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AN ANALYSIS OF THE CAPITAL STRUCTURE OF SINGLE PROPRIETOR  
KANSAS COMMERCIAL FARMS

by

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B. S., California Polytechnic State University  
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A MASTER'S THESIS

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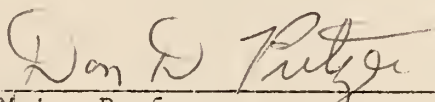
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## CHAPTER I

### INTRODUCTION

#### The Changing Scene in Agriculture

Agriculture is in a continual process of change. This process of transformation has taken U.S. agriculture from one of primarily self-subsistence to the present day highly commercialized and capital-intensive agriculture. This transformation to a more technical agriculture has led to the following:

1. Increased capital and credit needs;
2. Purchased inputs making up a relatively larger proportion of total inputs;
3. A greater demand for production and marketing efficiency;
4. An increased rate of resource and human obsolescence;
5. A problem of keeping abreast of rapidly changing technology;
6. Increased specialization;
7. Larger farms with fewer operators;
8. Increased total agricultural output;
9. Increased competition from synthetic products;
10. A need for more sophisticated management.<sup>1</sup>

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<sup>1</sup>David L. Heisterberg, "An Analysis of Capital Acquisition By Beginning Farmers," (Unpublished M.S. thesis, University of Missouri, 1975), pp. 1-2.

### The Balance Sheet of Farming

U.S. farm assets were valued at \$709 billion on January 1, 1978, and outstanding debt was \$120 billion, leaving farm proprietors an equity of \$589 billion. These amounts compare with assets of \$655 billion, a debt of \$103 billion, and an equity of \$552 billion at the beginning of 1977.

Farm real estate is by far the most valuable farm sector asset, accounting for close to three-fourths of total asset value the last several years. Farm real estate debt outstanding at the beginning of 1978 was \$64.2 billion, 13.5 percent higher than a year earlier. The rate of increase in farm real estate loans in 1977 was one and one-half times the rate of increase in the value of land in 1977. Part of the increase resulted from farmers refinancing farm operating or intermediate-term loans into farm mortgage loans which stretched out the repayment period and required smaller annual payments.<sup>2</sup> The financial shifting of short term debt to long term debt may relieve annual cash flow problems and/or allow additional debt servicing to enlarge existing profitable enterprises or add new enterprises. The issue of financial and management survival in the short run with long run implications prompted the following objectives for this research:

1. Determine the sources of capital currently used by Kansas farmers.
2. Determine the returns to capital.

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<sup>2</sup>U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service, Balance Sheet of the Farming Sector, 1978, by Carson D. Evans and Richard W. Simunek, Agriculture Information Bulletin No. 416 (Washington, D.C.: Government Printing Office, June, 1978), pp. 1-7.

3. Determine the interrelationship of loan terms.
4. Demonstrate the relationship of cash flow and profitability.
5. Test for adequacy of income for farms now and in five years, (1982).

Work by the Farm Management Fieldmen, state extension specialists, and concern by farmers and agricultural lenders indicated the need for more indepth analysis of the relationship between the variable, interest paid by farmers for the use of borrowed capital, to farm income and expense. Therefore, the sixth objective of this research was to investigate the relationship between interest expense and the following variables: gross farm income, net farm income, total capital managed, total cash operating expenses, depreciation, total expenses, net worth, return to labor and management, land value-owned, land value-rented, current loans, long-term loans, livestock income, and crop income.

## CHAPTER II

### REVIEW OF LITERATURE

An extensive computer search was conducted through Farrell Library at Kansas State University to obtain sources for a review of literature. The file searched was Agricola. Key words such as debt, equity, risk, leverage, and others were coded into the computer to aid in the search process. Several related articles and research reports were retrieved. Many sources retrieved were associated with the objectives of this thesis, although research directly relevant was not found. The review of literature which follows is a summary of information relevant to the methodology and analysis of results chapters of this thesis.

"Total U.S. farm debt outstanding on January 1, 1978, including CCC loans on stored crops, increased a record \$17 billion from January 1, 1977, the largest percentage rise since 1948. The increase in farm indebtedness in 1976 was \$12 billion. Farm real estate debt outstanding at the beginning of 1978 was \$64.2 billion, 13.5 percent higher than a year earlier."<sup>1</sup>

Several factors may have caused the dramatic debt expansion to occur, according to Thomas L. Frey in an article entitled "Agricultural

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<sup>1</sup>U.S. Department of Agriculture, Economics, Statistics, and Cooperatives Service, Balance Sheet of the Farming Sector, 1978, by Carson D. Evans and Richard W. Simunek, Agriculture Information Bulletin No. 416 (Washington, D.C.: Government Printing Office, June, 1978), p. 3.

Credit for the 1970s."<sup>2</sup> 1) With cost-price squeezes continually present, farms have been forced to expand to take advantage of the efficiency and the lower cost of production. 2) The substitution of capital for labor has occurred because changing relative prices of resources and production inputs favor substitution. 3) Farm firms will continue to purchase more inputs and the cost of all these inputs rises steadily. 4) Farmers realize that success today is increasingly dependent on the ability to profitably use borrowed capital. With this ever increasing demand for agricultural credit, the question of who is and who will be supplying credit to agriculture is extremely important.

In 1977, individuals were the most important source of real estate credit (See Table 1). They supplied 35.8 percent of all farm real estate loans, however this is somewhat less than 45.9 percent they supplied in 1940. Other major farm real estate lenders include Federal Land Banks, Insurance Companies, Commercial Banks, and the Farmers Home Administration.

The Federal Land Banks have been increasing the number of new loans as well as total loan volume over time and are expecting to continue doing so in the future. Also, since the 1950s, the Farmers Home Administration (FmHA) increased its relative importance while life insurance companies were decreasing in relative importance and commercial banks were decreasing slightly.

Currently, commercial banks are the largest farm non-real estate lenders (See Table 1). In 1977, they accounted for 51 percent of the

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<sup>2</sup>Thomas L. Frey, "Agricultural Credit For The 1970s," paper presented at the Farm Credit Management Training Seminar, Nebraska Center, 13 May 1971.

TABLE 1  
 OUTSTANDING FARM REAL ESTATE DEBT, JANUARY 1  
 (Amounts in Millions of Dollars)

Year	Commercial		Insur.		Individuals and Others
	Banks	FLB	Company	FHA	
1940	\$ 534	\$ 2010	\$ 984	\$ 32	\$ 3026
1945	450	1210	938	196	2147
1950	932	906	1172	202	2367
1955	1161	1267	2052	378	3387
1960	1523	2335	2820	676	4728
1965	2417	3687	4288	1285	7218
1970	3345	6671	5734	2280	10953
1975	5966	13402	6297	3215	17408
1976	6296	15950	6726	3369	18728
1977	6781	18455	7400	3688	20266

-----Percentage of Total Loans-----					
1940	8.1	30.5	14.9	0.5	45.9
1945	9.1	24.5	19.0	4.0	43.4
1950	16.7	16.2	21.0	3.6	42.5
1955	14.1	15.4	24.9	4.6	41.1
1960	12.6	19.3	23.3	5.6	39.1
1965	12.8	19.5	22.7	6.8	38.2
1970	12.1	22.9	19.6	7.8	37.5
1975	12.9	29.0	13.6	6.9	37.6
1976	12.3	31.2	13.2	6.6	36.7
1977	12.0	32.6	13.1	6.5	35.8

OUTSTANDING FARM NON-REAL-ESTATE DEBT, JANUARY 1  
 PERCENTAGE OF TOTAL (INCLUDING CCC LOANS)  
 (in millions of dollars)

Year	CCC	Commercial			FHA	Individuals and Others
	Loans	Banks	PCA	FICB		
1940	\$ 445	\$ 900	\$ 153	\$ 32	\$ 418	\$1500
1945	683	949	188	30	453	1110
1950	1721	2049	387	51	347	2320
1955	2219	2934	577	58	417	3210
1960	1165	4819	1361	90	398	4860
1965	1543	6990	2278	125	644	6330
1970	2679	10330	4495	218	785	5340
1975	319	18238	9519	374	1044	6050
1976	358	20160	10773	350	1772	6350
1977	1012	23283	12223	368	1877	7300

-----Percentage of Total Loans-----						
1940	12.9	26.1	4.4	0.9	12.1	43.5
1945	20.1	27.9	5.5	0.9	13.3	32.3
1950	25.0	29.8	5.6	0.7	5.0	33.7
1955	23.6	31.2	6.1	0.6	4.4	34.1
1960	9.2	38.0	10.7	0.7	3.1	38.3
1965	8.6	39.0	12.7	0.7	3.6	35.3
1970	11.2	43.3	18.9	0.9	3.3	22.4
1975	0.9	51.3	26.8	1.1	2.9	17.0
1976	0.9	50.7	27.1	0.9	4.5	16.0
1977	2.2	50.5	26.6	0.8	4.1	15.8

Source: Agricultural Finance Databook, Board of Governors of the Federal Reserve System, November, 1977.

market, up from 26 percent in 1940. Other major non-real estate lenders include Production Credit Associations, individuals, and the Farmers Home Administration.

Non-real estate debt is normally used to finance livestock, machinery, household needs, motor vehicles, and operating needs. Production Credit Associations increased their relative share from slightly more than 4 percent to 27 percent during the 1940-1977 period. Individuals, by far the most important non-real estate credit lenders in 1945, dropped to number three in 1977, holding 16 percent of the credit the latter year. The Farmers Home Administration reduced its relative share from 12 percent to 4 percent even though its absolute volume more than quadrupled. The Commodity Credit Corporation (CCC) went from a major credit supplier in the 1950s to become almost nonexistent by 1976. Based upon these observations, substantial shifts in the major suppliers of farm non-real estate credit have occurred since the 1940s and 1950s.<sup>3</sup>

#### Commercial Banks

According to the text Commercial Banking, by Reed / Cotter / Gill / Smith,<sup>4</sup> commercial banks are an important source of short term, intermediate term, and long term credit. Studies conducted by the Federal Reserve System periodically indicate that of loans financed by

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<sup>3</sup>David L. Heisterberg and James B. Kliebenstein, Farm Lending Practices and Services Provided for Missouri Farmers by Selected Credit Sources (Columbia: University of Missouri Agricultural Experiment Station, [1976]), pp. 4-10.

<sup>4</sup>Edward W. Reed et al., Commercial Banking (Englewood Cliffs: Prentice-Hall, Inc., 1976), pp. 305-307.



commercial banks, about 50 percent are for meeting current expenses, 40 percent for intermediate term investment, and the remaining 10 percent for such purposes as financing real estate, the consolidation of debts, etc.

Farm loans for current expenses include loans made by commercial banks to farmers for financing the recurring seasonal expenses for crop and livestock production, for family living outlays, and to purchase feeder livestock. Most of the current-expense loans to farmers made by commercial banks are secured and relatively small. Current operating loans generally are payable when the cash flow they generate is received, which customarily is in less than one year.

Farm loans for intermediate-term purposes include loans to purchase assets that will last several years, usually three to seven years. Such loans make possible the purchase of breeding livestock, machinery and equipment, automobiles and other consumer durable goods, building improvements and conservation practices. A smaller percentage of intermediate-term loans is unsecured than is true of current-expense lending to farmers, because of the increased length of the maturity, which increases the risk. A large percentage of the intermediate-term farm loans is repayable on an installment basis.

Loans to buy farm real estate are made for the purchase of land and buildings. The relative insignificance of bank loans to purchase real estate stems from the risk involved and the maturity of such loans. The maturity of most loans is relatively long since the purchase of a farm usually requires the working lifetime of a farmer. Commercial banks, because of their liquidity needs, are not in a position to make loans

for a 40 year period as are the Federal Land Banks, which specialize in loans to farmers for the purchase of real estate. Individuals, life insurance companies, and the Federal Land Bank are much larger farm real estate lenders than are commercial banks.

### Insurance Companies

Life insurance companies are an important source of long-term mortgage credit for farmers. Life insurance companies generally make only first-mortgage loans on farm and ranch property. In some states they are prohibited by law from making short-term loans. There are no limits on the size of insurance company loans except for a self-imposed minimum and a maximum based upon the appraised value of the security. The minimum is generally set in the range of \$5,000 to \$10,000, depending upon individual company policy, with a view to avoiding the relatively high expense and possible risk associated with such loans. Insurance companies are permitted by law to make mortgage loans up to 75 percent of the appraised value.

Loans generally range in terms from 5 to 25 years, with most of them being written currently for a 20 year term. Where the security is adequate, the term may be extended to 25 years or more, depending on company policy.<sup>5</sup>

### Individuals

Merchants, dealers, processors, individuals, and other types of noninstitutional lenders are an important source of credit for farmers.

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<sup>5</sup>Aaron G. Nelson, Warren F. Lee, and William G. Murray, Agricultural Finance, 6th ed. (Ames: The Iowa State University Press, 1973), pp. 339-341.

In considering financing by noninstitutional lenders, it should be recognized that there probably is greater variability in their policies and procedures than in those of institutional lenders.<sup>6</sup>

#### Federal Land Banks

Federal Land Banks deal primarily in real estate loans with some rural home loans being made. All loans are for five years or longer, with the usual farmland purchase being made for 20-35 years--forty years being the maximum loan period.

FLB's are allowed by the 1971 Farm Credit Act to lend up to 85 percent of an assets value. No upper limit is established for the total amount borrowed provided the borrower meets the qualifications for getting the loan.

The FLB can make participating loans with the Farmers Home Administration. It is possible, through a participating loan, for the farmer to borrow 100 percent of an asset's appraised value. With this arrangement, the agencies participating in the loan share the risk involved in supplying a farmer with capital needed.<sup>7</sup>

#### Production Credit Associations

Under present regulations, Production Credit Associations are allowed to make loans with terms up to seven years, but, the majority have a shorter term than this. They primarily make operating and/or

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<sup>6</sup> Ibid., pp. 350-352.

<sup>7</sup> Heisterberg and Kliebenstein, Farm Lending Practices and Services Provided for Missouri Farmers by Selected Credit Sources, pp. 16-17.

short and intermediate term loans. PCA's can lend up to 100 percent of the farmer's needs for operating capital and will usually do so if the farmer can meet the basic credit factors: the individual; financial position or progress; repayment capacity; basis of approval; and collateral.

PCA's can provide a line-of-credit financing plan. Under this system, seasonal and annual credit needs are determined in advance with the borrower drawing the money when needed and with interest paid only for the time the money is used.

PCA's are also allowed to make participating loans with commercial banks. This can be beneficial to those farmers whose credit needs exceed the lending limits of commercial banks which provide financing.<sup>8</sup>

#### Farmers Home Administration

The Farmers Home Administration has several types of loans to offer with farm ownership and/or farm operating loans the primary agricultural ones. Farm ownership loans can be used to buy land; to construct, repair or improve buildings; to improve farmland; to develop water facilities; and to refinance any of the above type debts. Farm operating loans can be used for purchasing livestock, equipment, feed, seed, supplies for farm and home operations, and for refinancing or paying interest on operating debts. FmHA is allowed to lend 100 percent of the appraised agricultural value of real estate and 100 percent of operating capital needs.

Real estate loans through FmHA are limited to 200,000 and with a maximum payback period of 40 years. In order to accommodate loan

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<sup>8</sup>Ibid., pp. 17-18.

demands larger than this, FmHA is authorized to enter into a participating loan with other institutions. Operating loans are limited to a seven year repayment period and \$100,000 with the ability to renew the loan for an additional five years if necessary.<sup>9</sup>

### Profitability and Liquidity

Dr. Lester L. Arnold, Vice President of the Federal Intermediate Credit Bank, Louisville, Kentucky, presented some ideas on profitability and liquidity at the Area Extension Farm Management Workshop, Hueston Woods Lodge College Corner, Ohio, May 28, 1975.<sup>10</sup>

Profit is the primary objective of the farmer in managing his business and is achieved through efficiency, combined with adequate volume. However, a given dollar profit level has limited meaning unless associated with some volume of business. A profit of \$30,000 may represent high achievement on a modest sized operation but would represent extreme inefficiencies on a large farming business. Profit is the return to the operator and family members for their labor and management input and for capital invested in the business. The extent to which profit is adequate can be measured in two ways:

1. Is it sufficient in relation to capital investment and value of farm production to provide an adequate return for labor, management, capital and equity?
2. Does it represent a level that will provide adequately for family living, new investment requirements, and debt repayment?

Comparative financial statements indicate the financial position at two distinct points in time--usually at 12 month intervals. An earnings statement analyzes the farm business as to its level of profit or loss between these two points in time. Growth may be indicated on the

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<sup>9</sup>Ibid., pp. 18-20.

<sup>10</sup>Dr. Lester L. Arnold, "Capital Planning In This Period Of Increasing Risk And Uncertainty," paper presented at the Area Extension Farm Management Workshop, Hueston Woods Lodge College Corner, Ohio, 28 May 1975.

comparative financial statement, but the earnings statement for the period must be studied in order to determine if earnings support the indicated change in equity. If not, financial growth must be the result of appreciation.

In financial planning, neither cash flow nor profit analysis is sufficient by itself. The projected earnings statement estimates profitability, but alone, does not indicate liquidity or provide the necessary information to determine loan repayment capacity. The cash flow projection shows liquidity and loan repayability, but does not, by itself, indicate profitability. A planned capital investment must meet both the liquidity and profitability tests.

#### Leverage

Hopkin discusses financial leverage in Financial Management in Agriculture as the use of borrowed funds to supplement equity capital.<sup>11</sup> In terms of a firm's balance sheet, the level of financial leverage can be expressed as the ratio of debt to equity:  $L=D/E$ . Thus, higher leverage refers to an increase in the debt-to-equity or leverage ratio.

According to Nelson, Lee, and Murray in Agricultural Finance,<sup>12</sup> the financial manager really has only two basic sources of capital, namely, his own equity capital and someone else's capital. The term nonequity capital is used to refer to borrowing, leasing, and other arrangements or contracts.

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<sup>11</sup>John A. Hopkin, Peter J. Barry, and C.B. Baker, Financial Management in Agriculture (Danville: The Interstate Printers & Publishers, Inc., 1973), p. 150.

<sup>12</sup>Nelson, Lee, and Murray, Agricultural Finance, 6th ed., p. 57.

The use of nonequity capital, whether it be acquired by borrowing, leasing, or some other contractual agreement, creates a fixed financial commitment in the form of principal, interest, rent, or a share lease. This financial commitment to the supplier of nonequity capital results in financial risk. As leverage increases, the financial commitment increases, hence, the risk increases. At the same time, as long as the rate of return on capital invested exceeds the cost of using nonequity capital, there is a gain from the use of leverage in the form of increased returns to the owner of the business.

## CHAPTER III

### METHODOLOGY

The Kansas Extension Farm Management Association Program is part of the educational program of the County Extension Councils and the Extension Service of Kansas State University. There are six Farm Management Associations covering the entire state, with more than 4,100 farm families as members. Each Farm Management Association is a group of farm families who want to put their farms on a better paying basis by becoming better managers.<sup>1</sup>

The Extension Service and the association together employ fieldmen who work personally with the cooperating families. The fieldmen are Farm Management specialists of the university, stationed out in the state so they can give close attention to the management and marketing problems of the cooperating families. Information pertinent to the member's farm operation is stored in the Kansas State University computer at Manhattan, Kansas, in the K-MAR-105 (Kansas-Management, Analysis, Research) Whole-Farm and Enterprise Data Bank, for years 1973-1977.

The K-MAR-105 data bank and computer system was developed for two primary purposes. First, the system provides detailed whole-farm and enterprise information to the individual Farm Management Association

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<sup>1</sup>Cooperative Extension Service, "The Kansas Extension Farm Management Association Program," Extension Agricultural Economics, Manhattan, 1977.



member. Additionally, the system includes programs which provide special study information and reports to the individual associations and fieldmen. Second, the data bank and retrieval system provide a means whereby extension, teaching, and research personnel can easily access the data bank to obtain information for research projects.

"Development of the K-MAR-105 Whole-Farm and Enterprise Data Bank and Retrieval System was initiated in 1972, with new programs and refinements added annually. The whole-farm information system contains 427 variables per farm for approximately 2600 farms for the years 1973, 1974, 1975, 1976, and 1977."<sup>2</sup>

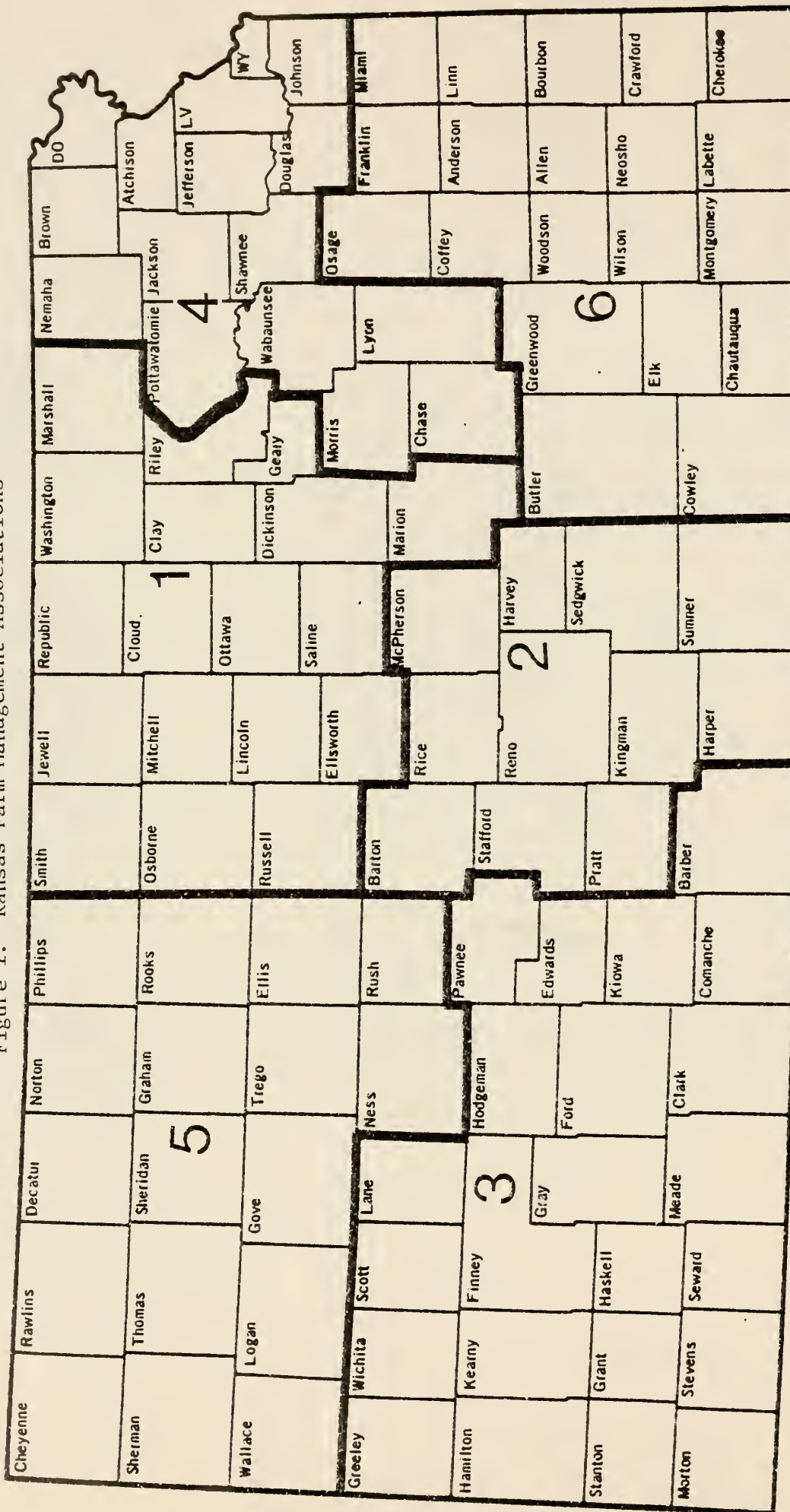
To conduct the proposed research, a list of farms with records on the Farm Management data bank was compiled from Farm Management Association #1 and #4, North Central and Northeast Kansas, respectively. (See Figure 1.) To simplify the data, all partnerships and corporations were excluded. Accounting and tax records of partnerships and corporations may disguise the existing farm operation, making it difficult to analyze the results of the research. Only sole proprietor operators who had records on the Farm Management data bank for each of the years 1973-1977 were compiled for the sample. This period of years is considered to be representative of those expected in the future.

Farms were selected from North Central and Northeast Kansas because these areas contain several types of agriculture. The final sample contained 320 sole proprietor operated farms from North Central and Northeast Kansas. Computer cards were punched for each farm for each

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<sup>2</sup>Larry N. Langemeier, "The K-MAR-105 Whole-Farm and Enterprise Data Bank and Retrieval System," Extension Agricultural Economics Farm Management Studies, Manhattan, 1977.

Figure 1. Kansas Farm Management Associations



year 1973-1977, in the format of association number, county number, farm number, year of data, ownership type, and farm type.

In the first phase of this research, the sample of farms was read in the K-MAR-105 Summary and Analysis Program by individual years, 1973, 1974, 1975, 1976, and 1977. The Summary and Analysis Program is designed to generate output for the "Farm Management Summary and Analysis" reports, as well as for information for special studies, farm management guides, and newsletters. "Summary and Analysis Reports provide averages and trends regarding the business and operational aspects of northeast Kansas commercial farms."<sup>3</sup>

The Summary and Analysis computer program was used to generate and retrieve data relative to Net Farm Income, Gross Farm Income, Farm Type, and Total Capital Managed for the 320 sample farms. Table 2 lists a breakdown of the number of farms for each specific division of Net Farm Income, Gross Farm Income, Farm Type, and Total Capital Managed for each year 1973-1977. Specific divisions for each classification are as follows:

1. Net Farm Income
  - a. High 25 percent
  - b. High Middle 25 percent
  - c. Low Middle 25 percent
  - d. Low 25 percent
  
2. Gross Farm Income
  - a. \$0-25,000
  - b. \$25,001-50,000
  - c. \$50,001-100,000
  - d. \$100,001-150,000
  - e. \$150,001--

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<sup>3</sup>Cooperative Extension Service, Farm Management Summary and Analysis Report, Kansas 1977 State Report (Manhattan: Kansas State University, [1977]), p. 10.

3. Farm Type
  - a. Dairy
  - b. Cash Crop-Dryland
  - c. Cash Crop-Cowherd
  - d. Sow and Litter (Market)
  
4. Total Capital Managed
  - a. \$0-250,000
  - b. \$250,001-350,000
  - c. \$350,001-450,000
  - d. \$450,001-550,000
  - e. \$550,001-655,000
  - f. \$655,001-775,000
  - g. \$775,001-900,000
  - h. \$900,001--

The classifications of Net Farm Income, Gross Farm Income, and Total Capital Managed were selected to investigate the size of the sample farms. Specific divisions within each classification were chosen to indicate changes as the size of the farms changed. The Farm Type classification was selected to determine the capital structure by type of farm for the sample.

The Summary and Analysis program computer output provides income, expense, financial, size, livestock production, and crop production information in a standardized format. The computer outputs contain data essential to categorizing Net Farm Income, Gross Farm Income, Farm Type, and Total Capital Managed into formats to meet the objectives of this thesis.

Specific data retrieved for each of the divisions were: debt, equity, and lease capital, total capital managed, percent return to equity, percent return to capital, dollar return to labor and management, expense/\$100 gross income, and amounts of debt according to term and financial ratios.

TABLE 2  
NUMBER OF FARMS RELATIVE TO NET FARM INCOME,  
GROSS FARM INCOME, FARM TYPE, AND TOTAL CAPITAL MANAGED  
FOR YEARS 1973-1977

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>Net Farm Income</u>					
High 25%	80	80	79	78	80
High Middle	80	80	79	78	80
Low Middle	80	80	79	78	80
Low 25%	79	79	80	78	80
 <u>Gross Farm Income</u>					
0-25,000	--	42	19	15	11
25,001-50,000	40	96	72	90	73
50,001-100,000	163	127	145	136	135
100,001-150,000	77	39	51	46	60
150,000 +	37	15	30	25	41
 <u>Farm Type</u>					
Dairy	40	40	39	34	35
Cash Crop-Dryland	221	190	182	120	129
Cash Crop-Cowherd	--	--	11	23	20
Sow & Litter (Mkt)	5	21	18	5	--
 <u>Total Capital Managed</u>					
0-250,000	99	85	39	29	27
250,001-350,000	89	82	57	51	50
350,001-450,000	54	56	65	53	48
450,001-550,000	25	35	40	52	54
550,001-655,000	30	29	42	44	46
655,001-775,000	15	18	35	28	32
775,001-900,000	6	9	15	20	17
900,000+	--	5	24	35	46

Net income was retrieved to examine the flow of funds concept of servicing family living, income tax and social security, debt, and growth for each of the years 1973 through 1977. Future needs were projected using 1977 as the base year for various classifications from the total sample.

The sixth objective, interest expense, was analyzed using the computer program SPSS (Statistical Package for the Social Sciences), specifically to use bivariate correlation analysis to summarize the strength of association between a pair of variables using an SPSS subprogram, PEARSON CORR. In bivariate correlation analysis, a single number summarizes the relationship between two variables. There are no independent or dependent variables in this correlation. The analysis simply investigates a relationship between two variables.

Subprogram PEARSON CORR computes Pearson product-moment correlations for pairs of variables. This program was used to investigate the relationship between the variable interest expense, V18, and the following fourteen variables:

- V4 Gross Farm Income
- V5 Net Farm Income
- V6 Total Capital Managed
- V7 Total Cash Operating Expenses
- V8 Depreciation
- V9 Total Expenses
- V10 Net Worth
- V11 Return to Labor and Management
- V12 Land Value - Owned

V13 Land Value - Rented

V14 Current Loans

V15 Long Term Loans

V16 Livestock Income

V17 Crop Income

Gross Farm Income, Net Farm Income, Total Capital Managed, Land Value-Owned and Rented, and Current and Long Term Loans are stored in the data bank in this format. The remaining variables were derived as explained below.

Gross Farm Income includes income to the businesses based on sales minus cost of items for resale, such as feeder livestock, plus or minus changes in inventory. Accrual basis income reflects the value of production whether sold or not.

Net Farm Income is equal to gross farm income minus total cash operating expenses and depreciation. Net Farm Income is a measure of the return to the operator's labor, management, and net worth computed on an accrual basis.

Total Capital Managed is the total assets of the business (current, intermediate, and long-term) plus the value of rented land. It represents the total value of capital used in the farm operation.

Total Cash Operating Expenses consists of hired labor, machinery repairs, building repairs, interest paid, feed purchased, seed and crop insurance, fertilizer and lime, machine hire, organization fees, etc., vet-medicine-drugs, irrigation expense, livestock marketing and breeding, gas-fuel-oil, real estate taxes, personal property taxes, general farm insurance, telephone and electricity, cash farm rent, herbicide and insecticide, conservation, auto expense and inventory change.

Depreciation refers to the arbitrary proration of the cost of a capital asset to the business over the expected life of the asset. It consists of the total depreciation from motor vehicles, machinery and buildings.

Total Expenses consists of the total cash operating expenses plus depreciation.

Net Worth is defined as the value of assets of a business that would remain if the business were to be liquidated and all outside claims against the business were paid. The opportunity cost of the Net Worth can be calculated as (interest charge on net current and intermediate assets plus interest charge on net long-term assets) divided by .06.

Return to Labor and Management equals net farm income less a charge for the following three items: (a) 6 percent of the net worth in land, buildings and long-term accounts receivable, (b) 6 percent of the net worth in machinery, livestock, feeds, and current-intermediate accounts receivable, and (c) the estimated value of unpaid farm labor of family members other than the farm operator. It provides a measure of the operator's own earnings for his labor and management after giving credit for his net worth.

Land Value - Owned is the total dollar value of all owned land. (Land was revalued in 1975 based on an appraisal for conservative agricultural purposes.)

Land Value - Rented is the total dollar value of all rented land. (Land was revalued in 1975 based on an appraisal for conservative agricultural purposes.)

Current Loans reflect the total value of all current loans.



Long Term Loans reflect the total value of all long term loans.

Livestock Accrual Income consists of these income items--beef, dairy, sheep, swine, poultry, other livestock, milk products sales, and egg sales.

Crop Accrual Income consists of these income items--grain, hay and forage, and cash crops.

The "Farm Management Summary and Analysis Report" outlines some additional terms that provide a framework for the discussions in the analysis of results chapters.<sup>4</sup>

Return to Capital equals net farm income plus interest paid less a \$7500 labor charge for each operator less the estimated value of unpaid family labor less a management charge (10 percent of Gross Farm Income). It provides a measure of the operator's return to capital after giving credit for his labor and management.

Percent Return on Capital Managed equals return to capital divided by total capital managed. It represents the rate of return on the total capital, including the value of rented land, used in the farm operation.

Percent Return on Net Worth equals return to capital minus interest paid divided by the operator's net worth in the farm operation. It represents the rate of return on the operator's net worth.

Current Assets equal the total sum value of livestock, supplies, crops, feeds, and current accounts receivable.

Intermediate Assets equal the total sum value of machinery, motor vehicles, and intermediate accounts receivable.

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<sup>4</sup>Ibid., pp. 10-11.

Long Term Assets equal the total sum value of owned land, buildings, and long term accounts receivable.

Current and Intermediate Loans equal the total sum value of loans for livestock, supplies, crops, feeds, machinery, motor vehicles, etc.

Long Term Loans equal the total sum value of loans for owned land, buildings, etc.

C and I Loans/C and I Assets is the ratio of current and intermediate loans to current and intermediate assets.

Long Term Loans/Long Term Assets is the ratio of long term loans to long term assets.

It should be noted that the method of calculation of return to capital is a residual method. Capital is credited with the residual income after \$7500 is subtracted for operator labor and 10 percent of gross farm income is subtracted for a management charge. The \$7500 constant for labor may build a bias in the results. An alternative method of calculation of return to capital could be to regress total capital on gross income.

## CHAPTER IV

### ANALYSIS OF THE FARM BUSINESS BY NET FARM INCOME

An analysis by net farm income for the high 25 percent income farms from 1973-1977, (see Table 3), showed inconsequential change in the percent of debt, equity, and lease capital of total capital managed over the five year period. Equity capital represents slightly less than one half of the total capital managed. Lease capital represents just over a third of the total capital managed and debt capital represents the balance of total capital managed or about 17 percent.

The 1973 percent return to equity, percent return to total capital, and dollar return to labor and management figures are substantially greater than the same figures for 1974-1977. Farm prices were unusually high in 1973 offering a probable explanation for the 1973 figures. Average figures for the period 1973-1977, for percent return to equity, percent return to total capital, and dollar return to labor and management are just less than one half of those shown for 1973.

There was a substantial decrease in absolute dollars of current and intermediate loans (C & I loans) and long term loans from 1973 to 1974. Likewise, the ratio of C & I loans to C & I assets and the ratio of long term loans to long term assets improved from 1973 to 1974. The farmers realized high net farm incomes in 1973 and probably made larger payments on outstanding loans that year. Generally, the absolute dollars

TABLE 3  
Selected Factors by Net Farm Income for  
the High 25% Income Farms from 1973-1977

	<u>High 25%</u>					Average
	1973	1974	1975	1976	1977	
Debt	96,037(20%)	48,364(12%)	102,057(17%)	81,747(14%)	118,004(19%)	89,242(17%)
Equity	216,057(44%)	186,928(47%)	253,048(42%)	259,244(46%)	271,397(44%)	237,335(44%)
Lease	178,374(36%)	162,731(41%)	250,635(41%)	226,184(40%)	232,708(37%)	210,126(39%)
Total Capital Managed	490,468	398,023	605,740	567,175	622,109	536,703
% Return to Equity	25.19	8.18	9.20	4.57	6.90	10.81
% Return to Total Capital	13.27	4.98	5.23	3.01	4.32	6.16
\$ Return to Labor & Mgt.	68,638	22,347	31,022	15,530	23,060	32,119
Expense/\$100 Gross Income	\$ 46	\$ 64	\$ 65	\$ 71	\$ 69	\$ 63
\$ of Current & Intermediate Loans	59,882	24,726	62,682	41,612	58,040	49,388
\$ of Long Term Loans	36,155	23,638	39,375	40,135	59,964	39,853
Current & <u>Intermediate Loans</u>						
Current & Intermediate Assets	.30	.19	.33	.28	.33	.29
<u>Long Term Loans</u>						
Long Term Assets	.23	.19	.19	.19	.25	.21

of C & I loans and long term loans increased from 1975 to 1977. The ratio of C & I loans to C & I assets increased from 1975-1977, but the ratio of long term loans to long term assets did not rise until 1977. This may be attributed to the fact that land was revalued by the Farm Management Association in 1975, causing dollars of long term assets to increase.

The flow of funds analysis for the high 25 percent income group for 1977, (see Table 4), demonstrated that a net farm income of \$40,390 had an end residual of \$8,631 available for long run growth and short term debt retirement. With expenses of \$69/\$100 gross income in 1977, and 9 percent assumed inflation in effect, the \$8,631 would be eroded by \$8,091 the first year. ( $\$89,900 \text{ total farm expenses} \times .09 = \$8,091$ .) The residual for growth and debt retirement would then be only \$540.

An analysis by net farm income for the low 25 percent income group from 1973-1977, (see Table 5), showed inconsequential change in the percent of debt, equity, and lease capital of total capital managed over the five year period. Debt capital represents about one fourth of the total capital managed. Equity capital represents slightly over a third of the total capital managed and lease capital represents the balance of total capital managed or about 41 percent.

The percent return to equity, percent return to total capital, and dollar return to labor and management figures are positive for only 1973. Farm prices were exceptionally good in 1973, explaining the positive figures for that year.

The absolute dollars of C & I loans and long term loans increased steadily from 1973 to 1977 with some slight fluctuations in 1975 and 1977.

TABLE 4  
FLOW OF FUNDS

BY NET FARM INCOME FOR THE HIGH 25% FARMS FOR 1977

1.	NET FARM INCOME	\$ 40,390
2.	DEPRECIATION	+ 12,403
3.	AVAILABLE FARM INCOME	52,793
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	52,793
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 15,053
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	27,030
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 5,996
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	21,034
11.	LESS DEPRECIATION (Line 2 above)	- 12,403
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	8,631

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$

TABLE 5  
Selected Factors by Net Farm Income for  
the Low 25% Income Farms from 1973-1977

	<u>Low 25%</u>					Average
	1973	1974	1975	1976	1977	
Debt	61,096(22%)	109,827(25%)	106,075(22%)	156,806(25%)	141,322(26%)	115,025(24%)
Equity	108,506(39%)	163,491(37%)	168,793(34%)	199,497(33%)	185,088(33%)	165,075(35%)
Lease	108,318(39%)	164,200(38%)	216,291(44%)	255,353(42%)	230,846(41%)	195,002(41%)
Total Capital Managed	277,920	437,518	491,159	611,656	557,256	475,102
% Return to Equity	2.24	23.63-	10.57-	15.54-	12.55-	12.01-
% Return to Total Capital	2.40	7.65-	2.56-	3.67-	2.43-	2.78-
\$ Return to Labor & Mgt.	9,551	39,000-	17,438-	30,783-	21,379-	19,810-
Expense/\$100 Gross Income	\$ 73	\$ 164	\$ 112	\$ 125	\$ 115	\$ 118
\$ of Current & Intermediate Loans	35,397	65,967	58,738	85,123	74,161	63,877
\$ of Long Term Loans	25,699	43,860	47,337	71,683	67,161	51,148
Current & Intermediate Loans						
<u>Current &amp; Intermediate Assets</u>	.37	.53	.54	.60	.60	.53
<u>Long Term Loans</u>						
<u>Long Term Assets</u>	.29	.31	.27	.33	.33	.31

Likewise, the ratio of C & I loans to C & I assets rose steadily over the five year period. The ratio of long term loans to long term assets increased slightly over the five year period. Possibly, the revaluing of land in 1975 by the Farm Management Association, which subsequently increased dollars of long term assets, prevented the long term ratio from increasing substantially.

The flow of funds analysis for the low 25 percent income farms for 1977, (see Table 6), demonstrated that a net farm income of \$-9750 had an end residual of an even lower \$-27,176 available for long run growth and short term debt retirement. With total farm expenses of \$75,299 for the low 25 percent income group and 9 percent assumed inflation in effect, there would need to be at least \$6777 available for long run growth and short term debt retirement to absorb the inflation leaving \$0 for growth and debt retirement. ( $\$75,299 \text{ total farm expenses} \times .09 = \$6777.$ )

The low 25 percent income farms had \$115 per \$100 gross income during 1977. Expenses were below \$100 only in 1973, the year of record high farm prices.

Similar tables and flow of funds analyses by net farm income for the high middle 25 percent and the low middle 25 percent income farms can be seen in the appendix, (see Tables 31-34).

To summarize the analysis of the farm business by net farm income for the period 1973-1977, the high 25 percent and the low 25 percent income farms showed the highest percent return to equity, percent return to total capital, and dollar return to labor and management in 1973. There was a wide spread between the figures for the two groups with the



TABLE 6  
FLOW OF FUNDS

BY NET FARM INCOME FOR THE LOW 25% FARMS FOR 1977

1.	NET FARM INCOME	\$ (9,750)
2.	DEPRECIATION	+ 10,352
3.	AVAILABLE FARM INCOME	602
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	602
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 0
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	(10,108)
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 6,716
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	(16,824)
11.	LESS DEPRECIATION (Line 2 above)	- 10,352
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(27,176)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

high 25 percent farms having a percent return to equity that was over 11 times greater than that of the low 25 percent farms. The high 25 percent farms had almost 6 times the percent return to total capital than the low 25 percent farms. The high 25 percent group had 7 times the dollar return to labor and management than the low 25 percent group. Conversely, expense per \$100 gross income was lowest in 1973. The high 25 percent income farms consistently had expenses less than \$75 per \$100 gross income. The low 25 percent income farms had expense less than \$75 per \$100 gross income in 1973 only. From 1974-1977, expenses were over \$100 per \$100 gross income. The high 25 percent income farms had lower average absolute dollars of C & I loans and long term loans as well as lower ratios of C & I loans to C & I assets and long term loans to long term assets than the low 25 percent income farms.

The flow of funds analysis for the high 25 percent income farms for 1977 showed adequate dollars available for long run growth and short term debt retirement. The low 25 percent income farms had inadequate dollars available for long run growth and short term debt retirement.

## CHAPTER V

### ANALYSIS OF THE FARM BUSINESS BY GROSS FARM INCOME

An analysis by gross farm income for the \$0-25,000 income division for 1974-1977, (see Table 7), showed a slight decrease in debt capital as a percent of the total capital managed. Conversely, lease capital as a percent of total capital managed showed a slight increase over the five year period. Equity capital remained fairly constant as a percent of total capital managed. Equity capital and lease capital represent about equal percents of total capital managed, with debt capital representing the balance or 14 percent.

The percent return to equity, percent return to total capital, and dollar return to labor and management figures are negative for each year of the period 1974-1977. Expenses per \$100 of gross income twice exceeded \$100 in 1974 and 1976 and exceeded \$100 in 1975 and 1977.

The absolute dollars of C & I loans and dollars of long term loans fluctuated from 1974-1977, decreasing in 1975 and 1977. Likewise, the ratios of C & I loans to C & I assets and long term loans to long term assets fluctuated from 1974-1977, decreasing in 1975 and 1977.

The flow of funds analysis for the \$0-25,000 income farms for 1977, (see Table 8), demonstrated that a net farm income of \$-3191, after family living, income tax and social security, and intermediate and long

TABLE 7

Selected Factors by Gross Farm Income for  
the \$0-25,000 Income Farms from 1974-1977

	1973	1974	1975	1976	1977	Average	
			<u>\$ 0-25,000</u>				
Debt	---	58,500 (19%)	27,579 (10%)	69,602 (17%)	27,100 (10%)	45,695 (14%)	
Equity	---	139,854 (46%)	129,373 (47%)	143,806 (34%)	116,348 (44%)	132,345 (42%)	
Lease	---	106,362 (35%)	120,908 (43%)	203,134 (49%)	119,564 (46%)	137,492 (44%)	
Total Capital Managed	---	304,716	277,860	416,542	263,012	315,532	
% Return to Equity	---	18.61-	10.85-	23.05-	10.91-	15.86	
% Return to Total Capital	---	7.95-	4.87-	7.15-	3.96-	5.98-	
\$ Return to Labor & Mgt.	---	27,173-	15,260-	33,347-	10,338-	21,530-	
Expense/\$100 Gross Income	---	\$ 226	\$ 139	\$ 230	\$ 117	\$ 178	
\$ of Current & Intermediate Loans	---	34,379	16,402	40,932	11,985	25,925	
\$ of Long Term Loans	---	24,121	11,177	28,670	15,115	19,771	
Current & <u>Intermediate Loans</u> Current & Intermediate Assets	---	.44	.28	.51	.30	.38	
<u>Long Term Loans</u> Long Term Assets	---	.21	.11	.23	.15	.18	

term debt servicing, had an end residual of \$-11,775 available for short term debt retirement and long run growth. Outside income is not shown for the sample farms. However, it is recognized that it was substantial enough over the time frame studied to contribute to the debt reduction.

An analysis by gross farm income for the \$50,001-\$100,000 income division for 1973-1977, (see Table 9), showed an inconsequential change in debt, equity, and lease capital as a percent of the total capital managed. Average figures showed equity and lease capital as approximately equal percentages of total capital managed, with debt capital representing the balance of total capital managed or 17 percent.

Except for 1973, the figures are negative for percent return to equity. Percent return to total capital figures are negative or between zero and one from 1974-1977. The dollar return to labor and management figures are negative for three of the five years. 1973 shows a strong positive return to labor and management but 1975 is below \$500. The expenses per \$100 of gross income are fairly constant from 1974-1977. Expenses/\$100 gross income are least in 1973, and expenses are below \$100 for all years.

Absolute dollars of C & I loans increased from 1973-1976 with the 1977 figure declining somewhat. Dollars of long term loans increased each year from 1973 to 1977. The ratios of C & I loans to C & I assets and long term loans to long term assets fluctuated from 1973-1977. The 1977 flow of funds analysis for the gross farm income division \$50,001-100,000, (see Table 10), began with a net farm income of \$11,719 and ended with a figure of \$-5725, available for long run growth and short term debt retirement.

TABLE 8  
FLOW OF FUNDS

BY GROSS FARM INCOME FOR THE \$0-25,000 FARMS FOR 1977		
1.	NET FARM INCOME	\$ (3,191)
2.	DEPRECIATION	+ 3,638
3.	AVAILABLE FARM INCOME	447
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	447
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 0
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	(10,263)
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 1,512
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	(11,775)
11.	LESS DEPRECIATION (Line 2 above)	- 3,638
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(15,413)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$

TABLE 9  
Selected Factors by Gross Farm Income for  
the \$50,001-100,000 Income Farms from 1973-1977

\$ 50,001-100,00

	1973	1974	1975	1976	1977	Average
Debt	53,120(18%)	65,128(16%)	75,781(15%)	99,425(19%)	94,602(18%)	77,611(17%)
Equity	119,681(40%)	180,501(45%)	209,871(41%)	217,173(40%)	209,578(40%)	187,361(41%)
Lease	127,626(42%)	157,923(39%)	220,365(44%)	222,601(41%)	220,220(42%)	189,747(42%)
Total Capital Managed	300,427	403,552	506,017	539,199	524,400	454,719
% Return to Equity	14.47	2.35-	.64-	3.12-	1.50-	1.37
% Return to Total Capital	7.29	.02-	.71	.17-	.61	1.68
\$ Return to Labor & Mgt.	26,281	592-	473	5,312-	1,597-	3,851
Expense/\$100 Gross Income	\$ 54	\$ 85	\$ 81	\$ 89	\$ 83	\$ 78
\$ of Current & Intermediate Loans	28,515	34,181	39,410	51,364	45,766	39,847
\$ of Long Term Loans	24,605	30,947	36,371	48,061	48,836	37,764
Current & Intermediate Loans						
Current & Intermediate Assets	.28	.27	.33	.43	.38	.34
Long Term Loans						
Long Term Assets	.26	.24	.20	.24	.25	.24

TABLE 10  
FLOW OF FUNDS

BY GROSS FARM INCOME FOR THE \$50,001-100,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 11,719
2.	DEPRECIATION	+ 9,402
3.	AVAILABLE FARM INCOME	21,121
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	21,121
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 1,850
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	8,561
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 4,884
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	3,677
11.	LESS DEPRECIATION (Line 2 above)	- 9,402
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(5,725)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$



An analysis by gross farm income for the \$150,000+ income division for 1973-1977, (see Table 11), showed an increase in the percent of debt capital and lease capital of total capital managed over the five year period. Conversely, equity capital as a percent of the total capital managed, declined over the five year period. The five year average figures show equity and lease capital as being approximately equal percents of the total capital managed. Debt capital represents the balance of the total capital managed or about 27 percent.

The 1973 figures for percent return to equity are positive for all years but 1976. Figures for percent return to total capital and dollar return to labor and management are positive for all years. Figures decline substantially after 1973 for the percent return to equity, percent return to total capital, and dollar return to labor and management. Expenses per \$100 gross income were least in 1973, and all years had expenses below \$100.

Absolute dollars of C & I loans and long term loans, as well as the ratios of C & I loans to C & I assets and long term loans to long term assets increased over the five year period.

The 1977 flow of funds analysis for the \$150,000+ farms, (see Table 12), began with a net farm income of \$33,146 and showed an end residual of \$-1550 available for long run growth and short term debt retirement.

Similar tables and flow of funds analyses by gross farm income for the income divisions of \$25,001-50,000 and \$100,001-150,000 can be seen in the appendix, (see Tables 35-38).

To summarize the analysis of the farm business by gross farm income for the period 1973-1977, the \$150,000+ income division farms use

TABLE 11  
 Selected Factors by Gross Farm Income for the  
 \$150,001 + Income Farms from 1973-1977

	<u>\$ 150,000 +</u>					Average
	1973	1974	1975	1976	1977	
Debt	143,322(23%)	158,294(26%)	201,792(26%)	264,510(29%)	286,555(30%)	210,895(27%)
Equity	279,131(44.5%)	233,629(39%)	270,540(35%)	287,610(32%)	309,001(32%)	275,982(36%)
Lease	203,851(32.5%)	209,163(35%)	301,680(39%)	349,496(39%)	359,430(38%)	284,724(37%)
Total Capital Managed	626,304	601,086	774,012	901,616	954,986	771,601
% Return to Equity	20.84	.36	8.84	3.29-	1.56	5.66
% Return to Total Capital	11.55	2.42	5.25	.95	2.66	4.57
\$ Return to Labor & Mgt.	73,113	14,002	37,985	236	13,175	27,702
Expense/\$100 Gross Income	\$ 55	\$ 85	\$ 73	\$ 91	\$ 83	\$ 77
\$ of Current & Intermediate Loans	97,951	106,523	132,363	153,328	157,091	129,451
\$ of Long Term Loans	45,371	51,771	69,429	111,182	129,464	81,443
Current & Intermediate Loans						
Current & Intermediate Assets	.37	.50	.50	.60	.58	.51
Long Term Loans						
Long Term Assets	.22	.28	.26	.35	.37	.30

TABLE 12  
FLOW OF FUNDS

BY GROSS FARM INCOME FOR THE \$150,000 + FARMS FOR 1977	
1. NET FARM INCOME	\$ 33,146
2. DEPRECIATION	+ 20,822
3. AVAILABLE FARM INCOME	53,968
* 4. OUTSIDE INCOME (Net)	+ 0
5. AVAILABLE (Fam. Liv., Debt, Growth)	53,968
** 6. FAMILY LIVING (Expected)	- 10,710
*** 7. INCOME TAX AND SS (Expected)	- 11,040
8. AVAILABLE DEBT SERVICING (Old P. & New P. & i)	32,218
9. PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 12,946
10. AVAILABLE FOR SHORT TERM DEBT SERVICING	19,272
11. LESS DEPRECIATION (Line 2 above)	- 20,822
12. AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(1,550)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

more debt capital as a percent of total capital managed than the \$0-25,000 and the \$50,001-100,000 income farms. The \$50,001-100,000 and \$150,000+ farms had the highest percent return to equity, percent return to total capital, and dollar return to labor and management in 1973. The \$150,000+ had about one and one-half times the percent return to equity and percent return to total capital, and almost three times the dollar return to labor and management than the \$50,001-100,000 farms.

Expenses per \$100 gross income were least in 1973 for the \$50,001-100,000 and \$150,000+ farms. Though expenses were less than \$100 from 1974 to 1977 for both income divisions, the \$150,000+ farms had expenses below \$75 only in 1975. The \$0-25,000 farms had expenses well over a hundred dollars from 1974-1977.

The \$150,000+ farms had the largest average absolute dollars of current and intermediate loans and long term loans. The ratios of C & I loans to C & I assets and long term loans to long term assets were largest for the \$150,000+ farms.

The flow of funds analysis for the specific divisions of gross farm income showed there were inadequate dollars available for long run growth and short term debt retirement in all three cases. However, higher gross farm incomes results in higher net farm incomes and lesser negative amounts on the flow of funds analyses.

## CHAPTER VI

### ANALYSIS OF THE FARM BUSINESS BY FARM TYPE

An analysis by farm type for the dairy farms from 1973-1977, (see Table 13), showed very little change in the percent of debt, equity, and lease capital of total capital managed over the five year period. Debt capital represents about one fourth of the total capital managed, lease capital represents slightly less than one third, and equity capital represents the balance of the total capital managed or 45 percent.

The percent return to equity, percent return to total capital and dollar return to labor and management figures for 1973 are substantially greater than the same figures for 1974-1977. All figures were negative in 1974, but the percent return to total capital and dollar return to labor and management figures increased to low positive values in 1975 and 1976. In 1977, the percent return to equity, percent return to total capital, and dollar return to labor and management figures exhibited somewhat stronger support.

Absolute dollars of C & I loans increased over the five year period. Dollars of long term loans increased over the five year period except for a decline in 1976. The ratio of C & I loans to C & I assets and long term loans to long term assets followed a pattern closely resembling the absolute dollars of loans, except for minor deviations.

TABLE 13  
Selected Factors by Farm Type  
for Dairy Farms from 1973-1977

	<u>Dairy</u>					Average
	1973	1974	1975	1976	1977	
Debt	63,344(22%)	76,207(24%)	89,772(24.5%)	78,551(22%)	92,279(25%)	80,031(24%)
Equity	136,565(48%)	144,445(45%)	152,790(42%)	156,264(44%)	167,422(46%)	151,497(45%)
Lease	86,107(30%)	99,474(31%)	122,649(33.5%)	119,104(34%)	106,149(29%)	106,697(31%)
Total Capital Managed	286,016	320,126	365,211	353,919	365,850	338,224
% Return to Equity	9.86	5.20-	3.03-	.01-	1.80	.68
% Return to Total Capital	6.67	1.07-	--	1.42	2.46	1.90
\$ Return to Labor & Mgt.	23,387	1,436-	1,425	7,894	10,855	8,425
Expense/\$100 Gross Income	\$ 64	\$ 90	\$ 87	\$ 82	\$ 79	\$ 80
\$ of Current & Intermediate Loans	30,740	41,598	44,826	44,279	45,148	41,318
\$ of Long Term Loans	32,604	34,609	44,946	34,272	47,131	38,712
Current & Intermediate Loans						
Current & Intermediate Assets	.30	.41	.44	.46	.41	.40
Long Term Loans						
Long Term Assets	.27	.28	.28	.23	.30	.27

The flow of funds analysis for the dairy farm type for 1977, (see Table 14), began with a net farm income of \$21,795 and resulted in an end residual of \$781 available for long run growth and short term debt retirement.

With 1977 total farm expenses of \$79 per \$100 of gross income and 9 percent assumed inflation in effect, there would need to be an end residual of \$7507 ( $\$83,408 \text{ total farm expenses} \times .09$ ) available for long run growth and short term debt retirement leaving \$0 on the bottom line.

An analysis by farm type of the cash crop-dryland farms, (see Table 15), showed a slight decrease in the percent of equity capital of total capital managed from 1973 to 1977. Conversely, the percent of lease capital of total capital managed increased slightly over the same period. Lease capital represents almost half of the total capital managed, with the balance being accounted for by 15 percent debt capital, and 39 percent equity capital.

Only 1973 exhibited strong positive figures for percent return to equity, percent return to total capital, and dollar return to labor and management. Expenses per \$100 gross income were least in 1973 and all expenses were below \$100.

Absolute dollars of current and intermediate loans and long term loans increased from 1973 to 1977. Likewise, the ratios of C & I loans to C & I assets and long term loans to long term assets followed the same pattern except for the long term loan ratio in 1975. The decline in this ratio in 1975 is probably because land was revalued in 1975 in all Farm Management Associations.

TABLE 14  
FLOW OF FUNDS

BY FARM TYPE FOR DAIRY FARMS FOR 1977

1.	NET FARM INCOME	\$ 21,795
2.	DEPRECIATION	+ 9,782
3.	AVAILABLE FARM INCOME	31,577
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	31,577
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 5,591
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	15,276
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 4,713
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	10,563
11.	LESS DEPRECIATION (Line 2 above)	- 9,782
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	781

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)



TABLE 15  
 Selected Factors by Farm Type for  
 Cash Crop-Dryland Farms from 1973-1977

	<u>Cash Crop-Dryland</u>					Average
	1973	1974	1975	1976	1977	
Debt	59,973 (16.5%)	62,903 (16%)	65,973 (13%)	80,024 (14.5%)	96,877 (16%)	73,150 (15%)
Equity	150,383 (41.5%)	157,801 (39%)	209,318 (40%)	216,055 (39%)	214,734 (36%)	189,658 (39%)
Lease	151,704 (42%)	182,147 (45%)	248,408 (47%)	256,905 (46.5%)	287,662 (48%)	225,365 (46%)
Total Capital Managed	362,060	402,851	523,699	552,984	599,273	488,173
% Return to Equity	17.76	4.45-	.13-	3.12-	.91-	1.83
% Return to Total Capital	8.97	.82-	.79	.41-	.80	1.87
\$ Return to Labor & Mgt.	36,326	3,368-	1,147	5,855-	411-	5,563
Expense/\$100 Gross Income	\$ 50	\$ 89	\$ 79	\$ 89	\$ 82	\$ 78
\$ of Current & Intermediate Loans	34,254	35,704	37,341	37,080	46,310	38,138
\$ of Long Term Loans	25,719	27,199	28,632	42,944	50,567	35,012
Current & Intermediate Loans						
Current & Intermediate Assets	.27	.30	.30	.33	.37	.31
Long Term Loans						
Long Term Assets	.23	.24	.17	.23	.26	.23

The flow of funds analysis for 1977 cash crop-dryland farms, (see Table 16), started with a net farm income of \$13,074 and had an end residual of \$-4971 available for long run growth and short term debt retirement.

An analysis by farm type for the cash crop-cowherd operations for 1975-1977, (see Table 17), showed a slight decrease in the percent of equity capital of total capital managed. Conversely, the percent of lease capital of total capital managed increased slightly over the three year period. Lease capital represents almost one half of the total capital managed and equity capital represents about 38 percent. Debt capital represents the balance of total capital managed, or 17 percent.

Of the percent return to equity, percent return to total capital and dollar return to labor and management figures, only the percent return to total capital figures were positive. Expenses per \$100 gross income were less than \$100 each of the three years, but greater than \$75.

Absolute dollars of C & I loans decreased while dollars of long term loans increased over the three year period. Ratios of C & I loans to C & I assets and long term loans to long term assets followed the same pattern.

The flow of funds analysis for the cash crop-cowherd farms for 1977, (see Table 18), began with \$11,696 and had an end residual of \$-6,724 available for long run growth and short term debt retirement.

An analysis by farm type of the sow and litter (market) farms for the period 1973-1976, (see Table 19), showed a sizeable decrease in the percent of debt capital of total capital managed. Equity capital, as a percent of total capital managed, increased substantially over the same period, while the percent of lease capital remained fairly constant.

TABLE 16  
FLOW OF FUNDS

BY FARM TYPE FOR CASH CROP-DRYLAND FARMS FOR 1977

1.	NET FARM INCOME	\$ 13,074
2.	DEPRECIATION	+ 10,733
3.	AVAILABLE FARM INCOME	23,807
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	23,807
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 2,278
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	10,819
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 5,057
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	5,762
11.	LESS DEPRECIATION (Line 2 above)	- 10,733
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(4,971)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$

TABLE 17  
Selected Factors by Farm Type for  
Cash Crop-Cowherd Farms from 1975-1977

	Cash Crop-Cowherd				Average	
	1973	1974	1975	1976		1977
Debt	---	---	103,405 (18%)	98,838 (17%)	109,090 (17%)	103,778 (17%)
Equity	---	---	217,704 (38%)	249,674 (42%)	208,483 (34%)	225,287 (38%)
Lease	---	---	254,895 (44%)	245,243 (41%)	302,095 (49%)	267,411 (45%)
Total Capital Managed	---	---	576,004	593,755	619,668	596,476
% Return to Equity	---	---	3.21-	2.13-	1.00-	2.11-
% Return to Total Capital	---	---	.15	.16	.77	.36
\$ Return to Labor & Mgt.	---	---	5,587-	6,352-	1,514-	4,484-
Expense/\$100 Gross Income	---	---	\$ 90	\$ 86	\$ 81	\$ 86
\$ of Current & Intermediate Loans	---	---	56,355	40,151	50,419	48,975
\$ of Long Term Loans	---	---	47,050	58,687	58,671	54,803
Current & Intermediate Loans	---	---	.41	.32	.40	.38
Current & Intermediate Assets	---	---				
Long Term Loans	---	---	.24	.25	.28	.26
Long Term Assets	---	---				

TABLE 18  
FLOW OF FUNDS

BY FARM TYPE FOR CASH CROP-COWHERD FARMS FOR 1977		
1.	NET FARM INCOME	\$ 11,696
2.	DEPRECIATION	+ 5,959
3.	AVAILABLE FARM INCOME	17,655
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	17,655
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 1,843
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	5,102
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 5,867
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	(765)
11.	LESS DEPRECIATION (Line 2 above)	- 5,959
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(6,724)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213) 1.44$   
 Income taxes & SS =  $(\text{Taxable Income} \times .0213) 1.44$   
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$

TABLE 19  
Selected Factors by Farm Type for  
Sow and Litter (Market) Farms from 1973-1976

	Sow and Litter (Market)					Average
	1973	1974	1975	1976	1977	
Debt	91,418(41%)	76,207(29%)	82,311(25%)	117,556(29%)	---	91,873(30%)
Equity	91,830(41%)	125,496(48%)	134,212(40%)	218,694(54%)	---	142,558(47%)
Lease	39,300(18%)	60,115(23%)	115,317(35%)	71,680(17%)	---	71,603(23%)
Total Capital Managed	222,548	261,818	331,840	407,930	---	306,034
% Return to Equity	21.46	9.57-	7.01	3.28-	---	3.91
% Return to Total Capital	12.10	3.57-	4.72	.32-	---	3.23
\$ Return to Labor & Mgt.	31,739	7,571-	20,103	1,597-	---	10,699
Expense/\$100 Gross Income	\$ 56	\$ 97	\$ 73	\$ 90	---	\$ 79
\$ of Current & Intermediate Loans	41,334	34,958	39,120	51,303	---	41,679
\$ of Long Term Loans	50,084	32,396	43,211	66,253	---	47,986
Current & Intermediate Loans						
Current & Intermediate Assets	.36	.32	.34	.32	---	.34
Long Term Loans						
Long Term Assets	.48	.34	.36	.35	---	.38

The percent return to equity, percent return to total capital and dollar return to labor and management figures exhibited strong positive figures in 1973, and to a lesser degree in 1975. Expenses per \$100 gross income were least in 1973 and 1975.

Absolute dollars of C & I loans increased from 1973 to 1976 as did absolute dollars of long term loans, with some decline in both 1974 and 1975. The ratios of C & I loans to C & I assets and long term loans to long term assets followed the same pattern as the loans until 1976.

The flow of funds analysis for the sow and litter (market) farm type for 1976, (see Table 20), began with a net farm income of \$12,148 and had an end residual of \$-7169 available for long run growth and short term debt retirement.

To summarize the analysis of the farm business by farm type for the period 1973-1977, the dairy, cash crop-dryland, and sow and litter (market) farms had the highest percent return to equity, percent return to total capital and dollar return to labor and management in 1973. (Figures were unavailable for cash crop-cowherd farms in 1973 and 1974.) Expenses per \$100 gross income were least in 1973, and less than \$100 for all farm types. The dairy and swine farms were low capital users relative to the cash crop-dryland and cash crop-cowherd farms. Average figures indicated dairy farms managed \$368 of total capital to produce \$100 gross income and sow and litter (market) farms managed \$323 to produce \$100 gross income. These figures are substantially less than the \$672 of total capital managed/\$100 gross income for cash crop-dryland farms, and \$874 of total capital managed/\$100 gross income for cash crop-cowherd farms.

TABLE 20  
FLOW OF FUNDS

BY FARM TYPE FOR SOW & LITTER (MARKET) FARMS FOR 1976

1.	NET FARM INCOME	\$ 12,148
2.	DEPRECIATION	+ 12,742
3.	AVAILABLE FARM INCOME	24,890
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	24,890
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 1,982
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	12,198
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 6,625
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	5,573
11.	LESS DEPRECIATION (Line 2 above)	- 12,742
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(7,169)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$



The cash crop-cowherd farms had the largest average dollars of C & I loans and long term loans. The average ratio of C & I loans to C & I assets was highest for dairy and cash crop-cowherd farms. The average ratio of long term loans to long term assets was highest for the sow and litter (market) farms.

The flow of funds analysis for the four farm types for 1977 and 1976 showed adequate dollars available for long run growth and short term debt retirement for dairy farms only. The dairy farm type showed the most overall progress for the period.

## CHAPTER VII

### ANALYSIS OF THE FARM BUSINESS BY TOTAL CAPITAL MANAGED

An analysis by total capital managed for the \$0-250,000 division for 1973-1977, (see Table 21), showed inconsequential change in the percent of debt capital of total capital managed. Equity, as a percent of total capital managed increased over the five year period, while the percent of lease capital of total capital managed decreased. The average figures showed equity capital represents over half of the total capital managed, lease capital represents about one fourth of the total capital managed, and debt capital represents the balance of the total capital managed, or 19 percent.

The percent return to equity figures showed a positive return only in 1973. The percent return to total capital showed positive returns in both 1973 and 1977, with the 1973 figure being substantially larger. All years but 1974 showed a positive dollar return to labor and management with the 1973 figure being considerably larger than the others. Expenses per \$100 of gross income were least in 1973, and all years had expenses of less than \$100.

Absolute dollars of C & I loans and long term loans fluctuated over the five year period, 1973-1977. The average figures showed dollars of C & I loans outstanding as slightly less than dollars of long term loans outstanding. Ratios of C & I loans to C & I assets and long term

TABLE 21  
 Selected Factors by Total Capital Managed  
 for \$ 0-250,000 Farms from 1973-1977

\$ 0-250,000

	1973	1974	1975	1976	1977	Average
Debt	37,991 (20%)	45,799 (24%)	35,007 (19%)	27,923 (14%)	34,390 (17%)	36,222 (19%)
Equity	94,996 (51%)	101,613 (53%)	108,320 (57%)	120,307 (61%)	120,967 (62%)	109,241 (57%)
Lease	54,563 (29%)	44,528 (23%)	44,787 (24%)	48,616 (25%)	40,876 (21%)	46,674 (24%)
Total Capital Managed	187,550	191,940	188,114	196,846	196,233	192,137
% Return to Equity	15.82	5.74-	3.58-	1.67-	1.43-	.68
% Return to Total Capital	9.95	1.95-	.96-	.10-	.44	1.48
\$ Return to Labor & Mgt.	24,437	851-	713	3,399	2,834	6,106
Expense/\$100 Gross Income	\$ 53	\$ 86	\$ 82	\$ 78	\$ 76	\$ 75
\$ of Current & Intermediate Loans	19,326	24,689	14,880	11,514	15,393	17,160
\$ of Long Term Loans	18,665	21,110	20,127	16,409	18,997	19,062
Current & Intermediate Loans						
Current & Intermediate Assets	.24	.33	.22	.20	.25	.25
Long Term Loans						
Long Term Assets	.25	.27	.23	.18	.19	.22

loans to long term assets fluctuated in much the same pattern as absolute dollars of C & I loans and long term loans.

The 1977 flow of funds analysis for the \$0-250,000 division, (see Table 22), started with a net farm income of \$10,612 and had an end residual of \$-3,519 available for long run growth and short term debt retirement.

An analysis by total capital managed of the \$450,001-550,000 division, (see Table 23), showed fluctuations in the percent of debt capital, equity capital, and lease capital of total capital managed from 1973-1977. Lease capital represents about one fourth of the total capital managed and equity capital represents almost 60 percent. Debt capital represents the balance, or 19 percent.

The percent return to equity, percent return to total capital, and dollar return to labor and management figures are largest in 1973. Expenses per \$100 gross income are least in 1973, and all years showed expenses of less than \$100.

Absolute dollars of C & I loans and dollars of long term loans fluctuated over the five year period. The ratios of C & I loans to C & I assets and long term loans to long term assets followed the patterns of the C & I loans and long term loans.

The 1977 flow of funds analysis for the \$450,001-550,000 division, (see Table 24), started with a net farm income of \$15,589 and had an end residual of \$-2685 available for long run growth and short term debt retirement.

An analysis by total capital managed of the \$775,001-900,000 division, (see Table 25), showed an inconsequential change in the percent of debt capital of total capital managed from 1973-1977. The percent

TABLE 22  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$0-250,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 10,612
2.	DEPRECIATION	+ 4,289
3.	AVAILABLE FARM INCOME	14,901
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	14,901
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 1,521
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	2,670
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 1,900
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	770
11.	LESS DEPRECIATION (Line 2 above)	- 4,289
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(3,519)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

TABLE 23  
Selected Factors by Total Capital Managed  
for \$ 450,001-550,000 Farms from 1973-1977

	<u>\$ 450,001-550,000</u>					Average
	1973	1974	1975	1976	1977	
Debt	108,272(22%)	86,436(18%)	63,206(13%)	67,629(14%)	86,273(17%)	82,363(17%)
Equity	202,791(41%)	197,873(40%)	243,022(49%)	231,166(46%)	218,415(44%)	218,653(44%)
Lease	181,474(37%)	206,541(42%)	186,472(38%)	199,267(40%)	193,750(39%)	193,501(39%)
Total Capital Managed	492,537	490,850	492,700	498,062	498,438	494,517
% Return to Equity	15.00	6.32-	1.85	1.44-	.14-	1.79
% Return to Total Capital	8.11	1.36-	1.87	.14	1.01	1.95
\$ Return to Labor & Mgt.	39,651	9,330-	5,464	2,111-	1,550	7,045
Expense/\$100 Gross Income	\$ 54	\$ 96	\$ 74	\$ 84	\$ 80	\$ 78
\$ of Current & Intermediate Loans	53,047	42,687	36,000	38,457	42,027	42,444
\$ of Long Term Loans	55,225	43,749	27,206	29,172	44,246	39,920
Current & Intermediate Loans						
Current & Intermediate Assets	.31	.31	.28	.32	.34	.31
Long Term Loans						
Long Term Assets	.31	.30	.14	.16	.24	.23

TABLE 24  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$450,001-550,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 15,589
2.	DEPRECIATION	+ 9,548
3.	AVAILABLE FARM INCOME	25,137
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	25,137
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 3,139
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	11,288
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 4,425
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	6,863
11.	LESS DEPRECIATION (Line 2 above)	- 9,548
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(2,685)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

of equity capital of total capital managed showed a substantial decrease from 1973 to 1977. Conversely, the percent of lease capital of total capital managed increased considerably over the five year period. The absolute dollars of total capital managed changed very little from 1973 to 1977.

The percent return to equity, percent return to total capital, and dollar return to labor and management figures are substantially greater in 1973. Expenses per \$100 gross income are least in 1973, and all years have expenses of less than \$100.

Absolute dollars of C & I loans and long term loans fluctuated from 1973-1977 with an increase in both over the five year period. The ratios of C & I loans to C & I assets and long term loans to long term assets followed a similar pattern of fluctuation.

The 1977 flow of funds analysis for the \$775,001-900,000 division (see Table 26), began with a net farm income of \$20,223 and had an end residual of \$-4,867 available for long run growth and short term debt retirement.

An analysis of the total capital managed for the \$900,001+ division for 1974-1977, (see Table 27), showed inconsequential change in the percent of debt capital of total capital managed from 1974-1977. The percent of equity capital of total capital managed decreased from 1974 to 1977 while the percent of lease capital of total capital managed increased over the four year period.

The percent return to equity, percent return to total capital, and dollar return to labor and management figures are negative for all figures but the 1975 and 1977 percent return to total capital and 1977



TABLE 25

Selected Factors by Total Capital Managed  
for \$ 775,001-900,000 Farms from 1973-1977

	<u>\$ 775,001-900,000</u>					Average
	1973	1974	1975	1976	1977	
Debt	123,254 (15%)	128,537 (15%)	171,479 (21%)	141,023 (17%)	207,327 (25%)	154,324 (19%)
Equity	479,385 (58%)	362,877 (44%)	241,233 (29%)	242,870 (29%)	221,456 (27%)	309,564 (37%)
Lease	219,858 (27%)	338,100 (41%)	419,793 (50%)	458,900 (54%)	406,100 (48%)	368,550 (44%)
Total Capital Managed	822,497	829,514	832,505	842,793	834,883	832,438
% Return to Equity	12.80	4.28-	2.34-	1.12-	.16-	.98
% Return to Total Capital	8.74	.93-	.34	.70	1.66	2.10
\$ Return to Labor & Mgt.	62,521	16,144-	2,931-	241	5,191	9,776
Expense/\$100 Gross Income	\$ 53	\$ 95	\$ 90	\$ 85	\$ 84	\$ 81
\$ of Current & Intermediate Loans	85,223	77,648	104,807	82,899	112,832	92,682
\$ of Long Term Loans	38,031	50,889	66,672	58,124	94,495	61,642
Current & Intermediate Loans						
Current & Intermediate Assets	.27	.31	.46	.49	.62	.43
Long Term Loans						
Long Term Assets	.11	.21	.28	.26	.34	.24

TABLE 26  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$775,001-900,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 20,223
2.	DEPRECIATION	+ 14,358
3.	AVAILABLE FARM INCOME	34,581
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	34,581
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 4,930
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	18,941
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 9,450
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	9,491
11.	LESS DEPRECIATION (Line 2 above)	- 14,358
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(4,867)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

TABLE 27  
Selected Factors by Total Capital Managed  
for \$ 900,001 + Farms from 1974-1977

	1973	1974	1975	1976	1977	Average
			<u>\$ 900,001 +</u>			
Debt	---	246,314 (25%)	184,878 (17%)	228,131 (21%)	246,636 (22%)	226,490 (21%)
Equity	---	448,424 (45%)	360,435 (34%)	317,727 (29%)	307,686 (27%)	358,568 (34%)
Lease	---	306,940 (30%)	515,485 (49%)	540,601 (50%)	571,208 (51%)	483,559 (45%)
Total Capital Managed	---	1,001,678	1,060,798	1,086,459	1,125,530	1,068,616
% Return to Equity	---	8.45-	.32-	7.27-	1.13-	4.29-
% Return to Total Capital	---	2.58-	1.13	.87-	1.19	.28-
\$ Return to Labor & Mgt.	---	52,075-	2,171-	22,033-	286	18,998-
Expense/\$100 Gross Income	---	\$ 122	\$ 85	\$ 101	\$ 87	\$ 99
\$ of Current & Intermediate Loans	---	131,238	110,958	120,700	139,103	125,500
\$ of Long Term Loans	---	115,076	73,920	107,431	107,533	100,990
Current & Intermediate Loans	---					
Current & Intermediate Assets	---	.52	.48	.54	.58	.53
Long Term Loans	---					
Long Term Assets	---	.25	.21	.32	.33	.28

dollar return to labor and management. Those three figures are positive but low. Average figures are negative for all three measures. Expenses per \$100 gross income are below \$100 in 1975 and 1977. The average expenses per \$100 gross income are \$99.

Absolute dollars of C & I loans and long term loans fluctuated over the four year period as did the ratios of C & I loans to C & I assets and long term loans to long term assets.

The 1977 flow of funds analysis for total capital managed of \$900,001+, (see Table 28), started with a net farm income of \$19,683 and had an end residual of \$-6,489 available for long run growth and short term debt retirement.

Similar tables and flow of funds analyses by total capital managed for the specific divisions of \$250,001-350,000; \$350,001-450,000; \$550,001-655,000; and \$655,001-775,000 can be seen in the appendix, (see Tables 39-46).

To summarize the analysis of the farm business by total capital managed for the period 1973-1977, the percent equity capital of total capital managed decreased substantially, and conversely, the percent of lease capital increased considerably for the \$775,001-900,000 and \$900,001+ divisions.

The percent return to equity, percent return to total capital, and dollar return to labor and management figures were highest in 1973 for all divisions. (Figures were not available for 1973 for the \$900,001+ division.) Expenses were below \$100 for all divisions but the \$900,001+ group of farms. The \$900,001+ farms had expenses greater than \$100 in 1974 and 1976.

TABLE 28  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$900,001 + FARMS FOR 1977	
1. NET FARM INCOME	\$ 19,683
2. DEPRECIATION	+ 18,602
3. AVAILABLE FARM INCOME	38,285
* 4. OUTSIDE INCOME (Net)	+ 0
5. AVAILABLE (Fam. Liv., Debt, Growth)	38,285
** 6. FAMILY LIVING (Expected)	- 10,710
*** 7. INCOME TAX AND SS (Expected)	- 4,709
8. AVAILABLE DEBT SERVICING (Old P. & New P. & i)	22,866
9. PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 10,753
10. AVAILABLE FOR SHORT TERM DEBT SERVICING	12,113
11. LESS DEPRECIATION (Line 2 above)	- 18,602
12. AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(6,489)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

The \$900,001+ farms had the largest absolute dollars of C & I loans and long term loans, as well as the highest ratio of C & I loans to C & I assets. The ratio of long term loans to long term assets was similar among all four divisions.

The flow of funds analyses for each division of total capital managed showed inadequate dollars available for long run growth and short term debt retirement.

## CHAPTER VIII

### THE APPLICATION OF A PROBLEM USING SPSS

#### BIVARIATE CORRELATION ANALYSIS

One of the objectives of this research was to analyze the relationship of interest paid by farmers for borrowed capital to farm income and expense. This objective was analyzed using SPSS.

SPSS, Statistical Package for the Social Sciences, is an integrated system of computer programs designed for the analysis of social science data. The system provides a unified and comprehensive package that enables the user to perform many different types of data analysis in a simple and convenient manner. It provides the user with a comprehensive set of procedures for data transformation and file manipulation, and it offers the researcher a large number of statistical routines commonly used in the social sciences.

The SPSS system furnishes three subprograms for bivariate correlation analysis: PEARSON CORR, NONPAR CORR, and SCATTERGRAM. PEARSON CORR computes Pearson product-moment correlation coefficients for pairs of interval-level variables. Spearman and Kendall rank-order correlations, appropriate for ordinal-level variables, are calculated by the NONPAR CORR subprogram. The SCATTERGRAM subprogram prints two variable scattergrams of data points.

Bivariate correlation provides a single number which summarizes the relationship between two variables. These correlation coefficients indicate the degree to which variation (or change) in one variable is related to variation (change) in another. A correlation coefficient not only summarizes the strength of association between a pair of variables, but also provides an easy means for comparing the strength of relationship between one pair of variables and a different pair.

Spearman's rho and Kendall's tau are the two nonparametric correlations computed by the NONPAR CORR subprogram. Nonparametric means that no assumptions are made about the distribution of cases on the variables. These statistics require nothing more than an ordinal level of measurement and a large number of categories or ranks on each of the variables. Interval and ratio level variables are frequently composed of a large number of distinct categories. When this is the case, scattergrams and the Pearson product-moment correlation ( $r$ ) can give us a picture of the relationship. A scattergram is a graph of data points based on two variables, where one variable defines the horizontal axis and the other defines the vertical axis.

Scattergrams often suffer from excessive detail. One way to reduce the detail is to draw a straight or curved line through the scattergram in such a manner that it approximates the pattern of points. This is quite easy when the pattern is clear and consistent.

If a line with known mathematical properties can be found to represent the general pattern of the data, then the formula for that line can serve as a summary of the form of the relationship between the two variables. In addition, the closer the data points fall to the line that best summarizes the relationship, the stronger the correlation between the two variables.



The most common statistical procedure for fitting a line to a scattergram based on interval-level variables is called least-squares regression. This method is based on the belief that the best-fitting line is the one in which the vertical distances of all the points from the line are minimized. The line itself is called the regression line. That is, if some straight or curved line were drawn through the scattergram, any point which did not fall exactly on the regression line would be incompletely accounted for. The amount of "error," then, is the vertical distance from the point to the line. Actually, the distances are squared and then added together. This summation of the squared error distances is a measure of the total error involved when the regression line is used as the prediction of the location of the data points. A line which minimizes this sum of squared distances will serve as a better predictor than any other line.

The most common type of regression is linear regression, in which the objective is to locate the best-fitting straight line. Linear regression is most commonly used because it gives a simple summary of the relationship, although not necessarily the "best," and since most variables of interest to social scientists are assumed to be related in a straight line manner.

In most social science research it is highly unusual to find a regression line, especially a straight one which perfectly fits the data. Whether this is because the true relationship does not quite fit the curve being drawn or because of errors or imprecisions in collecting the data, a measure of the "goodness of fit" of the regression line is called for. The Pearson product-moment correlation coefficient, symbolized by

r, serves this purpose for linear regression. When there is a perfect fit (no error), r takes on the value of +1.0 or -1.0. We can assume there is a strong linear relationship.

If we square the Pearson's r we get another statistic, denoted by  $r^2$ . Actually,  $r^2$ , the coefficient of determination, is a more easily interpreted measure of association when our concern is with strength of relationship rather than direction of relationship. (It ranges from a minimum of 0 to a maximum of 1.0.) Its usefulness derives from the fact that  $r^2$  is a measure of the proportion of variance in one variable "explained" by the other.

Variance is a measure of the variability, or lack of homogeneity, in a variable. When the cases cluster close to the mean, variance will be small; as the cases become more spread out, variance increases. The objective of correlation analysis is to determine the extent to which variation in one variable is linked to variation in the other.<sup>1</sup>

In this research, we are not interested in prediction or the regression line itself. We wish only to know the strength of the relationship or to obtain the correlation coefficient for statistical purposes. The PEARSON CORR subprogram is very convenient for this situation, since it can easily compute a large number of correlation coefficients without taking the time to display a scattergram or compute a regression equation.

A program was written, which retrieved particular data items relevant to the list of variables, V4-V18, from the data bank and stored

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<sup>1</sup>Norman H. Nie et al., SPSS Statistical Package for the Social Sciences, (U.S.A.: McGraw-Hill, Inc., 1975), pp. 276-280.

them on disc.<sup>2</sup> Nine data items were placed on a dataset. A total of six group datasets with 46 data items for each farm were stored on disc for individual years 1973, 1974, 1975, 1976, and 1977.

In the second part of the bivariate correlation analysis, a program was written which generated the variables not directly stored in the data bank.<sup>3</sup> One card was punched by the computer for each farm for each year 1973-1977 containing the manipulated data items in proper variable format. The punched cards for each farm were run in the SPSS subprogram PEARSON CORR in the third and final part of the analysis. Final bivariate correlation analysis outputs were received for years 1973, 1974, 1975, 1976, and 1977.

Output from this program includes the correlation coefficient, the test of significance, and the number of cases, N, upon which the correlation coefficient was computed.

Significance tests are reported for each coefficient and are derived from the use of student's t with N-2 degrees of freedom. The user has an option of selecting a one or two tailed test of significance. For this research, a one tailed test of significance was used.

When a correlation coefficient cannot be calculated, as will happen if the variable is either missing for all cases or takes the same value for all cases, SPSS will assign a value of 99.0, which is a flag to the user that the coefficient could not be calculated.

Outputs are presented in the form of a matrix. Table 29 shows Pearson Correlation Coefficients for a five year comparison of bivariate correlation analysis for years 1973, 1974, 1975, 1976, and 1977.

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<sup>2</sup>Program assistance by Gary Hanna, Computer Programmer, Department of Economics Cooperative Extension Service, Manhattan, Kansas.

<sup>3</sup>Program assistance by Kristopher L. Arheart, Manager of Information Services at the Kansas State University Computing Center, Manhattan, Kansas.

TABLE 29  
PEARSON CORRELATION COEFFICIENTS

	1973	1974	1975	1976	1977
	V18	V18	V18	V18	V18
V4 Gross Farm Income	0.5818 ( 319) S=0.001	0.3852 ( 319) S=0.001	0.4928 ( 320) S=0.001	0.5219 ( 320) S=0.001	0.6068 ( 320) S=0.001
V5 Net Farm Income	0.1775 ( 319) S=0.001	-0.3762 ( 319) S=0.001	-0.0635 ( 320) S=0.129	-0.4101 ( 320) S=0.001	-0.1205 ( 320) S=0.016
V6 Total Capital Managed	0.4717 ( 319) S=0.001	0.4566 ( 319) S=0.001	0.4500 ( 320) S=0.001	0.5143 ( 320) S=0.001	0.5344 ( 320) S=0.001
V7 Total Cash Op- erating Expenses	0.7122 ( 319) S=0.001	0.6742 ( 319) S=0.001	0.6592 ( 320) S=0.001	0.6993 ( 320) S=0.001	0.7248 ( 320) S=0.001
V8 Depreciation	0.5128 ( 319) S=0.001	0.4276 ( 319) S=0.001	0.4598 ( 320) S=0.001	0.5709 ( 320) S=0.001	0.6104 ( 320) S=0.001
V9 Total Expenses	0.7201 ( 319) S=0.001	0.6751 ( 319) S=0.001	0.6655 ( 320) S=0.001	0.7112 ( 320) S=0.001	0.7370 ( 320) S=0.001
V10 Net Worth	0.1551 ( 319) S=0.003	0.0823 ( 319) S=0.071	0.1053 ( 320) S=0.030	0.0701 ( 320) S=0.106	0.0123 ( 320) S=0.414
V11 Return to Labor and Management	0.1553 ( 319) S=0.003	-0.3891 ( 319) S=0.001	-0.1027 ( 320) S=0.033	-0.4311 ( 320) S=0.001	-0.1289 ( 320) S=0.011
V12 Land Value- Owned	0.3486 ( 319) S=0.001	0.3504 ( 319) S=0.001	0.3881 ( 320) S=0.001	0.4190 ( 320) S=0.001	0.4648 ( 320) S=0.001
V13 Land Value- Rented	0.0955 ( 319) S=0.044	0.1274 ( 319) S=0.011	0.1437 ( 320) S=0.005	0.1975 ( 320) S=0.001	0.2212 ( 320) S=0.001
V14 Current Loans	0.7665 ( 319) S=0.001	0.7828 ( 319) S=0.001	0.7930 ( 320) S=0.001	0.8023 ( 320) S=0.001	0.7663 ( 320) S=0.001
V15 Long Term Loans	0.6328 ( 319) S=0.001	0.7128 ( 319) S=0.001	0.7528 ( 320) S=0.001	0.6657 ( 320) S=0.001	0.7709 ( 320) S=0.001
V16 Livestock Income	0.4647 ( 319) S=0.001	0.2971 ( 319) S=0.001	0.3846 ( 320) S=0.001	0.4064 ( 320) S=0.001	0.4207 ( 320) S=0.001
V17 Crop Income	0.2936 ( 319) S=0.001	0.1551 ( 319) S=0.003	0.2281 ( 320) S=0.001	0.2477 ( 320) S=0.001	0.3976 ( 320) S=0.001

A combination of two things is looked at when analyzing the results, the correlation coefficient and the test of significance. A subjective value judgment is made to determine the strength of the correlation coefficient, keeping in mind that if the value of  $r$  approaches  $+1.0$  or  $-1.0$ , a strong linear relationship can be assumed.

A  $.70+$  seems to be a relatively good indicator of strength considering the variables involved in this bivariate correlation analysis. The test of significance ( $.05$ ) should be evaluated along with the correlation coefficient. A significance level of  $.001$ , indicating a one in one thousand times chance of occurrence due to randomness appears very significant. However, if this is paired with a correlation coefficient of  $.1775$ , for example, the significance doesn't seem to be very important. The correlation coefficient of  $.1775$  doesn't indicate any strength. Assuming a correlation coefficient of  $.70+$ , the significance level must also be analyzed, before drawing any conclusions.

Comparing the correlation coefficients for years 1973, 1974, 1975, 1976, and 1977, it is evident that four of the variables exhibit coefficients of near  $.70$  or above, with a significance level of  $.001$ . These four variables include V7 Total Cash Operating Expenses, V9 Total Expenses, V14 Current Loans, and V15 Long Term Loans.

The program results show that during the time of this study, the absolute value of the loans increased for the sample farms, resulting in increased interest expense to the farmers. A combination of low farm product prices and inflationary input prices may have caused farmers to borrow more dollars of operating capital. Higher prices paid for purchased inputs is reflected in total cash operating expenses and total expenses. The farmer's interest expense increases as current and long

term absolute loans increase. These four variables represent the strongest relationship to the interest variable of the fourteen variables studied. The other ten variables do not exhibit any strength of relationship with the interest variable. There is very little change in correlation coefficients from year to year.

Two variables exhibit a positive correlation coefficient in 1973 but negative coefficients for years 1974-1977, V5 Net Income and V11 Return to Labor and Management. The positive coefficients in 1973 may be attributed to higher farm products prices that year resulting in higher gross and net farm incomes than in years 1974-1977.

The coefficient of determination,  $r^2$ , measures the proportion of variance in one variable "explained" by the other. Computing  $r^2$  on Total Cash Operating Expenses, Total Expenses, Current Loans, and Long Term Loans, results in approximately 50 to 64 percent of variance in one variable that is "explained" by the other. This is a comfortable range of explained variation.

To summarize the analysis, four variables exhibited Pearson product-moment correlation coefficients ( $r$ ) of near .70 or above, with significance levels of .001. These four variables, Total Cash Operating Expenses, Total Expenses, Current Loans and Long Term Loans, represent the strongest relationship to the interest variable of the fourteen variables studied. The coefficient of determination,  $r^2$ , computed on the above four variables results in approximately 50 to 64 percent of variance in one variable that is "explained" by the other variable.

## CHAPTER IX

### A PROJECTION OF ADEQUACY OF INCOME

The last objective of this research was to test for the adequacy of income for future survival of the high 25 percent income farms, the low 25 percent income farms, and the average income farms. An inflation rate of 9 percent was applied to the farm expenses, (cash operating expenses and depreciation) and to family living expenses for a projection five years from now. (1982) (See Table 30.) If gross farm income was held constant but inflation continued to increase farm and family living expenses, neither the high 25 percent, low 25 percent, nor the average net income farms could survive. Negative dollars available for debt service, income tax, social security, and future growth was the result for the high 25 percent, low 25 percent, and average net income farms in 1982.

Future survival may be possible by (1) continued growth in size as long as the returns to capital are positive, (2) use of off farm income to supplement farm income, (3) increased efficiency as higher yield/acre or unit, and (4) higher product prices. This analysis cannot project which of the four will dominate, however, it does show that the high income group does have the best foundation for financial and production survival.

TABLE 30  
Adequacy of Income for 1977 Sample Farms

	<u>High 25%</u>	<u>Low 25%</u>	<u>Average</u>
Gross Farm Income	130,288	65,549	87,470
Cash Expenses	- 77,495	- 64,948	- 62,817
Depreciation	<u>- 12,403</u>	<u>- 10,351</u>	<u>- 10,473</u>
Net Farm Income	40,390	( 9,750)	14,180
Family Living	<u>- 10,710</u>	<u>- 10,710</u>	<u>- 10,710</u>
Available for Debt Service, Income Tax, SS, and Growth	29,680	( 20,460)	3,470

Projected Adequacy of Income for Sample Farms  
in 1982 Applying 9% Inflation to Expenses and  
Family Living and Holding Gross Farm Income Constant

	<u>High 25%</u>	<u>Low 25%</u>	<u>Average</u>
Gross Farm Income	130,288	65,549	87,470
Cash Expenses	-119,236	- 99,931	- 96,652
Depreciation	<u>- 19,084</u>	<u>- 15,926</u>	<u>- 16,114</u>
Net Farm Income	( 8,032)	( 50,308)	( 25,296)
Family Living	<u>- 16,479</u>	<u>- 16,479</u>	<u>- 16,479</u>
Available for Debt Service, Income Tax, SS and Growth	( 24,511)	( 66,787)	( 41,775)



Capital needs for growth will increase. If efficiency remains constant in terms of expense per \$100 gross and capital needs necessary to produce gross income, and if equity capital remains constant then the chances for growth are dependent upon borrowed capital and rented capital. Additional rented land can only be available with fewer farmers or some farms being smaller which would free up land for the larger farms.

With the 9 percent assumed inflation rate, the high income farms need to double in size in eight years, (rule of 72). The capital managed is presently \$536,703 and doubling that amount would be \$1,073,406, in inflated dollars. Borrowed capital would be required for the major portion of the growth with the above assumptions.

Can the financial institutions handle the increased capital requirements needed by the farms in order to survive? The answer to this should be the basis for additional study.

## CHAPTER X

### SUMMARY AND IMPLICATIONS

The analysis of the farm business by net farm income, gross farm income, farm type, and total capital managed showed the highest percent return to equity, percent return to total capital, and dollar return to labor and management in 1973. Most farm prices were at record high levels in 1973, explaining the substantial returns to the profitability measures. Expense/\$100 gross income was least in 1973. The high 25 percent income farms had over 11 times the percent return to equity, had almost 6 times the percent return to total capital, and had 7 times the dollar return to labor and management than the low 25 percent income farms. The high 25 percent income farms consistently had expenses below \$75 per \$100 gross income, whereas, the low 25 percent income farms had expenses less than \$75 only in 1973. Of the two net income groups, only the high 25 percent farms had adequate dollars available for long run growth and short term debt retirement.

The gross farm income analysis showed that as gross farm income increased, the percent return to equity, percent return to total capital, and dollar return to labor and management figures improved. Likewise, the expense/\$100 gross income decreased as gross farm income increased. The dollars of debt capital used by the farms increased as

the gross farm income increased. Although there were inadequate dollars available for long run growth and short term debt retirement for all divisions of gross farm income, higher gross farm incomes resulted in higher net farm incomes and lesser negative amounts on the flow of funds analyses.

The percent return to equity, percent return to total capital, and the dollar return to labor and management figures improved as the dollars of total capital managed increased. Exceptions to the increase were the total capital managed divisions of \$655,001-775,000, (see Table 45), and \$900,001+, (see Table 27). As the dollars of total capital managed increased, the dollars of debt capital used by the farms increased.

The dairy farm type and the high 25 percent net income farms exhibited the most overall stability and progress for the period studied because they were the only groups that had adequate dollars available for long run growth and short term debt retirement. The dairy and swine farms were low capital users relative to the cash crop-dryland and cash crop-cowherd farms.

Overall, the role of lease capital and equity capital changed during the period. Lease capital increased as a percent of total capital managed, and equity capital decreased as a percent of total capital managed.

The projection of adequacy of income for farms in five years, assuming a 9 percent inflation factor, demonstrated that of the net income farms, the high 25 percent farms have the best chance for survival because dollars available for debt service, income tax, social security, and growth were less negative for that group.

In the analysis of interest paid by farmers to farm income and expense, four variables exhibited Pearson product-moment correlation coefficients ( $r$ ) of near .70 or above, with significance levels of .001. These four variables, total cash operating expenses, total expenses, current loans, and long term loans represent the strongest relationship to the interest variable of the fourteen variables studied.

With the 9 percent assumed inflation rate, the need for growth will increase. Future survival of farms may be possible by increasing yields from the same acres or units; curtailing investments and reducing or holding constant farm and nonfarm expenses; and higher product prices. Alternatively, it may mean increasing the size of profitable enterprises through capital investment or renting, or using off farm income to supplement farm income.

Borrowed capital will be required for the major portion of the growth. Can the agricultural financial institutions handle the increased capital requirements needed by farms to survive? The answer to this question should be the basis for additional study.

APPENDIX

TABLE 31  
Selected Factors by Net Farm Income for the  
High Middle 25% Income Farms from 1973-1977

	High Middle 25%					Average
	1973	1974	1975	1976	1977	
Debt	62,662 (17%)	61,151 (16%)	53,099 (11.5%)	78,340 (16%)	120,018 (20%)	75,054 (16%)
Equity	148,683 (41%)	160,325 (42%)	205,668 (45%)	219,034 (44%)	206,413 (34%)	188,025 (41%)
Lease	154,664 (42%)	158,186 (42%)	199,802 (43.5%)	200,577 (40%)	274,251 (46%)	197,496 (43%)
Total Capital Managed	366,009	379,662	458,569	497,951	600,682	460,575
% Return to Equity	17.17	1.56-	2.05	1.00-	.49	3.43
% Return to Total Capital	8.64	.26	1.80	.35	1.55	2.52
\$ Return to Labor & Mgt.	35,982	2,081	6,363	985-	4,831	9,654
Expense/\$100 Gross Income	\$ 51	\$ 82	\$ 72	\$ 82	\$ 80	\$ 73
\$ of Current & Intermediate Loans	38,371	33,716	27,118	36,534	66,019	40,352
\$ of Long Term Loans	24,291	27,435	25,981	41,806	53,999	34,702
Current & Intermediate Loans						
Current & Intermediate Assets	.29	.29	.24	.33	.27	.28
Long Term Loans						
Long Term Assets	.21	.23	.16	.21	.47	.26

TABLE 32  
FLOW OF FUNDS

BY NET FARM INCOME FOR THE HIGH MIDDLE 25% FARMS FOR 1977

1.	NET FARM INCOME	\$ 18,018
2.	DEPRECIATION	+ 10,876
3.	AVAILABLE FARM INCOME	28,894
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	28,894
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 4,048
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	14,136
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 5,400
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	8,736
11.	LESS DEPRECIATION (Line 2 above)	- 10,876
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(2,140)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$

TABLE 33

Selected Factors by Net Farm Income for the  
Low Middle 25% Income Farms from 1973-1977

	Low Middle 25%					Average
	1973	1974	1975	1976	1977	
Debt	56,587 (20%)	66,004 (20%)	73,445 (17%)	89,809 (18%)	90,753 (18%)	75,320 (18%)
Equity	113,597 (41%)	135,516 (42%)	192,470 (43%)	163,570 (33%)	180,174 (36%)	157,065 (39%)
Lease	109,531 (39%)	124,444 (38%)	175,514 (40%)	242,259 (49%)	224,221 (46%)	175,194 (43%)
Total Capital Managed	279,715	325,964	441,429	495,638	495,148	407,579
% Return to Equity	13.68	10.87-	2.73-	6.30-	3.30-	1.91-
% Return to Total Capital	7.41	3.20-	.12-	.89-	.01-	.64
\$ Return to Labor & Mgt.	24,829	10,689-	3,570-	6,550-	3,461-	112
Expense/\$100 Gross Income	\$ 58	\$ 103	\$ 86	\$ 94	\$ 87	\$ 86
\$ of Current & Intermediate Loans	30,995	37,807	38,923	50,801	46,483	41,002
\$ of Long Term Loans	25,592	28,197	34,522	39,008	44,270	34,318
Current & Intermediate Loans						
Current & Intermediate Assets	.31	.38	.36	.51	.45	.41
Long Term Loans						
Long Term Assets	.28	.28	.20	.25	.25	.25



TABLE 34  
FLOW OF FUNDS

BY NET FARM INCOME FOR THE LOW MIDDLE 25% FARMS FOR 1977

1.	NET FARM INCOME	\$ 8,062
2.	DEPRECIATION	+ 8,264
3.	AVAILABLE FARM INCOME	16,326
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	16,326
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 845
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	4,771
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 4,427
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	344
11.	LESS DEPRECIATION (Line 2 above)	- 8,264
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(7,920)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents  $\times$  \$750)

TABLE 35  
Selected Factors by Gross Farm Income for the  
\$ 25,001-50,000 Income Farms from 1973-1977

\$ 25,001-50,000

	1973	1974	1975	1976	1977	Average
Debt	26,696(12%)	56,721(18%)	32,162(8%)	46,038(12%)	51,860(13%)	42,695(13%)
Equity	100,285(47%)	109,449(36%)	159,385(44%)	160,733(43%)	160,529(39%)	138,076(41%)
Lease	88,001(41%)	142,111(46%)	174,822(48%)	168,389(45%)	197,640(48%)	154,192(46%)
Total Capital Managed	214,982	308,281	366,369	375,160	410,029	334,964
% Return to Equity	4.90	12.80-	2.04-	5.02-	4.55-	3.90-
% Return to Total Capital	3.24	3.64-	.35-	1.41-	.94-	.62-
\$ Return to Labor & Mgt.	10,818	10,563-	1,708-	6,306-	5,716-	2,695-
Expense/\$100 Gross Income	\$ 58	\$ 109	\$ 80	\$ 91	\$ 89	\$ 85
\$ of Current & Intermediate Loans	15,693	32,627	17,989	23,906	26,674	23,378
\$ of Long Term Loans	11,003	24,094	14,173	22,132	25,186	19,318
Current & Intermediate Loans						
Current & Intermediate Assets	.23	.38	.19	.31	.36	.29
Long Term Loans						
Long Term Assets	.15	.29	.12	.17	.18	.18

TABLE 36  
FLOW OF FUNDS

BY GROSS FARM INCOME FOR THE \$25,001-50,000 FARMS FOR 1977

1.	NET FARM INCOME	\$	4,116
2.	DEPRECIATION	+	5,716
3.	AVAILABLE FARM INCOME		9,832
* 4.	OUTSIDE INCOME (Net)	+	0
5.	AVAILABLE (Fam. Liv., Debt, Growth)		9,832
** 6.	FAMILY LIVING (Expected)	-	10,710
*** 7.	INCOME TAX AND SS (Expected)	-	96
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)		(974)
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	-	2,519
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING		(3,493)
11.	LESS DEPRECIATION (Line 2 above)	-	5,716
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT		(9,209)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

TABLE 37  
Selected Factors by Gross Farm Income  
for the \$ 100,001-150,000 Income Farms from 1973-1977

	<u>\$ 100,001-150,000</u>					Average
	1973	1974	1975	1976	1977	
Debt	91,052 (22%)	106,923 (21%)	130,622 (22%)	139,145 (19%)	150,063 (23%)	123,561 (21%)
Equity	167,679 (41%)	223,802 (43%)	244,469 (42%)	266,869 (37%)	224,755 (34%)	225,515 (39%)
Lease	154,554 (37%)	187,106 (36%)	213,053 (36%)	323,652 (44%)	279,215 (43%)	231,516 (40%)
Total Capital Managed	413,285	517,831	588,144	729,666	654,033	580,592
% Return to Equity	20.56	2.17-	1.91	1.26-	.88	3.98
% Return to Total Capital	10.64	.37	2.36	.60	1.85	3.16
\$ Return to Labor & Mgt.	47,687	990	9,434	149	7,509	13,154
Expense/\$100 Gross Income	\$ 52	\$ 87	\$ 79	\$ 86	\$ 81	\$ 77
\$ of Current & Intermediate Loans	55,016	61,445	70,117	67,678	81,301	67,111
\$ of Long Term Loans	36,036	45,478	60,545	71,467	68,762	56,458
Current & Intermediate Loans						
Current & Intermediate Assets	.33	.37	.40	.38	.48	.39
Long Term Loans						
Long Term Assets	.27	.26	.27	.29	.31	.28

TABLE 38  
FLOW OF FUNDS

BY GROSS FARM INCOME FOR THE \$100,001-150,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 22,186
2.	DEPRECIATION	+ 12,856
3.	AVAILABLE FARM INCOME	35,042
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	35,042
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 5,759
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	18,573
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 6,876
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	11,697
11.	LESS DEPRECIATION (Line 2 above)	- 12,856
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(1,159)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$

TABLE 39  
Selected Factors by Total Capital Managed  
for \$ 250,001-350,000 Farms from 1973-1977

	<u>\$ 250,001-350,000</u>					Average
	1973	1974	1975	1976	1977	
Debt	57,939(20%)	53,857(18%)	59,211(20%)	55,809(19%)	52,199(18%)	55,803(19%)
Equity	119,620(40%)	126,573(43%)	145,956(48%)	139,593(47%)	152,397(52%)	136,828(46%)
Lease	119,948(40%)	116,900(39%)	96,133(32%)	102,422(34%)	89,586(30%)	104,998(35%)
Total Capital Managed	297,507	297,330	301,300	297,824	294,182	297,629
% Return to Equity	16.18	7.36-	1.13-	3.07-	1.04	1.13
% Return to Total Capital	8.41	1.99-	.65	.27-	1.73	1.71
\$ Return to Labor & Mgt.	29,809	4,279-	2,773	230	6,149	6,936
Expense/\$100 Gross Income	\$ 54	\$ 99	\$ 80	\$ 83	\$ 75	\$ 77
\$ of Current & Intermediate Loans	33,425	28,972	29,574	27,452	23,543	28,593
\$ of Long Term Loans	24,514	24,885	29,637	28,357	28,656	27,210
Current & Intermediate Loans						
Current & Intermediate Assets	.30	.30	.34	.38	.29	.32
Long Term Loans						
Long Term Assets	.26	.29	.23	.23	.23	.25

TABLE 40  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$250,001-350,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 15,891
2.	DEPRECIATION	+ 6,587
3.	AVAILABLE FARM INCOME	22,478
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	22,478
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 3,248
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	8,520
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 2,866
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	5,654
11.	LESS DEPRECIATION (Line 2 above)	- 6,587
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(933)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

TABLE 41  
Selected Factors by Total Capital Managed  
for \$ 350,001-450,000 Farms from 1973-1977

\$ 350,001-450,000

	1973	1974	1975	1976	1977	Average
Debt	67,991 (17.5%)	59,827 (15%)	57,185 (15%)	76,296 (19%)	92,572 (23%)	70,774 (18%)
Equity	150,127 (39%)	165,994 (42%)	180,637 (45%)	178,809 (45%)	164,904 (41%)	168,094 (42%)
Lease	168,472 (43.5%)	173,678 (43%)	159,302 (40%)	141,540 (36%)	147,642 (36%)	158,127 (40%)
Total Capital Managed	386,590	399,499	397,124	396,645	405,118	396,995
% Return to Equity	19.47	5.22-	2.22	4.18-	3.62-	1.73
% Return to Total Capital	9.39	1.25-	2.10	.81-	.12-	1.86
\$ Return to Labor & Mgt.	40,088	4,936-	8,273	4,609-	2,181-	7,327
Expense/\$100 Gross Income	\$ 53	\$ 92	\$ 73	\$ 90	\$ 88	\$ 79
\$ of Current & Intermediate Loans	42,572	36,762	30,006	40,425	44,447	38,842
\$ of Long Term Loans	25,419	23,065	27,179	35,871	48,125	31,932
Current & Intermediate Loans						
Current & Intermediate Assets	.29	.31	.27	.40	.43	.34
Long Term Loans						
Long Term Assets	.24	.20	.19	.22	.31	.23



TABLE 42  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$350,001-450,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 8,204
2.	DEPRECIATION	+ 8,294
3.	AVAILABLE FARM INCOME	16,498
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	16,498
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 880
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	4,908
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 4,813
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	95
11.	LESS DEPRECIATION (Line 2 above)	- 8,294
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(8,199)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213)^{1.44}$   
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)^{1.44}$   
 Taxable Income = Line 1 -  $(4 \text{ dependents} \times \$750)$

TABLE 43  
Selected Factors by Total Capital Managed  
for \$ 550,001-655,000 from 1973-1977

\$ 550,001-655,000

	1973	1974	1975	1976	1977	Average
Debt	107,071 (18%)	111,949 (19%)	96,803 (16%)	121,839 (20%)	116,027 (19%)	110,738 (18%)
Equity	230,463 (38%)	236,085 (39%)	223,065 (37%)	226,860 (37%)	229,790 (39%)	229,253 (38%)
Lease	262,580 (44%)	251,031 (42%)	285,034 (47%)	261,336 (43%)	249,197 (42%)	261,836 (44%)
Total Capital Managed	600,114	599,065	604,902	610,035	595,014	601,826
% Return to Equity	18.58	5.15-	1.04	3.21-	1.02-	2.05
% Return to Total Capital	8.53	.90-	1.50	.16-	1.07	2.01
\$ Return to Labor & Mgt.	52,312	11,110-	5,119	6,908-	634-	7,756
Expense/\$100 Gross Income	\$ 52	\$ 96	\$ 78	\$ 90	\$ 83	\$ 80
\$ of Current & Intermediary Loans	80,061	65,437	59,643	62,967	59,011	65,424
\$ of Long Term Loans	27,010	46,512	37,160	58,872	57,016	45,314
Current & Intermediary Loans						
Current & Intermediary Assets	.40	.38	.40	.43	.42	.41
Long Term Loans						
Long Term Assets	.16	.24	.20	.27	.26	.23

TABLE 44  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$550,001-655,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 13,943
2.	DEPRECIATION	+ 10,651
3.	AVAILABLE FARM INCOME	24,594
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	24,594
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 2,566
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	11,318
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 5,702
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	5,616
11.	LESS DEPRECIATION (Line 2 above)	- 10,651
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(5,035)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1  $-(4 \text{ dependents} \times \$750)$

TABLE 45  
Selected Factors by Total Capital Managed  
for \$ 655,001-775,000 Farms from 1973-1977

\$ 655,001-775,000

	1973	1974	1975	1976	1977	Average
Debt	169,637 (24%)	133,233 (19%)	128,141 (18%)	155,011 (22%)	148,749 (21%)	146,954 (21%)
Equity	230,922 (32%)	219,018 (31%)	265,808 (37%)	269,984 (38%)	261,295 (37%)	249,405 (35%)
Lease	309,977 (44%)	356,708 (50%)	316,389 (45%)	285,941 (40%)	287,108 (41%)	311,225 (44%)
Total Capital Managed	710,536	708,959	710,338	710,936	697,152	707,584
% Return to Equity	14.95	7.90-	1.61	6.27-	2.59-	.04-
% Return to Total Capital	7.17	1.05-	1.75	.95-	.56	1.50
\$ Return to Labor & Mgt.	51,066	12,659-	6,149	16,550-	5,971-	4,407
Expense/\$100 Gross Income	\$ 63	\$ 99	\$ 79	\$ 100	\$ 89	\$ 86
\$ of Current & Intermediate Loans	105,534	90,645	70,616	77,433	79,663	84,778
\$ of Long Term Loans	64,103	42,588	57,525	77,578	69,086	62,176
Current & Intermediate Loans						
Current & Intermediate Assets	.41	.50	.40	.48	.49	.46
Long Term Loans						
Long Term Assets	.31	.25	.23	.29	.27	.27

TABLE 46  
FLOW OF FUNDS

BY TOTAL CAPITAL MANAGED FOR \$655,001-775,000 FARMS FOR 1977

1.	NET FARM INCOME	\$ 10,321
2.	DEPRECIATION	+ 12,596
3.	AVAILABLE FARM INCOME	22,917
* 4.	OUTSIDE INCOME (Net)	+ 0
5.	AVAILABLE (Fam. Liv., Debt, Growth)	22,917
** 6.	FAMILY LIVING (Expected)	- 10,710
*** 7.	INCOME TAX AND SS (Expected)	- 1,438
8.	AVAILABLE DEBT SERVICING (Old P. & New P. & i)	10,769
9.	PRINCIPAL PAYMENT INTERMEDIATE AND LONG TERM	- 6,909
10.	AVAILABLE FOR SHORT TERM DEBT SERVICING	3,860
11.	LESS DEPRECIATION (Line 2 above)	- 12,596
12.	AVAILABLE LONG RUN GROWTH AND SHORT TERM DEBT RETIREMENT	(8,736)

\* It is recognized there is outside income on most farms. However this analysis is intended to test for an adequate flow of funds for commercial Kansas farms from farm sources.

\*\* Average for a family of four for all associations.

\*\*\*  $(\text{Line 1 less } (750 \times 4) ) \times .0213$ <sup>1.44</sup>  
 Income taxes & SS =  $(\text{Taxable Income} \times .0213)$ <sup>1.44</sup>  
 Taxable Income = Line 1 - (4 dependents X \$750)

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AN ANALYSIS OF THE CAPITAL STRUCTURE OF SINGLE PROPRIETOR  
KANSAS COMMERCIAL FARMS

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AN ABSTRACT OF A MASTER'S THESIS

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The issue of financial and management survival of Kansas commercial proprietor farms in the short run with long run implications prompted the research for this thesis.

The objectives of the research were as follows:

1. To determine the sources of capital currently used by Kansas farmers.
2. To determine the returns to capital.
3. To determine the interrelationship of loan terms.
4. To demonstrate the relationship of cash flow and profitability.
5. To test for the adequacy of income for farms now and in five years.
6. To investigate the impact of interest expense paid by farmers.

The sample contained 320 single proprietor Kansas commercial farms from North Central and Northeast Kansas that had continuous records on the Farm Management data bank for the period 1973-1977.

The relation of debt, equity, and lease capital managed for an average of the 320 sample farms for individual years 1973-1977 is provided for each subset of farms categorized by net farm income, gross farm income, farm type, and total capital managed. Overall, the role of lease capital and equity capital used by Kansas farmers has changed. Lease capital increased as a percent of total capital managed and equity capital decreased as a percent of total capital managed.

The farms were analyzed concerning the return to equity capital, return to total capital, and dollar return to labor and management. The high 25 percent net income farms had significantly larger returns

to capital than the low 25 percent. As gross farm income increased, returns to capital increased. As dollars of total capital managed increased, returns to capital increased, except the \$655,001-775,000 and \$900,001+ divisions.

Loans were analyzed by examining the absolute dollars of current and intermediate loans, dollars of long term loans, and ratios of current and intermediate loans to current and intermediate assets, and long term loans to long term assets for the sample farms. The dairy and swine farms were low capital users relative to the cash crop-dryland and cash crop-cowherd farms.

The 1977 data for the average of the sample farms was incorporated in a flow of funds table to arrive at dollars available for long run growth and short term debt retirement. The dairy farms and the high 25 percent net income farms were the only groups that had adequate dollars available for long run growth and short term debt retirement.

The flow of funds analysis was utilized to test for the adequacy of income projected to 1982 for the low, high, and average net income farms. An assumed inflation factor of 9 percent was applied to farm and family living expenses. The high 25 percent net income farms were the only ones with income to service the inflated costs.

Bivariate correlation analysis was used to analyze the strength of association between the variable interest expense and fourteen variables. Four variables, total cash operating expenses, total expenses, current loans, and long term loans, exhibited Pearson product-moment correlation coefficients ( $r$ ) of near .70 or above, with significance levels of .001.

The farmer has only two sources of capital, namely, his own equity capital and someone else's capital. Nonequity capital includes the use of borrowed capital, leasing, and other arrangements or contracts. The combination of the rapid growth in total capital requirements in agriculture and a steadily declining number of farms has created a highly capital intensive environment for farming. Capital and credit needs will continue to increase. Long run survival for farms may be possible by increasing yields from the same acres or units; curtailing investments and reducing or holding constant farm and nonfarm expenses; and higher product prices. Alternatively, it may mean increasing the size of profitable enterprises through capital investment or renting, or using off farm income to supplement farm income.





