely for credit unions (Hughes, et al. 2002, Jones and Critchfield, 2008). Empirical work on bank consolidation also shows very little benefit to consumers in terms of prices and services (Prager and Hannan 1998; Avery, et al. 1999). We would expect that credit unions’ organizational form and consumer representation would show benefits to consumers, especially, in terms of ATM networking and branching. As of 2014, there was no empirical work supporting this conjecture. Since 2012, Walker, and Smith (2019) found that credit unions acquired 16 thrifts and banks and provided better services to its members.

It is clear that banks engage in strategic behavior (hidden aspects) to capture market share and rents, such as product differentiation, switching costs, and geographic location patterns. Kim, Kliger and Vale (2005) focus on vertical differentiation and find that consumers are willing to pay for banks that offer a higher reputation or superior services. Product differentiation also dictates the degree of substitution between different types of institutions. In the U.S. banking context, Cohen and Mazzeo (2004) study thrifts, single, and multi-market banks and find that

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5For a review of the effect of consolidation on the banking industry see Jones and Critchfield (2008)
competition tends to be fiercest amongst banks of the same organizational and service type. Another strand of bank literature shows that relational lending or contracts allow banks to extract higher rents from borrowers (Boot and Thakor 2000). Fiercer inter-bank competition pushes banks to offer more relational lending.

All lending in credit unions is relational by definition because members are owners; *de facto* credit unions serve a captive clientele who are likely to find switching to other financial institutions costly. There is no emphasis in the current literature, however, that discusses the role switching costs (transaction costs, ATM networks, branching convenience, relational lending can play in understanding the pro-competitive effect of credit unions. We argue that we first need to demonstrate that switching costs are a potential missing link to solving this puzzle. Consumer level preference data are costly to collect for both banks and credit unions but location choice is a viable and insightful alternative. Rather than examining bank and credit union competition with respect to pricing, products and services offered, we recast the question in terms of spatial or geographical competition. Looking into competition between credit unions and other thrifts and banks we must first observe any existing sources of frictions in the markets such as fragmentation, socio-economic dependencies, and economic rigidities, among other things.

Banks locate or choose branch locations in close proximity to their consumer base for multiple reasons. Location influences spatial pricing as well as availability of products and services offered. Petersen and Rajan (2002) found that location of branches and distance to closest competitors are important for both spatial pricing as well as understanding the intensity of competition. Berger, et al. (2003) found that most small businesses prefer regional or local banks and that there is a strong correlation between bank reach and bank nationality. Evidence also suggests that most consumers prefer local or regional banks for long-term loans but rely less on local-ness for credit cards. Spatial studies have shown that banks are able to “redline” certain neighborhoods through strategic branching in predominately higher income white markets but not in lower income black markets (Avery 1991 and Chang, Chauduri and Jayaratne, 1997). One must keep in mind that from a historical perspective a major motivation for the creation of credit unions is that thrifts and banks were not entering into certain geographic markets; markets that they deemed as unprofitable. Unfortunately, while the location of banks has been extensively studied (Amel and Lianf 1997; Pilloff 1999, and Cohen and Mazzeo 2007) we are aware of only one study by Feinberg (2008) that explicitly models credit unions.
Observed “redlining effects” among smaller bank branches and switching costs alert us towards fragmentary access or other sources of friction in the financial market. For instance, if traditional retail financial institutions such as banks, savings, and loans tend to geographically cluster in more profitable markets then, credit unions should be more prevalent in markets with fewer banks and/or not so profitable areas. This implies that increased spatial concentration among banks would be met with lower credit union presence. Furthermore, we would expect to see a higher density of credit unions in poorer or less densely populated areas. Lastly, with a growing Hispanic population and the widespread presence of credit unions in Central and Latin America, we expect to see higher credit union concentration associated with Hispanic neighborhoods. There is considerable evidence that documents increased remittance activities to Central and Latin American countries (WOCCU 2008, 2010). Vertically differentiating by catering services to the growing population is likely to be captured in observed location patterns of credit unions.

3 Empirical Approach, Data, and Economic Estimators

We estimated a family of simple location models using U.S. data for 2,947 counties. Data on the presence of a credit union, our dependent variable, was made available from the University of Wisconsin Center for Cooperatives, the National Credit Union Association, and the socio-economic data were drawn from the City and County Data Book 2007. Although we had data on over 8,000 individual credit unions we aggregated credit unions up to the county unit of analysis to match with the socio-economic county level data. Within this aggregation we had count data on the number of credit unions within each county. We exploited the count nature of credit union data and estimated logit, Poisson, and zero-inflated Poisson (ZIP) models.

A simple plotting of the concentration of credit unions suggests that there is a spatial clustering in more urban areas (Figure 1). Unfortunately, a simple visual inspection of the location of credit unions as provided in Figure 1 does not definitively inform us if there are indeed spatial clusters or if the spatial distribution is purely random. Clustering has been

\footnote{Furthermore, consumers are willing to pay more for banks with better ATM networks than banks without. ATM networks also have an element of horizontal differentiation where consumers pay attention to whether ATMs are conveniently located or not.}

\footnote{http://reic.nwcc.wisc.edu}

\footnote{Note we do only model headquarters. Location of individual branches is not currently available. Because the vast majority of credit unions are too small to support branches, this lack of branch data should not be a serious limitation to this study.}
discussed within the much broader banking literature as “herding” (Devenow and Welch 1996). Here, the banking literature seeks to better understand why banks tend to act as herds in lending policies (Rötheli 2001), decisions to write down assets (Rajan 1994), and, for our perspective, the decision to open branches and foreign offices within close spatial proximity (Persons and Warther 1997).

This literature suggests that there are two types of herding: “rational” and “behavioral”. The first is consistent with the notion of endogenous (or Porter-style) clusters where the herding is strategic. There are external economics of scale in terms of locating in close proximity to other financial institutions. The second, the behavioral approach, exists when banks fall into what can best be described as “group think” or more bleakly a “mob mentality”. The argument for justifying the behavioral approach centers on information asymmetries and how people (banks) collect, process, and react to information. The rationale is that other banks have access to information that they do not. Within the rational approach, banks attempt to observe their competitors and learn from their actions. Within a behavioral approach, rather than learn from the actions of competitors banks blindly follow in an almost knee-jerk mob mentality.

Relevant for the credit union context is that if banks are clustering in what might be described as “irrational herding”, central place theory tells us that they may be spatial markets that are under-served. These under-served markets may fall below some market threshold for many retail banks, whether this is in terms of population size for remote rural areas or poor high risk for some urban markets. This raises the question of, if credit unions will be more prevalent in rural and/or poorer communities. As we noted in the introductory comments we are aware of only one study by Feinberg (2008) that explicitly models the location decisions of credit unions. Unfortunately, Feinberg (2008) theoretical foundation for his empirical work is lacking. Rather than lay a foundation on something like central place theory Feinberg (2008) appeals to the wide range of bank location studies to justify his empirical specification. But as explored below Feinberg (2008) is keen to point out that what works for bank location decisions may not apply to credit unions.

The behavior of most financial institutions in their location decisions, however, is consistent with the theoretical spatial modeling work of Ali and Greenbaum (1977). If banks have the objective to maximize profits within an oligopolistic location modeling framework a la Hotelling H. (1929) spatial clustering is a predicted outcome. For the vast majority of financial institutions, the premise of profit maximization makes intuitive sense. Such an assumption for credit
unions, however, is difficult to justify because of the organizational differences highlighted in the previous section. Consumer-ownership, governance structure, and different objectives than profit maximization alter credit union decisions.

To gain some insights into the presence of spatial clustering, or herding, of credit unions we use the Anselin’s Local Moran’s I and Getis-Ord Gi* statistics. Given a set of spatial weighted features (i.e., how geographically close individual observations are), the Local Moran’s I—as suggested by Anselin (1995)—looks for spatial patterns along a similar-dissimilar spectrum. A high positive value indicates that the county is surrounded by counties with similar values. Such a feature is part of a cluster. A small negative value indicates that the county is surrounded by counties with dissimilar values. Such a feature is an outlier. The Local Moran’s index can only be interpreted within the context of the computed Z score. The Getis-Ord Gi* statistics identifies spatial clusters of high values, sometimes referred to as “hot spots” and spatial clusters of low values or “cold spots”. A high positive Z score indicates spatial clustering of high values while low negative Z scores indicate spatial clustering of low values. In our case, high positive Z scores imply spatial clustering of credit unions while low negative Z scores suggest credit union “deserts”.

Considering the results of the Local Moran’s I statistic (Figure 2) and the Getis-Ord Gi* statistic (Figure 3), there are remarkable similarities in the identifiable clustering patterns. There appears to be strong spatial clustering of credit unions in the southern California coast and San Francisco, Seattle, Denver, Chicago and Detroit, as well as much of Ohio along with the Baltimore to Boston corridor. What is the more important observation is the lack of concentrations in the vast majority of the U.S. Outside of the small geographic concentrations, most of the credit union locations identified in Figure 1 is spatially random. Returning to our central theme, ‘do credit unions systematically compete with thrifts and retail banks’, the lack of spatial concentrations for most of the U.S. would suggest the lack of structural competition.

The second pattern that can be inferred from the spatial clustering analysis is the lack of concentration of credit unions in rural areas. The lack of a “rural effect” is relevant to the central theme of this work for two reasons. First, if mergers are the culprits motivating concern

\[ I_i = \left(X_i - \bar{X}\right) \left(S_i^2 \sum_{j=1, j \neq i}^n w_{ij} (X_i - \bar{X}) \right) \]

where

\[ S_i^2 = \left(\sum_{j=1, j \neq i}^n w_{ij} X_j \right) \left(\sum_{j=1, j \neq i}^n w_{ij} \right) \]

\[ \left(\sum_{j=1, j \neq i}^n w_{ij} X_j \right) \left(n - 1\right) - \bar{X}^2 \]

\[ X_i \text{ is the number of credit unions within county } I \text{ and } w_{ij} \text{ consist of spatial weight matrix elements identifying adjacent counties.} \]

\[ G_i^* = \left[\sum_{j=1}^n w_{ij} X_j - \bar{X} \sum_{j=1}^n w_{ij}\right] \left(\sum_{j=1}^n w_{ij}^2 - \left(\sum_{j=1}^n w_{ij}\right)^2 \left(n - 1\right)\right) \]

\[ S = \sqrt{\left(\sum_{j=1}^n X_j^2\right) \left(n\right) - \bar{X}^2} \]

\[ X \text{ and } w \text{ are the same as above.} \]
behind credit union’s regulatory advantage then, rural clustering or herding patterns make that argument nebulous. Most significant credit union mergers are urban based. Second, the states in which clustering seems of predominance have a higher immigrant Hispanic population. This means that strategic product differentiation is a likely mechanism for capturing market share rather than pricing behavior (WOCCU 2008, 2010).

We use four blocks of variables to capture the essence of credit union location patterns in the financial market: competition concentration, economic structure, socio-demographic, and measures of “common bond of association” (Table 2). Concentration variables include bank density per 10,000 persons as well as the savings and loans density per 10,000 persons. We hypothesize that credit unions locate in markets that are under-serviced by thrifts and community banks or higher concentration of thrifts and community banks in a location will lower the likelihood of credit union presence. On the other hand, if credit unions are directly competing with thrifts and community banks—we would expect to see higher concentrations of thrifts and/or community banks associated with credit union presence. If credit unions, thrifts and community banks do tend to display herding behavior, we can look into the presence of switching costs (product differentiation, specialization, ATM and branch network). The next steps of analysis from these results would point to barriers to entry, segmentation and access to financial services.

Socio-demographic variables capture the profile of the markets (counties) that are most likely to attract a credit union. Based on the work of Chang, Chaunduri, and Jayaratne (1997), Avery (1991) and to a lesser extent Feinberg (2008), we would expect to see credit unions located in poorer, less densely populated and counties more dominated by minorities. But, at the same time, credit unions require proactive initiatives from local residents to organize, tailor services, and operate the credit union. Will counties that are less likely to be attractive to traditional financial institutions have the capacity or social capital to form credit unions? These variables can also inform us on the credit unions’ strategic behavior in terms of product differentiation, and specialization. We also include dummy variables for metropolitan counties as well as non-metropolitan adjacent counties to capture market presence. That is, if credit unions have a significant rural presence, then we would expect to see a negative relationship between each of these variables.

In understanding competition between thrifts and credit unions we must also examine the relationship between different economic structures. For example, are credit unions more or less
likely to concentrate in residential or employment centered counties, or are they attracted to counties with higher or lower concentrations of proprietorships? We include the population to employment ratio along with the population to proprietorship ratio. A county with a higher population to employment ratio is an indicator of a more residential based county with perhaps a higher share of commuters or retirees. The population to proprietorship ratio is a simple measure of self-employment. We would expect that a higher concentration of self-employed persons is associated with lower levels of common bonds thus lowering the likelihood of a credit union being present. These variables fundamentally define thrifts and community banking who have higher volumes of commercial lending and approximately 65 percent of their lending volume to residential and consumer loans.

We also expand on the base model by controlling for the concentration of organizations of association. Credit unions were traditionally formed with stringent membership criteria based on a “common bond” such as employment, association, religious, or community organization. To test if one form of organization upon which common bonds can be built is more or less likely to influence the presence or location of a credit union we include: the number of non-agricultural cooperatives; the number of civil and/or social organizations; business associations; professional associations; and number of labor unions all on a per 10,000 persons basis.

With all else held constant, we expect that higher concentrations of these types of organizations will increase the likelihood of a credit union being present in the county. Also, because credit unions follow the spirit of the cooperative movement, we also include a simple dummy variable of certain types of other non-agricultural based cooperatives are present in the county. We consider grocery store cooperatives, artisan focused cooperatives, educational cooperatives, and childcare cooperatives specifically. We limit our attention to these because these specific types of cooperatives tend to be organized on grassroots efforts and reflect the willingness of the community to adopted and use the cooperative business structure. We do not include other types of cooperatives, specifically agricultural and/or utility focused cooperatives because these types of cooperatives tend to be driven by factors outside of the local community. We would expect that credit unions do not have a high presence around business and professional associations because of a restricted commercial lending volume.

We start with the simplest estimation model possible and building on it to gain insights into the questions of interest. The basic estimation addresses a simple question: is there a credit union present or not present in the county? This model can be written as $y_i = 1[y_i^* > 0]$, where
$y_i^* = x_i \beta_i + e_i$. The binary indicator $y_i$ takes on the value one if there is at least one credit union present in the county or zero otherwise. The logit estimator is derived from the underlined latent variable formulation $y_i^*$ when the error term $e_i$ has a logistic distribution. The vector $x$ contains the socio-economic, economic, and common bond characteristics that contribute to the location of the credit union; and each co-efficient $\beta_i$ explains the effects of each $x_i$ on the response probability.

Addressing the simple question if a credit union is present in the county in a yes-no framework ignores information on the concentration of credit unions. Specifically, we know exactly how many credit unions are within a county and we can refine our insights into the bank credit union competition question by taking that additional information into account. In this case, the number of credit unions takes on integer values $0, 1, 2, 3, \ldots$. With the conditional mean of $y_i$ given a vector of characteristics $x_i$ denoted by $E(y_i|x_i) = \lambda_i$, where $\lambda_i = \beta' x_i$ then the Poisson distribution is given by:

$$f(y_i = y \mid x) = \exp[-\lambda_i](\lambda_i^y)/y!, y = 0, 1, 2, 3 \ldots$$

(1)

The Poisson distribution imposes restrictions on the conditional moments, most commonly, the variance equals the mean: $\text{Var}(y_i|x_i) = E(y_i|x_i) = \lambda_i$. While the estimation of this model is fairly straightforward, the variance structure is often violated. Specifically, when the variance is greater (less) than the mean there is over dispersion (under dispersion) relative to the Poisson distributional case. Over dispersion is a potential source of concern because it is quite possible to have counties without any credit unions. To circumvent this we, could view this as a two-step process. First, due to certain characteristics, socio-economic or income some counties may not attract credit unions. These counties will always show a zero number of credit unions independent of the underlined data generating process. Whereas in other counties, the number of credit unions follows a Poisson process, but may show no credit union presence, due to the data generating process.

A natural way to model this was suggested by Lambert (1992) and Paupolis (1984) by putting a point mass at 0 because in those cases where counties have no credit unions are also of interest. That is with probability $p$ we sample from a degenerate distribution at 0 and with probability $(1 - p)$ we sample from a Poisson $(\lambda_i)$ distribution. This model is commonly referred.
to as the zero-inflated Poisson (ZIP) model. Explicitly given the parametric distribution $\pi(y)$ on integer values $y = 0, 1, 2, 3 \ldots$, we can write the associated zero inflated distribution as:

$$
P(y_i \mid p, 0) = p + (1 - p)\pi(0),
$$
$$
P(y_i \mid p, 0) = (1 - p)\pi(y), y > 0
$$

Where $p$ is the probability we use a logistic specification on a latent indicator variable $z$; and we define a joint distribution to estimate equation (2) as follows:

$$
P(y_i = 0, z = 1 \mid p) = p, P(y_i = y, z = 0 \mid p) = (1 - p)\pi(y)
$$

Then $z$ is a Bernoulli random variable with a probability of success of $p$. Then given a sample size $n$ with $y_i$ given $p_i$ distributed as in equation (2) the marginal or observed likelihood can be written as:

$$
L(p; y) = \prod_{i=1}^{n} [p_i(1(y_i = 0) + (1 - p_i)\pi(y_i)]
$$

Where $\pi(y)$ is Poisson($\lambda$) and leads to the zero inflated Poisson model, ZIP($p, \lambda$). The ZIP($p, \lambda$) model is over dispersed relative to the Poisson($\lambda$); that is, the $E(y \mid p, \lambda) = (1 - p)\lambda < \lambda$ and $\text{Var}(y \mid p, \lambda) = (1 - p)\lambda(1 + p\lambda) > E(y \mid p, \lambda)$. The spatial association in observed counts of credit unions is explained by each $\lambda_i$. Indeed, this would be the case if each $z_i$ were observed. But we argue that the counties showing no credit unions are unobserved so introducing a spatial effect for each observation would make the estimation unstable. In our sample, over half (50.5%) of the counties do not have credit unions and we find very little evidence of spatial clustering outside of small handful of urban areas (Figures 2 and 3), so we keep the estimation aspatial.

4 Estimation Results

Recall we are interested in understanding what credit union spatial locations can tell us about the nature of competition the market. The results to the logit, Poisson, and ZIP models are presented in Table 3. In general, the results across the three estimators were consistent, with the zero-inflated Poisson (ZIP) estimation providing the strongest set of results. We did find a substantial number of cases were variables are statistically significant in one model but not in another with the ZIP model, yielding the most statistically significant variables. More importantly, there are few cases where the same variables were statistically significant but with
different directional relationships across estimators. This lends credence to our view that ZIP model is the right specification in this context. Before turning attention to the principle question of interest, consider the results of some of our socio-demographic variables.

The racial make-up of counties did influence the location decision of credit unions. All three variables African-American, Hispanic, and foreign born appeared to have a positive influence on the presence of credit union within a county. Of these, the percent of Hispanic population was statistically significant across three models (logit, Poisson, and ZIP).

The higher concentration of credit unions in counties with large concentration of Hispanics is not surprising. Latin and Central Americans countries have approximately 1,800 credit unions with $38 Billion in total assets. Because credit unions offer remittance services to its consumers they are particularly attractive to Hispanics. The closest alternative for remittances is Western Union for working class and migrant labor with high associated fees of transaction. With joint accounts and availability of ATM services easily available to the recipients of remittances we would expect to find high market concentration in Hispanic communities. A higher share of the population that is African-American and the percent of the population foreign born, while not significant in the logit model, is significant in the Poisson and ZIP models. Here, a higher concentration of both is associated with a higher concentration of credit unions, all else held constant. These results are consistent with prior expectations because these are generally market populations that banks and other thrifts may under serve. Education attainment modeled by percent population over 25 with Bachelor's degree is positive and statistically significant.

The poverty rate and unemployment rate have a negative significant influence credit union concentration in the ZIP model. The potential negative impact of credit unions in poorer areas are potentially a source of concern. Thrifts and community banks have argued that they serve a higher share of the under-served population than credit unions. While these results are not adequate to explain the percent of under-served market captured by credit unions versus their closest competitors; it is worth noting this as a potential venue for further work. Although we could argue that credit union requires a minimum level of social capital within the community, a generally accepted hypothesis is that social capital and poverty are inversely related. It is equally likely that our aggregate measure of poverty is not sufficiently refined to fully address the hypothesis as we have laid it out.

The percent change in the number of household, our one measure of economic growth, has a statistically significant negative impact on credit union concentrations. This is as expected
because traditional retail financial institutions such as thrifts and community banks are drawn to more profitable markets that are experiencing economic growth. If credit unions avoid locating near traditional retail banks then we would expect counties that are experiencing economic growth would see lower concentrations of credit unions. Owner occupancy rates negatively influence concentrations in the ZIP model. Higher values of the population-employment ratio are associated lower concentrations of credit unions. This suggests that credit unions are more likely to be located in counties that can be described as employment hubs as opposed to residential or bedroom communities. Given the “common bond of association” requirement to form credit unions this result may be interpreted as indirectly capturing credit unions, that are based on employment opportunities. On the other hand, the population-proprietor ratio is positive and significant in the all models.

Consider the principle question of interest: are credit unions spatially close in proximity to banks? Our evidence suggests the contrary—a higher concentration of banks, measured by banks per 10,000 persons, is associated with a lower concentration of credit unions. This means that credit unions do not exhibit the herding behavior that is characteristic of the banking industry. In fact the results indicate that credit unions avoid locating where competing banking services are available. The results do indicate, however, that thrifts (referred to as savings and loans) and credit unions are spatially located in close proximity, which suggests herding behavior between the two. This means that credit unions fundamentally serve a different segment of the market. Even in presence of spatial price equalization, between thrifts and credit unions, ownership and governance may create enough incentives for a tied consumer base. That is, as the owners of the credit unions, the consumer base is locked into a rent-shielding relationship. Thus, to compare competition between thrifts and credit union we would have to take into account barriers to entry, vertical and horizontal differentiation, switching costs, and not spatial pricing.

Turning to factors that lend support to the presence of barriers to entry (e.g. common bond variables), community-based grassroots cooperatives did appear to have a positive influence on the concentration of credit unions and are statistically significant across all three models. There are strong and consistent results on the four measures of “common bond of association”.

The larger the number of civil-social organizations per 10,000 persons, the higher the concentration of credit unions, this result is consistent across all three estimators provided in Table 3. We suggest that this measure not only captures one potential source common association but is also a measure of social capital. The number of business associations per
10,000, however, has a negative influence on the concentration of credit unions. This, again, is an expected result because credit union business lending volume is restricted to 12.5 percent of total assets. Thus, communities (counties) that have a high concentration of business associations are more likely to be attractive to retail banks which in turn repel the formation of credit unions. The concentration of professional organizations does not appear to influence the creation of credit unions. The strongest result appears to the concentration of labor unions, which has a positive influence on credit union concentrations. The formation of credit unions as a service to their membership has been a common practice for labor unions. The strong ties to common bond show that credit unions do indeed serve a fundamentally different consumer base. Again emphasizing rigidities in the market in form of product differentiation, switching costs and barriers to entry.

But when we focus on the key variables of interest—like population density, the metro and non-metro adjacent dummies, along with the thrifts and community banks concentrations and finally the measures of “common bonds of association”. None of these demonstrate any spatial heterogeneity. Variables that do exhibit spatial heterogeneity include percent of the population that is African-American, Hispanic, and foreign born, the poverty rate, change in number of households, percent of houses owner occupied, the unemployment rate and the population-proprietorship if we lower the confidence level.

Putting together results from this study and Deller and Sundaram-Stukel (2010) we begin to see that to really address competition between thrifts, community banks, and credit unions we must examine the role of switching costs, value of ownership, product differentiation, and barriers to entry.

5 Concluding Remarks

Based on results presented here and in other studies, it becomes clear that comparing the subtleties of competition between two fundamentally different types of financial institutions would be reckless and is bound to ignore the organizational variations across business types. Our principle contribution to the literature is to draw attention to the organizational structure of cooperatives and how they influence competition among other firms offering similar services. A few consistent patterns emerge. First, credit unions serve fundamentally different segments of the market. There is weak evidence of herding between credit unions and thrifts but the results
are not statistically significant across all models. There has been a lot of speculation about the pro-competitive effect of credit unions on the interest rates and fees, offered by retail banks. We set out to explore if credit union regulation made the playing field unequal for thrifts and banks. It appears from this analysis that credit unions tend to avoid areas that have higher concentration of thrifts or community banks.

Second, we find that common bonds of membership appear to be the source of segmentation. That is, credit unions show strong positive concentration in areas with labor unions, presence of other cooperative organizations, and civil and social organizations. But do not, however, seem to show a strong market concentration in professional and business associations. Thus maintaining their ties closely to serving working class Americans. These results are not surprising because most thrifts and community banks have a larger commercial lending volume and most small-business lending tends to be relational contracts. Third, home ownership and population proprietorship are negatively associated with credit union concentration; reiterating the finding that credit unions have a client base that rooted in service rather than business. Once again, thrifts and community bank are required to hold 65 percent of lending volume on residential and consumer loans so these results are consistent with market segmentation. Fourth, poverty and unemployment do not seem to increase credit union concentration. But, racial ethnicity, particularly, Hispanic communities—show a higher credit union concentration. These results are aligned with the objectives WOCCU to ensure easier flow of funds with ATM-networking, wire transfers, and online banking to Central and Latin American credit unions.

To conclude, if spatial geography can be viewed as an accurate measure of “yardstick competition”, then credit unions serve a distinct market share. It is not clear if at margin the members of these credit unions would switch allegiance to regular banks if the credit unions did not offer similar rates. Furthermore, our results show that to accurately discern the private versus social pro-competitive effects of credit union regulation we must pay careful attention to organizational form, switching costs, product differentiation, barriers to entry, network of auxiliary services and cross-border activity.

This said, some limitations and directions to future empirical work especially understanding formation of credit unions and mergers in a post COVID-19 financial world are important. Our results, from 2008-2010, were conservative since we model only headquarters. Looking into spatial patterns of branch and ATM networks for both banks and credit unions will push our understanding further. Given that most merger activity was urban-based, separating analysis
of performance by urban and rural effects is of equal importance. Using direct measures—such as switching costs, product differentiation, barriers to entry among others—seem to logical venues of empirical work. Developing a theoretical framework that explicitly models cooperative business performance is of the most immediate importance.

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Table 1: Differences between Thrifts & Community Banks and Credit Unions Along Three Dimensions: Organization, Objectives and Regulation, and Measurement of Competition

| Sources of Differences | Thrifts and Community Banks | Credit Unions |
|------------------------|-----------------------------|---------------|
| Size and Scale          | 8000 communities and thrifts | 8193 Credit Unions |
|                        | Approximately 80% have assets higher than $1 Billion | < 2% have assets higher than $1 Billion. |
|                        | Account for 23% of total assets of U.S. Banking Industry | |
| Organizational         | Investor owned               | Consumer owned |
|                        | Board members are hired from community members and small businesses within the community. Board members are compensated and hold high equity stake in the bank. Consumers of thrifts and community banks do not have a voice in the way the bank operates | Board members are elected from consumer-owners of the credit union, by laws prevent compensation, board members due received free educational training and per diem expenses for board related activities. Consumers have control rights and vote on both consumer and producer decisions. |
| Objectives and Profits  | Objectives are to maximize rents or producer surplus | Objectives are to maximize rents or producer and consumer surplus. This is because consumer members are also producers. Credit union members have a dual relationship with the banks. Profits can be redistributed as lower loan rates, higher deposit rates, dividends, or held back as retained earnings for bank growth. |
| Regulation              | Are taxed under for-profit as C or S-corp, have no common bond requirement, are required to maintain a lending portfolio of 65% in housing or consumer related and around 23% in commercial and small business lending, and have standard FDIC reserve requirements. | Have a not-for-profit exemption 501-c12, have a requirement for community reinvestment for state chartered credit unions, have a common bond requirement, have a cap on commercial lending to 12.5% of total assets, and have a higher reserve requirement with NCUSIF. Credit unions do pay property taxes, payroll taxes, and the ownerconsumers pay income taxes on their earned interest and dividends. |
| Measurement of Competition | Are subject to scale and scope economies, efficiency, X-efficiency, productivity, and risk management | Are subject to scale and scope economies, efficiency, X-efficiency, productivity, and risk management. |

Sources (2009): National Credit Union Association, Credit Union National Association, American Banking Association, and Independent Community Bankers of America
Table 2: Variables Used in Credit Union Location Model

| Variables                                | Potential Inference for Credit Unions |
|------------------------------------------|---------------------------------------|
| **Market Concentration**                 |                                       |
| Population density                       | Access and product differentiation    |
| Metro County                             | Access and entry                      |
| Non-Metro Adjacent                       | Access and entry                      |
| Number of banks per 10K population       | Product differentiation, network, and specialization |
| **Economic Variables**                   |                                       |
| Unemployment rate                        | Access                                |
| Population to employment ratio           | Access and specialization              |
| Population to proprietorship ratio       | Access and specialization              |
| Poverty rate                             | Access                                |
| **Socio-Demographic Variables**          |                                       |
| Percent of population African American   | Access and specialization              |
| Percent of population Hispanic           | Access, product differentiation, network, and specialization |
| Percent of population over age 25 with a Bachelor’s degree | Access, product differentiation, and network |
| Percent of the population foreign born   | Network and specialization             |
| Percent of change in number of households 2000-2005 | Network |
| Percent of houses owner occupied         | Specialization and network            |
| **Organizations of Common Bond**         |                                       |
| Non-agricultural cooperatives present    | Specialization                        |
| Number of civil-social organizations per 10K population | Network, product differentiation, and specialization |
| Number of business associations per 10K population | Network, product differentiation, and specialization |
| Number of professional associations per 10K population | Network, product differentiation, and specialization |
| Number of labor unions per 10K population | Specialization, and product differentiation |

Source: Census county data and IMPLAN database.
Table 3: Estimates for Credit Union Location Patterns: Dependent Variable Number of Credit Unions

|                                | Logit Yes = 1, No = 0 | Poisson | Zero Inflated Poisson |
|--------------------------------|------------------------|---------|-----------------------|
| Intercept                      | 2.148 (0.020)          | 1.820 (0.000) | 4.188 (0.000)         |
| **Market Concentration**       |                        |         |                       |
| Metro County                   | 0.696 (0.000)          | 1.148 (0.000) | NA                    |
| Non-Metro Adjacent             | 0.021 (0.855)          | 0.086 (0.107) | -0.566 (0.000)        |
| Number of banks per 10K population | -0.204 (0.000)      | -0.148 (0.000) | -0.315 (0.000)        |
| Number of savings and loans per 10K population | 0.054 (0.486)       | 0.286 (0.000) | 0.373 (0.000)         |
| **Economic Variables**         |                        |         |                       |
| Unemployment rate              | 0.018 (0.593)          | 0.015 (0.124) | 0.022 (0.026)         |
| Population to employment ratio | -1.129 (0.000)         | -0.789 (0.000) | -1.095 (0.000)        |
| Population to proprietorship ratio | 0.106 (0.000)     | 0.007 (0.062) | 0.024 (0.000)         |
| Poverty rate                   | -0.009 (0.565)         | 0.007 (0.122) | -0.020 (0.000)        |
| **Socio-Demographic Variables**|                        |         |                       |
| Percent of population African American | -0.002 (0.059) | 0.012 (0.000) | 0.014 (0.000)         |
| Percent of population Hispanic | 0.017 (0.004)          | 0.005 (0.002) | 0.008 (0.000)         |
| Percent of population age 25 with Bachelors degree | 0.027 (0.010) | 0.012 (0.000) | 0.015 (0.000)         |
| Percent of population foreign born | -0.016 (0.411) | 0.033 (0.000) | 0.029 (0.000)         |
| Percent change in number of households 2000-2005 | -0.056 (0.000) | -0.043 (0.000) | -0.039 (0.000)        |
| Percent of houses owner occupied | -0.016 (0.100) | 0.002 (0.339) | -0.004 (0.074)        |
| **Organizations of Common Bond**|                        |         |                       |
| Non-agricultural cooperatives present | 0.586 (0.000) | 0.191 (0.000) | -0.207 (0.000)        |
| Number of civil-social organization per 10K population | 0.150 (0.000) | 0.011 (0.000) | -0.005 (0.000)        |
| Number of business associations per 10K population | -0.140 (0.004) | -0.226 (0.451) | -0.419 (0.0751)       |
| Number of professional associations per10K population | -0.016 (0.887) | 0.097 (0.020) | 0.269 (0.000)         |
| Number of labor unions per 10K population | 0.901 (0.000) | 0.355 (0.000) | 0.499 (0.000)         |

Source: Own estimations using NCUA call reports, and data from the University of Wisconsin Center for Cooperatives.
Number in parentheses is the marginal significance value.
Figure 1: Credit Union location
Figure 2: Credit Union Clustering (Anselin’s Local Moran’s I)
Figure 3: Credit Union Clustering (Getis-Ord Gi*)