Journal of International Development
J. Int. Dev. **30**, 1203–1222 (2018)
Published online 15 May 2018 in Wiley Online Library
(wileyonlinelibrary.com) DOI: 10.1002/jid.3372

FIRM SPECIFIC, FINANCIAL DEVELOPMENT AND MACROECONOMIC DETERMINANTS OF CREDIT UNION LENDING

BENJAMIN AMOAH[1]*, ANTHONY Q.Q. ABOAGYE[2], GODFRED A. BOKPIN[2] and KWAKU OHENE-ASARE[3]
[1]*University of Ghana Business School, Accra, Ghana*
[2]*Department of Finance, University of Ghana Business School, Accra, Ghana*
[3]*Department of Management and Operational Research, University of Ghana Business School, Accra, Ghana*

Abstract: Credit unions are set up to provide financial services, especially loans to members in a cooperative setting. The increasing competition from banking and non-banking financial institutions implies credit unions must provide financial products and services with a clear understanding of factors that interact in this competitive industry. This paper evaluates the discretional and non-discretional factors that tend to influence loans credit unions grant their members. From fixed effect model estimate, discretional factors such as size, profitability, management quality and solvency positively associate with credit union loan business whiles loan loss, net worth, non-loan income and non-loan activities associate negatively. Contractionary monetary policy creates an increase in loan demand in the credit union. Credit union managers should monitor developments taking place in the loanable funds market as increasing overhead cost of banks may imply a possible increase in loan demand leading to diseconomies of scale. Copyright © 2018 John Wiley & Sons, Ltd.

Keywords: credit union; loan; diversification; bank; competition; macroeconomic

1 INTRODUCTION

As a financial institution, the credit union is somewhat of a paradox. It cannot be classified as a purely classical economic firm that seeks to maximize profit. The credit union's cooperative nature complicates any decision-making that upholds profit making as its sole objective as it cannot then simultaneously maintain its social objective mission to provide

*Correspondence to: Benjamin Amoah, University of Ghana Business School, Accra, Ghana.
E-mail: benjamintoamoah@yahoo.com; kingbiroo@yahoo.com

financial services to its members at lesser cost than other competing financial institutions. Operationally, credit unions generate income by granting loans to members and investing excess reserves into interest-earning assets such as treasury bills, commercial paper and other money market instrument on the financial markets, as well as engaging in non-interest income such as operating pharmaceutical and building material businesses, among others.

In granting loans, credit unions compete with other financial institutions and to keep this business going, they must offer loans at lower rates. This means that although the loan demand in credit union is internal in that it is the owner-borrowers who demand the loan, the decision to grant the loan is not solely influenced by the owners as other economic forces that are external to the credit union affect its loan making decisions.

Credit unions operate in a vigorous competitive environment made up banks, savings and loans institutions, microfinance institutions that all offer similar products and services aimed at the same borrower with little variation in product features. The manager of the credit union must be prepared to pay more than average market return to attract deposits away from competitors but yet the same manager must charge lower than average lending rates to extend loans to borrowers of the union. Charging higher lending rates on the market would theoretically mean that the credit union would report lower loan income as borrowers would prefer to source for loans from competing financial institutions (Rubin, Overstreet, Beling, & Rajaratnam, 2013; Smith, 1984). Empirical data from Ghana in Table 1 suggest that about 73 per cent of credit unions' income is from loans while about 27 per cent of their income comes from non-loan sources.

A question that arises is why credit union managers would consider the riskier 27 per cent of income from non-loans sources in contrast to the 73 per cent loan income that is of lower risk because of the consignor effect. Attempts to answer this question would be incomplete without referring to the fact that in the credit union income scenario, non-interest income comes to the fore only in the presence of excess loanable funds over loan demand. In addition, loan default does not commonly occur (compared with banks) because the common bond that defines credit union members invariably reduces the information asymmetry problems that are typical in the lending business. The 73 per cent of funds extended as loans are to members hence the lower rates compared with the average lending rates on the market. The remaining 27 per cent would have to be invested to shore up income to pay appreciable deposit rates and dividends expected by depositors if they are to keep doing business with credit union.

The central issue facing the manager of the credit union is how to keep meeting loan requests from borrowers while fully aware that this borrower could request loan from other providers. This suggests that external forces do influence credit unions' loan making process. Again, because loan income makes up about 73 per cent of the income credit

Table 1. Descriptive statistics on loan to assets

Variable	Mean	Std. Dev.	Min	Max
Loan income to total income	73.21995	17.2137	0.0000	98.2000
Non-loan to total income	26.7802	17.2137	1.8000	100
Credit union loans to assets	56.3862	8.3227	48.0816	73.5883
Bank loan to assets	56.6078	13.1952	40.667	79.9151

Source: Credit union loans to assets, author's estimation from Credit Unions Association data. Bank loan to assets, author's estimation from Ghana Association of Bankers data.

DOI: 10.1002/jid

unions, the manager of the credit union is presented with a case where they have to deal with a major internal income generating activities for which the external factors greatly influence. Our paper makes the following contributions, firstly, we focus on credit union lending in Ghana, different from Adusei's study (2013) on credit union savings that concludes that credit risk, assets (size) and female membership are significant determinants of credit union savings. Adusei (2013) further argues that credit unions in Ghana could maximize their savings if they target their savings mobilization campaigns at income-earning men with higher marginal propensity to save as well as adoption effective and efficient asset management policy. Secondly, we provided empirical evidence on how diversifications into non-loan activities affect credit union lending and finally, how financial development indicators influence credit union lending.

From data on banks and credit unions sampled for this study, Figure 1 clearly shows that during the period 2008 to 2011, banks in Ghana were creating more loans out of their assets compared with credit unions; however, from 2012 to 2014, credit unions generated more loans out of assets compared with banks.

Bank loans have displayed more variability as seen in the standard deviation of 13.1952, with credit unions recording 8.3227. The two financial institutions however recorded almost the same average loan to assets over the period 2008 to 2014 from Table 1. We can also see in this same table that the variability in loan income to total income and non-loan income to total income is 17.2137 depicting a complete substitutability between this income groups.

This paper specifically attempts to answer the following questions: which pecuniary factors are important in credit unions' lending business? How the pursuit of income diversification affect credit unions' lending? How financial development indicators associates with credit union lending? Are there statistically significant causal macroeconomic factors for credit union lending? The rest of the paper is structured into four sections. Section 2 is the literature review, focusing on lending and theories of lending in the credit union management context. Section 3 is the method and data, Section 4 is the results and discussion and Section 5 provides conclusion and policy recommendations.

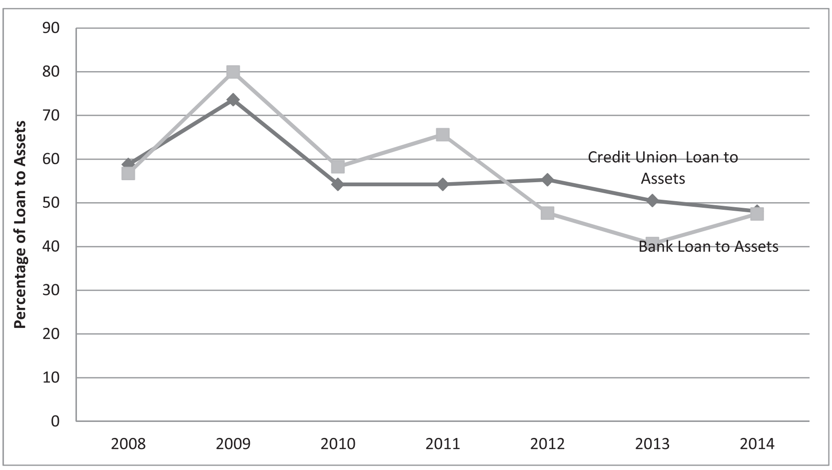

Figure 1. Trend of credit union loan to assets and bank loan to assets.
Source: Author's processed data from Credit Union Association of Ghana and Association of Bankers Ghana

DOI: 10.1002/jid

2 RELATED LITERATURE

The broad theme on lending falls on two viewpoints, the demand side mainly from firms or individual's perspective and the supply side from financial intermediaries' perspective such as the banks. The literature on lending presents two classes of information used by lending financial institutions and banks in particular in granting and monitoring loan extended to borrowers. Rajan (1992) asserts that lenders sometimes rely on soft information, that is, qualitative information obtained by means of personal interactions to evaluate a client's ability to repay loans. Berger et al. (2005) provide evidence that small banks are better positioned to collect and act on soft information than large banks as large banks are less willing to lend to informationally 'difficult' credits, such as firms with no financial records. They further contend that large banks lend at a greater distance, interact more impersonally with their borrowers, have shorter and less exclusive relationships and do not alleviate credit constraints as effectively, especially for the small business.

On the other hand, Berger and Udell (2006) emphasize hard quantitative information, such as information derived from the borrowers' statement of financial position, for assessing a borrower's loan servicing ability. The theme of lending in the corporate finance and depository financial institutions literature is broad; however, for the purposes of our objectives, this study concentrates on lending as presented in the banking literature, viz loans granted to borrowers. We focus on two lending propositions, namely, transaction based lending and relationship lending.

2.1 Transaction-based Lending

According to Bolton, Freixas, Gambacorta, and Mistrulli (2016), in transaction banking, banks specify a gross repayment at the inception of a loan. If the borrower defaults, the lender has the right to liquidate the firm's assets to repay the loan contracted. At the repayment date, if the borrower defaults, the bank can also offer to roll over the defaulted loan to the next repayment period. The sum to be paid at this point is the amount that the borrower expected cash flow can comfortably accommodate if the loan is not to fail. The bank in this situation has the right at any time to liquidate a borrower's assets to pay for defaulted loans.

Transaction banking mostly takes place in competitive banking market setting as no bank has information advantage over other competing bank in the provision of financial products and services. In sum, transaction-based banking treats each loan deal as a single contract and focuses on the risk of the loan. The capital allocation model by Stein (2002) posits that large complex banking organizations will not engage in relationship lending because these banks cannot verify soft information produced by the borrower and considers the cost of verifying such information as too expensive to be incurred on a small business client.

2.2 Relationship Lending

Financial institution lending can be related to relational contract that has the aim of building long-term relationship between the borrower and the financial institution, to establish strong business interest for both parties. Under this concept, the bank charges

DOI: 10.1002/jid

high loan rate at the inception of the lending relationship but lowers this overtime as the borrower repays loans. In the interim, the bank gathers more information on the borrower reducing the information asymmetry and, subsequently, the loan rates. With the improvement of information banks collect progressively, loan rates are reduced for both new and existing firms (see Bolton & Scharfstein, 1996; Boot & Thakor, 1994).

Embedded in relational contract is relationship banking. According to Berger and Udell (2002), banks acquire information in a relationship lending setting through contact with the firm, its owner and its local community on a variety of dimensions and use this information in their decisions about the availability and terms of credit to the firm. This customer interaction can be through the provision of financial products, deposits made by customers and contacts with suppliers and customers who give specific information about the firm.

In relationship banking, there is 'social attachment' in conducting the lending business with the borrower as the loan officer plays a central role in the lending process. The loan officer assesses borrowers banking relationship and other social commitments to build a good picture of the borrower's ability to service prospective loan facilities. Sharpe (1990) opines that during the later stages of relationship lending, lending institutions, having built a substantial enough dossier on borrowers, tend to exploit this information to borrowers' disadvantage. The evidence available in Katsutoshi (2012) is that, in the Japanese local credit market, small banks specialize more in relationship loans to small firms specifically loans to unincorporated firms or those with a very small number of employees. Similarly, Boateng and Abdulrahman (2013) argue that relationship banking significantly and positively influences banks decision to extend credit to micro small-sized enterprises in West Africa.

2.3 Credit Union Lending

From a theoretical standpoint, the nature of credit unions, in that they transact business with owners, renders credit union lending to be closely akin to relationship lending rather than transaction-based lending. Empirical evidence points to a dearth literature on credit union lending, we present lending literature from our search efforts and add other relevant issues presented in the literature on credit union lending. For example, Sayles (2002, cited in Wilcox & Berkely, 2011) employs a case study methodology, which examines the concentration of business loan programs in credit unions. Ely and Robinson's, 2009 work attempts to allay small business managers' fears that the extension of credit would decrease sharply in the face of the takeover or consolidation of community banks by larger banks. Addressing the concern that these small businesses would be overlooked by large banks, Ely and Robinson claim that the ability of small businesses to access credit may be dependent on the remaining unmerged community banks, including credit unions, and their decision to extend credit facility to small businesses. They conclude that credit unions would probably provide loans to small businesses in markets dominated by greater bank consolidation, implying that the credit needs of small business would be left unattended to in these markets.

In an effort to model the credit union loan stance, Emmons and Schmid (2000) employ a dynamic model of spatial competition for bank and credit union in a for-profit making and a not-for-profit making setting to analyse competition among banks and credit unions. Providing empirical evidence of two-way competitive interactions between banks and credit unions, their study shows that credit union participation rates are higher in more

DOI: 10.1002/jid

concentrated local deposit markets. In the Emmons and Schmid (2000) study, high bank concentration measured by the Herfindalhl index highlights the fact that higher prices for financial services offered by banks influences consumers to move from banks to credit unions for financial service, thus negatively impacting bank service provision. According to Emmons and Schmid, the higher prices for bank services unleash a continuing endogenous adjustment process of higher bank concentration and increasing credit union participation. In their opinion, credit unions are straightforward competitors to banks in the retail financial services market. As a result of losing market share to credit unions, banks respond by committing more resources in local deposit market which, Emmons and Schmid hypothesize, leads to higher credit union participation and this increase in credit union participation results in higher deposit-market concentration. The competitive position of credit unions in the provision of financial services is corroborated in Feinberg (2001) who argues that as the number of credit unions in particular market increases, rates charged by banks on new vehicle consumer loans decline, suggesting that credit unions play significant role in disciplining the exercise of market power by banks. This conclusion is drawn from a pooled cross-sectional, times-series study on 1000 observations on relatively small United States markets. In Tokle and Tokle (2016) evidence from the United States, credit union lending stagnated during the 2008 to 2009 financial crisis. Unemployment rates and changes in net worth were negatively associated with credit union lending, whiles loan rates, the size of the credit union and risk-based lending positively associate with lending during the 2008 to 2010 period.

From the foregoing discussion, small business credit needs can be said to be the preserve of small size financial institutions as large size banks would prefer doing business with well-established clients, a strategy that reduces information asymmetry problems and tackles moral hazard challenges in the lending business. The credit union, being concentrated by way of ownership, clientele base and localized depository financial institution, naturally has an incentive to provide credit facility to owners of small size business who are members of the credit union. The credit union's ownership–clientele nexus makes its lending business akin to the relationship lending type than the transaction lending one.

2.4 Macroeconomic Factors

In macroeconomic considerations of financial institutions' lending, various hypotheses exist that assess how monetary policy impacts on bank lending. The interest-rate channel proposition argues that a tight monetary policy will lead to an increase in short-term nominal interest rate which would in the short term lead to an increase in real interest rate. The conventional interest-rate channel stresses the direct impact of interest rates on loan demand. Per Gambacorta (2005), monetary tightening leads to larger reductions in loan supply for small banks.

The bank lending channel holds the view that, when banks are presented with a funding shock in the case of monetary tightening, banks may fall on liquid funds to make up for the short fall in loanable funds; if not, the supply of bank loans may be reduced. Subscribing to the bank lending channel, Bernanke and Blinder (1988) contend that monetary policy actions affect the balance sheet structure of banks, causing changes in banks' loan supply in addition to causing changes in loan demand. In situations of reduced loan supply by banks, small and medium scale businesses tend to suffer the most (Kashyap & Stein,

DOI: 10.1002/jid

1994). Arguing in support of the theory of bank lending channel, Diaz and Olivero (2010) claim that in contractionary monetary policy, banks reserves decrease a situation that directly limits banks capacity to create more loans as loanable funds on the market shrinks.

Bernanke and Gertler (1995) premise their work on the balance sheet channel that suggests that businesses with lower levels of equity would aggressively pursue a bank for loans, heightening the adverse selection and moral hazard phenomenon. Aware of this, banks cut back lending to low equity finance firms. On the other hand, if the equity stake in the business firm is high, then the adverse selection and moral hazard problem is reduced and the bank may be prepared to increase its lending to this firm.

Pruteanu-Podpiera (2007) observes that changes in monetary policy in the Czech Republic altered the growth rate of loans, with considerably stronger enormity in the period 1999–2001 than in the period 1996–1998. Furthermore, cross-sectional differences that exist in the lending reactions to monetary policy shocks could be attributed to the degree of bank capitalization and to liquidity. Italian financial intermediaries according to Quagliariello (2007) expand their lending activity that invariably affects their loan loss provision and new bad debts as a result of business cycle evolution. Orlowski (2015) holds the view that expansionary monetary policy pursued by the US Federal Reserve has neutralize the credit channel of policy transmission and further adds that an increase in the monetary base associates positively excess reserves, increase in security investments and results in a reduction of bank credit. From a study on 12 European countries, Fungáčová, Solanko, and Weill (2013) opine that the effect on monetary policy on loan supply hinges on the nature of competition in the banking industry and lending decision of banks that command high market power is less affected by monetary policy decisions. This condition is opposite to the case of banks with less market power. From these, it is clear that monetary policy does influence financial institutions lending decision.

2.5 Other Factors

In terms of industry effect, Cecchetti (1999) orates that the strength and the degree of the supply of bank loans also can depend on the size and the concentration of the banking system. Smirlock (1985) finds a positive relationship between size and bank supply of loan, implying that banks with larger asset size give out more loans compared with small-sized banks. On the other hand, Vihriälä (1997) finds that the lower the degree of capitalization of a bank, the more expansionary the supply of loans. For Ehrmann et al. (2003), there is no association between bank size of European banks and supply of loan and also offer the view that competition is the conduit for monetary policy to affect bank lending. They also claim that the transmission of monetary policy is through the bank lending channel that is less pronounced for banks with extensive market power. Petersen and Rajan (1995) do not make a compelling case for competition on bank relationship lending. Faleye and Krishnan (2015) study the effect of bank governance on risk-taking in commercial lending and find that banks with more effective boards are less likely to lend to risky borrowers.

According to Guo and Stepanyan (2011), domestic and foreign funding contributes positively and symmetrically to credit growth. They further contribute to the empirical literature that stronger economic growth leads to higher credit growth, and high inflation and that expansionary monetary conditions result in more credit, and more so a sound banking sector is significant in the credit growth for banks. In the case of the factors that

DOI: 10.1002/jid

accounts for bank credit to businesses in Pakistan, Imran and Nishat (2013) conclude in the long run that foreign liabilities, domestic deposits, economic growth, exchange rate and the monetary conditions are significantly associated with bank credit to the private sector whereas in the short run, domestic deposit does not influence private credit. In assessing the determinants of domestic credit, Gozgor (2014) argues that loose monetary policy, differences between domestic and global lending rates, and trade openness impact on bank credit, whiles external balance and perceptions of global tail risk negatively affect domestic credit levels. In the evidence by Olusanya, Oyebo, and Ohadebure (2012) in Nigeria, factors such as foreign exchange rate, investment portfolio, deposits and liquidity ratio positively impact commercial bank lending volumes, whiles lending interest rate and minimum cash reserve ratio exhibit a negative relation with commercial bank lending volume. Evidence from the Pacific Island region, according to Sharma and Gounder (2012), is that deposit, asset size of banks and economic growth contribute positively to credit growth, and also, rising average lending and inflation rate does not encourage bank credit extension in Fiji, Papua New Guinea, Solomon Islands, Vanuta, Samao and Tonga.

From Amidu (2014), the structure of banking markets influences credit delivery in South Saharan Africa stressing that in an environment where the financial sector is reformed and banks allowed to operate freely, there exist a link between bank credit and the financial strength of the banks. The overall results from Amidu suggest that regulatory initiative restricts banking activities, imposes severe entry requirements and requires high regulatory capital that influences banks' decisions to supply loans. Using generalized methods of moments, Boadi (2016) reveals that huge board size and foreign banks have the propensity to extend more credit to small and medium enterprise; on the other hand, high inflation period and profitable banks shy away from providing credit to the small and medium enterprise in Ghana. In an autoregressive distributed lag framework, Baoko, Acheampong and Ibrahim (2017) posit that the important factors that count in bank credit to the private sector in Ghana are broad money supply, bank assets, real lending rate and bank deposits in both the short and long run. They also remark that increase in inflation influences credit to the private sector in the short run.

Abedifar, Molyneux, and Amine (2018) provide three reasons why banks pursuit of non-interest income can be beneficial in bank lending business. The first is the access to private information on potential borrowers when bank engages in diversification activities aside loan extension. This information from the non-loan relation can then be used by the bank to manage its lending decision when these clients decide to assess loans from the bank. Secondly, by engaging in non-loan activities, banks can enhance its franchise value and deploy prudential lending strategy potentially from information, relationship and reputational factors from non-loan activities. Thirdly, income from non-loan activities can be used by banks to subsidized loan rates offered borrowers, the expectation is that this would then translate into increased loan business for the bank.

3 METHODOLOGY AND DATA

3.1 Sample and Data Source

Sample data for this work are sourced from the individual annual report of 66 credit unions in Ghana operating under the Credit Unions Association (CUA) of Ghana. The period for the study is from the year 2008 to the year 2014. We started our data search on all credit unions in Ghana. However, this was not successful because of data unavailability for some credit unions, and we had to leave out these credit unions from our data collection. After detailed examination of the available data at CUA, we settled on annual reports data for 66 credit unions for a 7-year period resulting in a balance data set of 462. The distribution of the 66 credit unions does not significantly bias the conclusions as the data sample covers all the 11 regional chapters making up the CUA Ghana. The panel data set used permits us to control for variables like differences in business practices across the sampled credit unions that account for firm specific heterogeneity. Financial development indicators is sourced from Global Finance Development database, the treasury bill rate is from the Bank of Ghana and GDP growth rate is from the world development indicators.

In modelling the loan business of credit unions, we express loan granted as a function of internal and external determinants. The internal determinants are discretional factors that management of the credit union can control; in this study, it is composed of the pecuniary items derived from credit union annual reports (the income statement and statement of financial position) that we term credit union specific determinants of loans. The external determinants are non-discretional variables that the manager of the credit union must adapt to because, as documented in the literature, these factors tend to relate to the lending business of financial institutions and reflect the industry and economic environment that affects the operation and performance of financial institutions. We also reiterate that the choice of credit union specific and financial development variables employed in our empirical model is heavily influence by the theoretical works of Smith (1984 and 1988) and Rubin et al. (2013).

Credit union lending in this study is loan to total asset ratio. Loans are created from excess reserves of the credit union. Further, the excess reserves are decomposed into loan and non-loan portfolios, namely, financial investments and non-interest earning income generating activities. It is obvious from the composition of excess funds that an indirect relationship exists between loan portfolio and non-loan portfolio as an increase in loan extended during a period would mean less funds available for non-loan activities (assuming that there is a no change in funds mobilized from depositors and there exists a constant demand for loans and constant demand for funds for non-loan activities).

We follow the diversification measure of Mercieca, Schaeck, and Wolfe (2007) by constructing a Herfindahl Hirschman index (HHI) measures for each credit union to account for income diversification from non-loan income activities. We construct three measures of index, in the first instance, we construct income diversification measure within the non-interest income category as:

$$HHI_{(NII)} = \left(\frac{ENT}{NII}\right)^2 + \left(\frac{COM}{NII}\right)^2 + \left(\frac{OTI}{NII}\right)^2 \tag{1}$$

The motive for estimating Equation (1) is to capture the extent of diversification income within non-interest income category for the sampled credit unions to know the extent spread within this income group. Where $HHI_{(NII)}$ is a measure for non-interest income diversification, *NII* is non-interest income. From Equation (1), *ENT* is income from entrance fee, *COM* is revenue arising from commission income and *OTI* is other non-interest income. From the aforementioned, higher values mean less diversification within the non-interest income activities and lower values mean more diversification among the non-interest income generating activities.

DOI: 10.1002/jid

Secondly, we construct the combined non-loan income diversification index that measures the income generated from all non-loan income activities (both interest income from liquid financial investment and non-interest income from non-interest earning activities) of the credit union given as:

$$HHI_{(COMB)} = \left(\frac{LFI}{TNLNI}\right)^2 + \left(\frac{OFI}{TNLNI}\right)^2 + \left(\frac{ENT}{TNLNI}\right)^2 + \left(\frac{COM}{TNLNI}\right)^2 + \left(\frac{OTI}{TNLNI}\right)^2 \tag{2}$$

In Equation (2), $HHI_{(COMB)}$ diversification index for combined non-loan income for the credit union is an attempt to account for credit union income diversification within non-loan income activities. *LFI* is liquid financial income, *OFI* is other liquid financial income and *TNLNI* is total non-loan income. An increasing $HHI_{(COMB)}$ means the credit union is concentrating on one type of non-loan income and less of diversifying income from the other non-loan income generating activity. The reason for estimating Equation (2) is to capture the extent of diversification income within non-loan income category for the sampled credit unions to know the extent spread in this income group.

Finally, the study endeavours to capture liquid financial investment, $HHI_{(LFI)}$. This measure accounts for diversification within credit union liquid financial investment for each credit union. Liquid financial investment is used as a proxy for income generated from financial investment as the breakdown of liquid financial income could not be gleaned from the financial statements; a composite sum was, however, presented in the account of the credit union. A breakdown of income generated from liquid financial investment would have been much preferred. Nonetheless, the liquid financial investment suffices as a good proxy for income from liquid financial investment. The proxy is computed as:

$$HHI_{(LFI)} = \left(\frac{BANK}{LIQUID\quad INVEST}\right)^2 + \left(\frac{CUACCF}{LIQUID\quad INVEST}\right)^2 + \left(\frac{T.BILL}{LIQUID\quad INVEST}\right)^2 + \left(\frac{OFININVEST}{LIQUID\quad INVEST}\right)^2 \tag{3}$$

The motivation for estimating Equation (3) is to capture the extent of diversification within the liquid financial investment activity of the credit union non-loan income generating activities. In Equation (3), $HHI_{(LFI)}$ is a diversification measure from liquid financial investment and *BANK* is investment in banks that earns interest, *CUACCF* interest earning savings in CUA central savings facility, *T. BILL* is treasury bill investment and *OFINVEST* is other type of financial investment that earns interest in other financial institutions besides banks. *LIQUID INVEST* is total liquid investment by the credit union for a year. An increasing $HHI_{(LFI)}$ means the credit union is concentrating on one type of financial investment and less of diversifying income from other liquid financial investment available on the financial market.

3.2 Econometric Estimation

We estimate the fixed effects model as specified in Equation (4) because some credit union specific variables may influence the predictor variables and we need to control for this. The

DOI: 10.1002/jid

Hausman test we performed also recommends the fixed effect model. We acknowledge the fact that in estimating fixed effects model, we cannot explore time invariant because of credit unions' loan to assets ratio. The panel empirical model we specify in the general form is

$$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it} \tag{4}$$

From Equation (4), Y_{it} is the dependent variable (credit union lending) i is the credit union and t is time. The variable X_{it} is the independent variable, β_1 is the coefficient for that independent variable. The variable u_{it} is the error term. For econometric estimation reasons, we estimate the fixed effect model specified in Equation (3) as:

$$LNLOTA_{i,t} = \alpha_1 + \sum_{j=1}^{k} \beta_j CUSV_{it} + \sum_{k=1}^{2} \delta_k FDI_t + \sum_{k=1}^{2} \lambda_k MACR_t + \ \mu_{it} \tag{5}$$

From Equation (5), $LNLOTA_{i,\ t}$ is the natural log of credit union loan to assets ratio, we use the natural log of loan to assets because it helps in overcoming the problem of outliers, α is a constant, $CUSV_{it}$ is a vector of credit union firm specific variables including, size, return on equity, loan loss to total loan, net worth to total assets, net interest expense to total assets, diversification (non-interest income, liquid financial investment and combined non-loan income) Zscore that measures the solvency level of the credit union, age of the credit union and lending rate a measure of rate charge on loans extended by the credit union. FDI_t is a vector of financial development indicator variables, namely, top 5 bank asset concentration, a measure of banking sector competition and bank overhead cost to total asset, an indicator for banking sector efficiency. $MACR_t$ is a set of macroeconomic variables including the 1-year treasury bill rate, a measure of riskless investment available on the Ghanaian market and a proxy for monetary policy decision by the central bank. *GDPG* annual gross domestic product measured in growth, GDPG measures size of economic growth. ε_{it} is the stochastic error term. The variables used in this study are presented in Table 2.

From Table 3, we show that the average loan to assets in the credit union is 54.74 per cent, with the highest level of 96.81 per cent recorded for the sample study period. The natural log of loan to total assets ranges between a minimum of 0.1620 and a maximum of 1.9859. The size of the credit of the credit union of the period 2008 to 2014 recorded a standard deviation of 0.5933, with an average size of 5.8315. During this same period, the least recorded return on equity was −27.8708 and a maximum return on equity of 30.7127. The total variation in loan loss to total loan was 5.3311 per cent. The net worth to total assets hovered between 0.5496 and 1 for the period 2008 to 2014.

The net-interest expense to total assets has a mean value of 8.4310. The range of values for diversification income measured by $HHI_{(COMB)}$ ranges between 0.2254 and 0.9954 indicating that during the period under study, some credit unions concentrated on some non-loan income activities as inferred from the high diversification index value. Diversification within non-interest income $HHI_{(NII)}$ group records an average of 70.5 per cent with a variability of 21.58 per cent with the evidence of 100 per cent implying that some credit unions during the period under review concentrated on only one source of income with the non-interest income earning activity. In the liquid financial investment $HHI_{(LFI)}$ category, the mean score is 59.13 per cent, with range of scores between 25.71 and 100 per cent; the standard deviation is 20.42 per cent. Other credit unions also spread funds across non-loan activities, a conclusion drawn from the extremely low

DOI: 10.1002/jid

Table 2. Variable description in the loan to assets model

Variables	Description	Source
LNLOTA	Natural log loan to total assets (%)	CUA
SIZE	Natural log of total assets	CUA
SIZE SQUARE	Square of natural log of total assets	
ROE	Net income scaled by total equity (%)	CUA
LLPLN	Loan loss to loans (%)	CUA
NWTA	Total assets less liabilities/total assets (%)	CUA
NIETA	Net interest expense to total assets (%)	CUA
$HHI_{(NII)}$	Hifindal Hirschman diversification measure for non-interest income	AE
$HHI_{(COMB)}$	Hifindal Hirschman diversification measure for combined non-loan income	AE
$HHI_{(LFI)}$	Hifindal Hirschman diversification measure for liquid financial investment	AE
ZSCORE	Insolvency risk; σROA is the standard deviation of ROA for credit union.	CUA
AGE	Number of years credit union has been operational	CUA
LENDRATE	Interest rate charge on member loans	CUA
BACN	Bank asset concentration for top 5 banks (%)	GFDD
BOCTA	Bank overhead cost to total assets	GFDD
TBILL	1-year treasury bill rate (%)	BoG
GPDGROWTH	Gross domestic product (%)	WDI

CUA is Credit Union Association Ghana; AE, authors estimate; GFDD, Global Finance Development Database; BoG is Bank of Ghana; WDI, Work Development Indicators.

Table 3. Descriptive statistics on the loan to assets model

Variable	Mean	Std. Dev.	Min	Max
LOTA	54.7368	15.0991	0.0000	96.8126
LNLOTA	1.7149	0.1677	0.1620	1.9859
SIZE	5.8315	0.5933	3.8891	7.5441
SIZESQUARE	34.3580	6.9207	15.1253	56.9130
ROE	3.3475	4.8208	(27.8708)	30.7127
LLPLN	2.9136	5.3311	0.0000	59.0278
NWTA	94.3705	5.3158	54.9623	100.0000
NNIETA	8.4310	4.7808	0.3810	39.7088
$HHI_{(NII)}$	0.7051	0.2158	0.0000	1.0000
$HHI_{(COMB)}$	0.6062	0.1982	0.2254	0.9954
$HHI_{(LFI)}$	0.5913	0.2042	0.2571	1.0000
ZSCORE	50.1611	38.6848	2.1966	263.7780
AGE	16.7403	10.5950	1.0000	45.0000
LENDRATE	20.9902	8.0873	0.0000	52.9465
BACN5	63.4629	10.5217	55.7100	87.3200
BOCTA	6.9400	1.0746	4.7800	8.0300
T.BILL	18.8643	4.5189	11.3000	22.9000
GDPGROWTH	8.0760	3.0751	3.9859	14.0460

diversification of 0.2254. The average solvency captured by the Zscore is 50.1611 implying that most credit unions were fairly solvent during this period. The average interest rate charged on loans by the credit unions is 20.9902 per cent with 52.9465 per cent being the highest rate charged. Top 5 bank asset concentration over the period is 63.4629 implying a non-competitive banking sector in Ghana. Bank over cost to total assets ranges between 4.7800 and 8.0300. The average rate is 18.8643 and 8.0760 for treasury bill and GDP growth, respectively.

4 RESULTS AND DISCUSSION

In all the models estimated in Table 4, size of the credit union is significant and positively associates with the loan to asset ratio of the credit union; in model 1, loan to assets is considered purely with management discretional variables. Under these conditions, the intuitive and logical inference is that the larger the credit union, the more loans it tends to give out. As Smirlock (1985) suggests, credit unions with more substantial total assets tend to grant more loans probably to justify the increase in resources.

Previous years' returns on equity also positively associated with lending in credit unions, a result that is not particularly surprising as loan income makes up about 73 per cent of credit unions' income. This relation is consistent in all four fixed effect models estimated. Loan loss provision has a significant negative association to credit union loans, implying that increases in bad loans tend to reduce the loan granted by the credit union; this relationship is true in the entire fixed effect model in Table 4. The quality management measured by NIETA positively associates with credit union loans; high quality management influences the level of loans that a credit union can create out of deposits. Meanwhile, an increase in the net worth of the credit union negatively affects its loans business. In other words, the more solvent a credit union is, the less likely it is to give out loans and this relationship is highly significant in Table 4 in all four models estimated.

Attempts by managers of credit unions to add on to their loan income by diversifying into non-loan income activities reduce their lending business as presented in all models of Table 4. This is to be expected because, with the limited pool of funds available to credit unions, any attempt to pursue non-loan income activities would lead to reduction in funds available for lending purposes. Management is therefore advised to be cautious in their pursuit of non-loan income due to its risk and competition with funds for loan business.

An increase in credit union lending rates has the ability to reduce the size of loan granted to borrowers of the credit union. For instance, a 1 per cent increase in lending rate would decrease the size of loans by 0.0044, 0.0045, 0.0044 and 0.0049 per cent in all four models, respectively, in Table 4. One reason for this correlation is that if credit union managers decide to increase lending rates, they stand a high chance of losing loan business to other competing financial institutions such as the commercial banks (Rubin et al., 2013; Smith, 1984).

With the introduction of non-discretional variables such as financial development variables into our model, the coefficient of size is positive and significant statistically. Top 5 bank asset concentration positively influences credit union loans although not significant. The inference here is that as the banking sector gets dominated by a few banks, the banking industry becomes non-competitive, credit unions tend to make more loans, probably because these banks would be charging high rates on loans thereby unintentionally directing loan business to credit unions, a conclusion that agrees with that of Emmons and Schmid (2000), Feinberg (2001) and Ely and Robinson (2009).

Efficiency of the banking sector measures by bank over cost to total assets also displays a positive but not significant association with credit unions' loan business, implying that an inefficient banking industry would probably result in charging high interest on loans, giving credit unions the opportunity to grant more loans. Drawing a similar conclusion, Feinberg (2001) contends that increased credit union activities in a particular market have the ability discipline banks in the exercise of their market power. An increasing overhead

DOI: 10.1002/jid

Table 4. Fixed effects estimation combined non-loan income

Variables	(1)	(2)	(3)	(4)
SIZE	0.0637* (1.8314)	0.0894** (2.1150)	0.1198*** (2.6468)	1.2191*** (4.5771)
SIZESQUARE				−0.0920*** (−4.1853)
L.ROE	0.0052*** (3.3735)	0.0050*** (3.2180)	0.0055*** (3.4679)	0.0046*** (2.9366)
LLPLN	−0.0099*** (−5.0176)	−0.0101*** (−4.9965)	−0.0106*** (−5.1861)	−0.0102*** (−5.0761)
NNIETA	0.0187*** (5.6315)	0.0196*** (5.6816)	0.0209*** (5.8944)	0.0200*** (5.7696)
NWTA	−0.0090*** (−3.8419)	−0.0090*** (−3.8657)	−0.0091*** (−3.9080)	−0.0089*** (−3.9113)
$HHI_{(COMB)}$	−0.1109** (−2.2285)	−0.1162** (−2.2797)	−0.1194** (−2.3048)	−0.1143** (−2.2620)
ZSCORE	0.0104*** (3.6112)	0.0106*** (3.6711)	0.0111*** (3.8388)	0.0111*** (3.9109)
AGE	−0.0110** (−2.4305)	−0.0079 (−1.4191)	−0.0031 (−0.5091)	−0.0025 (−0.4294)
LEND RATE	−0.0044*** (−3.5880)	−0.0045*** (−3.6442)	−0.0044*** (−3.5629)	−0.0049*** (−4.0651)
BACN5		0.0009 (0.9387)	0.0034 (1.5819)	0.0039* (1.8402)
BOCTA		0.0190 (1.0931)	0.0674** (2.0144)	0.0726** (2.2224)
T.BILL			0.0065* (1.6744)	0.0068* (1.8082)
GDPGROWTH			0.0047 (0.9042)	0.0047 (0.9170)
Constant	1.8682*** (8.7121)	1.4718*** (3.4845)	0.5370 (0.7548)	−2.7957*** (−2.6473)
Observations	396	396	396	396
R-squared	0.1797	0.1828	0.1936	0.2360
Hausman chi	86.89	73.24	75.98	73.01
p-value	0.0000	0.0000	0.0000	0.0000
Model	FE	FE	FE	FE
Credit Union	66	66	66	66

z-statistics in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

cost of banks would mean the credit unions would have to prepare to meet increase in loan demand.

Further, in model 3 of Table 4, we add macroeconomic variables to our model and note that the efficiency level of the banking sector becomes statistically significant, again suggesting that an inefficient banking sector promotes credit union loan business. The 1-year treasury bill rate, which is a proxy for monetary policy, displays a positive relation with credit union loans; an increase in the 1-year treasury bill rate tends to directly impact credit unions' loan business, a result that is not surprising as the proposition here is that an increasing treasury bill rate during a contractionary monetary policy implies increasing interest rate on the market. This relationship is significant in model 4 of Table 4. The member borrowers in such an environment would prefer to borrow from the credit union that would extend loans at relatively low rate compared with other financial institutions on the market. This comparatively low loan rate would spur on the loan business of the credit union. Growth in the economy does not significantly translate into increased loan business for the credit union as presented in model 3 of Table 4. This might be due to the restrictive market place for the credit union as it conducts business only with its members although non-loan activities provide conduit to circumvent the restrictive member market that can be exploited by the credit union, a point that needs further investigation.

In model 4 of Table 4, we verified the nature of relationship that exists as credit union grows bigger in size hence makes more loans. Our evidence is that there exist a non-linear relationship of size in the credit union loan business and the result shows a negative coefficient. The non-linearity relationship is confirmed, the deduction is that the size of the credit union positively influences loan business up to a point, after which any increase in size negatively associates with the loan business of the credit union. The managerial implication is that growing the size of the credit union is important; however, the managers must tread cautiously so as not to experience any diseconomies of scale arising from the increase in their loan business.

In Table 5, we find evidence to support the nature of relationship between credit union loan and non-interest income. The fact from our results is that the pursuit of non-interest income $HHI_{(NII)}$ by credit unions leads to a decrease in loans granted although is relation is not statistically significant. The negative coefficient signifies that loan and non-interest income activities are substitutes when it comes to deploying credit union financial resources. The other variables have similar conclusion as discussed in the results for Table 4. We again assess the relationship between liquidity financial investments $HHI_{(LFI)}$ on lending in our model; we find from Table 6 that liquidity financial investment is negative and statistically significant in credit union lending relationship. In all four models estimated, investment in liquidity financial investment impacts negatively on credit union lending. This negative relationship between lending and non-loan income and income activities confirms the substitutability hypothesis that pursing non-loan income activities limits credit union ability to grant loan. Non-loan income therefore can be pursued for diversification purpose as the extant financial institution literature suggest. This relationship fits into the three reasons posited by Abedifar et al. (2018) for the pursuit of non-interest income by deposit taking financial institutions. Finally, the R-squares from our regression estimates are within, these small R-square are small but not strange in panel model estimation compared with time-series estimation. Further, as we seek to explain how discretional and non-discretional factors associate with credit union lending and not a predictive model, a low R-square within is acceptable.

DOI: 10.1002/jid

Table 5. Fixed effects non-interest income

Variables	(1)	(2)	(3)	(4)
SIZE	0.0626* (1.7769)	0.0883** (2.0740)	0.1200*** (2.6317)	1.2115*** (4.4905)
SIZESQUARE				−0.0912*** (−4.1019)
L.ROE	0.0052*** (3.3403)	0.0050*** (3.1866)	0.0054*** (3.3735)	0.0046*** (2.8915)
LLPLN	−0.0105*** (−5.3386)	−0.0108*** (−5.3833)	−0.0114*** (−5.6232)	−0.0109*** (−5.5055)
NNIETA	0.0199*** (6.0268)	0.0209*** (6.0858)	0.0223*** (6.3446)	0.0213*** (6.1948)
NWTA	−0.0091*** (−3.8883)	−0.0092*** (−3.9155)	−0.0094*** (−3.9756)	−0.0091*** (−3.9592)
$HHI_{(NII)}$	−0.0512 (−1.2742)	−0.0551 (−1.3534)	−0.0512 (−1.2590)	−0.0345 (−0.8635)
ZSCORE	0.0109*** (3.7556)	0.0111*** (3.8189)	0.0117*** (4.0016)	0.0115*** (4.0481)
AGE	−0.0125*** (−2.7678)	−0.0091 (−1.6426)	−0.0043 (−0.6992)	−0.0036 (−0.6120)
LENDRATE	−0.0042*** (−3.4543)	−0.0043*** (−3.4889)	−0.0042*** (−3.4004)	−0.0047*** (−3.8706)
BACN5		0.0007 (0.7396)	0.0036* (1.6817)	0.0041* (1.9304)
BOCTA		0.0186 (1.0633)	0.0705** (2.0945)	0.0754** (2.2952)
T.BILL			0.0070* (1.7973)	0.0074* (1.9486)
GDPGROWTH			0.0062 (1.2057)	0.0062 (1.2364)
Constant	1.8485*** (8.4076)	1.4608*** (3.4387)	0.4419 (0.6187)	−2.8804*** (−2.6955)
Observations	396	396	396	396
R-squared	0.1712	0.1742	0.1842	0.2254
Hausman chi	122.34	92.50	96.72	83.86
p-value	0.0000	0.0000	0.0000	0.0000
Model	FE	FE	FE	FE
Credit Union	66	66	66	66

z-statistics in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

Table 6. Fixed effects liquid financial investment

Variables	(1)	(2)	(3)	(4)
SIZE	0.0731** (2.1086)	0.0990** (2.3418)	0.1290*** (2.8548)	1.1889*** (4.4450)
SIZESQUARE				−0.0888*** (−4.0177)
L.ROE	0.0051*** (3.3063)	0.0049*** (3.1648)	0.0053*** (3.3362)	0.0045*** (2.8481)
LLPLN	−0.0100*** (−5.1178)	−0.0103*** (−5.1776)	−0.0110*** (−5.4141)	−0.0106*** (−5.3255)
NNIETA	0.0196*** (5.9668)	0.0206*** (6.0340)	0.0219*** (6.2818)	0.0210*** (6.1539)
NWTA	−0.0092*** (−3.9637)	−0.0093*** (−3.9889)	−0.0095*** (−4.0464)	−0.0092*** (−4.0316)
$HHI_{(LFI)}$	−0.1158** (−2.5264)	−0.1180** (−2.5668)	−0.1130** (−2.4591)	−0.0959** (−2.1266)
ZSCORE	0.0115*** (3.9801)	0.0117*** (4.0414)	0.0122*** (4.2100)	0.0120*** (4.2379)
AGE	−0.0120*** (−2.6699)	−0.0085 (−1.5421)	−0.0039 (−0.6370)	−0.0033 (−0.5628)
LEND RATE	−0.0044*** (−3.5689)	−0.0044*** (−3.5939)	−0.0043*** (−3.5068)	−0.0048*** (−3.9707)
BACN5		0.0006 (0.6654)	0.0035 (1.6179)	0.0039* (1.8717)
BOCTA		0.0182 (1.0510)	0.0683** (2.0441)	0.0735** (2.2485)
T.BILL			0.0068* (1.7478)	0.0071* (1.8898)
GDPGROWTH			0.0061 (1.1863)	0.0060 (1.2054)
Constant	1.7930*** (8.5568)	1.4088*** (3.3449)	0.4277 (0.6047)	−2.7900*** (−2.6376)
Observations	396	396	396	396
R-squared	0.1832	0.1862	0.1955	0.2346
Hausman chi	101.89	85.46	89.22	82.35
p-value	0.0000	0.0000	0.0000	0.0000
Model	FE	FE	FE	FE
Credit Union	66	66	66	66

z-statistics in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

5 CONCLUSION AND POLICY RECOMMENDATIONS

Loan creations would continue to play a significant role in credit unions' existence, because one of the main reasons for establishing credit union is to offer loans at comparable and competitive rates on the financial market. In this paper, we have provided evidence that internal pecuniary factors that affect credit union lending include size of the credit union, the lag of return on equity, loan loss, quality of management, net worth to assets, diversification activities, non-loan income, solvency and lending rates. Externally, banking activities of top 5 banks, banking sector overhead cost and contractionary monetary policy open market operation proxy by 1-year treasury bill rate impact credit union lending. Again, we provide evidence that the pursuit of non-loan activities or non-loan income affects credit union lending negatively. Financial development indicators like banking sector concentration and bank over cost associate positively with credit union lending.

The managerial implication is that loan loss management should be a prime issue to be considered by the managers of the credit union although the consignor effect can be relied on to manage loan granted. Managers of credit unions would have to be cautious of increasing lending rates to member borrowers as it can drive loan business away from the union to other competing financial institutions such as the banks. Expense management and efficiency would also have to be a major concern of the managers of credit unions, as they cannot pass on inefficiency onto the member borrower by charging higher rates on loans or paying lower deposit rates for the member saver or paying lower dividends on shares. This condition if it persists would in the long run take away business from the credit union and destroy the very reason for its establishment. Further increasing loan portfolio should be done tactfully by managers of the credit union so as not to experience any diseconomies of scale from the loan business.

Finally, we propose that the central bank monetary policy committee looks beyond banks in assessing their desired effect of monetary policy, especially open market operations. This is because liquid financial investment activities of credit unions are propelled by treasury bill rate, which affect lending in credit unions.

REFERENCES

Abedifar P, Molyneux P, Amine T. 2018. Non-interest Income and Bank Lending. *Journal of Banking and Finance* **87**: 411–426.

Adusei M. 2013. Determinants of Credit Union Savings in Ghana. *Journal of International Development* **25**(1): 22–30.

Amidu M. 2014. What Influences Banks Lending in Sub-Saharan Africa? *Journal of Emerging Market Finance* **13**(1): 1–42.

Baoko G, Acheampong IA, Ibrahim M. 2017. Determinants of bank credit in Ghana: A bounds-testing cointegration approach. *African Review of Economics and Finance* **9**(1): 33–61.

Berger AN, Miller NH, Petersen MA, Rajan RG, Stein JC. 2005. Does Function Follow Organizational Form? Evidence from the Lending Practices of Large and Small Banks. *Journal of Financial Economics* **76**(2): 237–269.

Berger AN, Udell GF. 2002. Small Business Credit Availability and Relationship Lending: The Importance of Bank Organisational Structure. *The Economic Journal* **112**(477): F32–F53.

Berger AN, Udell GF. 2006. A More Complete Conceptual Framework for SMEs Finance. *Journal of Banking and Finance* **30**: 2945–2966.

DOI: 10.1002/jid

Bernanke BS, Blinder A. 1988. Credit, Money and Aggregate Demand. *American Economic Review, Papers and Proceedings.* **78**(1): 435–439.

Bernanke BS, Gertler M. 1995. Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives* **9**: 27–48.

Boadi I. 2016. Determinants of Ghanaian Banks' Credit to the "Missing Middle": A Supply Side Approach. *International Journal of Bank Marketing* **34**(6): 924–939.

Boateng A, Abdulrahman MD. 2013. Micro Small-sized Enterprises and Bank Credit Evidence from West Africa. *Journal of Emerging Market Finance* **12**(2): 129–150.

Bolton P, Freixas X, Gambacorta L, Mistrulli PE. 2016. Relationship and transaction lending in a crisis. *The Review of Financial Studies* **29**(10): 2643–2676.

Bolton P, Scharfstein DS. 1996. Optimal Debt Structure and the Number of Creditors. *Journal of Political Economy* **104**(1): 1–25.

Boot AW, Thakor AV. 1994. Moral Hazard and Secured Lending in an Infinitely Repeated Credit Market Game. *International Economic Review* **35**: 899–920.

Cecchetti SG. 1999. Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism. *Economic Policy Review* **5**(2): 9–28.

Diaz RA, Olivero MP. 2010. On the Firm Level Implications of the Bank Lending Channel of Monetary Policy. *Journal of Economic Dynamics & Control* **34**: 2038–2055.

Ehrmann M, Gambacorta L, Martinez-Pagés J, Sevestre P, Worms A. 2003. The Effects of Monetary Policy in the Euro Area. *Oxford Review of Economic Policy* **19**(1): 58–72.

Ely DP, Robinson KJ. 2009. Credit Unions and Small Business Lending. *Journal of Financial Services Research* **35**(1): 53–80.

Emmons WR, Schmid FA. 2000. Bank Competition and Concentration: Do Credit Unions Matter? *Federal Reserve Bank of St. Louis Review*, (May) 29–42.

Faleye O, Krishnan K. 2015. Risky Lending: Does Bank Corporate Governance Matter?.

Feinberg RM. 2001. The Competitive Role of Credit Unions in Small Local Financial Services Markets. *Review of Economics and Statistics* **83**(3): 560–563.

Fungáčová Z, Solanko L, Weill L. 2013. Does Bank Competition Influence the Lending Channel in the Euro Area?, Bank of Finland Institute for Economies in Transition

Gambacorta L. 2005. Inside the Bank Lending Channel. *European Economic Review* **49**: 1737–1759.

Gozgor G. 2014. Determinants of Domestic Credit Levels in Emerging Markets: The Role of External Factors. *Emerging Markets Review* **18**: 1–18.

Guo K, Stepanyan V. 2011. Determinants of Bank Credit in Emerging Market Economies, IMF Working Paper WP/11/51.

Imran K, Nishat M. 2013. Determinants of Bank Credit in Pakistan: A Supply Side Approach. *Economic Modelling* **35**: 384–390.

Kashyap AK, Stein JC. 1994. Monetary Policy and Bank Lending. In *Monetary Policy*, Mankiw NG (ed). Chicago University Press: Chicago; 221–256.

Katsutoshi S. 2012. Bankruptcies of Small Firms and Lending Relationship. *Journal of Banking & Finance* **36**: 857–870.

Mercieca S, Schaeck K, Wolfe S. 2007. Small European Banks: Benefits from Diversification? *Journal of Banking & Finance* **31**(7): 1975–1998.

Olusanya S, Oyebo A, Ohadebure E. 2012. Determinants of Lending Behavior of Commercial Banks: Evidence Form Nigeria A Cointegration Analysis (1975…2010). *Journal of Humanities and Social Sciences* **5**(5): p71–p80.

Orlowski LT. 2015. Monetary Expansion and Bank Credit: A Lack of Spark. *Journal of Policy Modeling* **37**: 510–520.

DOI: 10.1002/jid

Petersen M, Rajan R. 1995. The Effect of Credit Market Competition on Lending Relationships. *The Quarterly Journal of Economics* **110**: 407–443.

Pruteanu-Podpiera AM. 2007. The Role of Banks in the Czech Monetary Policy Transmission Mechanism. *Economics of Transition* **15**(2): 393–428.

Quagliariello M. 2007. Banks' Riskiness over the Business Cycle: A Panel Analysis on Italian Intermediaries. *Applied Financial Economics* **17**(2): 119–138.

Rajan RG. 1992. Insiders and Outsiders: The Choice between Informed and Arm's-length Debt. *Journal of Finance* **47**: 1367–1400.

Rubin GM, Overstreet GA, Beling P, Rajaratnam K. 2013. A Dynamic Theory of the Credit Union. *Annals of Operations Research* **205**(1): 29–53.

Sayles WW. 2002. Small Business: The New Frontier. Filene Research Institute 1–90.

Sharma P, Gounder N. 2012. Determinants of Bank Credit in Small Open Economic: The Case of Six Pacific Island Countries. *Griffith Business School Discussion Paper* no. 13, pp. 1–18.

Sharpe SA. 1990. Asymmetric Information, Bank Lending and Implicit Contracts: A Stylized Model of Customer Relationships. *Journal of Finance* **45**(4): 1069.1087.

Smith DJ. 1984. A Theoretic Framework of the Analysis of Credit Union Decision Making. *The Journal of Finance* **39**: 1155–1168.

Smith DJ. 1988. Credit Union Rate and Earnings Retention Decisions under Uncertainty and Taxation. *Journal of Money, Credit and Banking* **20**(1): 119–131.

Smirlock M. 1985. Evidence on the (non) relationship between concentration and profitability in banking. *Journal of money, credit and Banking* **17**(1): 69–83.

Stein JC. 2002. Information Production and Capital Allocation: Decentralized vs. Hierarchical Firms. *Journal of Finance* **57**: 1891–1921.

Tokle R, Tokle J. 2016. Credit Union Lending Following the Financial Crisis. *New York Economic Review*, p.30.

Vihriälä V. 1997. *Banks and the Finnish Credit Cycle 1986–1995, Bank of Finland Studies E: 7*. Helsinki: Bank of Finland.

Wilcox JA, Berkely UC. 2011. The Increasing Importance of Credit Unions in Small Business Lending. *Small Business Administration*.

