Approaches of relationship lending in cooperative and investor owned thrifts: Case of the thrifts in the US

Abstract

The object of this paper is to understand whether cooperatives have a different approach to relationship lending, and how this approach can impact the overall financial performance and risk. It focuses on the differences in market strategies and financial performance among different ownership structures of thrifts in the US. We compare the relational approach undertaken by cooperatives to investor-owned savings and loans institutions in the US and how they affect financial performance and risk using a sample of a cross-sectional data of 11280 observations between 1999 and 2014 of 505 cooperatives to 218 investor-owned thrifts. The results show that relationship lending increases the level of performance without increasing the level of risk for cooperatives. The paper also shows that the cooperative structure has a significant impact on the relational strategies. The cooperative structure has a direct and incremental impact on the insolvency risk and the variance of performance rather than the strategies adopted. The results suggest that risk aversion is part of the DNA of cooperatives.

Keywords: Thrifts, Cooperatives, Relational Banking, US Financial Institutions, Performance, Market Segments.

1- <u>Introduction</u>

Financial institutions in the US economy are a pillar of the economic stability not only in their country but also for the global economy as shown by the late financial crisis in 2008. Speculation and the disconnection from the real economy and their traditional role as depository and lending institutions were factors in creating the crisis.

The sector of the depository financial institutions is divided into three main categories: Commercial Banks, Thrifts, and Credit Unions. Commercial Banks are investor-owned, Savings and Loans institutions (also known as thrifts) can be mutual, nonprofit or investor-owned and Credit Unions are cooperative institutions. In this paper, we focus on comparing the relationship lending of cooperative or mutual thrifts to investor-owned ones in the US and how they affect financial performance and risk. Cooperative thrifts are created according to Hansmann (1996) are consumer cooperatives established to deal with the reverse problem of asymmetric information of banks towards their customers.

Cooperatives are "autonomous, voluntary associations meeting common economic, social, and cultural needs through jointly owned and democratically controlled enterprises" (International Cooperatives Alliance). The democracy advocated by cooperatives relies on the "one member one vote rule" on opposition to the voting in investor-owned corporations where voting is proportional to the number of shares owned. Therefore, cooperatives are constrained to diffuse ownership that might lead to agency problems that can lead to inefficiencies and deviation from the members 'objectives.

Cooperatives in the financial institution's sector are consumer cooperatives where clients are also members and have the ownership and the right to vote within the firm. Therefore, we expect that they have lower level of asymmetry of information with their clients since they are owners leading to a closer knowledge of their needs and expectations that lead to better performance in their business segments. Nevertheless, cooperatives can be accused of inefficiency since managers do not have a shareholder pressure on performance, because of the diffuse ownership that is engendered by the cooperative form of the enterprise according to the agency theory.

We also study the impact of the ownership structure on their relationship with clients. "Relationship information is often "soft" data, such as the information about character and reliability of the firm's owner, and may be difficult to quantify, verify, and communicate through the normal transmission channels of a banking organization"(Berger & Udell, 2002). This relationship lending approach implies the extraction of soft information from clients

allowing the institution to benefit from informational advantage, leading to better performances and fewer losses on lending activity. Soft information, as opposed to hard information, is difficult to capture and need a long term interaction with the client. In the case of mutual, since the owner is also the client, we expect that the institution can capture a higher level of soft information, therefore, an adapted rate on loans and a lower level of losses on their lending activity.

The paper is structured as follows: section two presents the relevant literature review to cooperatives and relationship banking and their relationship with financial performance and risk leading to hypotheses. Section three describes the data and methods used. Section four shows the results of the multiple regressions, sections fives exposes the creation of relationship lending variable to check the robustness of the results and section six concludes

2- <u>Literature review</u>

Thrifts also known as savings and loans institutions were created to finance exclusively the housing industry in the US. However, this restriction was relaxed in the 80's during the deregulation of the financial institutions in the USA, and they were able to provide a wider range of products. The main differences that characterize them from banks are that they have a statutory lending limit for commercial loans, can receive advances from under certain conditions on real estate and consumer lending. They also can more freely affiliate with securities firms and insurance companies than banks.

According to Hansmann (1996), savings and loan institutions can be nonprofits (MSB), cooperatives (MSLAs) or investor owned (IOSB). The mutual savings banks developed in the nineteenth century to respond to the need of deposit and lending for the poor working class. The investor-owned savings banks got however developed later, at the beginning of the twentieth century. The principal reason for their late development is that they had a lack of regulation, their speculative behavior and they behaved opportunistically towards their clients leading to a lack of depositors 'trust toward these types of institutions. The mutual savings banks were successful during the nineteenth century and reached a peak in 1900. Then they had fierce competition with mutual and savings associations and investor-owned banks.

Mutual and savings loan associations are true cooperatives. They arose in the USA in 1830 at the same time of the mutual building and loan associations in the UK. The purpose of their creation was to provide finance for building homes by the pool of the savings of a group of

people. "While mutual and savings banks arose principally in response to the customers 'lack of information about the action of the bank, the MSLAs arose principally to deal with the reverse problem of asymmetry of information: the banks lack information about their customers" (Hansmann, 1996). Investor-owned savings banks were more speculative entities, and they grew when they became insured by the FDIC. However, they faced big failures during the big depression of the 30s and showed lower levels of efficiency than MSLAs and MSBs. During the deregulation in the 1980s, many MSB and MSLAs converted to investor-owned institutions.

We differentiate in this paper between investor-owned and cooperative thrifts to study their relationship lending strategies and whether these strategies affect financial performance and risk.

It is interesting in this framework to study the relationship lending strategy since we are in the case of consumer cooperatives therefore the owner is the client of the institution. Hence, owners dictate the mission and objectives of the institution: therefore, they have implications on the strategies adopted and the managerial efficiency (Berle & Means, 1932).

Additionally, in the framework of financial institutions, information asymmetries between lender and borrower are a pillar in the financial intermediation literature (Diamond, 1984). According to (Boot, 2000) "the raison d'être of banks may well be their role in mitigating informational asymmetries. Relationship banking aims to resolve problems of asymmetric information." Therefore, we use the definition of relationship banking adopted by (Boot, 2000): "We define relationship banking as the provision of financial services by a financial intermediary that: (i) invests in obtaining customer-specific information, often proprietary in nature; and (ii) evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products." .This relationship allows the banker to collect soft (qualitative) and hard (quantitative) information. To evaluate to what extent considered institutions rely on the relationship created with their customers, we use, at first, the importance of the traditional banking activity. It is based on interest income indicator as used in several research studies, therefore on the traditional banking activity.

On the other hand, banks can pursue two main activities: traditional and deregulated. The traditional activities are lending and saving activities providing interest income and the deregulated activities that provide fee income. Relying on non-interest income might lead to a higher incertitude and, therefore, a higher volatility of returns (DeYoung & Roland, 2001).

Another finding regarding this indicator is that expanding in nontraditional banking activity is slower for well-managed banks, and an increase of this activity is associated with lower risk-return tradeoff (DeYoung & T. Rice, 2004). Relationship lending in traditional activity is higher and more important since it leads to higher ability of extracting soft information from the client. Additionally, extracting soft information from the client allows better identification of bad creditors and therefore, lower levels of non-performing loans.

In the case of cooperatives, since the client is also the member/owner, we expect that cooperatives the relationship lending approach is different for cooperatives as compared to investor owned firms.

The above allows us to have the following hypothesis:

Hypothesis 1: The cooperative ownership structure leads to higher relationship lending investment of the institution.

On another hand, the research on performance and risk of cooperatives is extensive. Rasmusen (1988) compares the efficiency of mutual banks to stock banks and starts from the hypothesis that mutual are less efficient than stock firms since they have high agency problems. They are due to the difficulty of management control for the member of the mutual, and the insurance of deposits reduces the incentive to exercise control. He argues that managers of mutuals are unlikely to minimize the costs of banking services since they do not have any benefits on residual claims.

Hermalin and Wallace (1994) test the efficiency hypothesis and find contradictory results. They find that stock thrifts are less efficient than mutuals on average and are more likely to fail. Similarly, in a study on German banks, Altunbas, Evans, & Molyneux (2001) find that mutual and public banks have efficiency advantages as compared to the private banks. In the EU framework, Iannotta, Nocera, & Sironi, (2007), show lower levels of profitability for mutual and government-owned banks, and they find a better loan quality and lower asset risk for mutual cooperatives. Ayadi, Llewellyn, Schmidt H., Arbak, & De Groen, (2010) show that European cooperative banks do not have any difference in efficiency and performance as compared to shareholder value banks with lower risks.

Finally, Birchall (2013) demonstrates the resilience of financial cooperatives in an economic downturn. We choose to assess performance using financial ratios while for measuring risk, we use the volatility of financial performance, insolvency risks using the z-score.

Another feature of performance can be assessed as the social performance of cooperatives as compared to investor-owned firms. Cooperatives advocate their service to their communities and the benefits they provide to their societies. In the US, commercial and savings banks are subject to such evaluation (Simpson & Kohers, 2002) through the credit Reinvestment Act showing a positive relationship between social and financial performance.

The above arguments allow us to question whether the cooperative structure or the relational banking affect the level of performance and risk of the institution, allowing to address the following hypothesis:

Hypothesis2: The relational banking activity and the ownership structure have a significant impact on financial performance and risk of thrifts.

To sum up, the object of this paper is twofold: (1) to understand if cooperatives have specific relationship lending approaches and (2) and how this approach and structure can impact the overall financial performance and risk.

To test our hypotheses, we examine these relationships using empirical investigation of American thrifts. The data is examined and detailed in the following section.

3- **Empirical Study: Data and univariate results**

We adopt a comparison of 213 Investor Owned thrift and 460 cooperative thrift for 16 years. We obtain data from 11280 observations between 1999 and 2014. We retrieved the data from SNL Financial Database[1]. A brief description of our data is exposed in Table 1.

Table 1: Descriptives of the data

In this table, we describe the data, with Own_Structure as the dummy variable taking a value of 1 in the case of cooperatives and 0 in the investor-owned case. The age shows the age of the firm, number of offices of each institution, the CRA rate is the average rate given during the year observations for the credit reinvestment act that ranges from 1 (bad performance), and 4 (good performance), Total assets for average asset per year-observation, Number of employees is the average number of employees per institution, ROAA is the return on average assets, ROAE the return on the average equity, the z-score indicating insolvency risk, Ln_stdevroaa is the natural logarithm of the standard deviation of the return on average assets for the 16 years observations, average rate on loans in the interest income on loans to total loans and average rate on deposits is the interest expense to total deposits.

Variable	Obs	Mean	Std. Dev.	Min	Max
Own_Structure	11280	0.678014	0.467258	0	1
Age	11086	91.10121	38.11720	1	194
Number of offices	11280	4.940426	5.696525	1	66
CRA rate	11072	3.155395	0.349926	1.4	4
Total Assets	10754	177117.3	167417.1	1314	997957
Number of employees	10754	49.70978	51.92335	1	655
Roaa	11280	0.751975	2.717511	-94.18	65.51
Roae	10646	6.502277	12.53491	-238.53	206.29
Zscore	10754	2.503075	2.153361	-0.821581	17.64274
Ln_stdevroaa	11280	-0.68907	0.922886	-2.809319	3.163003
Average rate on loans	7885	6.990879	2.134985	0	43.75
Average rate on deposits	10407	2.357699	1.486895	0	64.15

We then identify the outliers of the data by excluding the lower 1% and higher 1% quartiles.

We compare the means of each variable studied using univariate tests. The parametric mean comparison test with unequal variances and Welch approximation according to the ownership

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[1] The data was retrieved from the SNL Database in HEC Montréal, during a visiting to the International Center for research on financial cooperatives, Alphonse et Dorimène Desjardins Institute.

structure variable (0 investor-owned; 1 cooperative) and the non-parametric method Wilcoxon rank sum test. Tables 2 to 4 expose the mean comparison tests.

i-   Financial structure of thrifts per ownership structure

Comparing main financial structure ratios and characteristics between cooperatives and investor-owned thrifts, To study the size, we use the classical variable as total assets. We also expose some financial structure ratios such as the loans to deposits ratio, Total deposits to total assets, Total securities to total assets, Total reserves to total assets and the total equity to capital to total assets ratio.

Descriptive statistics in Table 2: Institution Characteristics and financial structure ratio per type of ownership, show us that cooperatives are older than investor-owned firms. It is historically justified since savings and loans associations were mainly created at the end of the nineteenth century in the US to serve the category unable to access to banks. The data shows that Investor-owned thrifts are larger institutions than cooperatives measured by total assets ratio. However, both institutions have same levels of bank liquidity as measured by the loans to deposits ratio, and use of securities and deposits.

Finally, the table shows that cooperatives have higher levels of equity that are in line with their goals and the endowment of profits strategy.

Table 2: Institution Characteristics and financial structure ratio per type of ownership

The table shows the results of the mean comparison tests by a group of cooperatives and investor-owned firms with the T-ratio and the results of the Wilcoxon rank sum test (Mann-Whitney) with the Z ratio with the levels of significance ***p<0.01, **p<0.05 and *p<0.1.

Variable	Group	Obs	Mean	Standard deviation	T ratio		Z ratio	
Age	IO	3 632	63.49	44.75	-46.9	***	-38.07	***
	Coop	7 648	101.83	30.05				
Total Assets ($000)	IO	3 408	199 476.60	171 572.40	9.33	***	12.086	***
	Coop	7 346	166 744.20	164 436.40				
Loans/ Deposits (%)	IO	3 402	80.85	24.11	1.28		2.199	**
	Coop	7 301	80.21	24.3				
Total Deposits /total assets	IO	3 408	0.81	0.12	0.17		0.268	
	Coop	7 346	0.81	0.12				
Total Securities /total assets	IO	3 408	0.21	0.17	-1.15		-2.76	***
	Coop	7 346	0.21	0.16				
Total Equity Capital /total assets	IO	3 408	0.12	0.09	-2.67	***	-5.863	***

	Coop	7 346	0.13	0.09		

ii. Performance and risk of cooperatives to investor-owned firms

Table 3 shows the performance indicators. Financial performance of these institutions was measured using Return on Average Assets Ratio (ROAA%) and Return on Average Equity Ratio (ROAE%). To measure risk, we use the natural logarithm of the standard deviation of returns during the studied period (Goddard, McKillop, & Wilson, 2008) and the z-score (Boyd & Runkle, 1993) as a measure of the insolvency risk. The z-score computation is the following:

$$z_{it} = \frac{K_{it} + \mu_{ROA_i}}{STdevROAi}$$

We also assess the social performance with the Credit Reinvestment Act (CRA) Rate applied to individual banks and not holding banks. The rates given are the following (1) substantial noncompliance, (2) needs to improve, (3) satisfactory and (4) outstanding. Several criteria are used to get the rates that are detailed by Evanoff and Segal (1997) and are mainly related to serving the community's credit needs and the contribution to their community's development with ethical practices.

We also examine asset and loan quality by using the non-performing assets to total assets and non-performing loans to total loans.

Table 3: Performances per ownership structure

The table shows the results of the mean comparison tests by a group of cooperatives and investor-owned firms with the T-ratio and the results of the Wilcoxon rank sum test (Mann-Whitney) with the Z ratio with the levels of significance ***p<0.01, **p<0.05 and *p<0.1.

Variable	Group	Obs	Mean	Standard deviation	T ratio		Z ratio	
ROAA (%)	IO	3,562	0.68	0.93	-2.33	**	2.02	*
	Coop	7,429	0.72	0.8				
ROAE (%)	IO	3,292	6.52	8.24	-1.08		2.62	***
	Coop	7,142	6.7	7.1				
Ln (Stdev ROAA)	IO	3 632	-0.57	0.01	9.6	***	12.33	***
	Coop	7 648	-0.08	0.01				
Ln (Stdev ROAE)	IO	3 632	1.59	0.13	14	***	14.64	***
	Coop	7 468	1.36	0.008				
Zscore ROA	IO	3 408	2.32	2.15	-5.88	***	-6.906	***
	Coop	7 346	2.59	2.15				
CRA Rate	IO	739	3.1	0.42	-3.16	***	-3.206	***
	Coop	1 696	3.16	0.44				

Nonperforming Assets /total assets	IO	3 408	0.015	0.02	4.24	***	5.439	***
	Coop	7 345	0.013	0.02				
Nonperming Loans/total loans	IO	3 351	0.018	0.03	4.94	***	6.393	***
	Coop	7 264	0.015	0.03				
Stdev non-performing assets to total assets	IO	3,632	0.015	0.014	8.673	***	10.71	***
	Coop	7,648	0.012	0.014				
Stdev non-performing loans to total loans	IO	3 520	0.019	0.0003	9.624	***	10.55	***
	Coop	7 504	0.016	0.0002				

The data shows that cooperatives assert significantly higher levels of financial performance as measured by ROAA and ROAE.

The volatility of returns is lower, and the z-score is higher for cooperatives than investor-owned institutions. The higher z-score is the lower the probability of default of the institution is. These results are in line with the findings of Ayadi et al., (2010) in the European Framework.

We find higher social performance using the credit reinvestment act rating of mutuals. Cooperatives seem to be more engaged towards their communities that are in line with their main missions and objectives.

The results concerning asset and loan quality shows lower levels of bad loans and assets of cooperatives as compared to investor-owned thrifts. They show better risk management for cooperatives and better quality of their balance sheets. The data shows that cooperatives have lower losses on their assets and loans as compared to investor-owned thrifts using the variation over the observed years of their non-performing assets and loans confirming the better ability of identifying good and bad creditors.

    iii.   Activity and relationship lending

In this part, we try to examine the difference in the main activities undertaken by each ownership type and what type of client they serve, while also assessing the performance per business line. We also examine ratios allowing to investigate the relationship lending activity. The results are shown in Table 4.

At first, we assess the level of engagement in traditional banking activity by using the loans and leases to assets ratio. We exclude the held for sale loans in this ratio.

We use the asset diversity ratio as defined by Laeven & Levine (2007) as a measure of diversification across different types of assets and is computed as:

$$Asset\ diversity = 1 - \left| \frac{Net\ Loans_{it} - Other\ Earning\ Assets_{it}}{Total\ Earning\ Assets_{it}} \right|$$

Where other earning assets are securities and investments. This measure takes values between zero and one and is increasing in the degree of diversification. Our data shows that cooperatives invest less in traditional banking activity and are more diversified in their businesses. The level of net loans total assets is, however, higher for investor-owned, as opposed to what we have expected that cooperatives invest more in traditional activity of lending. However, they have higher levels of diversification in their business activities.

We also examine the size of the three main business lines in the lending activity: Real Estate, Business and Consumer lending. We find that the main activity in thrifts lies on real estate, the original activity of thrifts, however, investor owned institutions diversified more their activities in business lending and consumer loans more than cooperatives.

Table 4: Activity and relationship lending per ownership structure

The table shows the results of the mean comparison tests by a group of cooperatives and investor-owned firms with the T-ratio and the results of the Wilcoxon rank sum test (Mann-Whitney) with the Z ratio with the levels of significance ***p<0.01, **p<0.05 and *p<0.1.

Variable	Group	Obs	Mean	Standard deviation	T ratio		Z ratio	
Tot Loans & Leases (Excl HFS) /total assets	IO	2 500	0.64	0.16	4.16	***	4.118	***
	Coop	5 537	0.63	0.17				
Asset Diversity	IO	2 499	0.44	0.26	-4.2	***	-4.15	***
	Coop	5 533	0.47	0.28				
Consolidated Real Estate Loans/ Loans (%)	IO	3 358	76.07	20.25	-4.1	***	-6.88	***
	Coop	7 275	77.86	21.88				
Consolidated Total Consumer Loans/ Loans (%)	IO	3 358	8.42	12.26	5.24	***	4.18	***
	Coop	7 275	7.11	11.3				
Consolidated business/loans	IO	3 358	14.53	14.84	1.87	*	6.74	***
	Coop	7 275	13.93	16.64				
Employees allocated to traditional banking per office	IO	2 499	17.93	27.45	6.35	***	7.13	***
	Coop	5 533	13.89	23.7				
Employee per office	IO	3 408	21.521	0.534	2.82	***	6.447	***
	Coop	7 346	19.6	0.422				
Salary Exp/ Employees	IO	2 498	59.77	26.14	-1.5	**	-1.53	
	Coop	5 532	60.76	29.69				
Advertising Expenditures to total assets	IO	1 361	590.5606	183.3651	2.01	**	-4.53	***
	Coop	3 588	222.0549	7.272418				
	IO	3 408	76 873.65	109960	3.57	***	2.894	***

Total assets/number of offices	Coop	7 346	69 018.13	97780.1				
Total loans/number of offices	IO	3 408	51 963.31	79995.2	4.27	***	2.932	***
	Coop	7 346	45 254.99	65556				

It is a complex issue to measure the relational lending approach with clients of each institution with its client. The emergence of credit scoring and other tools based on hard information makes it complicated to assess the investment in relationship lending. However, we use some proxies to assess proximity with their clients and therefore their ability to capture soft information.

Several measures can assess the relationship lending. The traditional banking activity lies in deposits and lending, a long-term relationship with the client, that generates repetitive transactions, that indicated the importance of relationship lending within the institution. We propose a proxy for the investment in the relationship lending, the number of employees allocated to traditional banking per office to assess the capacity of investment in such activity. It is an indicator of human investment per office, the higher this ratio is, the higher the investment in relational banking is. Another measure is employee per office ratio. Having higher levels of workforce per office, allow lower levels of extraction of soft information from the client.

We also examine the loans per employee ratio, the higher its value is, the lower the time allocated to extract and create a relationship between the client and the bank employee. Salary expenditure per employee can show the level of specialization of the employees, the more paid they are, the higher their ability to extract and use soft information from the client is. We also use the standard deviation of non-performing loans that indicated the ability to identify non-performing loans. Therefore, relationship lenders have a lower level of this ratio.

The marketing and advertising expenditures to total assets ratio indicate a transactional strategy of the institution. Investing in marketing and advertising indicates a short-term relationship with the client. These expenditures finance punctual transactions with the client rather than a long term one. However, these short-term investments can eventually be at service of long-term relationship approach.

The number of offices indicates the geographical presence of the offices. If the bank is more present within their environment, and therefore can extract more soft information than institutions with lower levels of geographical presence. We use the assets per office and loans per office in order assess if the importance of geographical distribution to the institution.

Notwithstanding, the data shows that cooperatives engage in lower levels of investment traditional banking activity per office and have a lower number of employees per office. The data also shows higher levels of salaries paid to employees by cooperatives.

Cooperatives invest less in advertising expenditures however they are more distributed geographically relatively to their sizes and loans.

These data show mitigated results concerning the relational lending strategy adopted by each ownership type.

To respond to the object of the paper of understanding whether cooperatives have a different approach to relationship lending, and how this approach can impact the overall financial performance and risk, we will use an OLS regression of the cross-sectional data in the following section to assess the impact of these indicators on financial performance and risk of thrifts. We then use two stages least square regressions to test for the endogeneity of the ownership structure of the strategy and performance. To assess the robustness of these results, we create an indicator of relationship lending and cross it with ownership structure and reassess their impact on financial performance using robust OLS.

4- <u>Empirical study: Assessing performance and risk using multiple regressions</u>

In this part of the study, we need to assess the impact of ownership structure and relationship lending indicators on financial performance and risk. We adopt Ordinary Least Squares regressions while having robust standard errors using White (1980) estimators to deal with normality, heteroscedasticity or observations that exhibit large residuals.

The model is as follows:

$$Performance = f(Ownership\ structure; Activity; Relationship\ lending)$$

$$Risk = f(Ownership\ structure; Activity; Relationship\ lending)$$

We use the return on average assets (ROAA) indicator as a ratio of assessing performance, and for the risk we use two indicators, the z-score for insolvency risk and the natural logarithm of the standard deviation of the returns for the years studied as an indicator of the stability of performance.

As explanatory variables, we use one year lagged performance for financial performance. We use when possible the workforce employed to the traditional banking activity per office (number of employees' x %of traditional banking activity within the institution/ number of offices), employee per office ratio, salary expenditures per employee, advertising expenditure ratio to total assets as relationship lending indicators. The number of offices shows the geographical distribution.

For banks activity, we use the proportion of the business loans (business and consumer loans percentage; the real estate as a reference value), the importance of the asset diversity as measured by Laeven & Levine (2007).

The ownership structure is the dummy variable taking the value of 1 in the case of cooperatives and 0 for investor-owned thrifts. We control for the number of employees and for the chartering of the institution (Dummy variable taking a value of 1 in the case of federal chartering and zero in the case of state chartering). We also control for market concentration using the Herfindahl-Hirschman Index for the depository financial institutions in the US. Usually, this index is extracted from the summary of deposits in market share database provided by the FDIC, but since we consider that thrifts compete in the same market of community banks and Credit Unions, we compute this index by the state this index on the three types of institutions.

$$HHI_{jt} = \sum_{i=1}^{n} S_{ijt}{}^2$$

Where j is the primary state, i is the financial institution in the market j; S is the market share of deposits of each institution i for year t in the state j. The calculus was held on annual values of this index per state between 1999 and 2014, for 50 US states, for 11 721 institutions from the SNL database. We also control for years using year-dummies between 1999 and 2014.

We run five regressions to use the maximum number of relational indicators and escape possible auto-collinearity of relational ratios and loss of relevant information. The equations are as follows:

(1) $ROAA_{i,t} = \alpha + \beta_1\ ROAA_{i,t-1} + \beta_2\ Trad\_Bank\_Empl\_PerOffice_{i,t} + \beta_3\ AdvExp\_TA_{i,t} + \beta_4\ \%BusinessLoans_{i,t} + \beta_5\ \%ConsumerLoans_{i,t} + \beta_6\ Ownership\_Structure_i + \beta_7 HHI_{i,t} + \beta_8\ Chartering_{i,t} + \beta_9\ YearDummies + \varepsilon_{i,t}$

(2) $ROAA_{i,t} = \alpha + \beta_1\ ROAA_{i,t-1} + \beta_2\ EmployeePerOffice_{i,t} + \beta_3\ AdvExp\_TA_{i,t} + \beta_4\ AssetDiversity_{i,t} + \beta_5\ \%BusinessLoans_{i,t} + \beta_6\ \%ConsumerLoans_{i,t} + \beta_7\ Ownership\_Structure_i + \beta_8 HHI_{i,t} + \beta_9\ Chartering_{i,t} + \beta_{10}\ YearDummies + \varepsilon_{i,t}$

(3) $ROAA_{i,t} = \alpha + \beta_1\ ROAA_{i,t-1} + \beta_2\ AdvExp\_TA_{i,t} + \beta_3\ Numb\_Offices_i + \beta_4\ AssetDiversity_{i,t} + \beta_5\ \%BusinessLoans_{i,t} + \beta_6\ \%ConsumerLoans_{i,t} + \beta_7\ Ownership\_Structure_i + \beta_8\ Numb\_Empl_{i,t} + \beta_9 HHI_{i,t} + \beta_{10}\ Chartering_{i,t} + \beta_{11}\ YearDummies + \varepsilon_{i,t}$

(4) $ROAA_{i,t} = \alpha + \beta_1\ ROAA_{i,t-1} + \beta_2\ SalaryPerEmpl_{i,t} + \beta_3\ AdvExp\_TA_{i,t} + \beta_4\ \%BusinessLoans_{i,t} + \beta_5\ \%ConsumerLoans_{i,t} + \beta_6\ Ownership\_Structure_i + \beta_7 HHI_{i,t} + \beta_8\ Chartering_{i,t} + \beta_9\ YearDummies + \varepsilon_{i,t}$

$$(5)\ ROAA_{i,t} = \alpha + \beta_1\ ROAA_{i,t-1} + \beta_2\ Trad\_Bank\_Empl\_PerOffice_{i,t} +$$
$$\beta_3\ \%BusinessLoans_{i,t} + \beta_4\ \%ConsumerLoans_{i,t} + \beta_5\ Ownership\_Structure_i +$$
$$\beta_6 HHI_{i,t} + \beta_7\ Chartering_{i,t} + \beta_8\ YearDummies + \varepsilon_{i,t}$$

We adopt the same equations on explaining insolvency risk and volatility of performance without the lagged return on assets.

We also test for the collinearity between the variables. The results of the regressions are exposed in Tables 5, 6 and 7.

a. Results of the model

Table shows the results of the OLS regressions that examine the impact of the activity, types of clients and ownership structure on financial performance as measured by the return on average assets. The results show that the past performance at one lagged year impacts significantly and positively the performance in all the five equations.

Concerning the relationship lending indicators, the results show that the workforce engaged per office for relationship lending has a significant and positive impact on performance as well as the overall workforce engaged per office as shown in equations 1 and 5.

The level of salary has no impact on overall performance. Investing in advertising expenditures affects negatively financial performance without being significant in all cases (exception equation 4).

For the type of activity, having diversified businesses has no impact on performance, while investing rather in business or consumer loans rather than real estate lending, has a significant positive impact on performance.

Chartering and concentration, however, did not impact performance significantly.

Our data also show as in the previous section that financial performance for cooperatives is at a higher level.

Nevertheless, we suspect endogeneity of ownership and activity. They affect the relationship lending approach that leads to bias the results.

Table 5: Model of Performance

The table shows the results of the OLS regression with the White sandwich estimator. The Return on Average Asset (ROAA) is the dependent variable. The explanatory variables are chosen with different equations, in order to avoid multicollinearity problems. The independent variables included in all equations (1) to (5) are the lagged return on average assets (ROAA t-1), the percentage of business loans to total loans including the agricultural, commercial and industrial loans (%Business Loans), the percentage of consumer loans to total loans (%Consumer Loans), the ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives, the Herfindahl-Hirschman Index (HHI) for market concentration, the type of chartering (0 for state and 1 for federal) and we control for years. Employees allocated to traditional banking per office is used in equations 1 and 5, Employee per office ratio in equation 2, Salary expenditure per employee and number of employees in equation 3, salary expenditures to total assets for equations 1 to 4, Number of offices in equation 3, Asset diversity in equations 2 and 3. The table presents the coefficients and heteroskedasticity- consistent (White, 1980) t-values and then the R^2. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	ROAA	ROAA	ROAA	ROAA	ROAA
ROAA t-1	0.437*	0.456*	0.480*	0.506*	0.343***
	(2.30)	(2.34)	(2.37)	(2.44)	(3.36)
Employees allocated to traditional banking per office	0.0191**				0.0143**
	(2.67)				(3.14)
Employee per Office		0.0132*			
		(2.48)			
Salary Expenditure per Employee				-0.0130	
				(-0.98)	
Advertising Expenditures To total assets	-3.200	-3.332	-1.505	-4.564*	
	(-1.71)	(-1.78)	(-0.74)	(-2.11)	
Number of offices			-0.0107		
			(-1.50)		
Asset Diversity		-0.181	-0.149		
		(-1.18)	(-0.96)		
%Business Loans	0.0176***	0.0171***	0.0177***	0.0121**	0.0134***
	(3.62)	(3.50)	(3.30)	(2.63)	(5.41)
%Consumer Loans	0.0115*	0.0128*	0.0151*	0.0143*	0.0124**
	(2.32)	(2.24)	(2.12)	(1.97)	(3.07)
Ownership Structure	0.204*	0.194*	0.240*	0.174*	0.204***
	(2.46)	(2.38)	(2.46)	(2.26)	(3.46)
Number of Employees			0.00537*		
			(2.51)		
HHI	0.0000449	0.0000318	0.00000458	0.0000341	-0.0000159
	(0.78)	(0.55)	(0.07)	(0.48)	(-0.28)
Chartering(State 0 federal1)	-0.0868	-0.0839	-0.0581	0.233	-0.0594
	(-1.82)	(-1.80)	(-1.40)	(1.47)	(-1.17)

Controlled for years			Yes		
Intercept	-0.263	-0.180	-0.297	0.710	-0.00600
	(-1.90)	(-1.25)	(-1.75)	(0.92)	(-0.04)
N	4476	4476	4476	4474	7518
R-sq	0.334	0.324	0.311	0.302	0.190

Table explains the insolvency risk of the studied institutions. A higher level of z-score shows a lower level of insolvency risk. However, the explanatory power of the model decreases.

The traditional workforce engaged per office increases this risk, which can be explained by the impact of overhead on performance. However, while the general workforce per office has no significant impact on this factor, investing in marketing expenditures increases the risk. Geographical distribution has a negative impact on this risk.

Diversification in business activity decreases this risk as well as investing in business and consumer lending proving that investing in different business lines is a good strategy for the institution, increasing performance and reducing risk.

Cooperatives have lower levels of insolvency risk that are as per the findings of the univariate analysis. The results also show that the higher the level of concentration of institutions is the lower the insolvency risk.

Table 6: Insolvency risk model

The table shows the results of the OLS regression with the white sandwich estimator. The z-score is the dependent variable. The explanatory variables are chosen with different equations, in order to avoid multicollinearity problems. The independent variables included in all equations (1) to (5) are the percentage of business loans to total loans including the agricultural, commercial and industrial loans (%Business Loans), the percentage of consumer loans to total loans (%Consumer Loans), the ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives, the Herfindahl-Hirschman Index (HHI) for market concentration, the type of chartering (0 for state and 1 for federal) and we control for years. Employees allocated to traditional banking per office is used in equations 1 and 5, Employee per office ratio in equation 2, Salary expenditure per employee and number of employees in equation 3, salary expenditures to total assets for equations 1 to 4, Number of offices in equation 3, Asset diversity in equations 2 and 3. The table presents the coefficients and heteroscedasticity-consistent (White, 1980) t-values and then the R^2. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	z-score	z-score	z-score	z-score	z-score
Employees allocated to traditional banking per office	-0.00209*				-0.00141
	(-2.28)				(-1.69)
Employee per Office		0.000207			
		(0.26)			
Salary Expenditure per Employee				-0.0210***	
				(-13.57)	
Advertising Expenditures To total assets	-7.626***	-5.974***	-10.59***	-7.879***	
	(-9.19)	(-7.94)	(-7.01)	(-9.68)	
Number of offices			0.0288***		
			(4.10)		
Asset Diversity		1.527***	1.520***		
		(12.28)	(12.23)		
%Business Loans	0.0189***	0.0160***	0.0159***	0.0182***	0.0106***
	(10.00)	(8.52)	(8.51)	(10.02)	(7.59)
%Consumer Loans	0.00440	0.00296	0.00326	0.00632**	0.0118***
	(1.67)	(1.19)	(1.34)	(2.86)	(5.32)
Ownership Structure	0.542***	0.518***	0.539***	0.581***	0.282***
	(7.17)	(7.00)	(7.16)	(7.82)	(5.19)
Number of Employees			0.000212		
			(0.40)		
HHI	-0.000432***	-0.000383***	-0.000382***	-0.000400***	-0.000442***
	(-7.57)	(-6.78)	(-6.86)	(-7.23)	(-9.58)
Chartering(State 0 federal1)	-0.00348	0.0324	0.0382	0.0583	-0.118*
	(-0.04)	(0.35)	(0.41)	(0.77)	(-2.32)
Controlled for years			Yes		
Intercept	2.388***	1.678***	1.499***	3.328***	2.563***
	(12.50)	(8.51)	(7.46)	(28.10)	(20.13)
N	4506	4506	4506	4504	7976
R-sq	0.048	0.077	0.080	0.079	0.027

We then assess the variability of performance for the 16 years studied using the natural logarithm of the standard deviation of the return on average assets.

Table 7: Standard deviation of financial performance shows the results of the model for the outcome variable using the variation of performance.

The traditional and the overall workforce per office increase performance volatility as well as the level of salary expenditures per employee. Investing in marketing expenditures increases the volatility, while the number of offices increases the volatility of results.

Diversification decreases the volatility and while investing in business and consumer lending increases it. These results are in contradictions with the findings of DeYoung & Rice (2004b) that find that diversification in the US banking activity leads to more volatile revenue.

Cooperatives have more stable performances, while the number of employees increases this variance. The findings also show that concentration increases the volatility.

Findings concerning the insolvency risk and volatility of performance are congruent with each other.

The findings on the ownership structure and performance are in contradiction with their inefficiency as expected by Rasmusen (1988). Our findings on a lower probability of default of cooperatives are in accordance with the findings of Ayadi et al. (2010) for the European banks.

Table 7: Standard deviation of financial performance

The table shows the results of the OLS regression with the white sandwich estimator. The natural logarithm of the standard deviation of the returns on assets (Lnstdev(roaa)) between 1999 and 2014 is the dependent variable. The explanatory variables are chosen with different equations, in order to avoid multi-collinearity problems. The independent variables included in all equations (1) to (5) are the percentage of business loans to total loans including the agricultural, commercial and industrial loans (%Business Loans), the percentage of consumer loans to total loans (%Consumer Loans), the ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives, the Herfindahl-Hirschman Index (HHI) for market concentration, the type of chartering (0 for state and 1 for federal) and we control for years. Employees allocated to traditional banking per office is used in equations 1 and 5, Employee per office ratio in equation 2, Salary expenditure per employee and number of employees in equation 3, salary expenditures to total assets for equations 1 to 4, Number of offices in equation 3, Asset diversity in equations 2 and 3. The table presents the coefficients and heteroscedasticity- consistent (White, 1980) t-values and then the R^2. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	Lnstdev(roaa)	Lnstdev(roaa)	Lnstdev(roaa)	Lnstdev(roaa)	Lnstdev(roaa)
Employees allocated to traditional banking per office	0.00347***				0.00180**
	(5.42)				(2.95)
Employee per Office		0.00177**			
		(3.10)			
Salary Expenditure per Employee				0.0119***	
				(16.06)	
Advertising Expenditures To total assets	5.736***	4.939***	6.734***	5.712***	
	(10.21)	(9.85)	(8.90)	(10.73)	
Number of offices			-0.0106***		
			(-4.31)		
Asset Diversity		-0.741***	-0.733***		
		(-16.52)	(-16.44)		
%Business Loans	0.00586***	0.00726***	0.00769***	0.00599***	0.00619***
	(6.95)	(8.75)	(9.21)	(7.63)	(10.25)
%Consumer Loans	0.00329*	0.00419***	0.00455***	0.00284*	0.000268
	(2.54)	(3.51)	(3.61)	(2.17)	(0.27)
Ownership Structure	-0.252***	-0.241***	-0.234***	-0.279***	-0.141***
	(-8.74)	(-8.62)	(-8.12)	(-10.05)	(-6.91)
Number of Employees			0.00111***		
			(3.41)		
HHI	0.000134***	0.000110***	0.000105***	0.000110***	0.000139***
	(4.19)	(3.52)	(3.40)	(3.66)	(5.22)
Chartering(State 0 federal1)	0.00260	-0.0141	-0.00996	-0.0553	0.0405*
	(0.07)	(-0.40)	(-0.28)	(-1.87)	(2.12)
Controlled for years	Yes				
_cons	-0.955***	-0.612***	-0.603***	-1.469***	-0.964***

	(-15.51)	(-9.58)	(-9.08)	(-28.27)	(-20.33)
N	4506	4506	4506	4504	7976
R-sq	0.068	0.115	0.118	0.136	0.037

Nevertheless, the univariate analyses have shown that the relationship lending strategy, performance, and activity ratios have different levels according to the ownership structure. We suspect endogeneity of ownership and activity. They affect the relationship lending approach that leads to bias the results. Therefore, we will examine the model using two stage equations with instrumental variables.

b. Testing for endogeneity in financial performance and risk assessment

While the univariate analysis and the results of the regressions above show that ownership structure and lending strategies affect financial performance, we need to test the robustness of these results, especially that we show that ownership structure affects the strategy.

Therefore, we adopt two-stage least square equations to at first predict the different strategies at a first stage by using the ownership structure variable as an independent variable as well as the business segments, and then using that predicted measure in assessing performance. We adopt a general method of moments approach for these regressions to have robust results while controlling for heteroskedasticity using White (1980) estimator.

First Stage:

$$Relationship\ lending = f(Ownership\ structure; Activity)$$

Second Stage:

$$Performance = f(Ownership\ structure; Relationship\ lending)$$

$$Risk = f(Ownership\ structure; Relationship\ lending)$$

The results of the first stage regression are shown in Table 8: Determinants of relationship lending strategies. At the first stage equation, we predict the relationship lending indicators by using the ownership structure and business lines of the institutions and the workforce per office engaged. Then the predicted values are independent variables for the second stage equation.

The first stage shows that the ownership structure affects the different strategies significantly except for the level of remuneration of employees. Cooperatives engage more in advertising expenditures and less in traditional banking investment. However, the impact of the adopted activity on these ratios (% of business loans and % of consumer loans) seem not to be significant.

Table 8: Determinants of relationship lending strategies

The table shows the results of the first stage OLS regression with the white sandwich estimator. The dependent variable in equation 1 is Employees allocated to traditional banking per office, Advertising expenditures to total assets ratio for equation 2 and salary expenditure per employee for equation 3. The explanatory variables are the number of employees per office, ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives the percentage of business loans to total loans including the agricultural, commercial and industrial loans (%Business Loans) and the percentage of consumer loans to total loans (%Consumer Loans). The table presents the coefficients and heteroscedasticity- consistent (White, 1980) t-values and then the R^2. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	(1) Employees allocated to traditional banking per office	(2) Advertising Expenditures To total assets	(3) Salary Expenditure per Employee
Employee per office	0.775***	-0.0000310***	-0.0433***
	(29.60)	(-5.92)	(-6.01)
Ownership Structure	-0.881***	0.00122**	0.549
	(-4.04)	(2.77)	(1.04)
%Business Loans	0.00179	-0.0000182	-0.0253
	(0.49)	(-1.25)	(-1.55)
%Consumer Loans	0.0500*	-0.00000791	-0.0210
	(2.47)	(-0.81)	(-0.46)
Controlled for years		Yes	
Intercept	-2.649**	0.00360*	42.52***
	(-2.80)	(1.99)	(42.50)
N	7976	4758	7971
R-sq	0.924	0.006	0.188

The results in Table 9 show that while controlling for endogeneity, the main criteria affecting performance is its past performance.

The relationship lending approach either in engaging in traditional banking or advertising expenditures are not significant anymore. Only the level of salary expenditures has a significant negative impact on performance.

Additionally, the significant impact of ownership structure has disappeared in the second stage equation. Taking into account the business lines and the ownership structure in predicting lending strategy leads to different results concerning cooperatives ability to have different financial performance. The results show that the performance of thrifts depends on their past performances and strengths rather than their ownership structure. These findings can help better understand the contradictory findings in the literature on the performances of cooperatives. Several studies have shown the lower levels of performance and efficiency of cooperatives while others proved no significant relationship.

The results of our analyses show that the ownership structure's impact on performance is not direct but passes by the strategy adopted.

Table 9: Performance results while controlling for ownership structure endogeneity

The table shows the results of the second stage regression of the 2SLS with the white sandwich estimator. The Return on Average Asset (ROAA) is the dependent variable. The explanatory variables are chosen with different equations, in order to avoid multicollinearity problems. The independent variables included in all equations (1) to (3) are the lagged return on average assets (ROAA t-1), the ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives, the Herfindahl-Hirschman Index (HHI) for market concentration, the type of chartering (0 for state and 1 for federal) and we control for years. Predicted value of employees allocated to traditional banking per office is used in equations 1, the predicted value of advertising expenditures in equation 2 the predicted value of salary expenditure per employee in equation 3 and Asset diversity in equations 2 and 3. The table presents the coefficients and heteroskedasticity- consistent (White, 1980) t-values. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	(1)	(2)	(3)
	ROAA	ROAA	ROAA
Predicted Employees allocated to traditional banking per office	0.000477		
	(0.76)		
ROAA T-1	0.603***	0.780***	0.223**
	(4.76)	(4.10)	(2.84)
HHI	-0.0000273	0.00000728	-0.00000638
	(-0.81)	(0.23)	(-0.19)
Chartering(State 0 federal1)	0.0371	-0.0169	0.0886***
	(1.44)	(-0.52)	(3.54)
Ownership Structure	0.00862	0.000735	0.0623*
	(0.29)	(0.01)	(2.16)
Asset Diversity		4.040	
		(0.29)	
Predicted Advertising Expenditures To total assets		-0.0841	
		(-1.34)	
Predicted Salary Expenditure per Employee			-0.0365***
			(-4.83)
Controlled for years		Yes	

Intercept	0.296***	0.232	3.090***
	(3.74)	(1.62)	(5.45)
N	7403	4412	7398

We then implement the same method for assessing risk through 2sls regression method, while using the same first stage equation for testing endogeneity in the regressions concerning insolvency risk and overall risk in tables 10 and 11.

Table 10: Insolvency risk while controlling for endogeneity of ownership

The table shows the results of the second stage regression of the 2SLS with the white sandwich estimator. The z-score is the dependent variable. The explanatory variables are chosen with different equations, in order to avoid multicollinearity problems. The independent variables included in all equations (1) to (3) are the lagged return on average assets (ROAA t-1), the ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives, the Herfindahl-Hirschman Index (HHI) for market concentration, the type of chartering (0 for state and 1 for federal) and we control for years. Predicted value of employees allocated to traditional banking per office is used in equations 1, the predicted value of advertising expenditures in equation two the predicted value of salary expenditure per employee in equation 3 and Asset diversity in equations 2 and 3. The table presents the coefficients and heteroskedasticity- consistent (White, 1980) t-values. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	(1)	**(2)**	**(3)**
	z-score	z-score	z-score
Predicted Employees allocated to traditional banking per office	0.000939		
	(1.03)		
HHI	-0.000379***	-0.000334***	-0.000262***
	(-8.61)	(-6.46)	(-4.41)
Chartering(State 0 federal1)	-0.0653	0.0694	0.0381
	(-1.29)	(0.75)	(0.62)
Ownership Structure	0.295***	0.562***	0.372***
	(5.43)	(7.23)	(6.25)
Predicted Advertising Expenditures To total assets		-21.70	
		(-1.29)	
Asset Diversity		1.643***	
		(11.28)	
Predicted Salary Expenditure per Employee			-0.0581***
			(-4.00)
Controlled for years		Yes	
Intercept	2.857***	1.454***	5.163***
	(23.17)	(10.47)	(8.88)
N	7976	4506	7971

Table 11: Risk on strategies while controlling for endogeneity

The table shows the results of the second stage regression of the 2SLS with the white sandwich estimator. The natural logarithm of the standard deviation of the returns on assets (Lnstdev(roaa)) between 1999 and 2014 is the dependent variable. The explanatory variables are chosen with different equations, in order to avoid multi-collinearity problems. The independent variables included in all equations (1) to (3) are the lagged return on average assets (ROAA t-1), the ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives, the Herfindahl-Hirschman Index (HHI) for market concentration, the type of chartering (0 for state and 1 for federal) and we control for years. Predicted value of employees allocated to traditional banking per office is used in equations 1, the predicted value of advertising expenditures in equation 2 the predicted value of salary expenditure per employee in equation 3 and Asset diversity in equations 2 and 3. The table presents the coefficients and heteroskedasticity- consistent (White, 1980) t-values. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	(1)	**(2)**	**(3)**
	Ln(stdevroaa)	Ln(stdevroaa)	Ln(stdevroaa)
Predicted Employees allocated to traditional banking per office	0.000210		
	(0.31)		
HHI	0.000104***	0.000107***	0.000232***
	(3.90)	(3.58)	(3.92)
Chartering(State 0 federal1)	0.0495**	-0.0775	0.130**
	(2.59)	(-1.71)	(3.14)
Ownership Structure	-0.154***	-0.194***	-0.0934*
	(-7.59)	(-5.10)	(-2.33)
Predicted Advertising Expenditures To total assets		-19.24	
		(-1.07)	
Asset Diversity		-1.025***	
		(-9.59)	
Predicted Salary Expenditure per Employee			-0.0426**
			(-2.93)
Controlled for years		Yes	
Intercept	-0.799***	-0.120	0.875
	(-19.44)	(-1.20)	(1.51)
N	7976	4506	7971

The results of the analyses of insolvency risk and variance of the performance show that cooperatives structure risk is significantly lower than the investor-owned. They are significant for reducing insolvency risk and volatility of performance. The strategies adopted do not affect significantly risk. Risk reduction seems to be incremental to cooperatives rather than the strategy adopted. The findings also show that higher levels of concentration of institutions within the state increase their insolvency risk and performance variance. However, the level of

remuneration of employees leads to higher insolvency risk but higher levels of the volatility of performance.

Comparative literature on cooperatives has found different levels of results concerning cooperatives performance. Some find that cooperatives are less performant than their peers while others find no significant difference. The findings of this paper show that the cooperative structure affects lending strategies but not on the performance.

Notwithstanding, the results of our study show that cooperatives have incrementally lower levels of risk independently of the strategies adopted. This result is as per the previous dominant literature showing the risk-averse attitude of cooperatives and their contribution to the stability of their environment.

5- <u>Empirical study: Creating a relationship lending indicator</u>

To assess the robustness of our results, and improve the measure of the relationship lending approach, we suggest creating an indicator of relationship lending to have a score for each bank-year observation. This variable is created by following the logic of the relationship lending ratios; when a ratio is a proxy for relationship lending, we divide our observations by two: lower to the median observations and higher to the median observations, giving a score of 1 if the value is higher than the year-ratio median, and 0 if else. This score is computed using 6 variables and ranging between 0 (transactional lending) and 6 (relationship lending) and then normalized.

The ratios used are the following: Loans to deposits ratio, the higher this ratio is, the higher the bank provides loans and therefore is more relationship oriented. The higher the employee per office ratio is, the higher probability of the bank of being relationship oriented. However, the higher it invests in advertising, the more likely of being transactional. The higher the portfolio of loans and leases is the higher traditional activity is and therefore the relationship orientation of the bank. The ability of increasing the level of given loans and leases is per year, the higher likely of the relationship orientation of the bank. Finally, the ratio of assets per office is also used, the lower its value is, the more likely the ability of the office to have time to manage the relationship with the client. Table 12 summarizes the measures used. While engaging the mean comparison test of the score between cooperatives and investor owned, we find that this score is significantly higher for investor owned firms than cooperatives and it holds for the entire observations (0.51 for cooperatives versus 0.53 for investor owned firms). These results reject hypothesis 1 of higher relationship lending investment of cooperatives.

Table 12: Ratios used for the indicator of relationship lending

Ratio	Relationship orientation
Loans to deposits	+
Employee per Office	+
Advertising expenditures to total assets	-
Net loans and leases to total earning assets	+
[Net loans and leases N / Net loans and leases N-1]-1	+
Assets per office	-

Using this new relationship lending score, we adopt the model of evaluating performance and risk while controlling for ownership structure, activity and concentration using robust OLS.

The results are shown in table 13.

Table 13: Results of the regressions using the relationship lending score

The table shows the results of the OLS regression with the White sandwich estimator. The Return on Average Asset (ROAA), the z-score and the natural logarithm of the standard deviation of the return on average assets are the dependent variables respectively. The independent variables included in the equations are the lagged return on average assets (ROAA t-1), the computed normalized relationship lending score ranging from zero (transactional bank) to 1 relational bank, the ownership structure dummy that takes a value of 0 in case of IOF and 1 in case of cooperatives, the variable of interaction between relationship lending and ownership structure, the percentage of business loans to total loans including the agricultural, commercial and industrial loans (%Business Loans), the percentage of consumer loans to total loans (%Consumer Loans), , the Herfindahl-Hirschman Index (HHI) for market concentration, the type of chartering (0 for state and 1 for federal) and we control for years. The table presents the coefficients and heteroskedasticity- consistent (White, 1980) t-values and then the R^2. N is the number of non-missing observations in the sample. ***, **, * indicate coefficients significant at the, 0.1%, 1% and 5%, significance levels, respectively.

	ROAA	ROAA	Z-score	Z-score	lnstdev(roaa)	lnstdev(roaa)
ROA T-1	0.172	0.172				
	(1.81)	(1.81)				
Relationship lending score	0.238***		-0.990***		0.752***	
	(4.11)		(-5.96)		(12.04)	
Ownership Structure	0.101**		0.510***		-0.227***	
	(3.17)		(6.50)		(-7.75)	
Relationship lending score X Ownership Structure		0.205***		0.299*		-0.0346
		(4.03)		(2.39)		(-0.71)
%Business Loans	0.0107***	0.0106***	0.0183***	0.0190***	0.00577***	0.00528***
	(8.82)	(8.75)	(9.64)	(9.94)	(6.92)	(6.18)
%Consumer Loans	0.00679***	0.00669***	0.00476	0.00484	0.00299*	0.00287*

	(4.22)	(4.15)	(1.75)	(1.74)	(2.20)	(2.08)
HHI	-0.0000645**	-0.0000640**	-0.000458***	-0.000457***	0.000141***	0.000141***
	(-2.72)	(-2.69)	(-8.01)	(-7.97)	(4.51)	(4.40)
Chartering(State 0 federal1)	-0.0293	-0.0244	0.0308	-0.0766	-0.0118	0.0543
	(-0.93)	(-0.77)	(0.31)	(-0.76)	(-0.31)	(1.41)
Controlled for years	Yes					
Intercept	0.258***	0.383***	2.993***	2.702***	-1.362***	-1.098***
	(3.43)	(5.21)	(13.65)	(13.95)	(-18.85)	(-17.59)
N	4182	4182	4264	4264	4264	4264
R-sq	0.260	0.259	0.052	0.036	0.076	0.030

The results demonstrate that investing in relationship lending increases the level of performance and the risk level, and cooperatives have higher levels of performance with lower levels of risk that show that our previous results are robust. However, when we examine the interaction between relationship banking and ownership structure, we find significant positive impact on financial performance and lower impact on the risk. This result is important and crucial in our analysis. It shows that cooperatives investing in relationship lending have higher levels of financial performance encouraging them to invest in such an activity leading to confirm hypothesis H2: the ownership structure and the relationship lending approach affect performance and risk.

6- <u>Conclusion</u>

This study investigates the difference in performances and risk levels between cooperatives and investor-owned thrifts in the American context. We examine whether the differences in performance and risk are derived from their relationship lending or is incremental to their ownership structure using quantitative empirical analyses, from univariate descriptive to multiple and multi-stage regression models and creation of relationship lending variable.

It examines if the reliance on a traditional banking activity based on relationship lending, the long-term relationship with their clients and the business lines have an impact on performance and risk depending on each ownership type.

The data of American thrifts between 1999 and 2014 show that cooperatives outperform financially and socially investor-owned savings and loan institutions, as well as having a lower insolvency risk and financial risk. They are also more capable of identifying good performing clients and better manage their risks.

Nonetheless, we find that cooperatives do not invest more in relationship lending than investor-owned institutions, they rely on both traditional and untraditional activity and invest less in marketing activities.

The findings impact of market strategies and ownership structure on the financial performance and risk show that the cooperative structure does not have a direct impact on performance that relies principally on past performance. However, the ownership structure has a direct impact on the relational strategies, the insolvency risk and the variance of performance. This structure encourages a more diversified portfolio of activities and to a risk-averse behavior. This behavior seems to be incremental to the cooperative structure. However, when we create relationship lending variable, the results show that investing in relationship lending for cooperatives increases the performance and lowers the level of risk.

This paper contributes to the existing literature by examining the relationship between the lending strategy and business lines, to ownership structure and financial performance and risk. It leads to better understand the reasons behind the differences in the results on previous literature concerning the performance of cooperatives and their efficiency notably in the thrifts sector. To our knowledge, no studies have examined this triangular relationship.

We underline the limit of the research in considering relational lending relying on traditional activity rather than fee-based activity. Even in the fee-based activity, bankers invest in long-

term relationships with their clients. Another limit is to consider the advertising expenditure exclusively as a transactional tool. Therefore, the consideration was taken in simplification of reality to be able to perform our analysis.

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