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**THE DETERMINANTS OF NET INTEREST RATE SPREADS FOR FARM CREDIT DIRECT
LENDING ASSOCIATIONS**

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THE DETERMINANTS OF NET INTEREST RATE SPREADS FOR FARM CREDIT DIRECT LENDING ASSOCIATIONS

Charles Dodson and Marvin Duncan¹

Abstract

Factors affecting the interest rate spread for Farm Credit System direct lending associations are explored. Much of the variation in spreads appeared to be a consequence of Farm Credit Bank (FCB) affiliation and the split between real estate and nonreal estate lending. When associations were grouped according to FCB affiliation and type of lending, operating costs were found to have a notable impact on spreads suggesting that higher costs are passed on to borrowers. Thus, more efficient credit delivery systems should result in reduced borrower rates for FCS borrowers.

Introduction

We explore the factors affecting the interest rate spread for Farm Credit System direct lending associations (DLAs)². The interest rate spread represents the return a financial institution earns for providing the service of intermediation. As a major supplier of farm credit, the FCS plays an important role in the determination of the cost of credit to farmers. If cost savings are passed on to borrowers, using the most efficient intermediation process reduces the cost of credit to farmers and enhances rural economic growth. Differences in spreads are largely explained by institution specific factors such as association size, capital base, operating costs, and management quality rather than by factors which are less amenable to association management such as competition, portfolio quality, and the uncertainty surrounding farming returns in the region.

Commercial banks and FCS institutions typically report interest rate margins rather than spreads in their financial reports (see box for definitions used for this study). Net interest margins for

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²The DLAs are part of the retail lending network of the Farm Credit System. They are organized as locally owned credit cooperatives who originate, service, and hold portfolios of agricultural loans. They include the Production Credit Associations (PCAs), Agricultural Credit Associations (ACAs), and Federal Land Credit Associations (FLCAs) of the FCS. Federal Land Bank Associations (FLBAs) are not considered direct lending associations since they do not hold portfolios of loans. The DLAs obtain loanable funds through one of seven Farm Credit District Banks (FCBs) or Agricultural Credit Bank. These institutions operate primarily as credit wholesalers and obtain funds through the Farm Credit System Funding Corporation which sells securities to the public.

FCS institutions are distorted, however, by variations in leverage. This is because cooperatives can use deferred borrower dividends as a near costless source of capital which reduces interest expense and increases interest margins. Since spreads were considered more indicative of the efficiency of the intermediation process for FCS institutions, they were the focus of this study.

Previous Studies

Earlier studies of interest rate margins and spreads, have concentrated on commercial banks, with no studies conducted of FCS associations. This study draws heavily from the existing literature, most of which focused on interest rate spreads for commercial banks.

Most studies of the interest rate spread or margin for commercial banks have been based on the assumption of profit maximization. But, DLAs are organized as cooperatives rather than investor-owned firms. Van Sickle and Ladd (1983) argue that the unique characteristics of cooperatives requires they be analyzed differently from investor-owned firms. But, in practice, the pressures of the business environment and the demands of the financial community outweigh the unique features of cooperatives, (Parliament and Lerman). Thus, firm-theoretical models developed to explain the variability of interest rate margins among commercial banks could be applicable to DLAs.

Attraction of loanable funds is an important function of intermediation that is reflected in most models of interest rate margins. Commercial banks may be exposed to significant risk because of the asynchronous arrival of loan and deposits. Obtaining loanable funds is not an important concern for DLAs since they have ready access to lendable funds of the desired maturity and quantity from their affiliated FCBs. Commercial banks also provide diversification potential and maturity intermediation to investors and manage the payment system. But, for DLAs many of these functions are performed by their affiliated FCB or the Funding Corporation. The major intermediation functions performed by DLAs are loan making, loan underwriting, and credit management.

The prevailing approach to analyzing bank interest margins has been the dealership model originated by Ho and Saunders (1981). This model was developed to study, in a stochastic environment, deposit taking banks with presumed market power. Banks are viewed as risk-averse dealers in loan and deposit markets where loan requests and funds arrive nonsynchronously at random time intervals. Bank interest rate spreads were shown to be a function of managerial risk aversion, the average size of deposits and loans, competition within the bank's market, and the variability of interest rates. But the size of deposits and the variability of interest rates do not apply to DLAs since they affect only the funding aspect of intermediation.

As a consequence of the separation of ownership from management, greater risk aversion by bank managers could result in greater interest rate spreads. Conflicts of incentives would arise since the bank manager has a substantial amount of their human capital invested in the bank. Given an imperfect labor market, the inability of the manager to diversify their human capital induces risk-averse behavior (Fama; 1980). In a comparative static analysis, Ho and Saunders demonstrated a positive relationship between manager risk aversion and interest rate margins.

The relationship between margins and manager risk aversion is implicit in other models (Allen, 1988; Zarruk, 1988; Zarruk and Madura, 1992; Wong, 1997). But, FCS managers are less likely to possess some of the skills required to manage a commercial bank such as expertise in attracting loanable funds or managing a diverse group of financial products. Consequently, the skills developed from managing an association may not be directly transferable to the management of commercial banks or to other financial institutions. Thus, the value of human capital for an FCS association manager may be closely tied to an association's success creating incentives for risk-averse behavior. Managerial risk aversion may be reflected in a preference for high capital levels achieved by higher spreads and retention of earnings.

The positive relationship between margins and market power suggested by Ho and Saunders has also been shown in other studies (Wong, 1997). If an institution faces a relatively inelastic demand function, it may be able to exercise monopoly power by demanding a greater spread than it could if banking markets were more competitive. Several studies have shown that the loan markets in which banks operate are imperfect; Pringle (1973), Hancock (1986), Gilbert (1984), Slovin and Susha (1984). Rural banking markets appear less competitive with 2,111 of 2,183 rural credit markets classified noncompetitive by the Department of Justice in 1993 (Collender). In many areas of the country, such as the Northeast and Mid-Atlantic States, FCS associations have little competition from commercial banks in making farm loans. Further, market power and manager risk-aversion may be interrelated as risk-averse managers align themselves with firms possessing greater market power (Heggstad, 1977).

As a consequence of market power, Ho and Saunders hypothesized that smaller banks would have greater spreads than larger banks (Ho and Saunders). Smaller or community banks are believed to have a competitive advantage in lending to small businesses because of their ability to access and monitor the operations of enterprises in their local communities with which they may have multiple business relationships. This competitive advantage, in turn, enables smaller institutions to exercise market power in pricing. As with banking, mergers and consolidations are yielding larger FCS associations. Nationwide, nearly one-third of all lending by DLAs in 1997 was undertaken by just 4 associations, each with over \$1 billion in loans outstanding. Yet, there remains a notable number of small DLAs which typically have higher costs than larger associations. In 1997, over 50 DLAs had less than \$100 million of total assets. One possible explanation for the continued existence of these small DLAs is that they serve unique niches, in which they have competitive advantages.

Previous studies have shown that the relationship between equity capital and spreads is ambiguous. Substituting equity for debt reduces the risk of insolvency which should lower the cost of debt, thus increasing spreads and suggesting a positive relationship between capital levels and spreads. But, if commercial banks or DLAs possess market power, a financial institution may actually increase borrower rates if capital levels fall suggesting a negative relationship between spreads and capital levels. In this circumstance DLAs with a less capital would increase borrower rates to increase profits and, as a result, increase their capital reserves. The final impact on spreads would depend on the size of these two affects.

The Ho and Saunders model has been extended to account for cross-elasticities of demand

between bank products (Allen;1988), and for default risk and capital base (Angbazo;1995). These studies showed that banks whose loans are more risky will require higher spreads to compensate for the higher risk of default. The greater the probability of loan charge-offs, and, potential loss of capital, the greater the default premium. An increase in the marginal administrative costs of loans has been shown to increase the optimal bank interest rate margin (Wong, Zaruk). Margins are also influenced by the managerial efficiency (Angbazo). Further, increases in insurance premiums increases the optimal bank interest margin (Zaruk and Madura; Wong).

Definitions Used in This Study for Rates Received, Paid, and Spread

Average rate received on earning assets =

(Interest income on accrual loans - cash patronage and dividends paid to borrowers during the year)/ (daily average loan volume for the year + capital stock purchases).

Average rate received on earning assets (assuming payment of allocated surplus) =

(Interest income on accrual loans - cash patronage and dividends paid to borrowers during the year - present value of surplus allocated to farmers during the year/ (daily average loan volume for the year + capital stock purchases).

Present value of surplus allocated =

Surplus allocated during year/ ((1.06)²⁰)

Average rate paid on interest-bearing liabilities=

(Associations interest expense - cash patronage and dividends received from FCB)/ (average daily balance of interest-bearing liabilities + investment in the FCB).

SPREAD= (Average rate received on earning assets- average rate paid on interest-bearing liabilities).

Interest rate margin= Net interest income/ average earning assets.

Empirical Specification

A regression model explores the relationship between net interest spreads and explanatory variables reflecting DLA characteristics and general economic conditions. The model specification focuses on the reported net interest spreads which are assumed to be a function of the desired (or pure) spread and bank-specific factors. This model follows Ho and Saunders (1981), McShane and Sharpe (1985), and Angbazo (1997) where the pure interest spread is incorporated into an empirical specification that also includes bank-specific characteristics as determinants of net interest margins.

$$(1) \quad \text{SPREAD}_{it} = f(S_{it}^*(\cdot), X_{it}, \varepsilon_{it})$$

SPREAD would be the observed or reported net interest spread at time t for association i . The function $S_{it}^*(\cdot)$ represents the desired interest rate spread, or the pure spread. Following from Ho and Saunders, the pure spread should be influenced by bank manager's risk aversion, market structure, the average size of bank transactions, and the variance of interest rates. In the context of deposit-taking commercial banks, average size of loans and deposits and the variability of interest rates reflect risks arising from the stochastic arrival of loans and deposits. Since associations are less concerned with funding issues, these factors are less important in determination of DLA spreads. Also, manager risk aversion is not directly observable, leaving market power as the only empirically measurable indicator of the pure spread for direct lending associations.

X_{it} is a vector of institution specific characteristics which may have an impact on association interest spreads, and the residual term ε_{it} , reflects all other market imperfections and regulatory restrictions affecting SPREAD. Based on the results from previous studies, the institution specific characteristics include default risk, solvency risk, administrative costs and institutional factors. Proxy variables were developed for each of these factors and incorporated into the following regression equation. A description of these variables along with their hypothetical effect on SPREAD is provided in table 1.

$$(2) \quad \text{SPREAD}_{it} = \beta_0 + \beta_1 \text{MKTPOWER}_{it} + \beta_2 \text{CLUB}_{it} + \beta_3 \text{PMACP}_{it} + \beta_4 \text{CONC}_{it} \\ + \beta_5 \text{PARTSOLD}_{it} + \beta_6 \text{NONPER}_{it} + \beta_7 \text{GTE}_{it} + \beta_8 \text{COSTS}_{it} + \beta_9 \text{FCBDIST}_{it}$$

Empirical Data

Data used in this study were obtained from the annual reports to stockholders which were available for the years 1994 through 1997 and from Farm Credit Administration's Annual Call Report³. The sample consists of 155 observations of DLAs which existed at year-end 1997. Data were restated to account for mergers of associations occurring during this period.

Spread was calculated as the difference between the average rate on earning assets less the average rate paid on interest-bearing liabilities. As cooperatives, DLAs may provide dividends and/or patronage refunds to their borrowers. If these are in cash, they have the same effect as interest rebates, thus lowering farmers' interest cost. Deferred patronage, or allocated surplus, has a present value to the borrowers, assuming it is ultimately paid. An average borrower rate was also calculated assuming allocated surplus was paid out in 20 years and discounted at 6 percent (see table 2).

³ The Annual Report to Stockholders of the associations provided unique information on dividends and patronage refunds paid to borrowers from the associations, as well from FCBs to associations. These sources also provided data on capital stock investments of borrowers in the associations and of associations in the FCB.

varied among districts. An unexpected negative relationship between market share and spreads was found in regions where FCS was the primary supplier of farm credit. Specifically, spreads for AgFirst and CoBank Associations declined as FCS market share increased. Regardless of the explanation for this relationship, it strongly indicates that FCS institutions can serve an important role in providing affordable credit to agricultural regions which are not served by other lenders.

Regardless of district affiliation or type of lending undertaken, higher operating costs appear to be passed on to the farm borrower resulting in higher spreads. In turn, this suggests that associations can reduce borrower rates by developing more efficient delivery systems. Some obvious methods to reduce costs include a reduction in the number of branches and increasing the average loan size. But this must be weighed against possible negative impacts on customer service. For some groups, spreads and, consequently, rates were higher at associations with fewer stockholders per branch. It could not be determined whether this reflected inefficiencies or perhaps a preference for smaller associations.

Spreads for associations with a higher degree of branching (CLUB) were 58 basis points greater than for other DLAs in AgFirst and 48 basis points higher for FLCAs in both the Agribank and Western districts. The recent decision by the FCA Board to allow over-chartering and greater competition among FCS associations could have a dramatic impact on these smaller associations.

If they are cultivating niche markets by providing greater customer service, we would expect this decision to have little adverse impact on their operations. In fact, they may be able to expand their niche beyond their current territories. But, if the higher spreads displayed by these smaller associations are merely a consequence of higher costs, the FCA decision threatens their survival.

Previously, borrowers served by these smaller associations could only borrow from the FCS institution serving that territory. Now, however, they may borrow from other associations choosing to operate in their territory. Larger, more efficient associations, which are likely to operate on lower spreads, may provide lower rates to farmers in regions served by smaller associations.

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Table 1. Variables hypothesized to affect interest rate spreads for FCS direct lending associations.

Factor/variable	Variables description	Predicted Sign	Rationale
<i>Market Power</i> MKTPOWER	(FCS Outstanding debt in State served by DLA) ----- (Total farm debt-FSA debt-debt owed to individuals)	+	Greater market power \Rightarrow Higher rates to farmers
CLUB	1 for DLAs loan vol. of less than \$10 million per branch or less than 150 stockholders per branch; 0 otherwise	+	By cultivating niche markets and utilizing relationship lending, these DLAs may obtain higher rates to farmers
<i>Solvency Risk</i> PMCAP	Permanent Capital Ratio	?	Capital ratio $\downarrow \Rightarrow$ Greater risk of insolvency \Rightarrow Cost of funds from FCB $\uparrow \Rightarrow$ Spread \downarrow Also--Capital ratio $\downarrow \Rightarrow$ Greater risk of insolvency \Rightarrow Average rate to farmers \uparrow (as DLA seeks to build capital reserves) \Rightarrow Spread \uparrow Portfolio concentration \uparrow Variability of DLA Profits $\uparrow \Rightarrow$ Risk of insolvency \uparrow
SPEC	Share of portfolio to one commodity	+	Portfolio concentration \uparrow Variability of DLA Profits $\uparrow \Rightarrow$ Risk of insolvency \uparrow
PARTSOLD	Share of loans sold as participations	-	Participations $\uparrow \rightarrow$ Portfolio concentration \downarrow Variability of DLA profits \downarrow Insolvency risk \downarrow
<i>Default Risk</i> NONPER	(Nonaccrual + restructured loans + Acquired property) ----- Total loans	+	Nonperforming assets $\uparrow \Rightarrow$ Repayment risk \uparrow \Rightarrow Default premium \uparrow

Table 1. (continued)

Factor	Variables	Predicted Sign	Rationale
GTE	FSA guaranteed loan volume ----- Total loans	-	FSA guarantees ↑ ⇒ Default premium ↓
COSTS	Salary + other noninterest Costs - noninterest income ----- Average earning assets	+	Administrative Costs ↑ ⇒ Loan rates ↑
FCBDIST:			
AGAM	1 if association affiliated with AgAmerica or Western FCB, 0 otherwise		Business relationships between FCBs and associations may vary by district. For example, some FCBs may pay a portion of an associations operating expenses, thereby affecting the spread.
AG1	1 if association affiliated with AgFirst FCB; 0 otherwise.		
TEXWICH	1 if associated affiliated with Texas or Wichita FCB; 0 otherwise		
COBANK	1 if association affiliated with Cobank ACB; 0 otherwise		
AGRIBANK	1 if association affiliated with Agribank FCB; 0 otherwise		

Table 2. Summary statistics for FCS direct lending associations, 1994-97 average.

FCS District		Ave	Std Dev.	Min	Max.	CoBank	AgFirst	Agribank	Wichita	Texas	Western	AgAmerica
						4	49	49	18	16	26	3
<i>Number of associations:</i>												
<i>Earnings</i>												
Ave. rate paid by farmers \1	8.71	0.880	6.24	13.38	8.61	8.61	8.61	8.67	8.96	9.41	8.96	8.60
Ave. rate paid by farmers \2	8.61	0.935	5.68	13.38	8.58	8.58	8.28	8.67	8.90	9.19	8.95	8.60
Ave cost of debt	6.02	0.668	3.56	9.84	6.02	6.02	6.26	5.94	5.80	6.19	6.01	5.86
Spread\3	2.69	0.903	0.22	7.90	2.59	2.59	2.35	2.73	3.16	3.22	2.95	2.74
<i>Default risk</i>												
Allowances / loans	2.75	1.080	1.01	7.03	2.75	2.75	3.01	1.86	3.31	2.92	2.02	1.60
Provisions/ loans	0.16	0.580	-0.04	0.08	0.03	0.03	0.05	0.24	0.28	0.23	0.16	0.13
Nonperforming assets/ loans	1.81	1.973	0.00	20.52	2.12	2.12	2.04	1.24	0.70	2.37	2.02	2.60
FSA guaranteed loans/ loans	2.07	2.952	0.00	23.53	3.38	3.38	2.94	2.41	2.29	2.90	0.59	0.55
Net participations/ loans	4.33	8.740	0.00	52.33	1.53	1.53	7.69	2.47	13.73	5.77	1.55	5.94
Vulnerable debt/ total debt \4	15.80	5.380	7.14	26.60	13.10	13.10	12.40	17.07	13.98	11.65	22.57	16.73
Single commodity concentration	42.30	16.15	16.00	88.00	46.56	46.56	33.19	46.52	52.25	51.76	32.63	36.50
<i>Capital adequacy</i>												
Permanent capital ratio	18.85	16.250	10.22	44.65	17.19	17.19	17.46	14.78	24.38	23.50	15.04	13.78
<i>Operating costs</i>												
Net noninterest expense/												
Earning assets	1.83	3.02	0.84	6.67	1.89	1.89	1.70	1.68	2.31	2.70	1.83	2.17
Real estate/total loans	38.00	37.00	0.00	1.00	45.38	45.38	48.39	56.14	0.00	0.00	64.09	72.24
Earning assets/total assets	90	14	69	99	95	95	95	90	87	88	15.04	13.78
Loan vol./voting stockholder	98,811	94,007	23,509	743,384	88,089	88,089	99,001	79,437	122,161	95,914	269,131	100,078
Loan vol./ association	212,048	389,602	6,868	4,128,785	439,738	439,738	201,864	245,938	39,336	53,616	180,856	1,642,282
<i>Branching</i>												
Loans/branch	24,202	22,242	918	117,182	58,632	58,632	23,270	20,220	10,115	9,975	42,013	38,794
Voting stockholders/branch	245	175	19.03	740.00	321	321	235	255	83	104	156	388
Market share	30	17	7	80	70	70	40	32	10	15	32	22

1\ Assuming no payment of allocated surplus
 2\ Assuming allocated surplus is paid 20 years after allocation. Present value calculated at 6%.
 3\ Spread is calculated assuming no payment of allocated surplus.
 4\ Based on FCRS/ARMS data for FCB district with which association is affiliated.

Table 3. Characteristics of Agricultural Credit Associations by amount of loans outstanding, 1994-97 average.

	All	Under \$100 Mi.	\$100-250 Mi.	Over \$250 Mi
Agricultural Credit Associations				
Number of associations	8	9	41	31
	-----percent-----			
<i>Market share</i>	40	39	42	40
Club Associations (#)	11	9	1	1
<i>Earnings</i>				
Ave. rate paid by farmer ¹	8.72	9.35	8.53	8.77
Ave. rate paid by farmer ²	8.58	9.27	8.17	8.73
Ave cost of debt	6.11	6.20	6.14	6.09
Spread ³	2.61	3.15	2.39	2.68
<i>Default risk</i>				
	-----as % of loans-----			
Allowances	2.54	2.21	3.11	2.32
Provisions	0.15	0.09	0.10	0.17
Nonperforming assets	1.96	1.40	2.15	1.90
FSA guaranteed loans	2.24	3.08	3.37	1.75
Net participations	1.96	2.98	5.82	4.97
	-----percent-----			
Commodity concentration	36.1	39.9	35.5	36.2
<i>Capital adequacy</i>				
Permanent capital ratio	15.66	19.8	17.3	14.9
<i>Operating costs</i>				
Net noninterest expense/				
Earning assets	1.74	2.46	1.78	1.70
Real estate/ loans	54.57	38.97	52.3	56.7
Earning assets/tot.assets	92	88	95	91
	-----dollars-----			
Loan vol.				
/voting stkhlder	98,427	61,305	106,199	97,841
Loan vol/association	327,763	80,309	178,627	595,463
<i>Branching</i>				
Loan vol /branch	31,265	14,915	29,370	33,528
Voting stockholders				
/branch (#)	318	243	277	321

1\ Assuming no payment of allocated surplus

2\ Assuming allocated surplus is paid 20 years after allocation. Present value calculated at 6%.

3\ Spread is calculated assuming no payment of allocated surplus.

Table 4 Characteristics of Production Credit Associations by amount of loans outstanding, 1994-97 average.

	All	Under \$100 Mi.	\$100-250 Mi.	Over \$250 Mi
Production Credit Associations				
Number of associations	87	69	15	4
Market share	14	14	25	10
Club associations (#)	11	3	5	3
Earnings				
	-----percent-----			
Ave. rate paid by farmer	9.14	9.18	8.98	9.26
Ave. rate paid by farmer	9.06	9.10	8.93	9.13
Ave cost of debt	5.88	5.88	5.76	6.01
Spread ³	3.26	3.30	3.22	3.25
Default risk				
	-----as % of loans-----			
Allowances	2.86	2.90	2.33	3.37
Provisions	0.24	0.23	0.19	0.32
Nonperforming assets	1.41	1.53	1.22	1.41
FSA guaranteed loans	2.30	2.67	2.24	1.68
Net participations	4.91	5.97	4.04	3.86
	-----percent-----			
Commodity concentration	42.3	49.5	37.03	35.51
<i>Capital adequacy</i>				
Permanent capital ratio	19.06	21.53	17.19	16.76
<i>Operating costs</i>				
Net noninterest expense/				
Earning assets	2.33	2.6	1.96	2.3
Earning assets/tot.assets	90	84	94	90
	-----dollars-----			
Loan vol./stockholder	90,654	54,060	151,406	532,944
<i>Branching</i>				
Loans/branch	12,748	9,776	20,970	14,730
Voting stockholders /branch	135	114	185	157

1\ Assuming no payments of allocated surplus

2\ Assuming allocated surplus is paid 20 years after allocation. Present value calculated at 6%.

3\ Spread is calculated assuming no payment of allocated surplus.

Table 5. Characteristics of Federal Land Credit Associations by amount of loans outstanding, 1994-97 average.

	All	Under \$100 Mi.	\$100-250 Mi.	Over \$250 Mi
Federal Land Credit Associations				
Number of associations	41	12	22	7
<i>Market Share</i>	39	44	42	37
Club associations (#)	4	3	1	0
<i>Earnings</i> -----percent-----				
Ave. rate paid by farmer \1	8.33	8.78	8.51	8.14
Ave. rate paid by farmer \2	8.33	8.78	8.51	8.14
Ave cost of debt	5.91	5.89	6.00	5.85
Spread\3	2.42	2.89	2.51	2.29
<i>Default risk</i> -----as % of loans-----				
Allowances	3.25	1.92	1.76	4.51
Provisions	0.11	0.28	0.16	0.04
Nonperforming assets	1.74	1.65	0.55	2.60
Net participations	2.33	1.68	4.20	1.09
FSA guaranteed loans	1.43	3.16	2.46	0.43
-----percent-----				
Commodity concentration	44.2	40.9	44.3	44.6
<i>Capital adequacy</i>				
Permanent capital ratio	14.0	18.0	14.9	12.8
<i>Operating costs</i>				
Net noninterest expense	1.65	2.38	1.74	1.50
Earning assets/tot.asset	92	74	93	93
-----dollars-----				
Loan vol./voting stkhlder	103,661	83,135	84,533	132,686
Loan vol./assoc	243,855	72,826	173,800	730,702
<i>Branching</i>				
Loans/branch	27,390	13,854	18,828	51,940
Voting stockholders /branch (#)	264	167	223	391

1\ Assuming no payment of allocated surplus

2\ Assuming allocated surplus is paid 20 years after allocation. Present value calculated at 6%.

3\ Spread is calculated assuming no payment of allocated surplus.

Table 6. Empirical determinants of FCS direct lending association spreads.

	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6
Constant	0.030269 (0.00428)***	0.037162 (0.00398)***	0.016505 (0.00323)***	0.005659 (0.00299)	0.021178 (0.00646)***	-0.00250 (0.00603)
Market Share	-0.01269 (0.00332)***	-0.03281 (0.01640)	0.010417 (0.00563)*	0.011511 (0.00626)*	-0.00811 (0.00605)	0.028935 (0.01004)**
Club	0.005295 (0.00198)**	-0.00077 (0.00178)	-0.00119 (0.00152)	0.003867 (0.00117)**	-0.00212 (0.00143)	0.003825 (0.00165)*
Permanent Capital Ratio	-0.03552 (0.01882)*	-0.04672 (0.01554)**	0.007457 (0.01286)	0.077301 (0.02003)*	0.061768 (0.02836)*	0.076585 (0.03514)*
Single Commodity Conc.	0.000441 (0.00325)	-0.00659 (0.00530)	-0.00229 (0.00092)*	-0.00143 (0.00084)	-0.02178 (0.00898)*	0.006185 (0.00765)
Sell Participations	-0.00157 (0.00099)	0.002247 (0.00163)	0.001004 (0.00088)	0.001206 (0.00093)	-0.00117 (0.00187)	-0.00022 (0.00173)
Non-performing assests	-0.03453 (0.03072)	0.061560 (0.03619)*	-0.09745 (0.05497)	-0.19343 (0.14383)	0.068880 (0.03135)	0.119374 (0.03732)**
FSA guaranteed loans	-0.04722 (0.02455)*	-0.01352 (0.03507)	-0.00137 (0.02096)	0.035128 (0.00857)***	0.173699 (0.03150)***	-0.01178 (0.10254)
Operating costs	0.432773 (0.10980)***	0.541176 (0.10642)***	0.437726 (0.13804)***	0.023074 (0.04859)	0.341407 (0.14365)*	0.037832 (0.07004)
CoBank	0.004729 (0.00158)***					
Texas		-0.00229 (0.00194)				
Western				0.002558 (0.00183)		
ACA				-0.00095 (0.00206)		
PCA			0.001986 (0.00171)			
N	172	135	120	72	71	49
R-squared	0.3243	0.183	0.244	0.615	0.666	0.27
F	10.2***	4.25 ***	5.27 ***	15.18***	15***	3.17 **

* Significantly different from 0 at the .05 level

** Significantly different from 0 at between the .001 and .05 level.

*** Significantly different from 0 at greater than the .001 level.

Estimates are corrected for heteroskedacity.

See table 1 for definition of variables.

Table 7. Percentage Change in Spread Attributable to a 1 Percent Change in Selected Independent Variables.

	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6
Market Share	-0.24	-0.13	0.15	0.19	-0.05	0.45
Permanent Capital	-0.27	-0.36	0.05	0.48	0.01	0.42
Nonperforming assets	-0.03	.03	-0.03	-0.02	0.06	0.09
FSA guarantee	-0.06	-0.01	-0.00	0.05	0.09	-0.00
Commodity conc.	0.01	-0.10	-0.03	-0.03	-0.19	0.07