MARKET SHARE DETERMINANTS FOR COMMERCIAL BANKS LENDING TO AGRICULTURE

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Market share determinants for commercial banks lending to agriculture

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The University of Arizona, 1987

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MARKET SHARE DETERMINANTS FOR COMMERCIAL BANKS LENDING TO AGRICULTURE

by

Benard Nganga Theora

A Thesis Submitted To The Faculty of the

DEPARTMENT OF AGRICULTURAL ECONOMICS

In Partial Fulfillment of the Requirements
For the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

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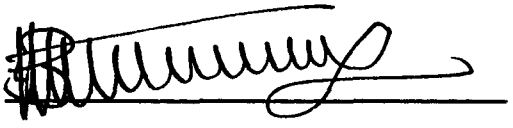
SIGNED: 

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This thesis has been approved on the date shown below:

Paul N. Wilson — March 19, 1987

P. N. WILSON — DATE

Professor of Agricultural Economics

DEDICATION

To my Mother, Cinana.

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ABSTRACT

This study has tried to investigate into the factors that go in to operation when commercial banks have to make their agricultural loan portfolio decision. Several factors were identified and an ivestigation was necessary to indentify the most important variables. The factor analysis technique was employed in an effort to group factors which were related by description together. Factor analysis though had some interesting results was dismissed because the factor groups failed to explain the behavior of market shares. It was decided that market share be decomposed into its Components of Change. After the decomposition, three components of change were identified. The percentage change in agricultural loan to deposit ratio, the percentage in commercial bnak deposit and the percentage change in the total agricultural loans were the component of change identified. An effort was also made to identify the factors that influenced change in the three components. Multiple regression mehtod was employed. The conceptual framework identified risk as the most important consideration when banks are deciding on loan portfolio. If the risk involved inlending to the agriculture sector was the same as that

involved in non-farm businesses, banks would be indifferent in their loan portfolio choice because the returns would be the same. The risk element varies between states and hence, variation in banks market shares. The regression results did not however, highlight the risk variable. Business atmosphere within a given state was also an important influence on banks loan decision.

CHAPTER 1

INTRODUCTION

IMPORTANCE OF FARM SECTOR DEBT

The agriculture business is a heavily capitalized industry. The capital requirements have increased enormously since the middle of the last century. Increasing land values together with more intensive methods of farming and the development of cooperative marketing have made it necessary for the farm to acquire larger working capital. Capital requirements for the farm can either be realized from the farm firm (savings) or from external sources in form of debt. As the capital requirements of farming have expanded, credit has become increasingly important in the operation of the farm. This has led to the individual farmers using credit facilities more extensively. (Barry Hopkin & Baker 1973)

A good indicator of the farming financial status is a balance sheet. Table 1-1 below shows the aggregate balance sheet of the farming sector for the period 1970-1984.

Preliminary data indicate that farm asset values increased during the period 1970-1983. In 1970, the value of farm assets was estimated at $326 billion (measured at current dollars). The value measured at 1972 constant dollar

Table 1-1.

BALANCE SHEET OF THE FARMING SECTOR: 1970 to 1984

Item	Current Dollars						Constant (1972) Dollars					
	1970	1975	1980	1982	1983	1984, prel.	1970	1975	1980	1982	1983	1984, prel.
Assets.....	326.0	576.4	1,108.3	1,082.0	1,061.4	955.8	356.5	458.2	621.2	521.7	492.9	427.8
Annual percent change	4.6	12.1	14.0	-1.2	-1.9	-9.9	.3	5.1	6.3	-6.4	-5.5	-13.2
Physical assets:												
Real estate	223.2	418.2	846.6	808.6	798.0	693.7	244.1	332.5	474.5	389.9	370.6	310.5
Non-real estate:												
Livestock and poultry	23.7	29.4	60.6	53.0	50.0	49.6	25.9	23.4	34.0	25.6	23.2	22.2
Machinery, motor vehicles	34.4	64.0	102.5	108.8	105.8	99.4	37.6	50.9	57.4	52.5	49.2	44.5
Crops stored	10.7	21.3	36.5	40.6	33.2	33.7	11.7	16.9	20.5	19.6	15.4	15.1
Household furnishings, equipment	10.0	11.7	19.4	23.0	24.4	26.1	10.9	9.3	10.9	11.1	11.3	11.7
Financial assets:												
Deposits and currency	12.4	14.5	16.2	17.4	16.2	20.0	13.6	11.5	9.1	8.4	8.4	8.9
United States savings bonds	3.6	3.9	3.8	3.5	3.6	3.6	3.9	3.1	2.1	1.7	1.7	1.6
Investments in cooperatives	8.0	13.4	22.8	27.1	28.5	30.0	8.7	10.6	12.8	13.1	13.2	13.4
Claims	326.0	576.4	1,108.3	1,082.0	1,061.4	955.8	356.5	458.2	621.2	521.7	492.9	427.8
Liabilities	54.5	91.7	182.3	217.2	216.2	212.5	59.6	72.9	102.2	104.7	100.4	95.1
Real estate debt	30.3	49.7	95.8	110.0	112.6	111.6	33.1	39.5	53.7	53.0	52.3	49.9
Non-real estate debt to-												
Commodity Credit Corp.	1.9	.4	5.0	15.4	10.8	8.7	2.1	.3	2.8	7.4	5.0	3.9
Other reporting agencies	17.4	33.0	63.9	72.2	73.9	74.2	19.0	26.2	35.8	34.8	34.3	33.2
Non-reporting creditors	4.8	8.5	17.7	19.5	18.9	18.0	5.2	6.8	9.9	9.4	8.8	8.1
Proprietors' equities	271.5	484.7	926.0	864.8	845.1	743.3	296.9	385.3	519.0	417.0	392.4	332.7
Debt/Asset	.167	.159	.164	.201	.204	.222	.167	.159	.165	.201	.204	.222

Source: USDA January 1986

was $356.5 billion. In the year 1983, the value of farm assets measured at current dollar was estimated at $1061.4 billion and $492.9 billion at the 1972 constant dollars. The value of farm asset measured at current dollars declined in 1984 by $105.6 billion. Estimating the real value of farm assets indicates that the value declined in 1984 for the third consecutive year. Most of the decline is attributed to a 12 percent drop in land values. There was also a drop in value of non real estate assets with most of the decline coming from crop inventories and in number and value of farm equipment and motor vehicles.

The total farm debt also increased for the period 1970 to 1982. In 1970, total real farm debt measured was estimated to be $59.6 billion. The value in 1982 had swelled to $104.7 billion. In 1983 and 1984 the value of farm debt declined to $100.4 and $95.1 billion respectively 1972 = 100. At the end of 1984, debt outstanding was reduced for all farm lenders with the exception of Farmers Home Administration and commercial banks.

Total farm debt is divided into two main categories: The real estate farm debt and the non-real estate debt. Real estate debt has averaged about half of the total farm debt during the decade of the 70s. In 1970 real estate debt was $30.3 billion and in 1984 real estate debt had increased to

$111.6, measured at current prices. In 1984, however, the real estate debt dropped by $1 billion. Non-real estate debt has persistently increased during the period 1970-1983. In 1984 non-real estate debt dropped by $2.7 billion from the previous year. It can therefore be concluded that although the total farm debt increased constantly during the 1970-83 period, 1984 recorded a drop.

Changes in assets and debts continued to increase proprietor's equity. Equity in 1980 increased by $654.5 billion from its 1970 level. For the period between 1981-1984, owners equity declined. In 1984 owners equity dropped by $81 billion from its 1980 level. The decline in equity value since 1982 may be explained by a decline in land asset values. The drop in equity indicates the diminished wealth position of the farmers. Farmers' ability to use assets as collateral to obtain loans is also limited by the drop in equity.

Debt are examined in relation to assets to obtain a perspective on both the financial leverage of the farm business and on the overall financial risk lenders face in providing loans to farm businesses. The higher the debt/asset ratio, the larger the share that lenders have in the farm's assets. Examining the debt/asset ratios also gives an indication of solvency problems. The farm

debt/asset ratio has been almost constant during 1970-1980. In 1970, this ratio stood at .167 while a decade later the ratio had only dropped by only .002. However, in 1981 the debt/asset ratio started to increase persistently. The ratio stood at .222 in 1984 indicating a heavier burden to the farming sector. This data can also be used to indicate the importance of debt as a source of funds to the farm sector.

Financial Intermediation

Financial intermediation is a process in which funds and securities are channeled between the savers on one side and the investors on the other. Financial intermediation can therefore be considered a two way flow in the sense that, while funds originate from savers and terminate with investors, securities originate with investors and end up with savers. The flow of funds arises because investors have need for funds that exceed their own capacity to generate funds. Flow of securities arises in order to assure the savers that the funds will be returned along with an additional payment for their use. Funds can be classified into two categories. The first category refers to debt funds. In case of debt funds, the investor (borrower) promises to repay the funds at a designated time along with interest as payment for using the funds. The second class of

funds refers to equity. In case of equity funds, there is no repayment promise and thus these funds are considered riskier than loans. The payment for providing equity funds is generally a share of the investor's profit. During hard business times when the profit of the investors is very small and a times equals zero, the saver either receives a very small amount proportional to the profit or zero share. Equity funds are therefore favored by savers when the business atmosphere is conducive to equity investments.

Securities can be divided into several classes but in this study, we will only refer to two major divisions. The first division which refers broadly to debt securities is generally know as a "note". The second division of securities is termed as "title" and refers to equity securities (Edmister 1980). The securities are also called financial assets because they reflect claims by their holders on the assets of investors who issue the securities. These assets originate from primary transactions between the saver and investor or between the saver or investor and the financial intermediary. Such participants constitute a primary market. A secondary market may exist where assets are sold from one holder to the other.

Financial intermediation has developed over time. In the early days when financial intermediaries were not well

established, financial transactions occurred directly between savers and investors. This arrangement is prevalent in the less developed countries even to the present time. Financial markets in these countries are not well developed . In the developed countries however, financial markets have undergone an evolution. Special financial intermediaries who can perform financial transactions more efficiently and safely than can individual savers and investors now control the financial markets. Along with these financial intermediaries (institutions) are laws and standard financial instruments that govern the money markets. Most of the intermediaries developed in response to a demand for services sufficient to generate a profit for them. The success of the intermediaries depends on their efficiency in performing the intermediation process.

Growth in financial intermediaries in the United States is evident from the increase in assets of commercial banks, mutual savings banks, life insurance companies, and savings and loan associations. One of the ways to examine change or growth of financial intermediaries is by looking at the ratio of assets held by financial institutions to the value of tangible national assets. At the beginning of this century, this ratio was estimated at about 1 to 7. Presently, the value of assets of all financial intermediaries represent

well over half of the nations assets. This should not be taken to mean that financial intermediaries own this much of the nation's assets. Liabilities of these financial intermediaries indicate that other economic units have claims on the assets of financial intermediaries (Edmister 1980).

Financial Intermediaries In The U.S.

Financial intermediaries are those institutions that sell securities to raise funds (money) and they simultaneously buy securities in another market. The working of the financial intermediaries can be explained through a flow diagram. As is depicted by diagram 1-1, the financial intermediary supplies deposits, debts and other securities. Then it demands loans and other investment which produce interest income. From interest revenue the intermediary pays interest expenses on its debts and operating expenses for labor, equipment, and facilities. After paying interest and operating expenses from revenues, the intermediary may either earn a net profit or loss. The managers of an intermediary plan ways of making profits by transacting for themselves and others in the financial markets. Transactions require labor and capital resources. Also transactions for the institution require investment analysis of the security itself, the security market and the general economic environment.

Financial intermediaries are classified as financial institutions but not all financial institutions can be categorized as financial intermediaries. Only those financial institutions whose general economic framework is depicted by figure 1-1 can be termed as financial intermediaries. The following is a general outlook of financial intermediaries in the US (Edmister 1980).

1. Commercial banks (CB)

Commercial banks are the most diversified and numerous of all the financial institutions in the United States. Commercial banks are an intermediary which attracts funds with deposits and invest money through a financial intermediary in consumer and business loans, state and local government bonds, and United States government bonds in domestic and international markets.

2. Saving Banks

This intermediary raises funds with time deposits only and invest primarily in long-term securities, bonds and residential mortgages. Savings banks attract funds from small investors.

3. Savings and Loans. This type of intermediary sells time deposits and invests in mortgages. The basic strategy of saving and loans associations has been to purchase funds directly from middle income savers and lend funds to real

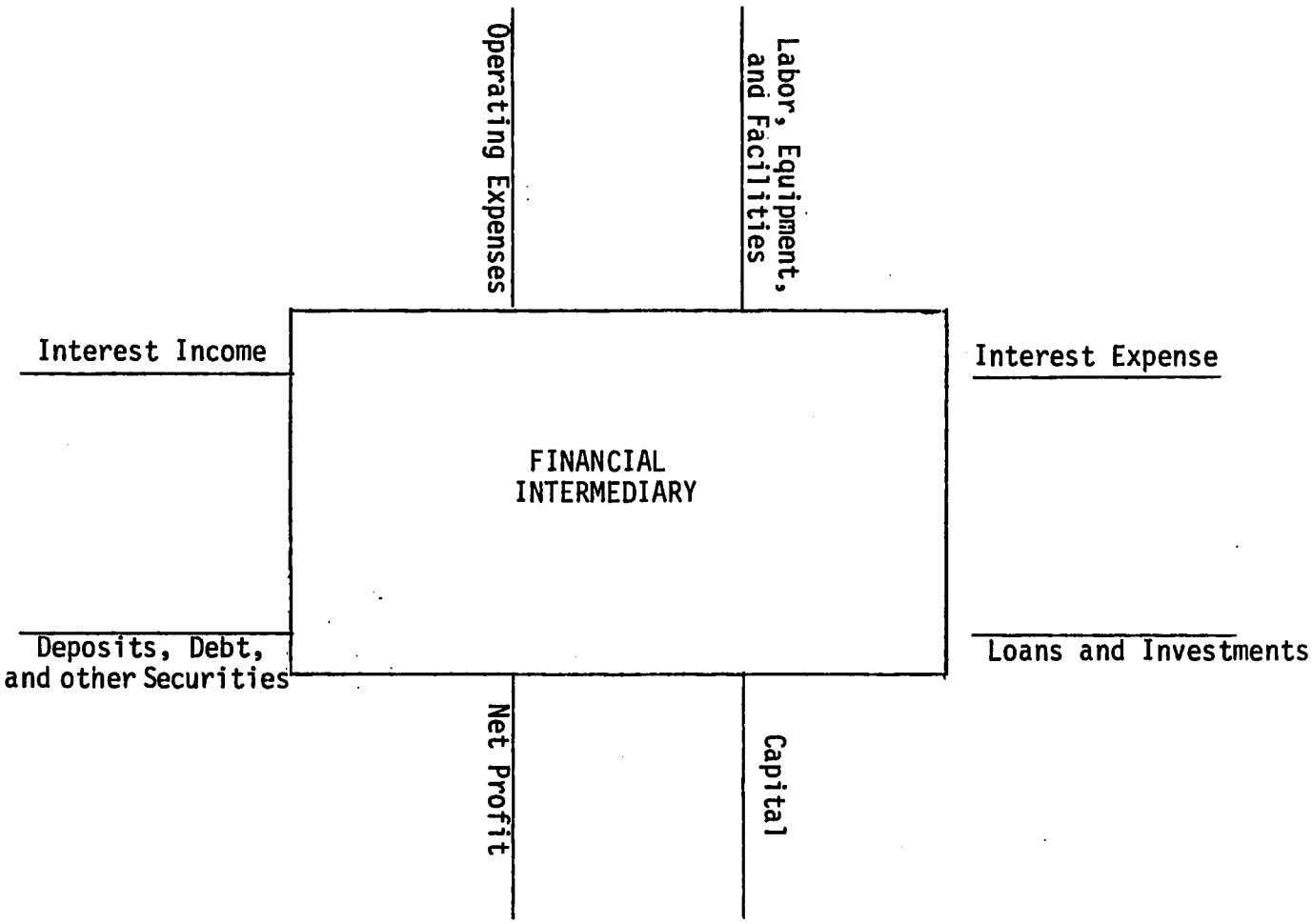

Figure 1*: Flow of income and expense, funds and securities through a financial intermediary.

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*This diagram is adapted from "Financial Institutions Markets and Management." (Robert O. Edmister, 1980)

estate buyers.

4. Credit Unions. These are a consumer saving and purchasing intermediary which pools saving to make mostly installment type loans to its members.

5. Finance Companies

Finance Companies are intermediaries that loan money to consumers and businesses with specialized loan arrangements. Finance companies raise funds by selling securities in the money and capital market and by borrowing from commercial banks. They usually buy money in large, wholesale quantities and retail it in small packages.

6. Life Insurance Companies (LIC)

LICs collect premiums from people and then invest the receipts until such a time when needed the funds are to pay death benefits, medical costs, etc.

7. Pension Trust

A pension trust is a fund established and maintained by an employer, union or individual to provide for the payment of definitely determinable benefits to people during retirement. In the process of providing for retirement income, pension trust function as intermediaries in financial markets. The trust receives small regular amounts from individuals which are aggregated and invested in large amounts in corporate securities and other long term

investments.

8. Investment Companies

Those type of companies exist in several forms but are best known as mutual funds. Mutual funds provide diversification by investing money in many marketable stocks and bonds selected by professional money managers.

9. Real estate investment trust.

There are real estate counterparts to investment companies. Only two decades old, real estate investment trusts are emerging, with growing pains, as a dynamic and demanded type of financial intermediary.

Need for Financial Intermediation in Agriculture.

There are several functions and important need for financial intermediation in agriculture. It is a proven fact that most of the saving takes place in the urban areas. In rural areas, there is high demand for funds to develop agriculture. The funds available are limited and therefore, there is a need to divert the metropolitan funds to the rural areas. The movement of funds from the urban and suburban areas to the farming communities in the rural areas is facilitated by intermediaries serving farming areas. This is the first function of intermediaries to the agricultural sector (Barry, Hopkin and Baker, 1979).

Second, some farmers require large sums of money to

finance their activities. Since savers are able to save only relatively small amounts of funds, a farmers would have to borrow from more than 100 savers to meet his or her needs. Through financial intermediaries, funds from these small savers are aggregated to larger units than are provided by most savers. Moreover, these funds must have unique time dimension to be of value to agriculture. Famers require seasonal operating expenses and loans for these particular purposes are repaid after the sale of farm products. At the same time farmers need long as well as intermediate-term financing for acquisition of depreciable assets and real estate. Financial intermediaries enable the farming community to acquire large amounts of funds with a unified time dimension.

Liquidity is a third characteristic because most farm securities must be modified to satisfy the liquidity preference of most savers. Some loans are given but must be repaid before the original purpose of the loan has been achieved. Such loans are of little if any value to a farmer. Some individuals and businesses are willing to commit funds to such an inflexible schedule of recall. Financial intermedition harmonizes the liquidity needed by savers with the liquidity of farm securities. This task is accomplished through having many savers in the bank. Savers deposit their

money in the bank but each has different time requirement for using the funds.

Risk associated with in most farm loans also must be modified if savers are ultimately to be interested in farm securities. Savers deposit their funds in banks because of the assured benefits. The banks in turn give loans to the farmers. The financial intermediaries substitute their own financial strength for the financial strength of the farmers. The bank depositors therefore do not look at the local farmers for the security of their deposits.

Financial Institutions and Their Market Shares of Farm Debt

The agriculture lending sector is composed of many different types of financial institutions. Among these institutions are Commercial Banks (CB), Life Insurance Companies (LIC), Farm Credit System (FCS), Farmers Home Administration (FmHA), Commodity Credit Corporations (CCC), Small Business Administration, and the non-institutional lenders - individuals and others (I&O). All these institutions have been competing with each other for a share of the agricultural market. Market shares of farm debt by lending institutions can change due to a variety of conditions: interest rate differentials, legal restrictions by the government, differences in services provided and many

others.

George Amols and Wilson Kaiser (1984), compiled a report showing debt shares by lender by state for each of the major financial institutions involved in the agricultural sectors for the period of 1960-1984. The report carries data reflecting changes in market shares for real and non-real estate debt.

National market share is calculated by dividing the outstanding debt for a particular lending institution by the total outstanding debt in the United States. Market shares are calculated for real estate and non real estate lending. Debt levels are also included to illustrate the absolute levels of debt outstanding by lenders.

The total outstanding farm real estate debt from 1960-1984 has been increasing for the entire period. During the decade from 1960-1970, the total debt increased by over twice as much and from 1970 to 1980, it increased by three times as much (see table 1-2).

Commercial Banks

Commercial banks are private, profit-making businesses chartered under federal or state laws. There is a variety of ways in which CBs operate: branch banking, limited branching, and unit banking. They can also operate under a

TABLE 1-2.

REAL ESTATE DEBT AND MARKET SHARES 1960-1984 (Nominal Dollars)

Year	Federal Land Banks		Farmers Home Administration		Life Insurance Companies		All Operating Commercial Banks		Individual and Other		Total
	%	Billions	%	Billions	%	Billions	%	Billions	%	Billions	Billions
1960	19	2.30	6	0.73	23	2.78	13	1.57	39	4.72	12.10
1961	20	2.56	6	0.77	23	2.94	12	1.54	39	4.99	12.80
1962	20	2.78	7	0.97	23	3.20	12	1.67	38	5.28	13.90
1963	20	3.04	7	1.06	23	3.50	12	1.82	38	5.78	15.20
1964	20	3.36	7	1.18	22	3.70	12	2.02	38	6.38	16.64
65	20	3.78	7	1.32	23	4.35	13	2.46	38	7.18	19.09
66	20	4.24	7	1,48	23	4.88	13	2.76	38	8.06	21.42
67	21	4.85	7	1.62	23	5.31	12	2.77	37	8.55	23.10
68	22	5.52	7	1.76	22	5.52	12	3.01	36	9.04	24.85
69	22	6.03	7	1.92	21	5.75	12	3.29	37	10.14	27.13
1970	23	6.72	8	2.34	20	5.84	12	3.50	38	11.10	29.50
71	24	7.27	8	2.42	19	5.76	12	3.64	38	11.51	30.60
72	25	8.05	8	2.58	17	5.47	13	4.19	37	11.91	32.20
73	26	9.13	8	2.81	16	5.62	14	4.91	36	12.64	35.11
74	28	11.06	8	3.16	15	5.93	14	5.53	36	14.22	39.90
75	30	13.38	7	3.12	14	6.24	13	5.80	35	15.61	44.15
76	32	15.87	7	3.47	14	6.94	13	6.45	35	17.36	50.09
77	34	18.77	7	3.86	13	7.18	12	6.62	34	18.77	55.20
78	34	21.52	6	3.80	14	8.86	12	7.60	34	21.52	63.30
79	35	24.99	6	4.28	15	10.71	12	8.57	33	23.56	72.11
1980	35	29.89	8	6.83	14	11.96	10	8.54	33	28.18	85.40
81	38	36.29	8	7.64	14	13.37	9	8.60	32	30.56	96.40
82	41	43.26	8	8.44	12	12.66	8	8.44	30	31.65	104.45
83	43	47.09	8	8.76	12	13.14	8	8.76	29	31.76	109.51
84	43	48.12	9	10.07	11	12.31	8	8.95	29	32.45	101.90

Source of Data: Agricultural Information Bulletin, Number 483.

correspondent bank, with a bank holding company or a claim bank.

Commercial banks have played a major role in financing the capital and credit needs of U.S. agriculture. They have contributed to financing the mechanization, modernization and growth of farm operations and to expanding U.S. food production. The commercial banks give short and intermediate loans (one to seven years) to the farmers. The role played by the commercial banks in providing credit to the farmers has been declining through the years. Among non real estate lenders, however, the banks maintained the most important position between 1950-1980 (Table 1-3).

Commercial banks have not been heavily involved in the farm real estate debt market. Since 1960, commercial banks have held an average of 13 percent of all farm real estate debt. Their share of the market has fallen since 1977 and is currently estimated at about 8 percent.

Commercial banks and I & O were the dominant lenders of non-real estate farm debt in the 1960s. In the following decade commercial banks shared this privilege with production credit association. (PCA)

Commercial bank share of the market increased steadily from 1962, when they held 36 percent of all nonreal estate debt, until 1974 when they held 51 percent. Since the mid-

TABLE 1-3.

NONREAL ESTATE DEBT AND MARKET SHARE BY LENDER 1960-1984 (Nominal Dollars)

Year	Production Credit Association		Farmers Home Administration		Federal Intermediate Credit Banks		Commercial Banks		Individual and others		Commodity Credit Corporation		Totals For US
	%	$Billions	%	Billion	%	Billion	%	Billion	%	Billion	%	Billion	Billion
1960	10	1.28	3	0.38	1	0.13	38	4.86	38	4.86	9	1.15	12.66
61	11	1.47	3	.40	1	.13	37	4.96	37	4.96	10	1.34	13.26
62	11	1.62	3	.44	1	.15	36	5.29	35	5.15	13	1.91	14.56
63	11	1.79	3	.49	1	.16	37	6.03	35	5.71	13	1.12	15.30
64	12	2.11	3	.53	1	.18	38	6.69	35	6.16	11	1.94	17.61
65	13	2.31	4	.71	1	.18	39	6.94	35	6.23	9	1.60	17.97
66	13	2.54	4	.78	1	.20	39	7.61	36	7.02	7	1.37	19.52
67	14	2.94	4	.84	1	.21	41	8.61	35	7.35	6	1.26	21.21
68	16	3.56	4	.89	1	.22	42	9.37	32	7.14	6	1.34	22.52
69	17	3.91	4	.92	1	.23	42	9.66	25	5.75	12	2.76	23.23
1970	19	4.52	3	.71	1	.24	43	10.23	22	5.24	11	2.62	23.56
71	22	5.32	3	.73	1	.24	46	11.13	20	4.84	8	1.94	24.20
72	22	6.03	3	.82	1	.27	46	12.60	20	5.48	8	2.19	27.39
73	22	6.56	3	.89	1	.30	48	14.30	20	5.96	6	1.79	29.80
74	23	7.80	3	1.02	1	.34	51	17.29	20	6.78	2	.68	33.91
75	26	9.59	3	1.11	1	.37	49	18.08	20	7.38	1	.37	36.90
76	26	10.92	4	1.68	1	.42	48	20.16	20	8.40	1	.42	42.00
77	25	12.18	4	1.95	1	.49	48	23.38	20	9.74	2	.97	48.71
78	23	13.66	5	2.97	1	.59	43	25.54	21	12.47	8	4.75	59.98
79	21	14.57	8	5.55	1	.69	41	28.45	21	14.57	8	5.55	69.38
1980	22	17.69	11	8.84	1	.80	39	31.36	21	16.88	6	4.82	80.39
81	23	19.87	14	12.10	1	.86	37	31.97	21	18.14	6	5.18	88.12
82	22	21.14	15	14.42	1	.96	34	32.67	20	19.22	8	7.69	96.10
83	19	20.27	14	14.94	1	.85	34	36.28	18	19.21	14	14.94	106.49
84	18	18.58	15	15.48	1	.82	37	38.18	18	18.58	10	10.32	101.96

Source of Data: Agriculture Information Bulletin Number 483.

1970's, commercial banks in particular have lost market shares. In 1984, Commercial banks held 37 percent of all nonreal estate farm debt. From table 1-3, it may be concluded that, during this decade it is only FmHA and CCC who are increasing their market share in non-real estate debt.

Several reasons are suggested as to why the role of CB's as a lender of nonreal estate capital has been declining. The first reason for change maybe related to changes in interest rate differentials. Government farm lending institutions have been providing low cost loans as compared to those given by CB's. The second reason could be explained by the increase in the farm sizes which results with heavy capitalization. Farm owners are therefore looking for large loans which small country banks are not able to provide. Bank liquidity problems also can be an important factor in determining banks' ability to meet the demand for farm borrowers. The loan to deposit ratio is usually used as the principal index of bank liquidity. Hence a high loan-deposit ratio indicates tight credit market conditions. Average loan deposit ratios of agricultural banks rose from 56 percent in 1975 to 68 percent in September 1979. This ratio has declined and almost stabilized at 58 percent.

Life Insurance Companies (LICs)

Life insurance companies have long been a significant source of farm mortgage loan funds for agriculture. Life insurance companies are profit oriented institutions with significant cash inflows from premium payments. They (LICs) hold large financial reserves which they like to invest in a diversified portfolio of low risk investments. Most real estate loans made by the life insurance companies are for 65 to 70 percent of the appraised value of the land. Maturities for these loans run from 10 to 50 years at market interest rates. As a result of high inflation and the use of fixed interest rate mortgages, life insurance companies have reduced the length of farm mortgage loans by 3-5 years. This procedure allows them to adjust interest rates more frequently.

Life insurance companies have played an important role in farm real estate debt markets. In 1960's the life insurance companies held about 23 percent of the market share. The role of life insurance companies as a lender to agriculture has been falling. In 1984 LICs held only 11 percent of the farm real estate debt. The reasons for this decline include an increase in demand for policy holder loans, increased returns to nonfarm investment and restrictive state usury laws.

Individuals and Others

Non-institutional lenders have been an important source of funds for farmers. Major sources of noninstitutional funds include merchants, dealers, personal loans and loan guarantees, and installment land contracts. Dealers for example find it very useful to lend to their clients for short-term operating loans in order to maintain their customers. In the State of Arizona for instance, cotton gins provide approximately 45 percent of the short-term operating loans to cotton producers. Individuals represent an important source of real estate funds. Typically, funds are made available through mortgages or installment loan contracts. Mortgages and installments require a downpayment with the remaining principal amortized over a 10 to 20 year period. The rate of interest in this category of loans is relatively low as compared to that charged by the other lenders. In some cases, especially when the lender and the borrower are relatives, the interest rate is zero.

Individuals and others have been the largest supplier of real estate debt capital during the last two decades (1960-1970). Table 1-2 above presents the outstanding real estate debt for United States. During the decade of the 60's individual and other held approximately 38 percent of the outstanding real estate debt. In the decade that followed,

I&O held approximately 36 percent of the debt. This share has declined steadily and in the current decade (80's) stands at about 30 percent.

One probable cause for the decline in I & O market share in the farm real estate debt market is the declining liquidity of the asset structure of farmers. Real estate assets have grown in importance over time so that a farmer who retires in 1984 has more need for cash than one who retired in 1960. An individual who wanted to buy a farm was more than anything else attracted by the purchase arrangements where a seller financed the buyer. The buyer enters an installment contract which requires him to pay only a small downpayment. This small downpayment represents less cash to the seller who has relatively few liquid assets to live on in retirement. The sellers now have many alternative investment opportunities for sales receipts.

Individuals and others have also been an important source of funds for non-real estate debt. The role of I & O has, however, declined nationally from a high 38 percent in 1960 to 18 percent in 1984. In the 1960 decade the share of outstanding farm debt averaged 35%. This figure fell to about 20 percent in the 1970s and still further to about 19% in the 1980s. It is explained that, as the size of the farm increases, the I & O institution is unable to meet financial

requirements of the farms. Increase in the size of the loans not only exceed the ability of individuals to lend, but also increases the need for recordkeeping to ensure the legal enforcement of payment. The cost of lending by I & O has therefore, gone up.

Farmers Home Administration (FmHA)

The FmHA, a federal govenment lending agency, was founded in 1946 and since its inception, it has grown tremendously both in size and activities. Originally, FMHA was meant to help farmers not well served by commercial lenders. Today FmHA provides emergency loans to borrowers whose characteristics more nearly fit into the commercial category. The number of borrowers served annually has increased and the dollar volume of funds loaned has increased also. More important, what was once a farm lending agency has been transformed into one which has a majority of its activities in the nonfarm sector of the rural economy. However, FmHA provides direct loans which include full range of short, intermediate and long-term loans. FmHA has credit which extends for periods of 1 to 40 years at moderately subsidized interest rates.

The role of Farmers Home Administration (FmHA) in supplying real estate debt has remained almost constant

between the period 1960-1979. Since 1980, its market share increased to 8 percent and has almost remained constant. In 1984, its share increased to 9 percent. The increase in the share of real estate debt held by FmHA was primarily due to growth of the economic emergency loan program which provided loans for real estate purposes.

FmHA has increased its role in providing non-real estate loans since 1977 FmHA's share has increased from 4 percent in 1976 to 15 percent in 1984. The major reason given is the initiation of economic emergency program and disaster loans (see table 1-3). It should also be pointed out that FmHA is regarded the lender of the last resort.

Commodity Credit Corporation (CCC)

The Commodity Credit Corporation was formed in 1933 with the original purpose of helping to minimize the effects of depressed commodity prices. The role of CCC has changed over time as government farm programs and farm economic conditions have changed. The farmers are using CCC as both a residual market and as a speculative and marketing aid. CCC loans continue to be an important element in minimizing the effect of depressed commodity prices on farm income; however, program emphasis has shifted to crop inventories. The loans given by CCC are non-recourse in the sense that, if farm

prices are below the loan rate, the commodity pledged as collateral can serve as full payment of principal and interest on the loan; the loans thus assure a farmer of a minimum price. If loans are repaid by redemption, the participant must repay the principal, plus interest based on CCC interest rate charges, and storage costs for the length of the loan. If on the other hand CCC takes title to the commodity as fulfillment of the loan obligations, the participant pays no interest on the loan but must pay for storage costs. The basic eligibility requirements for a CCC loan are that producers comply with USDA's allotment or set aside programs and store their crops in CCC approved facilities.

CCC loans are primarily a tool of farm policy. However, they do substitute for commercial sources of debt funds. Since 1960, the share of farm non real estate debt held by CCC has ranged from 1 percent in 1976 to 14 percent in 1983. In 1984 the market share was estimated at 10 percent (Table 1-3).

The Farm Credit System (FCS)

The Farm Credit System is a federation of special purpose institutions created by and initially capitalized by the government to better meet the financing needs of U.S.

agriculture. Today the FCS is owned and operated by its members although the FCS operates under the supervision of the Farm Credit Administration (FCA), an independent agency in the executive branch of the United States government. Within the FCS are three major financial institutions: (1) the Federal Land Banks (FLBs) and the Federal land Bank Associations (FLBAs), (2) The Federal Intermediate Credit Banks (FICBs) and Production Credit Associations (PCAs), and, (3) The Central Bank for Cooperatives and the district Banks for Cooperatives (DBCs).

The FCS began in 1916 with the establishment of Federal Land Banks (FLBs) to provide long term real estate mortgage loans to farmers. The terms of these loans were designed to be compatible with the unique characteristics of agriculture and were more reasonable than those available from other lending institutions. This purpose is essentially unchanged today.

The FICB was created in 1923 through the Agricultural Credit Act. Its purpose was to provide discounting privileges to commercial short-term lenders in agriculture. For several reasons, farmers did not receive the credit services they needed. In response to this, the Congress in 1933 authorized farmer-owned Production Credit Associations (PCAs) to channel short - and intermediate term loans to

farmers that could be discounted with the FICBs. PCAs are the owners of the FICBs and PCAs obtain their funds through the sale of FICB bonds in the nation's money market.

The Banks of Cooperative which were organized in 1933 are the third key part of the Farm Credit System. There are thirteen banks of cooperatives (one for each district) and a central Bank of Cooperatives. The banks are owned by the cooperative borrowers and provides seasonal and term loans to farmer-owned marketing, supply, and service cooperatives. Funds are provided from sale of Banks of Cooperatives bonds in the money market.

The fiscal agent is the individual responsible for the sale of farm credit bonds and discount notes for the FCS. The bonds and notes are sold to a nation wide claim security dealers who then sell them to CBs, state and local governments, thrift institutions, corporations and foreign investors. Agency securities usually trade at yields that fall between yields on U.S. Treasury securities and prime corporate bonds of comparable maturities.

The Federal Land Banks' share of the real estate lending market has increased steadily. During the decade of 60's, the FLB share averaged at about 21 percent. In the early 1970's FLBs held about 27 percent of the debt and this share increased to 34 in late 1970's. by the year 1984, FLBs

had increased its share of the market to 43 percent (Table 1-2). The market share for FLB's does not show any signs of declining.

This growth in market share for the FLBs is explained by many factors, including lower average interest rates than other lenders, availability of loan funds, a specialization in farm real estate,and liberalization of their lending authorizations in 1971 and 1980 legislation.

Variation in Market Shares Between States

Market shares for financial intermediaries are not evenly distributed among states. Hence, there is a tendency of some particular lenders concentrating in some regions or in some states. This may result with a state getting most of the farm credit from that particular institution(s). Several factors influence lending institutions to operate in some stattes while in others they do not. While in some states competition between lending institutions is encouraged, in yet other states, it is not allowed. This is because state laws are different for different states.

Tables 1-4 and 1-5 shows the market share by lender for 10 selected states which represent the 10 agricultural regions according to the U.S.D.A. classifications. Farm real estate market shares are given in percentages. This data is

Table 1-4.

Farm Real Estate Market Share By Lender January 1, 1983 For Ten Representative States.

	FLB	FmHA	LIC	All Operating Banks	I&O
Arizona	20.2	11.5	30.8	1.7	35.8
California	40.7	2.2	21.7	6.1	29.2
Georgia	57.9	8.9	7.7	12.5	12.9
Iowa	36.4	4.7	11.7	3.9	43.3
Kentucky	38.4	11.9	7.8	17.8	24.1
Minnesota	44.3	6.1	8.2	5.0	36.4
Mississippi	45.9	11.8	16.4	11.1	14.7
Nebraska	41.9	9.6	17.3	2.7	28.5
Pennsylvania	37.6	9.8	2.0	22.7	27.9
Texas	36.9	6.1	15.1	9.2	32.7
US	43.1	8.2	11.7	7.7	29.2

Source: Amols and Kaiser, April 1984.

Table 1-5.

Farm NonReal Estate: Market Share By Lender January 1, 1983
(For Ten Representative States)

	All Operating Banks	PCA	FICB	FmHA	I&O	CCC
			PERCENT			
AZ	37.9	14.8	.8	19.4	22.1	5.2
CA	46.4	23.4	.6	7.2	20.4	1.9
GA	12.5	23.2	0		18.6	3.6
Iowa	42.9	12.4	.2	5.0	16.2	23.2
KY	33.6	29.7	0	17.0	16.0	3.7
MN	35.6	17.2	.9	7.3	13.1	25.8
MS	16.3	12.8	2.1		13.5	9.0
NB	41.3	10.0	.4		15.3	27.4
PN	26.8	23.6	1.8	12.3		2.9
TX	33.4	13.1	2.2	14.4	21.9	15.0
US	33.8	18.8	.8	13.8	18.3	14.4

Source: Amols and Kaiser, April 1984.

given for the year starting in January 1, 1983. The data indicate that in 1983, most of the real estate debt was from the Federal Land Bank. All the states, a part from Arizona, have over 36% of their outstanding debt originating from FLBs. Arizona has only 20% of her outstanding debt coming from the FLB. Individuals and others is the next most important source of farm debt for most of the states. For Arizona, individuals and others was the main source of funds in 1983 accounting for 35% Iowa is the other state that heavily depended on individual and others for her debt funds (43.3%). Minnesota had 36.4% of her farm debt originating from individuals and others while Texas had 32.7%. In 1983 the states with the lowest share of the indiviudals and others market were Georgia with 12.9% and Mississippi with 14.7%.

Life Insurance Companies are an important source of farm debt. Some states for example Arizona (30.8%), California (21.7%), Nebraska (17.3%), and Mississippi (16.4%) borrow heavily from LICs. Pennsylvania was the only state with less that 3% of her real estate farm debt originating from the LICs.

Farmers Home Administration is an important lender of farm real estate debt to the agricultural sectors. In 1983 most of the states borrowed over 6% of their real estate debt

from this source. California and Iowa borrowed least from FmHA.

The largest source of non-real farm debt is the commercial banks. In the country as a whole, commercial banks accounted for 33.8% of the non-real estate debt. Production Credit Associations were second with 18.8% followed by individuals and others with 18.3% and then the Commodity Credit Corporation with 14.4 percent. In 1983, FmHA (13.8%) and FICB (.8%) contributed least to farm non-real estate debt.

The same national pattern is followed by the states although some states differ slightly. Out of all the ten states, Georgia, Mississippi and Pennsylvania borrowed least from the commercial banks in 1983. All the other states had over 33 percent of their total farm non-real estate debt originating from CBs. California had the highest share of her non-real estate debt from CBs. The next most important source of non-real estate funds was Production Credit Associations (PCA). All the states have over 10 percent of the non-real estate debt from PCA. Nebraska (12.8%) and Texas (13.1%) borrowed least from PCA in 1983. Individuals and others was the next most important source of funds in 1983. Pennsylvania had over 32 percent of her non-real estate debt from I & O. FmHA was the major source of funds

for Georgia and Mississippi. Commodity credit corporation was important for Nebraska (27.4%), Minnesota (25.8%) and Iowa (23.2%). Federal Intermediate Credit banks contributed very little to the non-real estate funds. However, this source was important for Texas (2.2%), Mississippi (2.1%) and Pennsylvania (1.8%).

There are several factors responsible for state to state variation in farm market shares of a particular lender. Economics, political, and social factors play important roles in market share variation between regions and states. These factors will, however, be examined in details in a later chapter.

Research Objectives

The objectives of this research project are:

(1) To review the literature on factors influencing shift in market shares (real estate and non-real estate).

(2) Present a conceptual model of commerical bank behavior.

(3) Investigate the functional relationship between socioeconomic conditions in states and the market share behavior of commercial banks.

CHAPTER 2

REVIEW OF LITERATURE

Demand for and supply of capital in the agriculture sector has been an important issue for the last three to four decades. The concerns of many researchers and politicians have focused on the adequacy and availability of capital to the farm sector. This concern has resulted in many agricultural economists and finance specialists dedicating their research work to three broad topics: demand for credit, credit, supply and market shares in the agricultural sector.

Demand For Credit

Demand for capital is a derived demand based on the potential net returns from investment opportunities. There are several activities which require the use of funds on the farm. Funds are required to purchase inputs, (machinery, fertilizer seeds), for land transfers, and sometimes to finance old debts. In most of the farming districts, the net returns to the farm is not large enough to meet the capital requirements of the farmers. Using this proposition as a point of departure, several researchers have estimated

capital needs of individual farm firms. For example Plato, Wise and Suanders (1970) used linear programming to determine the minimum investment in operating and long term capital required to achieve given levels of net farm income on a Georgia farm.

For estimating the net returns to capital, some studies have employed the Cobb Douglas production functions or other econometric approaches relating the demand for capital to its costs and returns. Yolopoulos (1967) demonstrated that such analyses are improved if capital inputs are specified as service flows rather than capital stocks. He also suggested a methodology for estimating service flow inputs from the more readily available data on capital stocks.

John Brake (1966) examined the capital and credit needs of the farm sector in relation to likely future structural changes in American agriculture. According to Brake, four major factors have contributed to structural changes in agriculture. The first factor is innovation which includes increased mechanization, new inputs, new methods of production, new markets and new marketing procedures. The second factor Brake identified was specialization. This has made farms less self sufficient and dependent on purchased inputs among them pesticides, herbicides, fertilizers and new seed varieties. The third factor mentioned is the changing

relative inputs and changing prices between inputs and products. The forth and last factor identified by Brake is improved management potential.

Brake examined the future structural change in the agriculture sector and concluded that, many of the changes mentioned above will continue in the foreseeable future. Further mechanization and specialization are likely. Certainly, new innovations will continue. Further price increases in machinery, real estate and other intermediary inputs seem almost inevitable. Money has to be generated in order to finance this structural change in the farming sector. The question many economists and policy workers have asked is, if this trend in capital and credit needs continues, how will the farm sector finance it. There are two major sources of funds in to the agricultural sector. The first, refered to as internal source is the farm sector itself where it generates funds from within (savings). The second source of fund is the external source whereby the farm sector obtain funds from without in form of debts.

Brake used flow-of-funds concepts and the internal external financing dichotomy as a means of obtaining a projection of increases in farm debt in 1980. His projection of $100 billion in outstanding debt in 1980 was widely publicized and served to alert lenders and others to the

logical case for continued large increases in farm loan demands over a protracted period. As it turned out, the $100 billion debt level which startled many observers in 1966 was reached earlier, most probably in 1977 largely because assets and input prices have been rising faster than Brake ever assumed.

In 1969 Melichar and Doll used flow accounts as the appropriate vehicle to employ in measuring past capital requirements and seeking insight into credit trends. They updated the capital formation series through 1968 and incorporated the new USDA series showing the annual value of farm real estate transfers. Debt was found to have provided 16 percent of total sources of funds between 1965 and 1968 compared with 13 percent in early 1950's. The proportion of cash flow that farmers devoted to financing the capital flow had fallen during the 1950's and in the next decade fluctuated around its new lower level (63 percent). Melichar and Doll have also used the flow-of-funds framework more fully as a vehicle for projecting increases in debt. Using three projections of 1980 capital stocks made respectively, by Heardy and Tweeten, Heady and Mayer, and Brake, they estimated the capital formation and value of farm transfers that were implied. The authors later estimated the amount of internal financing by estimating future cash flows - the sum

of net income and depreciation allowances and then assuming that the proportion of this flow devoted to meeting capital needs would remain at recent levels. The results arrived at were that capital requirements will continue to increase. The projected increase in debt was therefore, obtained as the residual difference between these projections of capital flow and internal financing. The debt implied for 1980 by the three alternative models ranged from $91 billion to $137 billion.

The flow-of-funds and asset demand studies which were done in the 1960s revealed that the rate of real capital formation in agriculture had been relatively low since the early 1950's. Over the postwar period growth in real estate stock had slowed to virtually zero, real cash balances were falling and physical stocks of lifestock and machinery, while highly cyclical, on balance showed only moderate growth. Thus the observed rapid growth in farm loan demands could not be attributed to high rate of physical expansion. Brimmer (1968) noted the important factors in loan demand were inflation in land and machinery prices plus the impact of farm reorganization and enlargement. More recently, demand for loans was also stimulated by unusually large increases in the prices of annual operating inputs.

Hesser and Schuh (1962) in their paper "Demand for

Agricultural Mortgage Credit," have examined the various factors that influence the demand for farm debt. The authors started by pointing out that a complete study of the market for farm mortgage credit would deal with at least three concepts of credit: stock of debt outstanding; the annual gross flow of farm mortgage loans; and the net flow or loans closed less repayments. Their study, however, concentrated on the annual gross flow of farm mortgage loans or the volume of farm debt closed during the year. They developed a theory which attempted to explain the gross flow of debt funds into the agricultural sector. Their theory was expected to explain the later relationship with the existing stock of mortgage debt and also to recognize that mortgage funds are used both to finance new capital and to transfer ownership of real estate. This same theory was used by Melichar in his study on demand for and supply of farm capital and credit.

The first factor that was recognized in the Hesser and Schuh study was the cost of credit or the rate of interest. The authors hypothesized that the amount of credit demanded is inversely related to the rate of interest charged. The rate of interest or cost of credit may be examined from different perspectives. Besides the rate of interest, factors such as terms of loan which includes payment period,

amount of annual payment and size of down payment may influence demand for credit. However, Hesser and Schuh used the rate of interest as the only price factor.

The second factor examined was the rate of saving in agriculture. The hypothesis in this case, is that, as the rate of saving increases, which implies availability of internal funds to finance capital flow on real estate transfers, the less need will be for credit or external financing.

The real price of farm products also is an important independent variable in the demand for farm credit equation.

A fourth factor is the price of labor because of the importance of labor in the capital labor substitution process. Technology was considered to be a fifth factor because it influences demand for farm credit. A final factor included in the model is mortgage debt level. In this case, the authors assumed that new credit will be used to refinance part of mortgage debt. The results from this study indicated that demand for long term farm credit is interest elastic. This implied that a decrease in the rate of interest would result with an increase in the quantity of credit demanded, other things remaining constant.

Internal funds were found to have an elasticity greater than one and were the most volatile of the demand shifters in

the short run. This suggests that fluctuations in internal funds are one of the main forces causing fluctuation in the quantity of farm mortgage credit demanded. The greater elasticity was assumed to imply that farmers had a higher propensity to save and used a large amount of the saved funds to accumulate assets. Demand was also found to be elastic with respect to farm wage rate and is related positively. According to Hesser and Schuh, this is an indication that, capital (with a derived demand for credit) tends to be substituted readily for labor with increases in the wage rate.

Melichar (1973) attempted to highlight the different causes of increase in farm debt. He started his discussion by examining the trend in outstanding farm debt. In 1972 outstanding farm debt was estimated at about $64.6 billion having risen steadily from a low $7.6 billion in 1946. In 1962, the outstanding debt was estimated at $27 billion. He projected an increase in farm debt for 1972 to be $4.69 billion.

Melichar tested the standard analysis which attributes increase in debt mainly to additions of capital assets and increases in land, machinery and other input prices. To test this hypothesis, he performed a second simulation in which he specified that all real capital stock remain unchanged at

their January 1, 1972 level. The result was that, the projected increase in debt during 1972 was $4.63 billion. In a third simulation, he specified that neither the general price level nor any asset price could change during 1972. The projected increase in debt was $4.20 billion. He finally carried out a fourth simulation in which he held the prices (interest rate) and real stocks constant. The projected increase in debt was then $4.16 billion. Melichar concluded that his projection and those made by Evans (1969) were identical but they differed in their explanation of the factors responsible for the increase. Melichar argued that in his model, only $530 billion increase in farm debt was attributable to casual factors like interest rates, real capital stocks, input prices and increase in land and machinery prices. He asserted that the other increase in debt ($4.16 billion) could be explained through the flow of Capital and Credit Model.

Melichar explained that, the capital flow that has to be financed has to be identified, quantified and then summed. This sum was financed externally through increase in debt or internally from farm cash flow. Since the increase in debt is known, then the amount of internal financing is computed by calculating the difference. Insights into the causes of any past changes in outstanding debt can be obtained by

noting the course of the total capital flow over time and by observing the behavior of such ratios as the percentage of cash flow devoted to internal financing.

For the purpose of simulation and projection, further steps were necessary. The first step, was to develop equations for the component of capital flow and then solve these equations to obtain estimated total capital flow. The same was done for the components of cash flow. Another equation specifies the saving rate which is the proportion of cash flow that farmers will allocate towards meeting their capital flow. One then computes the amount of internal financing. The difference between that amount and the total capital flow is the increase in debt that will occur.

The components of capital flow includes expenditures for new machinery, building and land improvements. Changes in holdings of livestock, stored crops and financial assets; and an annual capital requirement associated with the largest farm input, land. According to Melichar, the sum of all these capital flow refers to the total annual amounts that had to be financed. Melichar refused the allegation that financing needs have been going up and up. He asserts that this was not so during the study period. Melichar pointed out that between 1965 and 1970, a period of six years, there was hardly any increase. In the early 1950's the trend was

down. During some years, however, there may occur a boom in either machinery or land buying. In 1965 and 1971 a boom in machinery buying and a spurt in land market activity caused capital flow to be financed to rise faster percentage-wise, than the value of stock.

After examining the capital flow item by item, Melichar also examines the cash flow components. He argues that what is important in cash flow is the net income to the farmers because this is the amount at his or her disposal. The farmers can therefore, spend the cash flow as they wish. Melichar notes that part of the cash flow labeled capital consumption is essential because, this part is averaging 28 percent of cash flow.

Melichar then looked at the relative capital financing burden. Between 1965 and 1979, capital flow has averaged .52 of the cash flow. During the period of the study Melichar asserts that capital flow was the highest. He, therefore, concluded that, if the farming sector was allocating this proportion of cash flow toward financing capital flow, there would be no increase in outstanding debt. Melichar projected outstanding debt to reach $110 billion by the year 1980. He quickly pointed out that the outstanding debt grew at a rate of 6.7 percent during the 1970 decade which is less than past experience.

All these studies on the future need for capital and credit suggest that use of agricultural credit will increase markedly in the years ahead. Only a small fraction of capital needed by the farmer will be financed from flow of capital from within the farm sector. Most of the capital needed for the farm sector will have to be financed through credit. Continued assurances of available and adequate credit will be necessary to enable agriculture maintain productive efficiency and high levels of farm income.

If this high demand for credit funds is felt then we need to examine the existing fiscal policy and know whether in reality if favors the farm sector. Before that can be done, let us discuss the assets and debt situation in the farm sector.

Credit Supply

As mentioned earlier in this chapter, policy makers and farmers have been greatly concerned about the availability of credit funds to the farm sector. During recent bad business atmosphere, agricultural finance researchers and experts became pre-occupied with devising means of improving the flow of credit funds to farmers and to rural areas. The questions being asked by most economists especially those outside the field of agriculture are, "Are the financial institutions

serving the agricultural sector adequately?" Why is the fiscal policy of the government in favor of the agricultural sector as compared to other rural and urban enterprises? Can this bias towards agriculture be justified?

Hesser and Schuh, (1963) examined the factors affecting the supply of farm mortgage credit. The authors started their analysis by examining different hypothesis concerning the supply of farm credit. The supply of long-term credit to agriculture is hypothesised to be a positive function of the farm mortgage rate of interest, relative to the non farm rate. Other things remaining equal, increasing quantities of agricultural credit per unit of time will be supplied at successively higher relative rates of interest.

According to the authors the loanable-funds theory of interest suggests that the supply of loanable funds is a function of the rate of saving, changes in the money supply, and cash hoarding or dishoarding. The supply of credit to a major industry of an economy would be influenced by these same variables, although different industries may be affected differently. It would be expected that the supply of mortgage credit to agriculture would be increased with an increase in the rate of national saving, with an increase in money supply, or with dishoarding.

It is also hypothesized that, the supply of credit to

agriculture is a function of lenders' expectations concerning the ability of farmers to repay. It may also be hypothesized that lenders consider the value of agriculture's assets in deciding how much credit to extend.

A stochastic, simultaneous equations model was postulated with one equation representing the demand for farm mortgage credit and one for supply. The parameters were estimated by the limited information technique using national time series secondary data. All data measured in dollars were deflated to reduce multicollinearity.

Statistical results suggest that the supply of long-term farm credit is elastic with respect to the farm mortgage rate of interest. The maintained hypothesis was that the quantity of farm mortgage credit and the rate of interest are mutually and simultaneously determined that is, that the supply curve has a positive slope. The results also indicated that the supply of farm mortgage credit is inelastic with respect to both national saving and changes in the money supply. The relatively large average annual percentage fluctuations in these variables, however, indicate that noticeable shifts in supply conditions do occur from these factors.

Lee (1971) carried out research in an effort to answer the above anomalies. The thesis of Lee's article is that,

while the agricultural money markets are imperfect, they are adequate to ensure the necessary production of food and fiber. He further suggests that there has been some kind of discrimination in favor of agricultural borrowers which may have resulted in over-investment in the farm sector. Lee starts his paper by trying to define 'adequacy of money markets.' He argued that adequacy has not been rigorously defined and that the financial institutions serving the farm sector have not been studied in order to examine their effectiveness. He, however, accepted the observation that economic logic permits us to tentatively conclude that the money markets serving the farm sector are adequate to meet our basic needs.

In his effort to define "adequacy" Lee mentioned that if the term is defined to mean that every farmer can get all the funds he wants up to the point where the marginal value product of the money he borrows is equal to the prevailing interest rate charged, then the money markets are not adequate. Lee suggested that this is not a good measure or a good definition of adequacy. He defined adequacy of the money market for the farmers as a situation when farmers are able to produce enough food and fiber to meet the market demand. If this was to be taken as a general definition, the observation and economic logic permit us to conclude

tentatively that the money markets serving the agricultural sector are adequate to meet this basic need.

Lee was quick to point out that money markets in their lending process are motivated by profit just like any other business establishment. He mentioned that financial institutions allocate their scarce resources among competing agents. The farmers are expected to bid for funds thereby competing with other agents. The question then should focus on whether the farmers are out bid by their counterparts in other businesses. Lee pointed that the farmers are not outbid by the other economic agents because, if by any chance they were, basic economic theory suggests that production would fall and prices would consequently rise. Returns to agriculture would again be sufficient to draw in new funds. This fact has been proven over and over again by the interactions of supply and demand.

Lee argued that his evaluation was not entirely based on the theory. He called upon economic minded individuals to examine the situation the country was in which was characterized by over production and a need for supply management. This according to Lee was enough evidence that production was taking place which was further proof that investment in the farm sector continued. This is so despite the national outcry of inadequate credit by the farmers and

talk of low returns to agriculture. Lee acknowledged that forty or so years ago, by any reasonable measure, the farm sector was disadvantaged in the money markets, since World War II, there had apparently been discrimination in favor of agriculture in the national allocation of money. Through this biased policy towards agriculture,the money market has significantly been distorted. The money markets were not allocating funds to those sectors where productivity is maximized or where they receive maximum returns. If the money markets were to act on their own interests and seek to maximize profits, they would redirect funds to other sectors of the economy.

In his conclusion Lee showed how the money markets serving agriculture were distorted. Among the tools employed to distort the equilibrium of the money markets serving the farm sector were isolation of funds, federally sponsored lending institutions whose only customers are farmers, subsidized credit to agriculture, commodity programs which assure the farmers a particular price, and restricted interest rates. Lee also looked at another measure of adequacy for the money market. This time the question investigated was whether the existing institutions provide the kind of agriculture the nation wants. It is not easy to answer this question. The questions of adequacy has the

qualitative and quantitative connotations. While the money markets are sufficient in the sense that the country is able to meet basic needs,there is no assurance that the necessary funds will be forthcoming in a manner consistent with the nation's goals for the farm sector. National goals are not explicit and thus it is difficult to measure adequacy through this approach.

David Lins in 1972 did a study to measure factors underlying net changes in farm real estate debt. His study covered the periods 1947-1969. During these periods, farm real estate debt increased from about $5 billion to over $27 billion. The net annual changes in farm real estate debt for this period ranged from a low of $0.1 billion in 1947 to over $2.3 billion in 1965. Lin asserted that the determinants of net changes in farm real estate debt can be grouped in two broad categoreis - those affecting supply of funds available to farm borrowers, and those affecting the demand for funds by farm borrowers. A change in total demand may result from either a change in interest rate (price) or from other factors such as change in income. It is difficult to distinguish factors causing changes in the level of outstanding debt from published data. This knowledge can be acquired from examining the nature of demand for real estate funds and the intermediaries supplying funds to the farm

sector.

Lin identified five distinct groups that supply farm mortgage funds to the farm sectors, the Farmers Home Administration (FmHA), Federal Land Banks (FLB), Life Insurance Companies (LIC), Commercial Banks (CBs), individual and others. For the study period, the amount of outstanding real estate loans held by FmHA never exceeded 4 percent and was as low as 1.8 percent in 1969. Federal Land Banks share averaged over 19 percent during this period. Life insurance companies increased their share of real estate loans from 18 percent in 1947 to approximately 25 percent in 1957. Since 1957, their share of the market has been declining steadily. Banks and individuals have held relatively constant proportions of the total real estate debt, approximately 14 and 40 percent respectively. Relative elasticities of supply for the five groups are expected to vary substantially. Other studies have concluded that elasticity of demand for farm mortgage funds is elastic. These estimates, however, were on aggregate gross flow basis.

In constructing his models, Lins used a general hypothesis that, demand for farm real estate debt is primarily a function of the cost of borrowing, Capital appreciation, net farm plus non farm income, and the ratio of money balances to gross production expenses. His assumptions

were that, there exists a negative relationship between the cost of borrowing and the debt level. He also assumed a positive relationship between capital appreciation, net farm plus non-farm income with changes in farm real estate debt. Lins expected a negative relationship between the ratio of money balances to gross farm production expenses and net changes in real estate debt. After running a regression for his supply equation, Lins found that, own price elasticity of supply for life insurance companies and individuals was elastic. For commercial banks, own price elasticity was found to be inelastic. Supply from Federal Land Banks was treated as elastic but this was only by assumptions. Own price elasticities of supply and demand for farm mortgage funds are key items in determining the expected impact of monetary policy on the level of farm real estate debt in the farm sector. The elasticity estimates produced by Lin's equations suggested that in general, the impact of interest rate changes will vary by lending institution and that the greatest impact may be on supply rather than demand. Estimated elasticities of demand shift variables indicate that net changes in real estate debt are much more sensitive to changes in income than to capital appreciation.

Market Share

Robinson and Love (1979) examined the changes in market shares held by the Federal Land Banks (FLB) and the Life Insurance Companies. In 1965, Life Insurance Companies held 23 percent of all outstanding loans but this figure had fallen to 13 percent at the end of 1977. The Federal Land Banks (FLB) which held 23 percent of outstanding farm mortgage debt in 1965 held 34 percent at the end of 1977. The FLB's and LIC's share of the market has totaled to an average of 45 percent since 1965 to the time of this study (1979). If the market share of the LIC is declining but their combined market share (FLB plus LIC) has been increasing, then it is obvious that the FLB is servicing part of the farm debt once serviced by the LICs.

Robinson and Love tried to examine the possible causes of this transfer in market shares from the LIC to FLB. They outlined four possible causes of the change in market shares. The first cause, according to the authors is the adoption of variable interest rate by the FLB. With the variable rate, FLB could increase interest rates on outstanding as well as on new loans dependent on changes in bond costs. The second cause is liquidity problems of the LIC. While the FLB were having problems covering bond costs, LIC farm mortgage loan departments were having other difficulties. Policy loan

outstanding increased by 258 percent from 1965 to 1977 while LIC assets increased by only 121 percent for the same period. The increased demand for policy loans which LICs are required to supply reduced the amount of funds available for other investments such as farm mortgage loans.

The third cause was the 1971 Farm Credit Act. The Act gave authority to the FLB to increase their farm mortgage financing from 65 percent to 85 percent of the appraised value. FLB responded to the increased lending authority and not only did it lend to new customers but also increased the size of loans for those who already had the policy loans. The final factor considered was the quasi-public image of the FLB. The FLB have a cost advantage in the sale fo bonds which is another factor that change market share in its favor. This cost advantage exists because most investors believe FLB bonds have the backing of the Federal Government even though they are a private corporate bonds. Other possible causes for the change in market shares could include usury laws which restrict the rate LIC charge on new loans, (this according to Robinson and Love is a difficult hypothesis to test) and access of Federal Land Bank to the central money market.

Robinson and Love used simulation model to test the importance of each of the above outlined causes of change in

market share. The results revealed that although the simulations explains the shift in market share, no single factor could explain the result. They concluded that several factors must be operating simultaneously to produce market shares substitution from LIC to FLB. The authors, however, pointed that the most plausible explanation for market shares changes was internal rationing of funds by the LIC. This resulted from increased demand for policy loans, improved investment opportunities outside the farming sector and usury laws which may have restricted the LICs ability to compete for loan funds. Variable interest rate adopted by the FLB was found to be very insignificant in changing market shares against LICs.

The 1971 Farm Credit Act was found to influence the shift in market shares in favor of FLB. This is because the Act not only strengthened the demand for FLB Loans but also the supply. The influence of the Act in changing market shares is not, however, very clear during the study period because the LICs outstanding loans increased at 0.4 percent which is not explained by the Act. On the other hand, the outstanding farm loans for the FLB increased by 15 percent and this increase can be or could be attributed to the 1971 Farm Credit Act. The quasi-public image of the FLB did have an impact on the change in market shares although it was very

small.

Benjamin (1980), carried out an investigation to find out the problems facing the agricultural banks. He started by acknowledging that, growth in farm debt increased sharply in 1970s. In the decade of 1970 farm debt rose at an annual rate of 11.7 percent as compared to 7.5% in the 1950s and 1960s. Growth was rapid, especially in the period 1975-1979. But growth at banks has not kept pace and this has resulted with a substantial loss of market share. The outstanding debt owed to the banks by the farm sector rose by an annual rate of 10.5 percent during the period 1975-1980. In the other farm lending institutions, the rate was 17 percent during the same period. Due to the low growth by banks the proportion of institutionally held farm debt owed to them has been declining. In 1975 the banks held only 40 percent of farm mortgage debt. This is the smallest market share for banks since the end of World War II. Benjamin discusses the factors that have influenced this shift in market share in favor of non-banking institutions.

The first factor Benjamin cited was the competitive imbalances that favor other lenders. While the banks are affected by the usury ceiling and taxes, the Farm Credit System (which includes FLB and PCA) are exempted. Also exempted are Commodity Credit Corporation and Farmers Home

Administration. Because of this discriminatory aspect against the banks, government agencies have been the fastest growing institutional lender serving farmers in recent years. Much of this growth reflects new and more liberally subsidized programs for farmers affected by natural disasters and economic distress.

The second factor mentioned in this article is liquidity problems. Benjamin defined liquidity as a general measure of the balance between funds flowing into a bank and those flowing out. Rural banks have the local depositors as their only source of funds. Sudden changes in local economic conditions such as a fall in the net earning of the farms may result with a fall in deposits. The pressure on rural banks appears as a rise in loan-deposit ratios. Benjamin reports that the ratios at agricultural banks have risen sharply in recent years as banks tried to meet strong loan demand while deposit growth slowed. Liquidity pressures clearly undercut the ability of bankers to meet the strong farm loan demand of the past few years. Farm debt owed to the bank rose only 32 percent, while that owed to the Farm Credit System, insurance companies and other lending agencies rose by 56, 66 and 240 percent respectively. This clearly indicates that the banks and individual and other are losing their share of the market to government agencies.

The third factor highlighted by Benjamin is the problem of legal lending limits. Legal lending limits refer to the maximum credit a bank can extend to a single borrower. The legal lending limit is imposed in order to protect the depositors by spreading loans among large number of borrowers in different lines of business and thereby distributing risk. The lending limit has handicapped the banks because most of their customers have credit needs beyond the legal limit. Since most rural banks are state banks, the legal limits are imposed by state agencies. The legal limits are, therefore, not uniform through the states. Also the legal limits are different between banks because the limit is calculated as a percentage of the banks capital base. Illinois and Iowa are reported to have the lowest lending limits. More than half the agricultural banks in Illinois and over three-fifths in Iowa had lending limits of $100,000 or less at the end of 1977. This legal limit would (of $100,000) would only affect 30 percent of the agricultural banks in Indiana, 16 percent in Michigan, and 40 percent in Wisconsin.

In conclusion, Benjamin pointed out that there was every likelihood of a continued increase in farm size. In other words as the number of farmers continued to fall, the size of individual farm units would continue to increase. This has the implication that operating capital would also

increase. Since part of capital flow is financed through loans, credit demand of individual farmers will increase. Legal lending limits have to be flexible enough in order to accomodate the increased demand. Benjamin also argued that the answer to the liquidity problem was by the banks expanding their economic base. The liquidity problem can be solved by banks using branch lending and multibank holding companies which increase lending potential. This bank arrangement to a great extent would solve the dual concerns of liquidity and legal lending limit. This did not imply that by so doing the banks would recapture their share of the market. As already mentioned not a single factor can explain the shifting market share.

Dallas and White (1985) tried to determine the impact of factors affecting changes in national market shares held by the major lending institutions in the farm sector. They start by an acknowledgement that farm real estate debt increased drastically over the period 1951-81 study period. They also mention that the market shares of the major lenders serving the agricultrual sector have shifted during this period. According to the authors, individuals and others, together with commercial banks, held most of the share of the market. Current data indicates that Federal Land Bank (FLB) and other government agencies now have become leading

suppliers of farm real estate credit.

The analysis of market share reveals whether a gain or loss in a market has resulted from the size of the market effect (resulting from change of the overall market over time), a distribution effect (revealing a decline or gain in overall market when individual markets remain constant), or a competitive effect (showing gains or losses in individual markets). Market share for a particular lending institution is determined by the interest rate charged by the institution, interest rates charged by all other institutions serving the same community and the change in the overall size of the market.

Two approaches were used to analyze market shares of the major farm real estate credit lenders for the period 1951-1981. The first approach used the farm real estate debt held by each lender for the period 1951-81 to explain how this market has change through time. The result implied that size of the market effect was a dominant component of gain for all lenders during the study period. The Federal Land Bank and the Farmers Home Administration (FmHA) captured most of the market during the 1970 decade. This period concides with granting of lending authority to the government institutions by the 1971 Farm Credit Act.

The second approach used was the maximum likelihood

estimation within a demand framework. The analysis was divided into two periods 1951-71 and 1972-81 in order to show the effect of the 1971 Farm Credit Act. It was found that 1972-81 was a short period to directly estimate the parameters. The parameters for this period were, therefore, calculated from the 1951-71 and 1951-81 coefficients. The constant terms representing annual market share trends increased for FLB but declined for commercial banks, life insurance companies and individual and others. In 1972-81 period, FLB had an upward trend of over 5 percent. Banks, life insurance companies and individual and other experienced a downward trend of 2.2 and 5 percent respectively. The authors deduced that the trend was due to the 1971 Farm Credit Act which extended lending authority to FLB and FmHA.

Carraro and LaDue (1983), carried a survey of agricultural banks in New York State (1978-83) to establish the factors limiting commercial banks lending to agriculture for purchases of real estate. The survey revealed that the primary limiting factor was the commerical banks' ability to compete on an interest rate basis. Previously, the losing of market shares by the commercial banks had been attributed to liquidity problem. Through their study the authors indicated that, the low interest rate charged by the Federal Land Banks had given the institution an edge over others. A MASI* like

intermediary would only be necessary only to banks unable to use loan participation and with high CD costs and would likely require a large multistate area to be feasible. Carraro and LaDue pointed out that only eight percent of the New York banks serving agriculture qualify for FICB Funding. FICB funds would only be beneficial in a situation where banks are experiencing liquidity problems.

Calvert and Meltzer (1985), examined the factors affecting delivery of credit to agriculture via cooperative and commerical banks and how each of this factors has affected the availability of agricultrual credit. The cooperative lender to the farm sector is the Farm Credit System (FCS) which operates under a congressional mandate to improve the income and well being of U.S. farmers and ranchers by providing financial services to creditworthy borrowers during both favorable and unfavorable times. The dominant commercial lender to the agricultural sector is commercial banks whose loan portfolio decisions are based on economic decision of profit maximization.

The factors that influence the commercial banks into lending to the agricultural sector include, current phase of business cycle, the level of interst rates, the shape of yield curve, the credit need of the farm sector and the rest of the economy, and the impact of deregulation within the

financial services industry. Calvert and Meltzer have exmained these factors and drawn their conclusion based on each observation.

First, commercial banks have been and still are an important source of credit to the agriuclture sector. Commercial banks however, have an obligation to their stockholders of maximizing net profit or dividends. This is not the case with the share-holders in the FCS. The share-holders in the FCS are farmers, ranchers and farmer owned cooperatives who borrow from the FCS. Their interest, unlike that of shareholders in the commercial bank, is to be assured continuous supply of credit. The commercial banks have therefore, to ensure that the dividend maximization obligation is met. Commercial banks therefore, have to diversify credit risk across different industries. It is this diversity of stockholder interest that appears to serve as an important determinant of a commercial bank's approach to credit extension.

Second, during recessions, borrowers demand more loans because they experience cash flow problems. Commercial banks follow conservative guidelines when issuing loans during recessionary periods. During the recessionary periods since the Korean War, commercial bank loan growth averaged 3.7 percent annually, while growth during expansionary periods

averaged 11.4 percent annually. The FCS on the other hand is expected to provide credit to agriculture at all times. FCS experienced larger increases in market share during recessions. During recession the market share for FCS rose by 1.14 percent points per year, while during expansions the increase averaged 0.52 percentage points per year. The conclusion is that during recession, the share of commercial bank lending to agriculture rose but fell during expansion period. However, the average growth in commercial bank farm loan was less than the average growth in their total loans. FCS experienced larger increases in market shares during recession and also during the expansion period.

Third, as mentioned earlier commercial banks have to maximize their share-holders profits. The CBs have to make a decision as to where the funds will be invested in order to obtain maximum profits. Calvert and Meltzer conducted an analysis of the degree of co-movement between the shares of total CB loans devoted to farm loans and business loans. The results suggest that change in CB lending priorities occured around 1965. During the period 1952-65, it was found that the CB share of loans to agriculture moved in concern with the share devoted to business. From 1966 to mid - 1984, however, the respective shares of CB loans devoted to the farm sector and business moved in opposite directions.

Fourth, interest rates are important factors that influence a commercial bank's decision to lend to the agricultural sector. During the period 1952-1965, interest rates were generally docile (by today's standards very low). Since 1965, interest rates were displayed as highly volatile in nature. During the earlier period when interest rates were rising, Commercial banks devoted a smaller share of their loan portfolio to business. This relationship change during 1966-1984 period in that a larger loan portfolio was now devoted to business. Commercial bank devotion to farm lending was inversely related to the level of interest rates. In the entire period, it should also be pointed out that in the farm lending market commerical bank share was also inversely related to the level of interest rate. The FCS share of the market moved in concern with interest rates. The authors have given two reasons for this type of behavior. One is Farm Credit System's tendancy to price loans based on the average costs of funds while CBs price loans on marginal cost basis. The other reason is that the average maturity of Farm Credit System's sources of funds is much longer than that of the Commercial banks.

The fifth factor mentioned is credit extension and deregulation. Deregulation of financial services industry derives from a realization of a need in the economy for a

more efficient delivery of credit and investment services. Deregulation has concentrated on the relaxation of interest rate ceilings placed on deposits. This has helped the commercial banks because they can now meet loan demand during times when interest rates are relatively high. Deregulation has promoted restructuring of the banking industry towards the formation of multi-bank holding companies and large branch banking networks. Bank holding companies have increased size through merger.

As already mentioned, no particular factor can be cited as influencing the market share behavior. It can be concluded, however, that, all the factors mentioned are important and are working simultaneously to influence the change in market shares in the agriculture sector. Until recently, most of the work done on Agricultural financing had concentrated on credit demand and supply. The question of market share in the agricultrual financing became an important issue in the decade of 1970 when commercial banks and life insurance companies increasingly reduced loans to agriculture. It was not until then that some researchers felt the need to examine the role of different financial markets serving the agricultural sector. This research will try and give a contribution to this area and also make suggestions for further research.

CHAPTER 3

Conceptual Framework

There are several factors which may influence market shares for a particular lender in the farm sector. These factors could be, economic, social, political and administrative in nature. Interest rates, loan policies dealing with collateral, loan maturity, the status of agriculture, geographical location and reputation all may affect the decision of the lender or borrower and hence result with shifts in market shares. In some cases lenders have aggressively sought new agricultural business while others have been more conservative in accepting new agricultural customers. In this chapter, the factors affecting market shares will be discussed and several hypothesis made.

Portfolio Composition of CBs

Commercial banks are business organization that are similar in many respects to firms that produce or market commodities. The only difference between the CBs, and non-financial organizations is that the former produces loans, instead of physical goods. Commercial banks like any other

businesses are out to maximize their net profits. With limited funds, these financial institutions have to make important decisions on how to achieve that desired result.

The portfolio composition of the commercial banks will determine the overall size of loan portfolio, nature of the loans and the amount to be allocated for each type of loan. The overall loan portfolio is determined either by the total assets (of the CB) or by the total deposits of CBs. In deciding the type of loan and the amount to be allocated, CBs determine the amount to the agricultural sector. By so doing, the CBs determine the size of market share they will control in the farm sector. The following discussion explains how the CBs determine the loan portfolio and the quantity of loans to the agricultural sector.

Economic Model*

The portfolio of commercial banks may be divided into three main categories: loans, investments and defensive assets (Tobin, 1982). Loans and investments are in the short run either illiquid or unpredictable in value. Loans and investment assets can only be used to meet withdrawals when the banks are faced with the risk of loss. Defensive assets on the other hand are assets of very high liquidity value. The overall loan portfolio composition of CBs varies from

bank to bank, between states and between regions. The factors that may influence the CBs loan portfolio include, the bank's loan policies, state laws, competition, historical evolution of the bank, and management preferences (Hodgman 1963). However, the most important factor to determine a banks loan portfolio is the risk associated with their loans. Commercial banks have a long-run plan and a short-run budget for their portfolios. The long-run plan surveys the financial market and tries to gather information concerning the type of loans, degree of risk the bank is willing to accept, relative prices necessary to maintain the desired loan groups, the terms of loans to offer to these desired groups, and the returns the bank expects to receive from each type of loan. The long-run plan is usually of five to seven years duration, but there are variations within the long-run. These long-run variations require banks to develop a short-run budget which usually is quarterly or sometimes annual. The annual budget forecasts loan rates, loan quantities and loan terms for different loan types. Understanding the long-run plan provides important information which is used in determining the short-plans.

Defensive Assets (Reserves)

Reserves may be classified either as primary or

secondary reserves. Primary reserves are those liquid assets set aside by the bank for meeting legal financial requirements. An example of primary reserve assets is the federal reserve ratio. The secondary reserve refers to assets intended for meeting the long term liquidity needs of the bank which may be a result of seasonal variation in bank business. Treasury bills are an excellent example of secondary reserves. The less the reserves, especially legal reserves, the more funds a bank will have for credit. Therefore, there is a negative relationship between the defensive assets and the number or size of loans.

Bank Loans

Loans are the major portion of the banks assets. The overall size of loans portfolio is assessed by looking at the capacity of the bank to lend. There are several criteria used for determining loan commitment by banks. The most popular criterion is loan/deposit ratio. Other balance sheet relationships also expressed in ratio form include the loan/capital ratio, risk assets/capital ratio and bond/asset ratio.

Banks can either issue short-term loans or the long-term loans. These loans can be open lines of credit, transaction loans, working capital loans and revolving

credit. Most of the loans issued by commercial banks to the farming sector are working capital loans.

Bank Investments

The bank makes the decision on how much it will invest after examining its loan and reserve requirement. Invested capital is normally the residual after loan and reserve demands have been met. When the demand for loans and reserve funds is therefore high, investments are expected to drop. Investments are composed of many types of security bonds (US Governnment bonds, US agency bonds, Municipal bonds, etc.). Commercial banks are increasingly investing in businesses outside the financial sphere eg. housing, real estate and non real estate. Investments unlike reserves have a longer maturity period, low investment risk and can be sold in a secondary market services.

Commercial banks may be regarded as service oriented enterprises. Commercial banks therefore, charge for the services they offer on demand deposits, NOW accounts, time accounts, saving accounts, and credit cards.

Bank liability are determined by the legal definition of the type of account (such as demand deposits, saving deposits, NOW accounts or time deposits) or by type of instrument (certificates of deposits as opposed Eurodollars)

and also by the maturity period (Mason, 1979). Other sources of funds for commercial banks include borrowing from other banks (eg. the Federal Reserve banks and larger banks). Funds may also be obtained from the selling of CDs and by discounting agricultural paper with the FICB. The proportion of total assets in form of equity capital averages between 5 and 10 percent and this number could even be lower for the larger banks. Equity capital must grow in accordance with the growth in the bank's loan portfolio and other income generating activities.

Most commercial banks have a loan/asset ratio averaging at 60 percent. In other words 60 percent of banks assets is in the form of loans, 30 percent are in form of investments while about 10 percent are in reserves. A very small percentage of the banks assets are in fixed assets which include buildings, machinery and equipments and other inventories. As already mentioned in this study, commercial banks have been decreasing their market share for both farm real estate and non-real estate. It will be in the rightness of things at this point to examine how the banks portfolio is determined. The analysis may help us understand why the CBs market share in the farm sector is declining, in some states while in other, share may be increasing.

Commercial banks while considering its broad portfolio

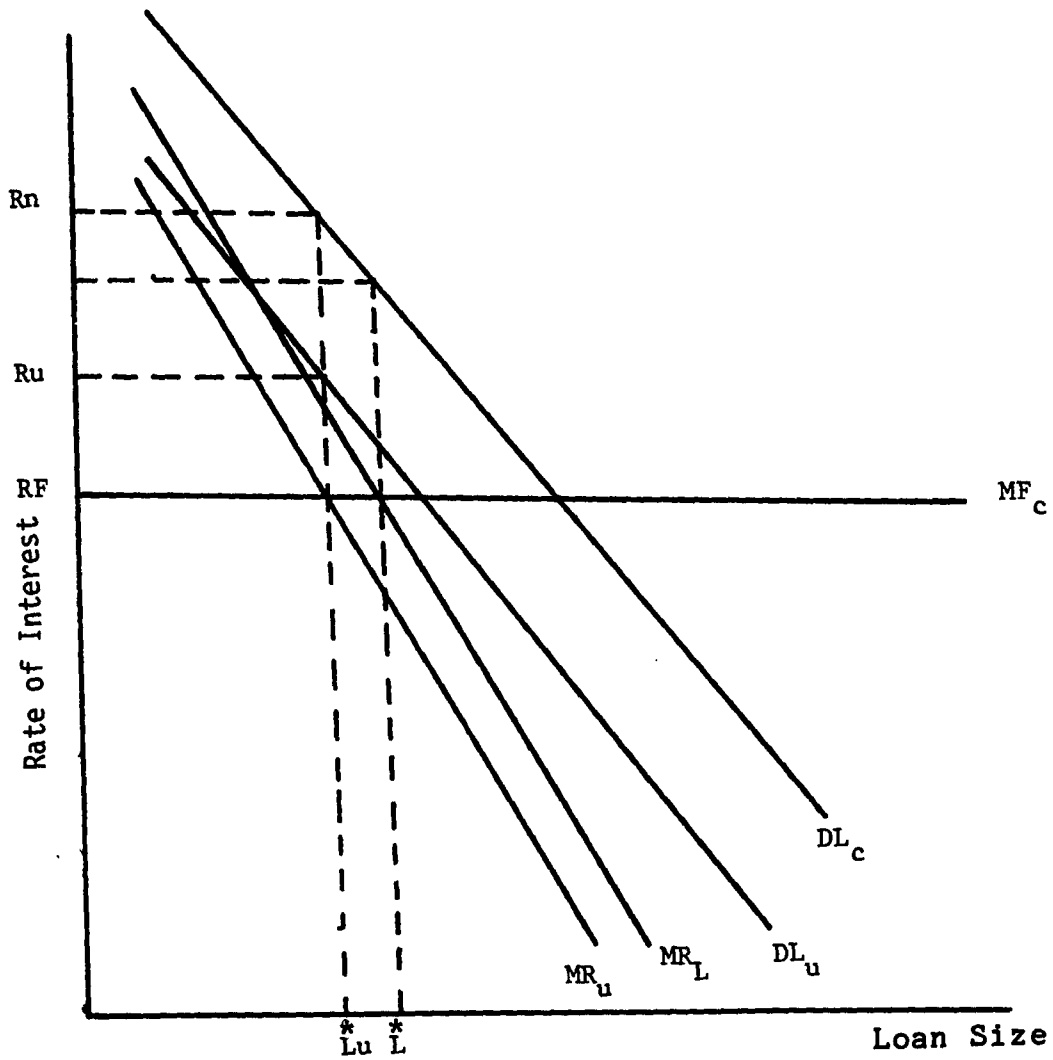
choice between loan and investment and defensive position may act like a monopoly (Mason 1979). This section explains how a bank will select the optimal loan portfolio among their types. The choice of optimal loan portfolio when considering other profit making activities will also be discussed using graphs.

First, the loan portfolio determination under certainty will be explained with the help of Figure 3-1 below. Then the case of uncertainty and optimal loan determination will follow using the same graph.

Figure 3-1 shows the optimal loan portfolio under certainty and under uncertainty. The y axis measures the rate of return while the x axis measures the loan level. The curve labeled DL_C is the demand curve for loans under certainty. This curve has a downward slope indicating that the bank can lend more only if it lowers its interest on loans or the cost of the loan. The horizontal curve MF_C is the marginal cost of funds to the bank at the going market interest rate. The marginal revenue curve (MR_L) under certainty is marginal to loan demand DL_C. The marginal revenue curve represents, for each quantity of loans the bank makes, the added revenue that accrues to the bank from the last dollar increment of loans. The optimal loan portfolio will be at loan quantity where the marginal revenue curve

Figure 3:1.

Optimal Loan Portfolio Under Certainty and Uncertainty



(MR_L) intersect or equals the marginal cost of funds curve (MF_C) (also known as the marginal opportunity cost of other activities). Hence, the optimal amount of loan the bank will carry is L* and DR* will be the rate of interest the bank will charge. At the optimal loan portfolio the bank is maximizing profit. Mathematically it can be shown that the bank maximizes it's profit by choosing that loan portfolio which equates the marginal cost of funds (MCF) with marginal revenue of loans (MR).

In an imperfectly competitive market, we assume that

$r = g(L)$

$TR = g(L)L$

We also assume that total cost is a function of output.

$TC = C(L)$

Therefore,

$\Pi = g(L)\ L - C(L)$

Maximum profit level can be found by taking the derivative of the profit equation with respect to output L and equating it to zero.

$$\frac{d\Pi}{dL} = \frac{d\,[g(L)L]}{dL} - \frac{d\,C(L)}{dL} = 0$$

$$= g(L) + g'(L)\ L - C'(L) = 0$$

where;

$$g(L) + g'(L)L = MR$$

$$C'(L) = MC$$

In other words the profit maximization condition is met when MR = MC (in this case MR = MF_C).

Having considered the situation of certainty in the banks loan portfolio selection, it will be appropriate to discuss the situation of uncertainty. Introducing uncertainty into the picture changes things slightly. The demand for loans under uncertainty is going to decrease compared to demand under certainty. This is because commercial banks as business enterprises are out to maximize profits. In a situation of uncertainty banks will lower their loan portfolio and hence, the demand curve for loans under this condition will be closer to the origin than the loan demand curve under certainity. The new demand curve for loans is now DL_u. The rate of return or interest although it changes is neglected because the variation is minimal. MR_u is the risk-adjusted marginal revenue of loans. The optimal level of loans under uncertainty will be determined where the risk-adjusted marginal revenue of loans (MR_u)equals the marginal cost of funds MF_c. Hence the optimal amount of loan the bank will carry is L_u. The rate of interest that will be charged on these loans is R^*_u because this is the expected market curve.

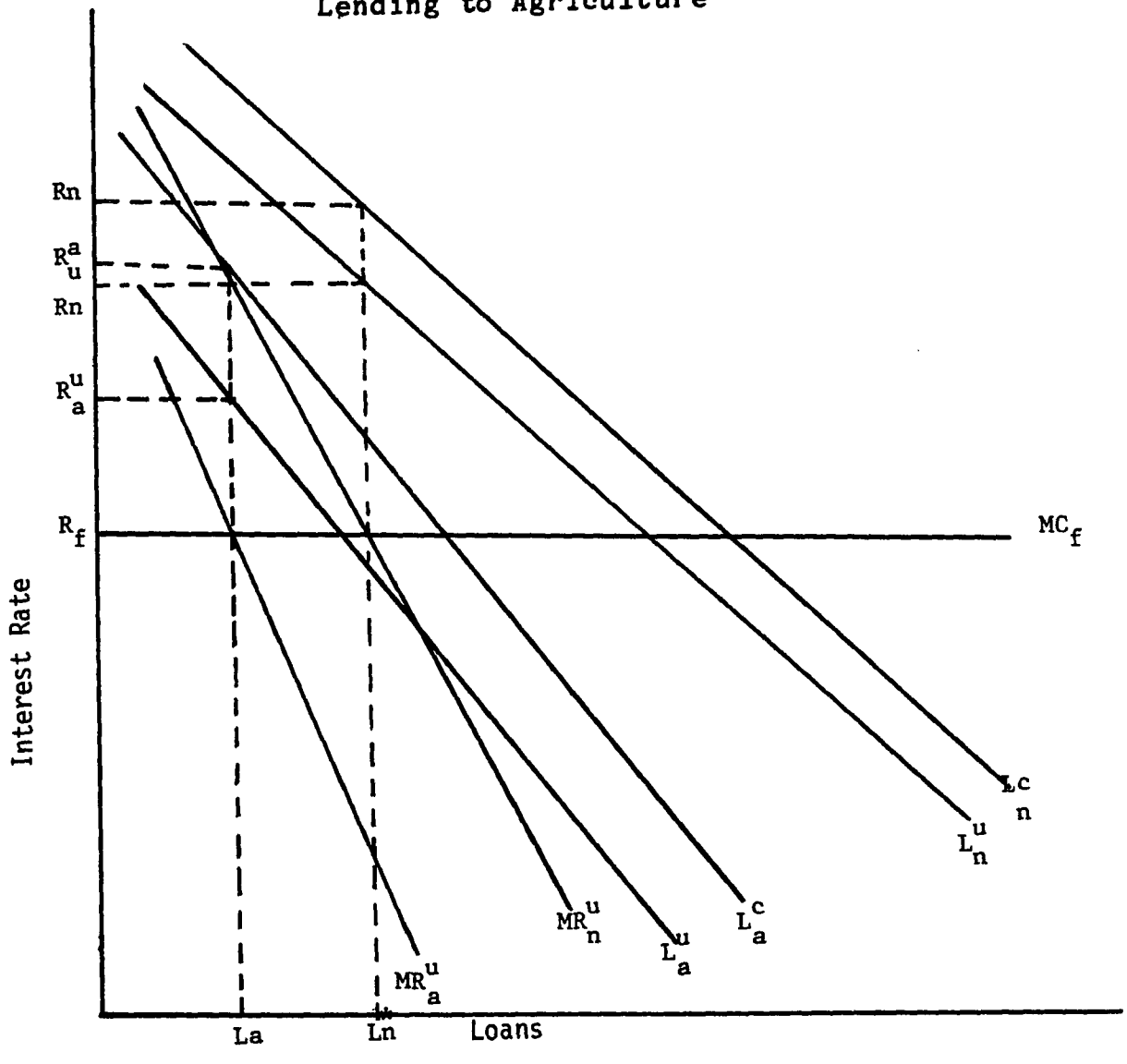
This rate is higher than in the certainty case. The expected rate of return however, is R_n. R_n is the appropriate rate to charge because it takes into account the cost to the bank of subjecting itself to the uncertainty of this market. The difference between R_n and R^*_n, if no change of loan demand occurs, may be considered as payment to the bank for accepting uncertainty. If on the other hand demand for loan changes over time, this amount is used to offset loan demand that is higher than the expected or lower than expected.

After explaining how the bank selects its loan portfolio under situations of certainty and uncertainty, the following discussion examines how different types of loans are allocated. The bank needs an estimate of the loan demand on each individual loan category. In this case we assume that there are only two loan types; the agricultural and non-agricultural loans. This assumption must be made for the simplicty of this study. Otherwise, there are several types of loans which the banks extend to its customers besides agricultural and non-agricultural loans. It is also assumed that the bank from past experience knows the riskiness of each loan class. The graph below shows the selection of the optimal loan portfolio for both the agricultural and non-agricultural loans (Figure 3-2).

When comparing agricultural and non-agricultural loans,

Figure 3:2.

Optimal Portfolio Composition for a Commercial Bank Lending to Agriculture



it is assumed that the returns and demand for the later category of loans is greater than that of the former class. It is also assumed that agricultural loans have higher risk involvement than the non-agricultural loans. The demand curves for non-agricultural loans under certainty and uncertainty are given by DCn and DUn respectively. DCa and DUa are the demand curves for the agricultural loans under certainty and uncertainty respectively.

The marginal cost of funds (MCF) is given as a horizontal line parallel to the X axis. The marginal revenue curve for non agricultural loan is given as MRn while for the agricultural case is given as MRa. These curves are both adjusted for risk. It is important to note that agricultural loans are considered riskier and this can be explained by the greater shift in the demand for agricultural loan curve. Optimal loan portfolio for both category of loans will be determined as explained before in graph 3-2. The optimal level of non-agricultural loans is given at L_n while the optimal level for the agricultural loans is La. The quantity of non-agricultural loans is greater than the quantity of agricultural loans. This is partly explained by the riskiness of the agricultural loans. The rate of interest charged for non-agricultural loans R^u is greater than that charged to agricultural borrowers. The rate of return for

the non-agricultural loans is R_n. Non-agricultural loans have a higher expected rate of return compared to the agricultural loans and there is less risk involved. The higher demand for the non-agricultural loans has resulted with a higher rate of interest charges on this class of loans. The Banks risk involvement for each type of loan is shown by the difference between Rn and R_n^u in the case of non-agricultural loans and Ra and R_a^u in the case of agricultural loans.

As mentioned earlier, if loan demand performs in a truly random fashion, this amount ($R_a - R_a^u$) will be used to offset loan demand that is higher than expected demand. This analysis may partly explain why commercial banks are moving away from financing agriculture because of the greater risk and less return. However risk consideration is just one of the factors that explain shift in market shares for lending to agriculture.

Factors Influencing Market Shares Interest Rate Differential

Interest rate variability is perhaps one of the most important factors influencing market shares in the agricultural sector. Interest rates vary between lending institutions and also between regions. There are several factors that influence the variability in interest rates.

Differential rates of growth between regions may cause interest rate variability. However, the most important factor causing interest rate differential is risk in relation to variability in farm income, repayment capacity and capital intensity. Table 3-1 below shows the different interest rates charged by different lending institutions.

The lenders of real estate loans include CBs, FLB, LIC and FmHA. Few farmers who obtain real estate loans from commercial banks pay 100 to 300 bases points above the prime rate. The table indicates that the Farmers Home Administration has been the cheapest source of loans since 1970. However, eligibility to borrow from FmHA has been only extended to those marginal farmers with no other source of income. The amount of money going to FmHA has been reduced since 1982 and this has affected the interest rates charged. For the last five years since 1979, FmHA rates are almost equivalent to those charged by other lenders. Life insurance companies (LIC) have had the highest interest rate charges. In 1979 however, LICs dropped their rates to be on the same level with FLB. Since 1979 to 1982 CBs charged rates way beyond those of other lenders. In 1981 for instance the interest from CBs was at 21.50 percent while that of FLB, LIC and FmHA was 10.76, 14.06 and 12.25 respectively. The FLB interest rate has been fairly stable

Table 3:1.

Interest Rates for selected lenders as of January 1, 1970-1983.

	Real Estate Loans		Non Real Estate Loans		
Year	Prime rates large banks	FmHA	Rural Banks	PCAs	FmHA
1970	8.50	5.00	8.09	9.31	6.33
1971	6.75	5.00	8.37	8.60	7.13
1972	5.25	5.00	8.09	7.32	6.38
1973	6.00	5.00	8.06	7.36	5.88
1974	9.75	5.00	8.56	9.18	6.75
1975	10.50	5.00	9.11	9.89	8.75
1976	7.25	5.00	9.05	8.59	8.50
1977	6.25	5.00	9.15	8.05	8.00
1978	7.75	5.00	9.22	8.28	8.00
1979	11.75	8.52	10.24	9.89	8.54
1980	15.25	10.29	13.63	12.07	10.64
1981	21.50	12.25	17.58	12.90	13.00
1982	15.75	13.25	17.21	15.26	14.33
1983	11.50	10.89	15.00	12.83	10.47

Source: Amols, G and Kaiser, Agricultrual Finance Statistics, 1960-1983, Statistical Bulletin No. 706, Economic Research Service, U.S. Dept. of Agriculture, Washington, D.C., 1984.

through the entire period (1970-83) and was below those of CBs and LICs for the period 1978-1981.

The providers of loans for non-real estate purposes include commercial banks, Production Credit Associations (PCAs) and the FmHA. FmHA charge lower interest rate compared to the other two lenders. CBs interest rate charges are the highest in this category of loans. For example in 1981, CBs interest rate level was at 17.58 percent compared to 12.90 and 13.00 percent for the PCAs and FmHA respectively. Comparing the interest rate charged for real estate loans and non-real estate loans, the data reveal that FmHA charged higher interest rates for the non-real estate loans. For example, the FmHA rate of interest for real estate loans for the period 1970-1978 averaged 5 percent while that for non-real estate averaged 7.34 percent. Commercial banks seem to have been charging high interest rates for the non-real estate loans during the first eight years of the 1970 decade. During the period 1979-1982, the rates were almost equal but in 1983 the rate was higher for the non-real estate loan.

Other things remaining constant it can be hypothesized that the higher the interest rate, the less the number of loans borrowers are willing to take. In other words the rate of interest and the number and size of loans has a negative

slope. The lender charging the lowest rate of interest is expected to have many borrowers thereby controlling a large size of the market. This can also be stated as follows: the lower the rate of interest, the greater the number of borrowers and the larger the size of market share.

From Table 3-1, FmHA is expected to have the largest share of the market for both real estate and non-real estate loans. Commercial banks are expected to have the least share of the market due to the high interest rates they charge. However, as will be seen, there are other factors besides interest rates that influence the size of the market.

It is worth mentioning that interest rate differentials, though an important factor influencing shifting market share between lenders, was not empirically analysed in this research. This study assumes perfectly competitive financial markets across states which implies that the relative rates of interest are the same across states. Neither are state by state interest rates available for the lenders in question. Including a differential interest rate in the model would not explain the shifting of the banks market shares between states.

Net Farm Income

Net farm income for a given calendar year measures the

net value of agricultural production regardless of disposition and indicates the profit loss associated with current production. Table 3-2 shows the per farm net income (including net CCC loans and farm households after inventory) for the 10 representative states for the period 1976-1983. This data indicate that the per farm net income for the US has not been stable. Between 1976 and 1977, the per farm net income only increased by $10 (nominal value). Between 1977 and 1979, there occurred the highest nominal per farm net income of $5188. In the subsequent years, nominal per farm net income dropped.

Arizona had the highest nominal per farm net income in 1976, 1977 and 1978. From 1979 to 1983 California took the leading position from Arizona. Per farm net income may drop because of several factors among them high input prices, low output prices, high interest rate, etc. It is hypothesized that the states with high per farm net income will also have higher levels of debt. In other words, financial institutions lending to agriculture will be willing to offer credit to farmers with high, per-farm income.

Government Regulation

The major services provided by financial institutions include an efficient payment mechanism for transactions,

Table 3:2.

Per Farm Net Income (Including Net CCC Loans and Farm Households), After Inventory Adjustment by State

(adjusted dollars, 1972 = 100)

State	1976	1977	1978	1979	1980	1981	1982	1983
Arizona	35553	23190	32361	30237	25142	22206	6601	5054
California	22538	21974	26441	31205	30586	27590	19482	17342
Georgia	6452	2884	7395	7133	854	4941	5514	5061
Iowa	5509	5759	11163	8328	3940	9060	3565	-551
Kentucky	3580	4304	4062	4593	3574	5270	4633	2105
Minnesota	4387	9534	9019	8506	6420	7411	4653	2340
Mississippi	5570	5923	7160	8057	2334	1347	2661	1642
Nebraska	5281	4653	7471	8285	1575	9589	5490	2879
Pennsylvania	4233	3783	5191	6422	3560	5571	4015	3075
Texas	4429	4015	4132	6414	2562	5016	2429	2464
U.S.	6091	5763	7546	8113	4894	6520	4498	3150

Source: Economic Indicators of the Farm Sector, State Income and Balance Sheet Statistics 1983, USDA, ERS, Jan. 1985, (pp. 90).

Table 3:3.

Per Farm Net Income (Including Net CCC Loans and Farm Households), After Inventory Adjustment by State

(Nominal dollars)

STATE	1976	1977	1978	1979	1980	1981	1982	1983
Arizona	47051	32478	48677	49414	44858	43332	13656	10900
California	29828	30775	39772	50995	54571	53839	40304	37395
Georgia	8539	4039	11123	11656	1524	9642	11407	10914
Iowa	7291	8065	16791	13610	7029	17680	7376	-1189
Kentucky	4738	6028	6110	7506	6376	10283	9585	4358
Minnesota	5806	13353	13566	13900	11454	14462	9627	7202
Mississippi	7372	8295	10770	13167	4164	2629	5505	3541
Nebraska	6989	6516	11238	13539	2810	18712	11359	6209
Pennsylvania	5602	5298	7808	10495	6351	10871	8307	6630
Texas	5862	5623	6216	10481	4572	9788	5025	5313
U.S.	8061	8071	11350	13259	8731	12723	9306	6793

Source: Economic Indicators of the Farm Sector, State Income and Balance Sheet Statistics 1983, USDA, ERS, Jan. 1985, (pp. 90).

allocating and bearing risks and an intermediation system for channeling savings into investment. The intangible nature of these services and related financial assets requires confidence, trust and stability among the market participants in order for financial markets to function effectively (Barry, 1981). Accordingly, financial markets are considerably regulated for purposes of safeguarding savers and investors, standardizing instruments and practices, modifying competition, responding to imperfections and gaps in financial services and providing for effective monetary policy. There are different forms of regulations: restraints on geographic expansion, as in branding and holding company regulations; mandatory specialization in some services; portfolio diversification through reserve and capital requirements, loan limits and asset allocations; interest rate controls on deposits and loans; special borrowing privileges; fair trade practices; and public programs for credit and insurance.

Regulations are intended to produce positive results but in some cases have imposed substantial costs on financial markets. This section will examine the major regulations imposed on the financial institutions since 1960.

The farm credit act of 1971 permitted the FLB to make loans from 65 percent to 85 percent of the appraised real

estate market value. Availability of credit from FLB was increased. The FLB loans were made more desirable to the farmers. The result of the 1971 Farm Credit Act was the increase in the market shares for the FLB. For instance, during the decade of the 60's FLBs market shares increased by 11 percent (see Table 1-2). Though there is no conclusive evidence to suggest that the increase was entirely due to the 1971 Farm Credit Act, this study hypothesizes that there was a positive relationship.

The major elements of the 1980 DIDMC Act included: the imposition of uniform federal reserve requirement; provision for the orderly phase-out by 1986 of interest rate ceilings on deposits; nationwide authorization of interest bearing transaction accounts; temporary preemption of state usury laws on certain types of loans; immediate increase in federal insurance coverage on deposits and accounts; more liberal investment and lending limits of thrift institutions; and requiring the Federal Reserve to price competitively its individual services and grant all depository institutions access to these services.

The expected results from all these regulatory changes were mainly focused on small agricultural banks who previously had greater problems in fund availability and were less flexible in balance sheet management. The agricultural

banks were therefore to gain loanable funds from reduced reserve requirements and able to extend more credit thereby increasing their size of the market share.

The Farm Credit Act Amendments of 1980:

1) Gave authority to the cooperative banks to finance agricultural export activities.
2) Reduced the farmer's requirements prior to joining the co-operatives.
3) Involved the FLBs and the PCAs in lending to eligible borrowers in order to finance the processing and marketing activities.
4) Increased limits for FLBs on loans guaranteed by a federal or state agency.
5) Increased the cooperation between FCS, commercial banks, and other lenders.

These changes clearly indicate the greater role the Bank of Cooperatives and the FLBs are expected to play in funding the farm sector. Commercial banks are also expected to respond positively to these regulations.

Government credit programs include price support programs, emergency loan programs, and loan guarantees to certain category of borrowers. This special treatment of borrowers by the government increases the farm incomes. Farmers become more credit worthy. The expected results

should be an increase in total farm debt.

Importance of Agricultural Sector

The importance of agricultural sector as a factor contributing to changing market shares for real estate and non-real estate loans is worth mentioning. The contribution of the farm sector for each state can be measured by dividing farm income by the total state income (total state income include farm income and non-farm income). The higher the ratio, the more important is the agricultural sector in that particular state. Table 3-4 shows the ratio of farm income to total income for the 10 representative states for the years 1960, 1965, 1970, 1975, and 1980. Nebraska and Iowa have had the highest ratio followed by Mississippi. The lowest ratios were found in the states of Pennsylvania, California, and Georgia. These ratios have not been constant through the years. In 1980, 5.3 percent of the income in Iowa was from the farming sector. This ratio fell from 23 percent in 1960. Nebraska a state where the farm sector contributed over 24 percent of the state (1960) income had dropped to slightly over 4 percent (1980). The three states with the highest farm income in 1980 were Iowa (5.3 percent), Nebraska (4.2 percent) and Mississippi (4.2 percent).

Nationally, the contribution of agriculture to the

Table 3:4.

Ratio Of State Farm Income To Total State Income

1960, 1965, 1970, 1975, and 1980

State	1960	1965	1970	1975	1980
Arizona	.111	.0788	.0475	.0361	.0274
California	.0503	.0371	.0287	.0368	.0267
Georgia	.0743	.0683	.0441	.0444	.021
Iowa	.2302	.2983	.2015	.227	.0528
Kentucky	.1137	.1076	.0708	.0557	.041
Minnesota	.1176	.1055	.0724	.0912	.0146
Mississippi	.1922	.1947	.1526	.0709	.0421
Nebraska	.2465	.2713	.1831	.2455	.0424
Pennsylvania	.0176	.0143	.0123	.0119	.0098
Texas	.0925	.0788	.0615	.0355	.0166
U.S.	.0547	.0492	.0347	.0360	.0183

Source: Survey of Current Business, U.S. Dept. of Commerce/ Bureau of Economic Analysis, #8, 1976, 1982.

Statistical Abstract of the United States, U.S. Department of Commerce/Bureau of the census, 1962, 1967, and 1972.

country's total income has been falling. In 1960 the ratio indicated that over 5.4 percent of the country's income was from agriculture. Two decades later, the contribution of the farm sector to the national economy was only 1.8 percent. The question to be asked is whether this data indicates the declining importance of the agricultural sector in the US.

The above discussion leads us to hypothesize that, the states with the highest farm income/total income ratios are likely to be favored by financial institutions lending to the farm sector. For example, commercial banks are expected to extend loans to states with the highest ratio.

Average Size of the Farm

The average size of the farm is another possible factor for changes in market share for non-real estate purposes. The number of farms in the US has been experiencing a steady decline in the last 20 years. This is because most small farmers are selling out to the large scale producers and moving into the urban areas to work in other economic activities. Also as the credit burdens increase for the marginal farmers, the only solution left to them is to sell out. Other farmers are selling out in order to retire sometimes due to old age. Such farmers may not have relatives who are willing to take over the farming business.

Table 3-5 shows total number of farms, the land under farming and average size of the farm for the 10 representative states and for the entire country (1982).

Preliminary data indicates that in 1982 the number of farms in the country totaled to 2,400,370 while the area occupied by those farms was 1,038,530 thousand acres. Texas had the largest number of farms and also the largest area under farming. Arizona with the least number of farms had the second largest area under farming. Iowa and California followed Arizona with the largest areas under farming. The national average size of the farm is 433 compared with the average size of the farm in Arizona 5416 acres. Farm sizes are smallest in Kentucky and Pennsylvania with averages of 142 and 146 acres respectively. Texas and California also are composed of large farms. All the other states, Georgia, Iowa, Minnesota and Mississippi are composed of small-sized farms but certainly larger than Kentucky and Pennsylvania.

How is the average farm size related to market shares? It is assumed that the larger the farm, the higher the demand for loans. In other words it is assumed that large sized farms require more capital to acquire farm inventories. Using real estate or the farm as collateral, large farms can acquire larger loans compared with smaller farms. Financial institutions will therefore, favor those farmers whose farm

Table 3:5.

Number of Farms, Acreage under Farming, and Average size of Farm by States (1982)

	Number of Farms	Acreage under Farming (1000 acres)	Average Size of the Farm
Ariz	7200	39000	5416*
Calif	80000	33700	421
Geo	58000	15200	262
Iowa	117000	33800	288
Kentucky	102000	14500	142
Minnesota	103000	30400	295
Mississippi	53000	14500	273
Nebraska	63000	47600	755
Pennsylvania	60000	8800	146
Texas	185000	138400	748
US	2400370	1038530	433

Source: Agricultural Statistics Various Issues.

* The table shows that Arizona has the highest average farm size (5416). As is well known, Arizona has the largest number of Indian reservations. The Indian reservations are considered as farms, irrespective of the size of a reservation. For example a reservation like the Navajo Reservation which occupies thousands of acres, is regarded a single farm. When calculating the average farm size for Arizona, the number is exaggerated because of including reservations as single farms. The average farm size for Arizona would appear more realistic if the Indian reservations were not included.

size is large. Hence, states with above average farm size are expected to capture a large share of commercial banks market for agricultural loans. Commercial banks are specifically known to extend more credit to large scale farmers and less to small farmers. This assumption is made with further assumption that other factors affecting shifts in market shares for commercial banks are not in operation.

Type of Branching System

One of the most important differences in the general character of commercial banking between regions and states originates from differences in the degree to which state authorities permit branch banking (Hodgman, 1963). States are classified as unit banking (no branch offices permitted) limited branching (additional offices within the home county and in some cases in neighboring counties), or state wide branching (branches throughout the state). Correspondent relationship, usually with a larger city bank in order to obtain various types of bank services e.g. loans and deposits is common. This is usually important when a bank receives an acceptable loan request that exceeds its legal lending limit. A correspondent relationship is deemed as the immediate variable solution. Many authors have argued that state wide branching enhances local bank competition as large banks

open new offices all over the state, thus adding competition in areas previously served by one or two small independent banks. It can also be argued that state-wide branching system produces larger banks that more efficiently perform their intermediation role, and that this is reflected in higher loan to deposit ratios.

The above argument suggest that in states where the law does not encourage bank branching, the unit banks face the problems of insufficient funds to make large loans, lack of facilities to shift assets, and only can offer limited bank services. It has also been argued that units banks are more exposed to risks and do not benefit from the economies of scale and size. It can therefore be concluded that statewide or limited branching systems are favored more than the unit banking system because they lead to faster economic growth (Kreps and Wacht, 1970 and Lombaidin & Zmk, 1971). However, the bank branching system is just one of the factors that enhances economic growth of a bank. Making a conclusive argument based on the branching behavior would therefore be misleading.

Table 3-6 below shows the branching behavior of ten states which are representative of the 10 agricultural regions of the US. While Arizona and California are the only states with a state wide branching system while Nebraska and

Table 3:6.

State	Branching System (B,L,U)	Head Offices	Branches	Total assets (Million US $)
Arizona	B	46	620	18977
California	B	529	4802	276105
Georgia	L	412	973	34382
Iowa	L	642	528	26924
Kentucky	L	338	743	25635
Minnesota	L	758	337	44394
Mississippi	L	165	736	14675
Nebraska	U	471	133	14651
Pennsylvania	L	357	2873	113332
Texas	U	1707	335	181910
U.S.		15672	44145	2344256

Source: The Rand McNally International Bankers Directory - 3 U.S. Operations (1984).

Key: B: State wide Branching
L: Limited Branching
U: Unit Banking

Texas are classified as unit banking states. The rest of the states, Georgia, Iowa, Kentucky, Minnesota, Mississippi and Pennsylvania are limited branching states.

Our new hypothesis in this case is that the branching system affects farm market shares. In states with state wide branching, banks have several loan options. Consider a state with unit banking system. Assume that this banks is located in a rural area with limited business options. Agriculture being one of the main occupation of such a community will be favored by the banks loan type decision. In other words it is argued that states where commercial banks have unit or limited banking system, they command a large share of farm credit than in those states that favor statewide branching system because it is less likely to shift out of agriculture.

The above factors are not the only ones that contribute to shifts in the market shares. However, they are the most important factors identified so far. Some of these factors will strongly affect farm market share shifting but others may be expected to have a small or negligible effect. It is the objective of this study to identify the factors that have more influence on shifting market share of commercial banks in the agricultural sector.

CHAPTER 4

DESCRIPTION OF DATA USED IN THE STUDY

Chapter 3 of this study explained the several independent variables that influence the shift in market shares of the commercial banks in the agricultural sector. While some of these variables are social or economic in nature, others are political. It is, therefore, important to note that some of the variables mentioned in Chapter 3 are qualitative in nature while others are quantitative. However, all these variables work simultaneously to influence the shift in market shares of the commercial banks in the agricultural sector and it is difficult to single one out as being the most important.

The data used in this study is from different sources (see table 4-1) and covers the 48 contiguous states in the U.S. The only two states not included in the study are Hawaii and Alaska. Decision to exclude these two states was reached after examining the relevant data. It was felt that data from these two states did not follow the general pattern followed by data from other states.

The behavior of commercial banks in their selection of agricultural loan portfolio is different almost for all the

Table 4-1.

VARIABLES USED IN THE STUDY, THEIR MEASUREMENTS, LABEL, AND SOURCE OF DATA

Independent Variable	Measurement	Symbol	Source	
% change in Farm income (Deflated)	%	DPC FY	USDA	1960-83
Average Farm size	Acres	O O	USDA	
Coefficient of variation of Farm Income	ratio	CVDF	USDA	
%tage change in # of farms	%	PFN	USDA	
% of farms with sales < 100,000	%	U U	USDA	
Irrigated land as % total cropland	%	S S	USDA	
% of farm sales by corporations	%	P P	KRAUSE	
% of total and under corporation	%	Q Q	KRAUSE	
% of farms owned by corporation	%	R R	KRAUSE	
% Change Farm population	%	PFP	USDA	1970-1980
% change in manufacturing employment	%	PME	Statistical Abstract various issues	
% change in service employment	%	PSE		
% change in metropolitan population	%	PMP		
% change in non metropolitan population	%	PNM		
% change in none farm income (deflated)	%	DPCNFY	USDA	1960-83
% change in per capita income	%	PIP	USDA & Statistical Abstract	
Coefficient of variation non-farm income	ratio	CVANF	USDA	
% change in value added	%	PVA	Statistical Abstract	
Number of PCA offices	real #	K K	Rand McNally international bankers directory # 3 US operations	
Number of FLB offices	real #	L L		
Branching system (dummy variable)	either 0 or 1	BRL		
Dependent variables				
% change Agr loan deposit ratio	%	PCALDR	Amols & Kaiser	
% change in bank deposits	%	PCBD		
% change in total ag. loans	%	TAL		

states included in this survey. The data for a particular state, therefore, may explain the behavior of commercial banks in that particular state.

The period covered by this study is from 1969 to 1982. This is a thirteen year period which presents an evaluation in the agricultural sector of the U.S. The period is characterized by high inflation due to escalating oil prices in the early 1970s which affected agriculture greatly. Also during this period the agricultural sector experienced several government regulations which were geared towards regulating lending behavior of financial institutions. The Farm Credit Acts of 1971 and 1980 are some of the important regulations that were implemented during the period in question.

The data used in this study may be classified into two broad categories: Time-series data and Cross-sectional data. The time series data explains the percentage change in the dependent variable while the cross sectional data explains the structural nature of the agricultural sector in the individual state. The data can further be grouped into independent variable data and the dependent variable data. The following discussion will follow this latter order.

Data On Independent Variables

As already mentioned, there are many independent variables which may explain the behavior of the dependent variables. Data on the independent variables can, therefore, be classified into three main descriptive categories. The first category include those variables that express the characteristics of a state's credit markets. The second group encampass all those variables that are farm related. In other words, these variables can be said to be farm sector characteristics. The last category of variables and not necessary the least important is the non-farm sector variables. These variables can otherwise be refered to as the general economy variables because they express the general behavior of the economy. Each of these variables will be discussed below.

States Credit Market Characteristics

As mentioned in the first chapter of this study, farmers obtain credit for non-real estate from the commerical banks (CB's), Farmer's Home Administration (FmHA), Production Credit Associations and from Individuals and Others (I&O's). Individuals and others is an important source of credit in some states but because of the way it is organized (depends on mutual understanding between the borrowers and the

creditors), it is the most difficult source of credit to monitor. The other three sources (FmHA, CBs, PCA) are organized and hence, easy for any interested party to monitor.

The characteristics of a state's credit market may be explained by examining the involvement of all the three institutions in the farm sector. A good indicator of the involvement of the Farmer's Home Administration and the Production Credit Associations is perhaps the number of offices opened in a particular state. In states where bank branching is allowed, several commerical bank branches may indicate high involvement in agricultural lending by the banks. Data used to determine the involvement in credit by FmHa and PCA is given in absolute numbers. As for the structure of commercial banks in different states, it was decided to use zero in case of no or limited branching practice and a one in case of state wide branching practice.

Some hypothesis were generated from these variables. Due to the competition between Farmer's Home Administration, Production Credit Association and commercial banks, it can be hypothesized that as the number of FmHA and PCA offices increase the commerical banks' share of the market for non-real estate loan is expected to drop. However, this may not always be the case because FmHA and PCA give credit to

special class of farmers who are either beginners or are in serious economic problems. This class of farmers can be categorized as small scale. Commercial banks on the other hand, give credit to large-scale farmers who in most cases do not meet the loan requirements of the FmHA and the PCA. The hypothesis that commercial banks share of the market for non-real estate loans will be inversely related to the number of PCA and FmHA offices can only hold if we include the assumption that other things remain constant.

Another hypothesis generated from these variables concerns the structure of the banks within a state. In a state where commercial banks have several branches, the share of the banks market for non-real estate loans is expected to be lower than in unit banking states. However, this is not as simple as it looks. Some states may have unit banking procedures and yet control a small share of the market. It is argued that unit banking allows limited options for the bank to lend money. Branching gives a bank a large scope and lots of business options. In a state where branching is not allowed, unit banks will lend more to the farm sector because they operate under limited options. Correspondent banking may help to reduce this problem.

Farm Sector Characteristic Variables

Farm sector characteristic variables include all those variables that are farm related or those variable that explain the structure of the farm sector in a particular state. These variables besides specifying the size of the farms and also the importance of the agriculture sector in a given state also address the ownership question. Variables in this category will, therefore, include among others the average farm size during the study period, the percentage change in farm numbers, the percent of farms with sales less than $100,000, percentage change in net farm income, the coefficient of variation for net farm income, irrigated land as a percent of total crop land. Other variables express the legal ownership situations in the states. Such as percent of sales by corporations, percent of farms under corporations and percent of land under corporations.

The percentage change in net farm income was computed by substracting the 1969 net farm income from the 1982 figure and then dividing by the 1969 figure. The measurement used in this case is percentage change. This figure could either be negative or positive. If the figure is negative, it indicates that farm incomes have dropped and if the figure is positive shows growth in net farm incomes. Percent of farms with sales less than $100,000 was computed by dividing those

category of farms with total farm number in a given state. This ratio is positive. The hypothesis that may be drawn by looking at the percentage change in net farm income is that when it shows an increase (positive) CBs are expected to extend more credit. On the other hand, if this ratio was negative, commercial banks will withdraw funds from the farm sector. States which had positive ratios are expected to have more involvement of the commercial banks as compared to those with negative ratios.

In states where the percent of farms with sales less than $100,000 was high, the commercial banks participation is expected to be less. This is because commercial banks usually extend loans to large scale farmers. At the same time these category of farmers with sales less than $100,000 are serviced by FmHA and PCA. This does not, however, imply that small farmers are not serviced by the CBs. On the contrary, in states like Pennsylvania and Kentucky where farms are not only small by size but also by net returns commercial banks are in operation. However,the general hypothesis is that other things remaining constant, commercial banks' agricultural loan portfolios will be determined by sales from the farm. The same hypothesis may be used to explain the relationship between the dependent variable and the average farm size and also the percentage

change in farm numbers. The average farm size was calculated by aggregating the farm acreage in a state and dividing by the number of farmers within that state. The percentage change in number of farms was computed by substracting the 1969 farm numbers from the 1982 figure and then dividing by the 1969 figure. This ratio if negative indicates a decline in farm number and if positive shows an increase in farm numbers.

The hypothesis is that as the farm size increases, the CBs share of the market will also increase. Also the percentage change in farm numbers may indicate the direction of change in the banks market share. When the number of farms drop, it may imply that some small scale farmers are selling out and hence, the average farm size will increase. Commercial banks share of the market will be expected to increase as the number of farms fall. It may also be argued that as the number of farms drop marginal farmers are leaving the agricultrual sector for opportunities elsewhere. This may imply that business outside the farm sector is booming and hence, the banks will invest outside agriculture.

Irrigated land as a percent of total crop land is another important ratio worth mentioning. The computation of this ratio is arrived at by dividing the total irrigated land with the total crop land. Irrigation is a very expensive

venture that requires heavy machinery. Banks, the Farmer's Home Administration and the Production Credit Associations are the only organized institutions that have enough resources to finance purchase of machinery and equipments required for irrigation. Commercial banks, however, become more involved in this because the other two institutions issue small loans to marginal and special category of farmers. It can, therefore, be assumed that in states where the ratio of irrigated land to total crop land is high the commercial banks agricultural loan portfolio is also high.

Percent of farm sales by corporations, percent of total acreage under corporations and the percent of farms owned by the corporations are all important variables that may help the bank in its agricultural loan portfolio decision. These variables are all measured in percent as can be deduced from Table 4-1. Computation of these ratios was done by dividing sales by corporations, farms under corporations and acreage under corporations by total agricultural sales, total number of farms and the total cultivated land respectively. The importance of these ratios is to show what percent of the agricultural business is controlled by corporations in a given state. In states where these ratios are high commercial banks are expected to control a large share of the market as compared to states with low ratios. It may be

argued that this is true because farms under corporations are large and better managed compared to those farms under individuals. Banks will, therefore, consider such farms less riskier and thus extend more credit to them. This hypothesis is based on the assumption of other things remain constant.

Coefficient of variation in net farm income is a variable that expresses the risk situation in the agricultural sector. Coefficient of variation is given as a ratio of the standard deviation in net farm income to the mean. When this ratio is high it implies that the agriculture business is a risky investment and hence, banks will be less involved. In states where the ratio is high the commercial banks share of the market is expected to be smaller.

Non-Farm Sector Characteristic Variables

In this category, variables encampass all those that are not farm related but may explain the behavior of commercial banks in selecting the agricultural loan portfolio. Most of the variables in this category are related to the economic situation within a given state and hence, are variables that express the general outlook of the economy. The general outlook of the economy may help the bank in decision making. In states where the general economy

is considered healthy, commercial banks may find them attractive for business. On the other hand, in states where the economy is poor banks will not be as heavily involved.

Percentage change in manufacturing employment and the percentage change in service employment during the study period were calculated by substracting the level of employment in 1969 from the level of employment in 1982 and dividing the result by the 1969 level. In both cases ratios were obtained from all these states. These ratios could either be positive or negative. If the percentage change was recorded as a positive ratio, it is an indication that employment in either the manufacturing or the service industries had increased. A negative ratio would imply a drop in employment in the respective state.

An increase in employment in either industry woud indicate that business in the non-farm sector is booming. Assuming that there is small if any growth in the agricultural sector, commercial banks will increase their non-farm loan portfolio. In states where manufacturing and service employment are increasing, the banks market share of the non-real estate loans is expected to decline. These ratios may be compared to the percentage change in farm employment although no serious conclusions can be drawn because the farm sector may be booming and labor may be

replaced by machinery. In actual fact in states where the farm sector is very prosperous, machinery is replacing labor and hence, a low percentage change in farm employment may not mean much.

Percentage change in metropolitan and non-metropolitan populations were both calculated since they were considered important variables affecting change in banks market share. When the percentage change in metropolitan population is a large positive ratio, it implies that urban areas are experiencing high population growth rates. The growth could be a result of increase in the birth rate in a metropolitan area or an increase in rural/urban migration. For this study, we consider the rural/urban migration. The large ratio may explain the business situation in the metropolitan areas. The migration may result from worsening agricultrual business or growing non-farm economy. If the migration is due to rapidly growing non-farm economy, then banks are expected to have a bias against agriculture because it will then be considered bad business. In states experiencing heavy rural/urban migration, commercial bank's market share for the non-real estate loans is expected to decline. Similar conclusion may be reached when considering increase or fall in value added.

Percentage change in non-farm income is another

important variable used to determine change in commercial banks market share. The income data was deflated for inflation and 1982 was used as the base year. The percentage change in non-farm income is given as a ratio. Again if this ratio is positive, it is an indication that business in the non-farm sector is booming. Banks will, therefore, extend more loans to the non-farm sector thereby neglecting the farm businesses. States with high positive percentage change in non-farm income will have commercial banks more involved in non-real estate laons than in states with a low or negative ratio.

Percentage change in per capita income was also computed. The per capita income shows the entire economy within a state. Percentage change in per capita income may be positive or negative. If the per capita income in a given state has been increasing, a positive ratio will result. If on the other hand, the per capita income has been falling, the ratio will be negative. In states where the per capita income has been increasing, banks will have a large share of the market for non-real estate loans. This may be so because, assuming growth in per capita income is recorded from the non-farm sector, good business in this sector may be used to offset bad loans in the farm sector. On the other hand, the agriculture sector may also be experiencing

positive growth and hence, banks will feel secure in extending their loans.

Percentage change in bank deposits (1969-1982) was also computed for all the states in this study and deflated for inflation. This ratio can either be positive or negative. A positve ratio implies that there has been growth in commercial banks deposits. A negative ratio will imply a fall in bank deposits. Normally the banks deposits increase because people's marginal propensity to save has increased. This results from higher earnings which is an indication of a growing economy. It can, therefore, be hypothesized that in states where the percentage change in bank deposits is a positive ratio, the bank's share of the market for non-real estate loan.

The coefficient of variation is a risk variable which is important. Coefficient of variation for non-farm income expresses the risk involved in commercial banks lending to the non-farm sector because of variation in income. When the ratio is high, it is an implication that it is risky to lend to the non-farm because of unstable incomes. If on the other hand the ratio was low, it implies that non-farm business is good investment for the bank.

As mentioned earlier, all the above variables may be important in explaining the shift in commercial banks'

agricultural loan portfolio.

CHAPTER 5

RESULTS

About twenty independent variables were used to explain shift in the market share of the commercial banks in the agricultural sector (see table 5.1). All these variables are considered important and therefore to take the data or any one variable at face value is to beg questions of validity, reliability and comparablity. Confronted with entangled behavior, unknown interdependencies, masses of qualitative and quantitative variables, and maybe bad data, it was decided that factor analysis technique could be used as a tool to uncover structural patterns in the data.

Factor Analysis

Factor analysis may be defined as a means by which the regularities and order in phenomenon can be discerned. In other words, factor analysis can be employed in order to explore a content area, structure a domain, map unknown concepts, classify or reduce data, illuminate casual uses, screen or transform data, define relationships, test hypothesis, formulate theories, control variables, or make inferences (Rummel 1968). This section will outline factor analysis applications that are relevant to this study.

As already mentioned about twenty variables were identified as possible variables influencing the shift in commercial bank market shares. In other words, a lot of data was gathered which was considered relevant. After observing the raw data however, it was suspected to be interrelated in a complex manner. It was therefore, decided to employ the factor analysis technique in an effort to untangle the linear relationships into their separate patterns. Each pattern would appear as a factor delineating a distinct cluster of interrelated variables. As regards the amount of data available, the technique was deemed necessary because it can be implied to reduce data without much loss of information.

After examining the raw data, it was decided that factor analysis be used in order to reduce information to an economical description. For example, the original data consisted about twenty variables (20) and 48 cases (48 states). This data was difficult to handle descriptively or analytically. Management analysis and understanding of such data are facilitated by reducing them to their common factor patterns. These factors concentrate and index the dispersed information in the original data and can therefore, replace the twenty plus variables without much loss of information.

Factor analysis may also be used to explore unknown domains. As already mentioned the technique is capable of

reducing complex interrelationships to a relatively simple linear expression and also uncover unsuspected and perhaps startling relationships. Factor analysis is also capable of mapping empirical concepts and sources of variation.

Factor analysis results are usually reported or displayed in one or more tables. For this study, twenty variables and forty-eight states were investigated. The most salient results were reported for the purpose of the analysis. This consisted of describing the distinct patterns that have been found. Also, the interrelationship between variables was of interest to this study. The most important tables that were displayed included the correlation matrix, the component loading matrix, the rotated loading matrix, and the factor score coefficient table. However, of major concern to this study were the correlation matrix and the factor score coefficient table. These tables were to aid the study in understanding how variables were linearly related and also described the factor patterns.

Although factor analysis and not correlation matrix was the aim of the technique, it was felt that the correlation matrix be discussed because it contains useful information about variable relationships. A correlation matrix expresses the degree of linear relationships between the row and column variables of the matrix. The closer to zero the coefficient,

the less the relationship; the closer to one, the greater the relationship. A negative coefficient in the matrix is an indication that variables are inversely related. To interpret the coefficient one is required to square it and then multiply by 100. This will give the percent variation in common for the data of the two variables. For example, the correlation of -26 between the number of Production Credit Association offices and the average farm size means that $[(-26)^2 \times 100] + 6.8\%$ of the variation of the commercial banks market share in the 48 states on these two characteristics is in common. In other words, if one knows the state's value on one of the two variables, one can predict 6.8% of the values on the other variable. (See Appendix A1).

The component loading matrix is the other important table for our consideration. The component loading matrix presents the loading by which the existence of a pattern for the variables can be ascertained. The component loading matrix gives a score for each case on these patterns. These scores are derived for each variable. Each variable is weighted proportionally to its involvement in a pattern. The more involved a variable is, the higher the weight. A factor not at all related to a given pattern would be weighted near zero. Variables belonging to the same pattern are grouped

together and display weights above zero. The component loading method was used in the selection of factor patterns for this study. The component loading coefficient matrix is shown in appendix 1A. Factor score coefficient forming the first pattern are shown by score .883, .828, .805, .795, .788, .758, .707, .626, and .620. These coefficients are for variables QQ, OO, PMP, PME, PP, RR, SS, PCB AND PVA (See tABLE 4.1, key to the variables). These 9 variables therefore, form the first factor pattern. The second pattern is obtained considering the highest scores in column 2. Variables in this category include PPI, BRL and NN. The same procedure is employed to obtain the third, and fourth factor patterns.

It is important at this point to examine whether the patterns of relationship between variables contradict or collaborate the reality of already discussed concepts. The first pattern includes farm related variables like percent of farm sales by corporation, percentage change in non-metropolitan population, percent of land under corporation, percent of irrigated land to total crop land, percent of farms owned by corporations and the percentage change in farm numbers. This pattern is consistent with the variable grouping in Chapter Four. In Chapter Four, this pattern is equivalent to the farm sector characteristic variables.

The second pattern describes the general nature of the macro economy. This pattern include variables like change in metropolitan population, change in manufacturing employment, change in per capita income, change in value added and change in bank deposits. However, all these are measured in percent. Average farm size was grouped in this class. In general this pattern may be considered same with the non-farm characteristic variables grouped in Chapter Four that explained shift in market share as influenced by the general economic situation.

Factor patterns three, four and five were found to have overlapping variables. Farm related variables were found to be grouped together with variables that designated the nature of competition the banks were facing. For instance factor pattern 3 was found to have farm related variables (TT and UU) together with non-farm variable (PSE). Four factor as well as three factor patterns were tried but similar overlapping between variables resulted.

However, it was decided that we run multiple regression with three and four factor patterns. The two regression equation are given below

PCBMS = Constant + Factor (1) + Factor (2) + Factor (3) + e (1)

PCBMS = Constant + Factor (1) + Factor (2) + Factor (3) +

Factor (4) + e (11)

where PCBMS = Percentage change in agricultural market share by banks

Constant = the Y intercept

Factors (1), (2), (3) and (4) = the independent variables.

As regards equation (i), the reported regression coefficients were -0.004, -.003, and -.035 for the first second and third factors respectively. Non of these factor was found significant at any level. The adjusted R^{-2} was zero, while the reported F ratio was .307. Lack of any significant factor and explanatory power by the three factors pointed me to conclude that something was seriously wrong with the data. The signs of the regression coefficient failed to explain, the economic hypothesis developed in Chapters Three and Four.

Equation two did not improve the adjusted R^{-2} and resulted with an F value of .401. The t statistics produced proved that non of those four factors were significant (see Table 5-1). The results definitely called for a probe into the data.

One way to do this is to decompose Commercial bank's market share into different components of change. The components include the banks deposits and total agricultural loans, the agricultural loan to deposit ratio. The

Table 5-1.

Regression Results after Factor Analysis.

Independent variable	Dependent variable	
Factor (1)	-.021	-.004
Factor (2)	(-0.218)*	(-0.112)
Factor (3)	0.000	-0.003
	(-0.002)	(0.084)
Factor (4)	.091	-0.035
	(.945)	(-0.945)
	-0.079	
	(-0.814)	
Constant	-.202	-0.320
	(-2106)	(8.798)
R^2	.036	.020
R^2	000	.000
F	.401	.307

* t Statistics at 5% level of significance.

discussion below examines how these components are related to the change in market shares and how when the components change they affect or change banks market share.

Commercial Bank's Market Share

Let MS^t = Commercial banks market share at time t.

BAL^t = Commercial banks agricultural loan at time t.

D^t = Commercial banks deposit at time t.

TAL^t = Total agricultural loans by all institutions at time t.

$ALDR^t$ = Agricultural loans to deposit ratio at the commercial banks in time t.

$$MS = \frac{BAL}{TAL} \quad \ldots\ldots (5:1)$$

Equation (5:1) ca also be written as

$$\frac{\frac{BAL^t}{D^t} \cdot D^t}{TAL^t} \quad \ldots\ldots$$

$$= \frac{ALDR \cdot D}{TAL} \quad \ldots\ldots$$

Change in Commercial banks Market Share

$$dMS = d(ALDR) \cdot \frac{D}{TAL} + d\left(\frac{D}{TAL}\right) \cdot ALDR \quad \ldots 5.2$$

$$= d(ALDR)\,\frac{D}{} + ALDR\,\frac{[TAL \cdot d(d) - D \cdot d\,TAL)]}{TAL^2}$$

$$= d(ALDR) \cdot \frac{D}{TAL} + d(d) \cdot \frac{ALDR}{TAL} - dTAL \cdot \frac{D \cdot ALDR}{TAL^2}$$

Relative Change in Market Shares

This may be described as the change in market shares divided by market share. Symbolically, this may be written as

$$\frac{d(MS)}{MS} = \frac{d(MS)}{\frac{ALDR \cdot D}{TAL}} = \frac{TAL}{ALDR \cdot D} \cdot d(MS) \quad \ldots\ldots\ldots 5.3$$

$$= TAL \left\{ \left[\frac{d(ALDR) \cdot D}{TAL} \right] + \left[\frac{d(D) \cdot ALDR}{TAL} \right] - \left[\frac{d(TAL) \cdot D \cdot ALDR}{TAL^2} \right] \right.$$

$$= \frac{TAL}{ALDR.D} \left[\frac{d(ALDR) \cdot D}{TAL} \right] + \frac{TAL}{ALDR.D} \left[\frac{d(D) \cdot ALDR}{TAL} \right]$$

$$- \frac{TAL}{ALDR.D} \left[\frac{d(TAL) \cdot D \cdot ALDR}{TAL^2} \right]$$

The above equation may be reduced to the form below:

$$\frac{d(MS)}{MS} = \frac{d(ALDR)}{ALDR} + \frac{d(D)}{D} - \frac{d(TAL)}{TAL} \quad \ldots\ldots (5.4)$$

where

$\frac{d(MS)}{MS}$ => Relative change in Commercial Banks Market Share.

d(ALDR) => Relative change in Agriculture Loan to deposit ratio at the Commercial bank. This in other words is the bank portfolio adjustment component.
ALDR

d(D) => Relative change in commercial bank deposit. This is the banks loanable funds component.
D

d(TAL) => Relative change in total agricultural loans. This component reflects the size of the market for the agricultural loans.
TAL

Numerical Examples.

Some numerical examples are given below to support equation (5.4) above. The raw data which was given in dollar value was deflater in order to accommodate inflation during the study period. 1982 was considered the base year and a GNP deflated of .398 was used for the 1969 figures.

$$d(MS) = d(ALDR) + d(D) - d(TAL)$$

MS ALDR D TAL

Let us use the above equation to examine how states of Arizona, California and Texas experienced changes in market shares of the banks agricultural loans.

ARIZONA

$$d(MS) = -.383 + 0.620 - .596 = .357$$

MS

CALIFORNIA

$$d(MS) = -.339 + .512 - 1.067 = -.894$$

MS

TEXAS

$$\frac{d(MS)}{MS} = -.505 + 1.018 - .753 = -.24$$

$$MS = 1.266$$

The interpretation given by the above examples is that in Arizona, Commercial banks lost about 36% of their market share in the agricultural sector. In California and Texas, Commercial banks decreased their share of the market by 89.4 and 24 percents respectively. During this study period, oil prices increased tremendously. Both these states are endowed with oil reserves and it is therefore, not surprising to experience this high percentage change in banks share of the market to the farm sector.

As already mentioned, the percentage change in market shares was decomposed and the components of change examined. The three equations which were regressed using the multiple regression technique where the percentage change in the agricultural loan deposit ratio, the percentage change in commercial bank deposits, and the percentage change in the total agricultural loans as the dependent variables. All these changes are influenced or affected by different factors which contribute to their change.

Change in Market Shares

Percentage Change in Agricultural Loan deposit ratio

(PCALDRZ)

The factors that were included in the multiple regression model are; percentage change in farm income (DPCFYZ); the risk element denoted by (RISKZ); the type of branching system within a state (ii) and the average ratio of farm population to non-farm population. The risk variable was computed by dividing coefficient of variation non-farm income with coefficient of variation farm income. II which represents the states banking practice is a dummy variable. The regression equation may be expressed as:

$$PCALDRZ = b_0 + b_1\ DPCNFYZ + b_2\ DPCFYZ + b_3\ RISKZ + b_4\ II + b_5\ POP + e$$

For simplicity,

Let PCALDRZ = Y Dependent variable

DPCFYZ
RISKZ
II
POP
e = error term

Independent variables.

This equation was regressed to produce results as summarized in table 5-1. The regression equation with the regression coefficients may be written as

where b_0 = Constant or PCALDRZ intercept.
b_1, b_2, b_3 and b_4 are regression coefficients.

From Table 5-1, one may substitute for the regression coefficient in the regression equation above to obtain

TABLE 5-2.

SUMMARY OF THE REGRESSION RESULTS

INDEPENDENT VARIABLES	DEPENDENT VARIABLES PCALDR2	PCBD	PCAL
DPCNFY2	-.636	.756	
	(-2.556)*	(7.463)	
DPCFY2	.404	.040	.436
	(1.534)	(.334)	(2.384)
RISK2	-.128		
	(-0.531)		
PCSIZE			1.391
			(4.032)
PCVAL			.223
			(1.417)
POP	1.288	.601	.132
	(1.117)	(1.027)	(140)
II	-.231	-.008	-.008
	(-2.167)	(-.146)	(-.087)
CONSTANT	.434	.050	.628
	(2.222)	(.606)	(4.589)
DEGREES OF FREEDOM			
Regression	5	4	5
Residual	42	43	42
R^2	.369	.572	.404
R^2	.294	.532	.333
F	4.917	14.363	5.692

t - values in parentheses

* Represent a confidence level of 10% using a two-tailed test.

PCALDRZ = 434 - .636 DPCNFYZ + .404 DPCFYZ - .128 RISKZ - .231 II + 1.288 POP

in other words

b_0 = .434. This implies that PCALDRZ = .434 when b_1, b_2, b_3, b_4

and B_5 all equal to zero.

b_1, b_2, b_3 b_4 and b_5 are referred to as the net regression coefficients. Each measures the average change in PCALDRZ associated with a unit change in the relevant variable. However, since the simultaneous influence of all independent variables on PCALDRZ is being measured, the net effect of DPCNFYZ or any other independent variable must be measured apart from any influence of other variables. Therefore, it is said that b_1 measures the average change in PCALDRZ per unit change in DPCNFY holding the other independent variables constant.

In our case, the b_1 value of -.636 indicates that each increase of 1 percent of non-farm income when risk, branching system and average ratio of farm/non-farm population are held constant reduces the percentage change in agricultural loan deposit ratio by an average of .636 percent. Similarly, the b_2 value of .404 means that if farm income is increased by 1 percent, when non-farm incomes, branching system and the average ratio of farm/non-farm population are all held

constant, then the percentage change in agricultural loan deposit ratio will increase by an average of .404 percent. The same interpretation follows for b_3 and b_5. Increasing the average ratio of farm/non-farm population raises the dependent variable by 1.288 percent and increasing risk by one limit decreases PCALDRZ by .128.

A slightly different interpretation of b_4 is given bearing in mind that II is a dummy variable and can take values of either 1 or 0. A zero value implies that a particular state has unit or limited banking system. A value of 1 (ie II = 1) indicate that the state has a branding practice. $b_4 = -.231$. Now assume that a given state has branching system hence II = 1. On the other hand, in unit or limited banking system, II = 0. The two equations will therefore be,

$Y_R = b_0 + b_4$ (1)

$Y_R = b_0 + B_4$ (0)

In other words, the expected values of Y when II takes the value of 1 and 0 may be expressed as

$$\text{PCALDRZ} = \begin{matrix} B_0 & \text{II} = 0 \\ B_0 + B_3 & \text{II} = 1 \end{matrix}$$

Therefore,

PCALDRZ = .434 when II = 0
PCALDRZ = .434 - .231
= .203 when II = 1

The interpretation is that in states with unit or limited banking, the percentage change in agricultural loans deposit ratio increases by more (.434) than in those states which practice branching system.

Economic interpretation attached to the above results may be in order. First the percentage change in farm income is positively related to the independent variable (percentage change in farm loan deposit ratio). The implication is as farm incomes increase, banks will be willing to extend more credit to the farm sector because it now proves to be good business to invest in. In other words, banks consider i a higher chance of getting their money back when the farmers are receiving higher returns.

The risk element is perhaps the most important variable that influences the banks decision. There exists inverse relationship between the percentage change in agricultural loan deposit ratio and the risk variable. The economic interpretation is that as farm business becomes more risky, the percentage change in agricultural loan deposit ratio drops.

The t distribution is useful for testing hypothesis in the context of the multiple regression that a given coefficient is equal to zero. The relevant t statistic is calculated as a ratio of the estimated coefficient to the

estimated standard error. The computed t value is compared with the reported t value from the students t tables. From table 5-1, the regression coefficients are reported. Now assume we wish to test the null hypothesis that $b_1 = 0$. The computed t value is equal to + 2.556. The reported t value from the table with 42 degrees of freedom is $t_{.10} = 1.671$ and $t_{.05} = 2.000$. At both the 10% and 5% level of significance, the reported t values from the table are less than the computed t value. That is,

t computed = 2.556
$t_{.05\ 43} = 2.000$, $t_{.10,\ 43} = 1.671$

From this information, we can reject the null hypothesis that $b_1 = 0$. This leads us to accepting the alternative hypothesis that 6_1 is not equal to 0. The same argument may be used to reject the null hypothesis that $6_4 = 0$. One may conclude that the first and fifth coefficients 6_1, and 6_4 are significantly different from zero. Also the constant is significantly different from zero at 10% level.

The other coefficient b_2, b_3 and b_5 may be tested for significance. The null hypothesis are as before $b_2 = 0$, $b_3 = 0$, $6_4 = 0$. The computed t value are 1.534, .531 and 1.117 respectively while $t_{05,\ 43} = 2.000$ and $t_{10,\ 43} = 1.671$. Since the t value from the table is greater than the computed value at both the 5% and 10% levels, we may accept the null

hypothesis that $b_2 = 0$, $b_3 = 0$, and $b_5 = 0$.

The coefficient of determination R^2 is a measure of the explanatory power of the regression. R^2 therefore, indicates the percentage change of dependent variable (percentage change in agricultural loan deposit ratio) variance explained by the multiple regression equation using independent variables percentage change in farm income, risk, branching system and average ratio of farm/non-farm population. A high R^2 of say .9 implies that 90% variation in Y is explained by variation in the independent variables. It is worth noting at this point that R^2 values tend to be high when using time series data where both dependent and independent variables reflect certain underlying time trends. When using cross-section data, by contrast, R^2 values tend to be low because of both the great variability that is possible across the individual entities and the lack of a common underlying trend (Intriligator 1978).

An $R^2 = .369$ was reported for this multiple regression exercise. This implies that 36.9 percent variation in the dependent variable can be attributed to variation in explanatory variables. This R^2 value is very low but as mentioned above cross-section data results with low R^2 values.

There are some problems however, associated with using

R^2 to validity regression results. Besides being sensitive to the number of independent variables included in the model, it assumes that the regression model is correct. It is therefore, appropriate to sue the adjusted R^2 denoted by R^2. From the regression table 5-1, R^2 = .294. This means that 29.4 percent variation in Y is due to variation in the explanatory variables.

The F test on R^2 provides a test of the null hypothesis that all the regression coefficients are zero. The F test is usually used to test the joint significance of a subset of all the regression coefficients. A level of significance is chosen say 1 or 5 percent and then the test statistic is compared with the critical value of the F distribution. If the F statistic is larger than the critical value, we reject the null hypothesis and conclude that the subset of variables in statistically significant.

The null hypothesis in this case will be given as

H_0: $6_1 = 6_2 = 6_3 = 6_4 = 6_5 = 0$

The reported F statistic (3.991) from Table 5-1 was computed by dividing the mean square regression with the mean square residual (.561/.141 = 3.991). This F value becomes larger as a larger portion of the total sum of squared residual is explained by the regression. In our case, the critical F value. (df_n = 5, df_d = 42 X = .01) is 3.34. The F

statistic is therefore, larger than the critical value of F. The null hypothesis is therefore, rejected. In other words, the null hypothesis that ($b_1 = b_2 = b_3 = b_4 = 0$) the regression is not significant from zero is rejected and we conclude that the regression is significant at 1% level. At 5% level of significance, the hypothesis is still rejected since the critical F value ($df_n = 4$, $df_d = 43$ X = .05) is 2.37. What this implies is that the increment in the error from 3.062 to 5.232 is not due to chance. The economic interpretation of the above results are that percentage change in agricultural loan to deposit ratio is inversely related to non-farm income, risk and bank branching practice. In state with increasing non-farm incomes, commercial banks will tend to give less credit to agriculture. This may be explained by the fact that such states will have a booming non-farm sector which will be more than favored by the banks. In state where lending to the agriculture sector has a high risk, banks will avoid giving credit to farmers. Unit or limited branching practice has an interesting interpretation. States with bank branching tend to have less credit from the banks. In states with unit or limited banking banks have limited business options and hence tend to lend more to the farm sector.

Percentage Change in Bank Deposits (PCBD)

This is another important component of change in the market shares. The percentage change in bank deposits is a function of percentage change in non-farm income (DPCNFY2), percentage change in farm income (DPCFY2), the bank branching practice (11) and the average ratio of farm population to non-farm population (POP). The regression equation may be written as:

PCBD = constant + r_1 DPCNFY2 + r_2 DPCFY2 + r_3 II + r_4 POP + e we may desire

to express these symbols as

PCBD = independent variable

constant = r_0 Y intercept

From table 5-1, we may substitute the regression coefficient in the equation above to obtain,

9 = .050 + .756 DPCNFYZ + .040 DPCFYZ - .008 II + .601 POP

All the regression coefficients (r_1, r_2 and r_3) have positive signs which indicate that they are positively related to the dependent variable (PCBD). The r_1 value of .756 indicates that for each increase of 1 percent of non-farm income when farm income, average farm/non-farm population ratio and the branching system are held constant, the percentage change in bank deposits increases by an

average of .756 percent. Likewise a one percent increase in farm income holding all the other independent variables constant raises the dependent variable by .4 percent. A one percent increase in the ratio of farm/non-farm population all the other explanatory variables held constant will increase the percentage change in bank deposits by an average of .601 percent.

As mentioned earlier, the branching variable has either a value equal to or a zero value. The interpretation of the branching variable was given earlier. In this case, the expected values of PCBD when $b_3 = 0$ and when $b_3 = 1$ are given below.

$$E(PCBD) = r_0 + r_3(1) \text{ when } r_3 = 1$$

$$r_0 + r_3(0) \text{ when } r_3 = 0$$

$$E(PCBD) = .05 \text{ when } r_3 = 0$$

and

$$E(PCBD) = .042 \text{ when } b_3 = 1$$

This implies that in states with bank branching system, the percentage change in bank deposits increases by less (.042) than in states with unit banking (.05).

The critical t value at 43 degrees of freedom is $t_{.05,\ 43} = 2.000$ and $t_{.10,\ 43} = 1.671$. This critical value is compared with the computed t values for each regression coefficients. For example we wish to test the hypothesis

that $r_1 = 0$. The t computed is equal to .7463. At both 10 and 5 percent confidence intervals the computed t is greater than the critical value. The null hypothesis is therefore, rejected thereby accepting the alternative hypothesis that r_1 is not equal to 0. All the other computed t values are less than the critical values at both 5 and 10 percent level of significance. The null hypothesis that $r_2 = 0$, $r_3 = 0$, and $r_4 = 0$ are therefore accepted. The conclusion here is that percentage income is the most important variable affecting change in bank deposits.

The coefficient of determination $R^2 = .572$. This implies that 57.2 percent variation in the bank deposits is due to variation in the explanatory variables. As mentioned earlier, $R^2 = .572$ is considered satisfactory while using cross - section data. The adjusted R^2 is .532. Adjusted R^2 is always less than R^2 because of degrees of freedom.

From table 5-1, F value is equal to 14.363. The critical F values ($df_d = 4$ $df_n = 43$ = .01 and = .05) are 3.65 and 2.53 respectively. The null hypothesis that $r_1 = r_2 = r_3 = r_4 = 0$ is therefore rejected since the critical F value is less than the computed F value both at 1 and 5 percent levels of significance. The regression is therefore significant from zero at 1 and 5 percent levels. The decrease in the error from 2.170 to 1.624 is not due to

chance.

Percentage Change in Total Agricultural Loans (PCAL)

PCAL is a function of percentage change in farm income (DPCFY2), percentage change in farm size (PCSIZE), percentage change in value added, the bank branching practice (II), and the average farm/non-farm population ratio (POP) mathematically, this statement may be expressed as

$$PCAL = Constant + n_1\ DPCFY2 + n_2\ PCSIZE + n_3\ PCVAL + n_4\ II + n_5\ POP + e.$$

The values of the regression coefficients from Table 5-1 may be substituted in the equation

Therefore,

$$PCAL = .628 + .436\ DPCFYZ + 1.391\ PCSIZE + .223\ PCVAL - .008\ II + .132\ POP.$$

All the regression coefficients except n_4 have positive signs implying that they are positively related to the dependent variable. The interpretation of the regression coefficients is the same as those of the preceding equations. For example the n_2 value of 1.391 indicates that for each increase in 1 percent of farm size, when all the other variables are held constant, percentage change in agricultural loans increases by an average of 1.391 percent. The same interpretation may be given for all the other explanatory variables.

The critical t values at 42 degrees of freedom are $t_{.05,42} = 2.00$ and $t_{.10,42} = 1.671$ comparing these values with the computed t values in an effort to test for the significance of individual regression coefficients, we conclude that only n_1 and n_2 with t computed values of 2.384 and 4.032 are significantly different from zero at 5 and 10 percent levels. The null hypotheses that $n_1 = 0$ and $n_2 = 0$ are therefore rejected. On the other hand the computed t values for the other regression coefficients lead us to conclude that the null hypotheses that $n_3 = 0$, $n_4 = 0$ and $n_5 = 0$ are accepted at both 5 and 10 percent levels of significance.

$R^2 = .404$. This implies that 40.4% of the variation in PCAL (dependent variable) is due to variation in the independent variables. Adjusted R^2 which as mentioned is a better measure of variability is equal to .333.

F value is 5.692. The critical F values ($d_{fd} = 5$, $d_{fn} = 42$ X = .01 and X= .05) are 3.34 and 2.37 respectively. The joint null hypothesis that $n_1 = n_2 = n_3 = n_4 = n_5 = 0$ is therefore rejected at both 1 and 5 percent levels of significance. The increase in errors from 2.254 to 3.326 is not due to chance.

CHAPTER 6

SUMMARY AND CONCLUSION

The purpose of this study was to examine the determinants of changes in market shares of commercial banks in the agricultural sector with special emphasis to non-real estate loans. Understanding the factors influencing changes in market shares of commercial banks for non-real estate lending is important because it may help in establishing why some states or regions are experiencing serious financial problems and also why banks and other institutions are deciding to put agricultural lending in some states.

Commercial banks have been identified as the largest source of non-real estate loans to the farm sector. However, the loan portfolio by the commercial banks has been declining. For example, between 1970 and 1979, commercial banks controlled about 45% of the non-real estate loan market. During the early years of 1980s, the banks share of the market for non-real estate loans declined to average about 35% (see table 1-3). The recorded decline in market shares was for the entire country and no regional data was available to show the decline in commercial banks shares in different states. However, it had been established that

different states were facing financial stress due to loan reduction by different lending institutions.

It was also established that different socio-economic factors are responsible for shifts in the market shares of commercial banks. However, these factors operate at different levels in different states. To explain this variation, one needs to examine the components of change in changes in market shares among states. Three components of market share changes were identified. The three components are percentage change in agricultural loan deposit ratio, the percentage change in bank deposits and the percentage change in total agricultural loans. The first component to be considered is the percentage change in agricultural loans to deposit ratio. This ratio may be negative or positive. The highest percentage change in agricultural loan to deposit ratio occurred in the states of Minnesota (32.8%), Nebraska (18.4%), California (14.3%), Iowa (6.9%) and Kentucky (0.06%). All these states with the exception of California have agriculture as one of the major industries. All the other states experienced a drop in the percentage change in agricultural loans to deposit ratio. Arizona had the highest decline (-54.5%) followed by Texas (-32.6%). Pennsylvania, Georgia and Mississippi also recorded a drop in the ratio.

The other component of change is the percentage change

in bank deposits. Out of all the 48 states included in the study, only two states Michigan and Ohio registered decline in bank deposits. The rest of the states recorded tremendous increase in bank deposits. Table 6-1 shows that the ten selected representative states all had positive growth in bank deposits. Texas had the highest growth in bank deposits (101.8%) followed by Arizona with 71.4%. Mississippi, Kentucky and California with 60.3%, 52.9% and 51.1% respectively were the other three states that registered above 50% growth in bank deposits. The states that registered the lowest percentage change in bank deposits are Pennsylvania (12.2%), Minnesota (33.9%), Nebraska (36.8%), Georgia (38.2%), and Iowa (38.6%). These later states are important agricultural states. The main factor that influences bank deposits is change in non-farm income. Texas had the highest growth in non-farm income. This high increase may be attributed to the oil business which was at its peak in early 1970 and 1980. Mississippi, Georgia and California also had high growth in non-farm income.

The highest increases in farm income occurred in Iowa, Mississippi and in Texas. However, it is argued that as the farm income increases, banks are going to lend more to the agricultural sector because farm business will then be more attractive. Increase in farm income may therefore, have an

TABLE 6-1

APPROXIMATE COMPONENTS OF MARKET SHARE CHANGES FOR COMMERCIAL BANKS LENDING TO AGRICULTURE, NON-REAL ESTATE LOANS 1969-82

REPRESENTATIVE STATES	COMPONENTS: AGRICULTURAL LOAN TO DEPOSIT RATIO	COMMERCIAL BANK DEPOSITS	TOTAL AG LOANS	MARKET SHARES
	PERCENT CHANGE			
ARIZONA	-54.512	74.418	36.953	-43.065
CALIFORNIA	14.327	51.192	106.671	-16.363
GEORGIA	-19.179	38.180	118.399	-48.865
IOWA	6.928	38.558	64.908	-10.158
KENTUCKY	0.058	52.944	82.441	-16.119
MINNESOTA	32.759	33.886	99.787	-11.032
MISSISSIPPI	-10.674	60.298	141.648	-40.745
NEBRASKA	18.448	36.887	91.082	-15.146
PENNSYLVANIA	-24.898	12.225	46.774	-42.576
TEXAS	-37.629	101.824	75.253	-28.173

inverse relationship with change in bank deposits. It may also be argued that as farm incomes continue to rise, farmers will deposit some funds in the bank and hence, a positive relationship may also be expected. This is however, expected to occur in the long run.

Another counter argument concerning increase in farm incomes is that farmers will be in a position to finance farm activities and hence, will need less credit. In states where growth in farm income is low, banks may extend more credit to the farmers in an effort to redeem the farm sector. This may be used as the explanation to the problems the commercial banks are finding themselves in.

Percentage change in agricultural loans was recorded positive in all the states included in the study. This is an indication that agricultural loans increased in all the states. However, the increase in the agricultural loan was not uniform for all the states. While some states experienced minimal growth, others registered over 100% growth in agricultural loans. This variation can be explained by the factors which influence changes in agricultural loans which are different in different states. As was discussed in Chapter Five, the factors responsible for changes in the agricultural loan are percentage change in farm size, percentage change in value added in agricultural

land and buildings, percentage change in farm income, bank branching system and the non-farm population. Among the 10 representative states selected as representatives of all the ten agricultural regions, Mississippi recorded the highest risk ratio and also the highest percentage change in farm size. (See table 6-2) The state also had among the highest percentage change in non-farm income second to Texas. The percentage change in farm income was also the highest among the states. It may therefore, be concluded that those states that recorded the highest percentage change in value of land and buildup in farm size, in farm income had the highest increase in total agricultural loans.

Other states that recorded high percentage change in farm loans include Georgia, California, Minnesota, Nebraska and Kentucky. All these states with the exception of California are important agricultural states. The importance of agriculture may be reflected by the ratio of state farm income to total state income. The highest ratios were recorded in Iowa, Kentucky, Mississippi and Nebraska (1980), (see table 3-4). Another indicator of the importance of agriculture in these states is the acreage under farming. It may also be pointed out that these states with the exception of California are characterized by unit or branch banking. California and Arizona are the only two states which have

TABLE 6-2.

RELATIONSHIP BETWEEN INDEPENDENT AND DEPENDENT VARIABLES 1969-82 (FOR TEN SEELECTED STATES)

	PCALDR	PCBD	PCAL	RISKS	PCFY	PCNFY	PCSIZE	PCVAL	POPI	LL
ARIZONA	-54.512	71.418	36.953	1.005	.313	.026	-.206	.764	.006	1
CALIFORNIA	14.527	51.192	106.671	.785	.278	.469	-.141	.670	.008	1
GEORGIA	-19.179	38.180	118.399	.451	.297	.547	.060	.511	.025	0
IOWA	6.928	38.558	64.908	.296	.472	.341	.184	.931	.163	0
KENTUCKY	0.058	52.944	82.441	1.077	.079	.443	.094	.653	.080	0
MINNESOTA	32.759	33.886	99.787	.313	.238	.380	.131	1.225	.089	0
MISSISSIPPI	-10.674	60.298	141.648	1.093	.446	.595	.326	.795	.039	0
NEBRASKA	18.448	36.887	91.082	.304	.362	.368	.177	.707	.136	0
PENNSYLVANIA	-24.898	12.225	46.774	.496	.264	.200	.049	.489	.014	0
TEXAS	-37.629	101.824	75.253	.743	.436	.947	.032	.635	.022	0

bank branching practice. Arizona however, only recorded about 37% increase in total agricultural loans.

It is argued that growers in states with limited or unit banking systems acquire more agricultural loans from the banks. Banks in these states have limited business options outside farm business.

As was mentioned earlier, the percentage change in market share was computed by subtracting the 1969 market share from the 1982 share and then dividing the result by the 1969 share [(MS82-MS69)/MS69]. Table 6-1 shows the approximate percentage change in market shares. The results indicate that in all the selected states, commercial banks lost their share of the market. Georgia had the highest drop in commercial banks share of the market (-48.9%). The other states which experienced high decline in commercial banks market share are Arizona (-43.1%), Pennsylvania (42.6%) and Mississippi (-40.7%). Georgia and Mississippi had very high increases in total agriculture loans. It may therefore, seem that the increase in total agricultural loans in these two states must have originated from elsewhere outside the banks influence. This may suggest the presence of production credit association and the Farmers Home Administration within the two states. Georgia and Mississippi are states characterized by small farms and as was mentioned earlier,

commercial banks tend to avoid those category of farmers.

The states of California, Texas, Nebraska, Minnesota, Kentucky, and Iowa all registered low declines in commercial bank's market share. These states on the other hand recorded very high increase in total agricultural loans. All the mentioned states excluding Iowa and Kentucky are characterized by large scale farms which as already mentioned are favored by commercial banks while extending loans to agriculture. The high increase in total agricultural loans and the a less than 20% (except Texas - 28%) decline in banks market shares may imply that most of the loans to farm sector originated from the banks. In Iowa and Kentucky, the importance of agriculture as reflected by number of farms, income as a ratio to total state income and farm population relative to metropolitan population, may influence the commercial banks to increase loans to agriculture. It may also be worth mentioning that Iowa is among the few states with limited branch banking which may imply that, the banks in this heavy agricultural state have to increase their farm loan portfolio due to limitations in other business options.

Arizona and Pennsylvania are the two states which recorded lowest increases in total agricultural loans but high decline in commercial bank's market shares. The economic growth outside the farm sector may be used to

explain Arizona's high decline in commercial bank's market share. Booming non-farm business in Arizona may be reflected by high positive increase in banks deposits. It may also be reflected by a diminishing farm income/total state income ratio. Pennsylvania is a state which depends to a very large extent on non-farm income. During the period in question, the state recorded a very low increase in bank deposits. It may be argued that the overall economy in the state grew at a very slow pace during the period in question.

In general we may state that states which recorded high increase in agricultural loans do not necessary imply a high percentage change in market shares by the commercial banks. However, if the increase in agricultural loans originated from commercial banks, then the decline in banks market share is less. Another important observation is that if bank deposits increase tremendously, there is a high likelihood that the increase originates from non-farm businesses. In that case business is good in that sector and hence, banks will lend more in an effort to avoid risky farm business.

From our theoretical model in Chapter 3, one may be tempted to conclude that the most important element or factor commercial banks consider in selecting their agricultural loan portfolio is risk. All the other factors included have a risk element consideration. For example, it was

established that the higher the farm incomes, the higher the farm size and the higher the value of land and other farm inventories, the more likely the banks will increase their loans to agriculture. The bank's decision is entirely based on risk considerations because when farm incomes increase, it implies that banks are not likely to lose money. Also large farms are usually well managed and have high returns (This argument is based on economies of size). It is also worth noting that when the value of land and other business inventories is increasing, farm business is being competitive. Due to the high value attached to farm businesses, banks will be willing to extend more loans to the farm sector. It does not matter how one looks at the bank's decision, the risk consideration according to our theoretical model is paramount.

Although risk featured prominently in our conceptual framework, the statistical results the risk variable was found to be insignificant at both the 10 and 5 percent level of significance. This leads us to conclude that either the riks measurement in the model is wrong, or that risk is not an important variable as highlighted by the conceptual framework.

This study does not conclude that all the areas of consideration by the banks when making loan portfolio

decisions have been fully exhausted. The study has only investigated the most important factors. One cannot therefore, make concrete conclusions before examining the performance of other financial institutions competing with banks within a state. It would therefore, be worthwhile to research into how all institutions lending to the farm sector arrive at their loan decisions not only for the non-farm estate but also for the real estate loans. It may also be interesting to examine how the bank selects the size of non-real estate loan while considering the real estate loan. Further research is therefore, recommended in the above mentioned areas.

APPENDIX A1

Component Loadings. (Three Factors)

	1	2	3
QQ	0.883	-0.286	0.016
OO	0.828	0.013	0.023
PMP	0.805	0.154	-0.134
PME	0.795	0.309	-0.076
PP	0.788	-0.226	-0.174
RR	0.758	-0.480	0.154
SS	0.707	-0.164	-0.203
PCB	0.626	0.543	-0.030
PVA	0.620	0.601	0.001
PPI	0.360	0.642	0.133
BRL	-0.009	-0.627	0.107
NN	0.248	-0.509	-0.490
KK	-0.326	0.308	-0.790
LL	-0.245	0.403	-0.763
MM	0.171	0.435	0.472
UU	-0.396	0.426	0.335

APPENDIX A2

Component Loadings. (Four Factors)

	1	2	3	4
QQ	0.883	-0.286	0.016	0.098
OO	0.828	0.013	0.023	0.086
PMP	0.805	0.154	-0.134	-0.349
PME	0.795	0.309	-0.076	-0.304
PP	0.788	-0.226	-0.174	0.176
RR	0.758	-0.480	0.154	0.166
SS	0.707	-0.164	-0.203	-0.061
PCB	0.626	0.543	-0.030	-0.127
PVA	0.620	0.601	0.001	-0.201
PPI	0.360	0.642	0.133	0.201
BRL	-0.009	-0.627	0.107	-0.577
NN	0.248	-0.509	-0.490	0.229
KK	-0.326	0.308	-0.790	0.063
LL	-0.245	0.403	-0.763	0.018
MM	0.171	0.435	0.472	0.532
UU	-0.396	0.426	0.335	-0.371

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