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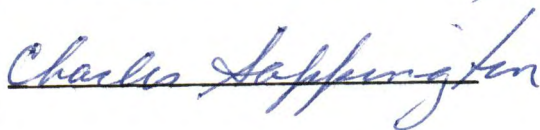
To the Graduate Council:

I am submitting herewith a thesis written by Ralph William Barnett entitled "Knowledge and Attitude Toward the Use of Credit by Farmers in West Tennessee." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.


Major Professor

We have read this thesis
and recommend its acceptance:





Accepted for the Council:


Vice Chancellor for
Graduate Studies and Research

KNOWLEDGE AND ATTITUDE TOWARD THE USE OF CREDIT
BY FARMERS IN WEST TENNESSEE

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fullfillment
of the Requirements for the Degree
Master of Science

by
Ralph William Barnett
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ABSTRACT

The objectives of this study were: (1) to determine West Tennessee farmers' attitudes toward short-term and long-term credit, and credit in general, and (2) to compare the socio-economic characteristics of the farmer to his attitudes about credit.

The data was obtained from a sample of 150 farmers in six counties of West Tennessee. A multiple regression analysis was used to determine the effect of the variables which were hypothesized to have an effect upon the farmers' attitude toward credit. One regression equation was developed for each of the four types of credit attitudes.

The short-term credit attitude equation showed that none of the eleven independent variables were significant. However, when they were considered as a group, the entire equation was significant. Age, crop farmers, farm size, and livestock product farmers were all negatively associated with short-term credit attitude.

It was shown in the second equation that two of the independent variables, farm size and Production Credit Association borrowers, were positively associated with long-term credit attitude. This equation was also significant and had the highest R^2 value of the four equations. Long-term credit attitudes were found to be negatively associated with farmers age, sons over 14 living at home, and the farmers wife having a job off the farm.

In the third equation, an increasing educational level for the farmer and being a Production Credit Association borrower were positively associated with farmers' attitudes toward credit in general. However, the equation as a group was not significant and only livestock farmers had a negative general credit attitude association.

The overall credit attitude equation was significant and the R^2 value was significantly different from zero. The educational level of the farmer, and whether the farmer borrowed from the Production Credit Association were positively associated with overall credit attitude. The farmers wife having an off-farm job and the farmer being a livestock farmer were negatively associated with favorable overall credit attitudes.

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CHAPTER I

INTRODUCTION

The national farm debt has increased from 26.8 billion dollars in 1962 to 44.5 billion dollars in 1967. Over these same five years, the real estate farm debt has composed a little over half of the total national farmer debt. The ratio of net worth to total assets decreased from .8665 to .8416 (8, p. 13) which would indicate that farmers are gradually using more credit per dollar invested in assets¹ (see Table I).

The increasing farm debt and the use of credit has been the result of several factors. The expansion of farm size, increased land values, decrease in the labor supply, and a rising cost of living are factors that created the need for farmers to invest more money in their operations. Much of this increased investment has been financed by the use of credit (7, p. 5).

One of the more important aspects of this increased use of agricultural credit has been the shortage of labor. As the price of labor increased, mechanization has become relatively cheaper and thus has encouraged an increased use of farm equipment. However, even though the machines save man-hours of labor, many of them require large outlays of cash or credit when purchased.

The increasing value of land has been another one of the major reasons why more agriculture credit is being used. Tennessee's

¹However, this ratio is still relatively high as most lenders believe this ratio need only be .50 or above for a loan.

TABLE I

FARM DEBT OUTSTANDING JANUARY 1, AND ANNUAL INCREASES, 1961-68^a

Year	Debt Outstanding January 1			Increase in Debt During Year					
	Total	Real Estate	Non-Real Estate	Dollar Increase			Percentage Increase		
				Total	Real Estate	Non-Real Estate	Total	Real Estate	Non-Real Estate
<u>Billion Dollars</u>				<u>Billion Dollars</u>					
1961	24.8	12.8	12.0	2.0	1.1	0.9	8.2	8.4	7.9
1962	26.8	13.9	12.9	2.9	1.3	1.6	10.7	9.1	12.3
1963	29.7	15.2	14.5	3.3	1.6	1.7	11.2	10.8	11.7
1964	33.0	16.8	16.2	3.0	2.1	.9	9.2	12.4	5.6
1965	36.0	18.9	17.1	4.2	2.3	1.9	11.5	12.1	10.8
1966	40.2	21.2	19.0	4.3	2.2	2.2	10.8	10.0	11.4
1967	44.5	23.3	21.2	4.1	1.7	2.4	9.2	7.3	12.1
1968 ^c	48.6	25.0	23.6	--	--	--	--	--	--

^aExcludes commodity credit corporation loans.^bComputed from unrounded data.^cPreliminary estimate.

Source: Economic Research Service, United States Department of Agriculture, 1968 Agricultural Finance Outlook, Bulletin No. AFO-7 (Washington: Government Printing Office, November, 1967), p. 13.

land value has risen from an index of 100 in base period 1957-59, to a high of 173 in 1964 (1, p. 86). At least part of this rise can be attributed to the limited supply of land, an increasing amount of competing uses for agriculture land as urban centers expand, and inflation. Farmers who expand need more money per acre for land purchases and, therefore, more credit is needed. However, some of the smaller farmers may have kept their farms operating on a limited scale because of this increased cost per acre of land. Further, the larger farmers have been able to buy out or rent land from many of these smaller farmers who could not or would not expand.

Another aspect of the rising farm debt is the increasing average size of farms in Tennessee. Farmers have used long-term credit from several sources to supply them with the money to make these land additions to their present operations. From 1959 to 1964, the average farm size in the state increased from 102 to 114.4 acres. During this same period, the number of farms in the state decreased from 157,688 to 133,445 and the total acres in farming in Tennessee also declined (3, pp. 52-54). This decrease in the total number of acres reemphasizes the need for more efficient and intensive production to meet the expanding need for farm products.

Increased use of dry and liquid fertilizer has brought about an increased demand for short-term credit. Farmers find it difficult to put large acreages in row crops and use the proper amounts of fertilizer and pay cash for it. They must usually rely on the fertilizer supplier to allow them short-term credit or borrow the money from one of the short-term lending institutions. Tennessee farmers have

increased their use of dry and liquid fertilizers by almost 30,000 tons in the years 1959 to 1964. This same trend is also true for lime, as Tennessee farmers have increased their use of lime by 298,000 tons (5, p. 54).

The increasing amount of money being borrowed for farming has been spread over fewer and fewer farmers (3, p. 7). Very few of the commercial farmers operate without using credit. Some farmers have enough finances of their own but they use credit to prevent a disruption of their investment programs (9, p. 92). Farmers must realize that credit is only another tool for production and can be used wisely and most effectively if they do not wait to use it until they are in financial trouble.

I. THE PROBLEM

Since it is necessary for agriculture to expand its production and improve its efficiency, it will take new additions of capital in agriculture to reach this stage in production. Two of the major sources of new capital in agriculture are credit and savings (9, pp. 75-76). Savings are not usually accumulated in large enough amounts to provide farmers all the capital they could profitably use. Credit can be used to bridge this gap and supply the farmer the extra capital he needs to expand and become more efficient.

II. THE OBJECTIVES

The objectives for this study were to:

1. Determine West Tennessee farmers' short-term, general, long-term, and overall credit attitudes.

2. Relate the socio-economic characteristics of the farmer to his attitude about credit.

III. THE PROCEDURE

The farmers attitudes toward short-term, long-term, general, and overall credit were measured by a structured questionnaire with categorical questions. Each farmer was interviewed individually and asked to answer, strongly agree, agree, indifferent, disagree, and strongly disagree, according to his attitude toward a particular credit statement.

The farm characteristics included total acres, amount owned, amount rented, tillable acres five years ago, and the type of farm. The farm operator characteristics included years in farming, age, education, wife working off the farm, husband working off the farm, sons over 14 living at home, and if he borrowed from the Production Credit Association. A regression model was used to determine the effect of the independent variable on the attitude scores.

IV. USE OF THE STUDY

By setting up these relationships between the farmers attitude and their personal and farm characteristics, it is possible to draw inference about associations that exist. It is possible to say as age increases short-term credit attitudes become more or less favorable. Or it is possible to infer that as farm size increases, long-term credit attitudes become more or less favorable. By studying these

relationships, we can determine how personal and farm characteristics influence farmers' attitudes toward credit.

The study should be of interest to both lenders and farmers. Lenders should be interested in the type of attitudes farmers have about credit. This would help them to recognize what types of ideas farmers need to get from advertising. The study may also show that farmers who do not use farm credit have certain distinguishing characteristics from the users of farm credit.

Farmers should also find the results of the study interesting. This may enable them to recognize some of their own personal biases or to place themselves in several of the farm and personal categories and find how they compare with the sample taken as far as attitudes are concerned. This may enable them to better analyze their own situation in comparison with the rest of the area's agriculture.

People who work in the area of adult education such as extension workers may find the results of the study helpful. If it is noted that a change in attitudes is needed, this may pinpoint an area for work in adult education programs.

CHAPTER II

REVIEW OF RELATED LITERATURE

Wirth and Nielson in a study on ownership and productivity of Michigan farms concluded that farm units will require increasingly large amounts of capital in the future (13, p. 33). Linear regression analysis was used to inspect the relationships between net worth and income. Functional analysis models were fitted to gross farm income and to tillable acres, labor in man months, productive cash expenses in dollars, machinery investment in dollars, and livestock and forage investment in dollars. The implications of their findings were that inflation has had great impact on farmers by allowing capital gains on the value of farm assets. However, inflated asset values work hardships on those farmers who wish to expand because net farm incomes have not inflated as fast as farm capital.

A study was conducted in Kentucky by Bondurant and Creswill of the capital requirements to become established in farming (2, pp. 3-20). They found the same increasing capital requirements as did the Michigan study. They stated that generally it is a good practice for a young man to go in debt if it is necessary for the development of his farm unit. However, it was not desirable for them to be in debt more than 25 percent of the value of their farm machinery and more than 65 percent of the value of their agriculture real estate.

A second Michigan study had as its objective to determine how the state's farmers financed their credit and how the use of credit

affected their success in farming (6, p. 3). Hamblin, Wirth, and Nielson found that over a five-year period 78 percent of the farmers did borrow money and that farmers surveyed borrowed an average of \$2,600 a year.

Hamblin, Wirth, and Nielson found of the total credit used banks provided 31 percent, PCA supplied 16 percent, FLBA 13 percent, and individuals the remaining 11 percent. The farmers who had substantial gains in asset ownership, net worth, and net income, 1954-58, used 3 to 4 times as much credit as did the farmers who had low gains. The younger farmers obtained larger amounts of credit than did the older farmers. Farmers with less than 8 years of formal education obtained significantly less credit than those with a formal education of 8 to 12 years. It was also found that farmers who did some off-farm work borrowed less on an average than farmers who did no off-farm work. Farmers with large farms used more credit than did those who operated smaller ones.

A description and analysis of Georgia, North Carolina, and South Carolina's cooperative farm credit programs was done by von Tungeln (12). He reported that 82 percent of the borrowers were owner-operators and 17 percent rented or cropped more land than they owned. One-third of the borrowers were in the age group of 40 to 49 years in age, one-fourth were 50 to 59 years in age, and 17 percent were over 60 years old. The average age of the non-borrowers was 52 and the average age of PCA and FLBA borrowers was 49. The non-borrowers, in general, farmed smaller operations than did those who borrowed some

money. The PCA and FLBA member-borrowers averaged 350 to 375 acres which was about double the amount farmed by non-borrowers.

Information was also obtained relating to the knowledge of the PCA and FLBA borrowing members. Only 11 percent of the FLBA members and 9 percent of the PCA members were apparently not familiar with the interest rates being paid. This was thought to be favorable; however, they were very uninformed as to the source of the funds loaned to them by the PCA and FLBA. Forty-four percent of the FLBA and 78 percent of the PCA borrower respondents indicated they were not aware that they, as member-borrowers, were the owners of the local association and operated the association through their local board of directors.

In relation to advertising the study showed that 70 percent of the member-borrowers had first learned of the association from other farmers. Ten percent indicated they had first learned of the association from its personnel or through advertisement of the local associations.

Spitze and Romans conducted a study to determine farmers knowledge about available credit sources, why they possess that level of knowledge, and how this affected their decisions about credit (10). A survey of 500 farmers was taken in the state of Tennessee. From this survey it was concluded that Tennessee farmers lacked dependable knowledge about existing credit sources. It was found farmers with higher knowledge scores had more formal education, greater volume of sales from the farm, were older, and lived farther west (moving across the state by grand divisions). However, tenure, type of farmer, and

off-farm income had little effect on knowledge scores. Farmers who were borrowing money or had recently considered doing so had higher knowledge scores than those not borrowing and those who had not recently considered doing so. About two-fifths of the farmers surveyed were using credit in the past three years. The commercial bank supplied about 35 percent of the outstanding credit, individuals supplied about 25 percent, while FLBA provided almost 20 percent. Farmers who borrowed from the PCA, FLBA, FHA, and insurance companies had higher scores than the average farmer about credit sources.

Bostwick, Esmoy, and Rodewald made a study of the attitudes of farmers toward the use of short-term credit (4). The purpose of the study was to try and gain insight as to why farmers do not always make expansions that would be profitable. It was the researchers intentions to find if farmers attitudes and beliefs blind them to the economic opportunities in question. The study found that while farmers did have a positive attitude toward the use of credit and did not dislike using short-term credit, they may prefer other methods of financing their operations. A rank order of borrower attributes were obtained from both lenders and borrowers. It was found that lenders and borrowers disagreed on only two attributes (1) ambition and (2) size of the operation. The lenders ranked ambition high and size of the operation low, while borrowers reversed these two attributes.

B. R. McManus conducted a study of West and Middle Tennessee with the objective of determining sources, amounts borrowed, security requirements, and uses of agriculture credit by commercial farmers in West and Middle Tennessee (7). McManus found that 70 percent of the

414 farmers sampled used farm credit. Part-owners and tenants used credit more frequently than owners. Cotton farmers borrowed money more often than farmers who raise livestock, tobacco, or general farmers. Age was also found to be a factor. The farmers who were in their 30's used credit more often than any other age group. From this category on, as the age group of the farmers increased, the percent of users decreased. Farmers with larger operations used more credit for operating expenses and for real estate than did the farmers with smaller acreages. It was found that education was not directly associated with the use or nonuse of credit. Commercial banks provided more funds than any other organization (40 percent). Seventy-two percent of all loans were for short and intermediate purposes. Twenty-two percent were for long-term real estate purchase or improvement. Merchants and dealers provided 18 percent and the PCA supplied 12 percent of the loans.

CHAPTER III

METHODOLOGY

A sample was taken from six West Tennessee counties which comprised the Dyersburg district of the Production Credit Association. The counties sampled were Gibson, Lake, Obion, Weakley, Crockett, and Dyer. A county map indicating farm housing units was obtained for each county and the maps were consolidated to form one large section of the six individual counties.

These six counties were divided into 675 sampling blocks with each individual block being about four square miles. It was arbitrarily determined that 150 blocks would be selected by a random procedure. The 675 blocks were assigned a three digit number and the 150 blocks were selected from a table of random numbers without replacement.

A farm unit and an alternate unit were selected by a standard procedure. A highway or road entering the block from the northeastern border of the block was chosen. There were three procedures used to choose the farm units after the highway or road had been chosen.

The first method was to select the initial farm house on the northeastern most road as the unit to be sampled, and the second farm house as the alternate. The second method was to select the first farm unit as the alternate and the second as the unit to be sampled. The third method used was to select the first road turning east off the northeastern most road. The second farm unit was the one to be

sampled and the third was selected as the alternate. If in any case both houses were vacant or occupied by nonfarm workers, the next nearest farm house was chosen as a replacement. These methods were used in a rotating manner in the order they are discussed.

The people who were to fill out the entire questionnaire were required to have had a minimum income of \$1500 from farming in the previous year. No other requirement was made of the people who were interviewed. The farmers whose minimum income was less than \$1500 were counted as part of the sample.

The survey was conducted in the fall of 1968 and the winter and spring of 1968-69. The questionnaire was completed by personal contact. Only the head of the household was allowed to fill out the questionnaire.

The Questionnaire¹

The first section of the questionnaire was related to information about the farm operators and their farm characteristics. Personal characteristics; such as, name, age, address, off-farm employment, sons over 14 living at home, and years of education were obtained. The farm characteristics recorded were farm size, tillable acres-- owned and rented, acres in each crop, and number of livestock. Facts about the farmers' credit practices were also obtained. Information was recorded as to present sources of both short and long-term loans and interest rates being paid on each one.² Any sources of short or

¹See appendix for schedule.

²The short-term loan is usually thought of as one with a time span of one year or less. However, in our study we have combined

long-term credit being used by the farmer in the past five years was listed.

The final section contained a total of seventeen questions concerning farmers' credit attitudes and thirteen questions testing their credit knowledge. Of these seventeen attitude questions, seven were short-term, four were long-term, and six were about general credit attitudes. These seventeen questions were combined to make an overall attitude score. The questionnaire was field tested on ten farmers in Gibson County.

Attitude scores were determined by using a scale of 5 to 1 for questions with a reply of strongly agree, agree, indifferent, disagree, and strongly disagree. Farmers who answered an attitude question with the most positive response received a 5, while those who answered a question with the most negative response received a 1. A reply that indicated a positive attitude received a 4, one with an indifferent attitude received a 3, and one with a negative attitude received a 2. It was then possible to obtain each attitude score by combining all the farmers' numerical answers to each type of attitude question and obtaining a mean. This gave an attitude score for short-term, long-term, and general credit attitudes. An overall attitude score was obtained by summing the other three attitude scores. The average attitude scores of the sample are shown in Table II.

short and intermediate credit (1-7 years) into one group. The types of inputs purchased on credit for this time period are both numerous and critical to the farmer. Machinery is one of the most important items purchased on a short-term basis. Some of these items, such as fertilizer, may be purchased on credit from the dealer.

TABLE II
SAMPLE ATTITUDE SCORES FOR WEST TENNESSEE FARMERS, 1968-69

Attitude	Average Total	Average Scores ^a
Short-term	25.00	3.57
Long-term	16.18	4.05
General	27.07	4.51
Overall	68.25	4.01

^aAverage attitude scores were determined by dividing the average total by the number of attitude questions of that type that were in the questionnaire. The scores show the relative favorability of farmers' attitudes toward credit. A score of over three is a relatively favorable score while a score higher than four is even more favorable.

Sample Characteristics

The data for farmer and farm characteristics were tabulated and are reported in Tables III through VII. Farm size for the West Tennessee sample area was 368 acres. However, all of this amount was not tillable. Ninety percent of the total acres was reported as being suitable for row crops. Tillable acres were found to have increased by 58 acres from 1963 to 1967. It was also noted that farmers rented more of the tillable acres in their operations than they owned.

Crop farmers were defined as those who received the major portion of their income from row crops. Seventy percent of the farmers sampled were of this type. Farmers who received over half of their farm income from livestock made up 13 percent of the total. Farmers who received a relatively equal amount of income from both crops and livestock also made up 13 percent of the total. Only 4 percent of the farmers sampled received over half of their income from milk or eggs.

The average farmer from this sample was 52 years old and had been farming for 30 years. Twenty percent of the farmers had sons over 14 living at home and 24 percent of their wives worked off the farm. The average educational level was a completion of the tenth grade.

Over one-half of the farmers sampled had short-term loans while 22 percent of them had long-term loans. Slightly less than one-fifth had both a short-term and a long-term loan at the time of the interview.

The most frequently used source of short-term credit was a bank. PCA was the only other source that was frequently mentioned as

TABLE III

AVERAGE FARM SIZE FOR A SAMPLE OF WEST
TENNESSEE FARMERS, 1968-69

Item	
Total Acres	368
Total Tillable Acres	331
Owned	159
Rented	172
Total Tillable Acres, 5 years ago	273

TABLE IV
FARM TYPES FOR A SAMPLE OF WEST TENNESSEE FARMERS, 1968-69

Item	Percent
Crop	70
Livestock	13
Livestock Products	4
Crops and Livestock	13

TABLE V
SAMPLE CHARACTERISTICS OF WEST TENNESSEE FARMERS, 1968-69

Item	Averages
Number of Years in Farming	30
Years of Age	52
Percentage with Sons 14 Years or Over at Home	20
Percent of Husbands Working Off Farm	12
Percent of Wives Working Off Farm	24
Educational Level, Years	8.94

TABLE VI
SAMPLE OF WEST TENNESSEE FARMERS' FREQUENCY IN
USING TERM LOANS, 1968-69

Item	Percent
Have Long-term Loan	22
Have Short-term Loan	54
Both	19

TABLE VII
LENDING AGENCIES THAT A SAMPLE OF WEST TENNESSEE
FARMERS USE AS SOURCES OF CREDIT, 1968-69

Source	Percent		Most Frequent
	Short-term	Long-term	
Bank	60	23	33
PCA	37	3	39
FLBA	0	47	6
Individual Loans	1	3	1
FHA	4	10	7
Dealer Credit	8	7	7
Other	0	7	0

an important supplier of short-term credit. Dealer credit, FHA, and individual loans were the only other sources of short-term credit mentioned.

The FLBA supplied 47 percent of the long-term farm loans while the bank supplied slightly less than half as many loans as the FLBA. Individuals, PCA, dealer credit, and miscellaneous other sources made up the remaining 20 percent.

Thirty-nine percent of the people mentioned PCA while 33 percent mentioned the bank as the most frequently used source of farm credit. FLBA is basically a long-term lending institution and was not a frequent supplier of short-term farm credit. The FHA, dealer credit, and individual loans were other sources that were mentioned (see Tables III through VII, pages 17 through 21).

The Model

Multiple regression was to be used to determine the relationships between the dependent and the independent variables. The dependent variables to be used were the four attitude scores about credit. These variables were denoted by the following symbols:

X_1 = the farmer's attitude toward short-term credit.

X_2 = the farmer's attitude toward long-term credit.

X_3 = the farmer's attitude toward credit in general.

X_4 = an aggregate attitude toward credit which is a summation of the three listed above.

The independent variables were farmer and farm characteristics as from the questionnaire. Part of these variables were taken on

the questionnaire as real numbers. They are listed as follows:

X_5 = the actual acreage of the farm.

X_6 = the educational level was taken in years of school completed and scaled for computation purposes.³

X_7 = actual age of farmer.

X_8 = actual years the operator has been actively engaged in farming.

The remaining independent variables were taken on the questionnaire as yes or no responses. These are zero-one dummy variables and are used to quantify the independent variables, X_9 , X_{10} , X_{11} , X_{12} , X_{13} , X_{14} , and X_{15} .⁴ If the response was negative to a question as it was written in the questionnaire it received a value of zero. The values were assigned as listed below:

X_9 = one if the farmer had a son over 14 living at home, zero otherwise.

X_{10} = one if the farmer had a part-time job, zero otherwise.

³ Scale of Education Value	Years of School Completed
0	None
1	1-4
2	5-7
3	8
4	9-11
5	12
6	13-15
7	16
8	Graduate

⁴According to W. G. Tomek, zero-one variables can be appropriately applied if the original observations can be divided into mutually exclusive groups and the effect of the differences is to change the level of the regression equation without changing the slope coefficient (11, pp. 814-822).

X_{11} = one if the farmer's wife had a part-time job, zero otherwise.

X_{12} = one if the farmer was a crop farmer, zero otherwise.

X_{13} = one if the farmer was a livestock farmer, zero otherwise.

X_{14} = one if the farmer was a livestock products farmer, zero otherwise.

X_{15} = one if the farmer had borrowed from PCA, zero otherwise.

From these variables the following model was formulated:

$$iAS = f(X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, X_{15})$$

i = short, long, general, and overall attitudes about credit.

A multiple regression was used to determine the relationship between the dependent and independent variables.

It was hypothesized a priori that farm size, educational level, sons over 14 living at home, and PCA borrowers were positively related to favorable credit attitudes. A one-tailed test was used to determine the significance of the independent variables. The null hypothesis stated that the beta coefficient was greater than or equal to zero. This was written as follows:

$$H_0: \beta_1 \geq 0$$

$$H_a: \beta_1 > 0$$

It was hypothesized that age and years in farming were negatively related to credit attitudes. Again a one-tailed test was used to test for significance. The null hypothesis stated that the beta coefficient was greater than or equal to zero. The alternate stated that the beta coefficient was less than zero. This was stated as follows:

$$H_0: \beta_1 \geq 0$$

$$H_a: \beta_1 < 0$$

It was hypothesized that the beta coefficient for farm type, husband working off the farm, wife working off the farm was not equal to zero. A two-tailed test was employed to test for significance because no a priori hypothesis was made for the sign of the independent variables. The null hypothesis was that the beta coefficient is equal to zero, and the alternate stated that it was not equal to zero. The hypothesis was written as follows:

$$H_0: \beta_i = 0$$

$$H_a: \beta_i \neq 0$$

CHAPTER IV

RESULTS

This chapter contains the results of the multiple regression problem as discussed in Chapter III. The results of the analysis are found in Table VIII and a discussion is found in the text of the chapter.

The Model

The four dependent variables were regressed in a stepwise manner against the eleven independent variables. Three of the four equations were statistically significant at the .05 probability level. The significant equations were short-term, long-term, and overall credit; general credit attitudes were not significant. None of the R^2 values from the regression equation exceeded 26 percent; however, they can be of some value in explaining the variation in farmers' credit attitudes. The standard errors ranged from a high of 5.85 for overall credit to a low of 2.34 for long-term credit attitudes. Few of the coefficients were statistically significant at the .05 level, and none of the coefficients was statistically significant in all equations.

Specific Variables

Farm size, X_5 . Farm size was significant as an independent variable for long-term credit attitudes; in all other cases it was not significant. In three of the four cases the coefficients for farm size was positive. However, farm size was negatively associated with

TABLE VIII
STEP WISE REGRESSION OF FACTORS AFFECTING FARMERS' CREDIT ATTITUDES

Dep. Var. ^b	Constant X_0	Regression Coefficients ^a										R^2	F Ratio
		Acres X_5^d	Educa- tion X_6	Age X_7	Years X_8	Sons Over 14 X_9	Part- time Farmer X_{10}	Wife Works X_{11}	Crop- Farmer X_{12}	Live- stock Farmer X_{13}	Livestock Products Farmer X_{14}	PCA Borrower X_{15}	
Short X_1	23.601	-.0002 (-.55) ^c	.2336 (1.59)	-.0022 (-.07)	.0148 (.40)	.7365 (1.36)	.5083 (.72)	.8525 (1.58)	-.2410 (-.36)	.2286 (.27)	-1.258 (-.33)	.3841 (.88)	.2096 2.96*** ^e
Long X_2	15.946	.0011 (2.54)	.1679 (1.19)	-.0178 (-.56)	.0230 (.68)	-.6626 (-1.27)	-.8050 (-1.18)	.2034 (.39)	.6299 (.99)	.1100 (.14)	.5713 (.50)	1.3602 (3.23)	.2545 3.82***
General X_3	33.015	.0007 (1.38)	.5565 (3.23)	.0451 (1.15)	.0439 (1.07)	.0772 (.12)	.0255 (.03)	.2788 (.44)	.6430 (.26)	-1.2660 (-1.29)	1.1055 (.79)	1.0498 (2.06)	.0950 1.17
Overall X_4	72.572	.0016 (1.45)	.9580 (2.70)	.0250 (.31)	.0529 (.62)	.1510 (.12)	-.2713 (-.16)	1.3346 (1.03)	1.0318 (.65)	-.9276 (-.46)	.4186 (.15)	2.7041 (2.65)	.1988 2.77***

^aRegression coefficients.

^bDependent variables identified in Chapter II.

^ct values in parenthesis.

^dt values for variables X_5 through X_9 and X_{15} are significant if they are 1.645 or above.

^et values for variables X_{10} through X_{14} are significant if they are 1.96 or above.

^fT test ratio for R^2 : *** = .01 significant.

short-term credit attitudes. It is interesting to note the significantly positive relationship between farm size and long-term credit attitudes and the common use of long-term credit to expand farm size. The coefficient of .0011 for X_5 for long-term credit attitudes indicate that a ten-acre change in farm size will result in a .01 unit change in the long-term attitude score.

Education, X_6 . Education proved to be relatively one of the most important variables tested in explaining the variation in credit attitudes. The coefficient for education (b_6) was significant for both general and overall attitudes but not for short or long-term credit attitudes. However, the coefficient in each equation was positive as hypothesized. The coefficient for general credit attitudes was .5565. For every unit change in education, as it was coded, there will be a .5565 change in general credit attitudes.

Age, X_7 . It was hypothesized that as farmers' ages increased there would be less need to use credit in their operations and their attitudes would become less favorable toward credit. However, farmer's age was not significantly associated with any of the attitude scores at the .05 level. Upon examination of the signs of the beta coefficients it was found that age was negatively associated with general and overall credit attitudes. It may be possible that these farmers do become more liberal in their credit attitudes but do not necessarily apply them to their own case.

Years in farming, X_5 . It was hypothesized that as the operator increased his years in farming, he would become less favorable in his attitudes toward credit. The fitted models indicated that this variable was not significantly related to attitude toward credit. Further, all of the signs for the beta coefficients were positive. Therefore it was concluded that years in farming was positively associated with favorable credit attitudes but not significantly so.

Sons over 14 living at home, X_9 . It was hypothesized a priori that farmers with sons over 14 living at home would be positively related to a favorable credit attitude. This hypothesis was made because it was felt that farmers with sons this age living at home would be expanding and improving their farms to make room for their sons in the operation. However, none of the beta coefficients was significant at the .05 confidence level. This implies at this confidence level the independent variable does not explain a significant amount of variation in any of the credit attitudes. Short-term, general, and overall credit attitudes were positively associated with sons over 14 living at home while long-term credit attitudes were negatively associated with this same variable. Part of the failure of this independent variable to explain a significant amount of the variation in credit attitudes may be from the fact that fewer and fewer boys are returning to the farm to assume a part of the farming operation.

Farmer working off the farm, X_{10} . It was hypothesized that farmers who had a job off the farm would be less favorable in their credit attitudes. It was felt that farmers who had a part-time job

would not be as likely to make investments in his farm or to farm on as large a scale as those without a part-time job. Upon examination of the t values and the signs of the beta coefficient we find that our hypothesis is not substantiated. None of the t values was significant at the .05 level. Long-term and overall credit attitudes were negatively related with farmers who had a part-time job, but these associations were not significant at the .05 level and they were inconsistent with the signs for short-term and credit in general. The differences in the signs may be partly explained by noting which attitude scores were positive. It is necessary for even a part-time farmer to use general and short-term credit for farming purposes. However, he might be more hesitant to use long-term credit to expand his operation when it might cause him to have to quit his off-the-farm job to devote full time to his expanding farming operation.

Wife working off the farm, X_{11} . It was hypothesized that farmers who had wives working off the farm would be negatively related to credit attitudes. This was not the case. All of the signs of beta are positive for each of the four attitude scores. However, none of the t values was significant at the .05 level. One can conclude that although this variable showed a consistency in its positive relationship with credit attitude it was not statistically significant.

Crop farmers, X_{12} . Farmers who received a major portion of their income from crops were negatively associated with favorable short-term credit attitudes and positively associated with favorable long-term, general, and overall credit attitudes. The null hypothesis

stated that the beta coefficient was not significantly different from zero. This hypothesis was not rejected in any of the cases. Overall, this variable showed little reliability in explaining the variation in farmers' credit attitudes.

Livestock farmers, X_{13} . It was hypothesized that farmers who receive the major portion of their income from livestock would not have a beta coefficient that was significantly different from zero. The null hypothesis was not rejected in any of the four cases. Although no hypothesis was made as to what specific sign the beta coefficient would have, it is interesting to note that short-term and long-term credit attitudes had positive signs while general and overall had negative signs. This variable could not be used to explain variation in farmers' credit attitudes at the .05 level of confidence.

Farmers Producing Livestock Products, X_{14} . Livestock products farmers showed little tendency to be an important variable in explaining any significant amount of variation in farmers' credit attitudes. The analysis indicated this variable was not significant in explaining the variation in farmers' credit attitudes at the .05 level of confidence. The signs of the beta coefficient were the same as those for crop farmers. Short-term credit attitudes were negatively associated with livestock products farmers while the other three attitude scores were positively associated with variable X_{14} . Other than the positive and negative relationships that this variable has toward credit attitudes, it shows little tendency to be able to explain the variation in farmers' credit attitudes.

PCA borrowers, X_{15} . Using a one-tailed test, the alternate hypothesis stated that PCA borrowers would be positively related to credit attitudes. In all four cases the farmers' credit attitudes retained a positive relationship with favorable credit attitudes. In three of the four cases the t value was significant and rejected the null hypothesis that the beta coefficient was not significantly different from zero. Only short-term credit attitudes were not significantly related to PCA borrowers. This variable had the second highest t score for farmers overall credit attitudes and was significant more often than any other independent variable. Therefore, this variable was thought to be more strongly associated with credit attitudes than any of the others.

Summary

Short-term, long-term, and overall credit attitudes all had overall equations that were significant when all eleven of the independent variables were considered. Farm size and PCA borrowers were significant variables for long-term credit attitudes. Education and PCA borrowers were significant for both general and overall credit attitudes. All of these variables that were significant were positively associated to favorable credit attitudes. Short-term credit attitudes were negatively associated with farm size, age, crop, and livestock product farmers. Favorable long-term credit attitudes were negatively associated with age, sons over 14 living at home, and farmers with part-time jobs. Being a livestock farmer was negatively associated with general credit attitudes. Farmers with jobs off the farm and livestock farmers tend to have negative attitudes toward credit.

PCA borrowers was the only independent variable that was significant three times. It was strongly associated with favorable credit attitudes. However, it was not possible to tell from the information collected if PCA had educated these borrowers to have this favorable credit attitudes or if the PCA just attracted this type of person to borrow money from them.

Education was the only other variable that was significant at least twice. It showed strong association with both general and overall credit attitudes. Its other two t scores were not significant at the .05 level but both were relatively high. This association was expected as other studies have found this same relationship.

Farm size was the only other variable that was significant for any one of the four dependent variables. It was positively related with farm size. This relationship is also one that can be logically associated together because of the need of long-term credit to expand farm size.

CHAPTER V

SUMMARY

The objectives of this study were: (1) to determine West Tennessee farmers' short-term, long-term, general, and overall credit attitudes, and (2) to compare the socio-economic characteristics of the farmer to his attitudes about credit.

The data were collected from a sample of 150 farmers in six counties of West Tennessee. A structured questionnaire with categorical questions was used to determine the farmers' credit attitudes and also to collect farmer and farm characteristics. The information was collected by personal interview.

Farm size was found to have increased from 1963 to 1967 by 58 acres. The tillable acres per farm were about 90 percent of the total acres. West Tennessee farmers in the sample area rented more land than they owned. Seventy percent of farmers sampled were crop farmers. The average age of the farmers sampled was 52 years and the average educational level was a completion of the tenth grade.

Of the farmers sampled 54 percent had short-term loans, 22 percent had long-term loans, and 19 percent had short and long-term loans. The bank and Production Credit Association were the two most frequently mentioned sources of short-term credit while the Federal Land Bank Association and the bank were the most frequently mentioned sources of long-term credit.

It was hypothesized that eleven independent variables would effect farmers' attitudes toward the various forms of credit. A multiple regression analysis was used to analyze the data to determine the relationship between farmers' credit attitudes and the eleven independent variables. One regression equation was developed for each of the four types of farmers' attitudes.

Of the four equations tested, three of them were found to be statistically significant. Short-term, long-term, and overall attitude equations were significant at the .05 level. The greatest amount of variation explained by any one of the equations was about 25 percent. This left 75 percent of the variation in long-term credit attitudes to be explained by other factors than those used in the regression. The regression explained 21 percent of the variation in short-term credit attitudes, 9.5 percent of the variation in general credit attitudes and 19.9 percent of the variation in overall credit attitudes.

Only a few of the eleven variables that were used in the regression were proven to be significant. Increasing farm size and Production Credit Association borrowers were found to be associated with favorable long-term credit attitudes. No individual independent variable was statistically significant for short-term credit attitudes. An association was found between West Tennessee farmers' attitudes toward credit in general and educational level of the farmer, and whether the farmer was a Production Credit Association borrower or not. The variation in the farmer's overall credit attitude was found to

be associated with educational level of the farmer and whether he was a Production Credit Association borrower or not.

Part of the eleven independent variables used in the regression equation were found to be positively associated with all four of the types of credit attitudes. Those that were positively associated were: educational level of the farmer, actual years the operator has been actively engaged in farming, the wife of the farmer having a part-time job, and the farmer being a Production Credit Association borrower.

The four equations that have resulted from the multiple regression have not explained a very large part of the variation of attitudes held toward the various forms of credit by West Tennessee farmers. However, the equations have shown which of the variables were able to explain the greatest amount of variation in farmers' attitude toward the various forms of credit.

The measurement of the dependent variables in the study proved difficult because of several limiting factors. In addition, these factors also point out that attitudes do not necessarily reflect actual behavior. Farmers who answered questions concerning credit attitudes experienced difficulty placing their attitudes in one of the five categories listed in the questionnaire. Also, farmers seemed to express credit attitudes that in some cases did not reflect their financial behavior. This could be the result of various factors that could be included in future studies. The farmer's wife may have a conflicting attitude that would alter the farmer's credit actions. In some cases the farmer may have a very favorable credit attitude,

but may not have a need for credit. In still other cases the farmer may have a poor credit rating that would limit his credit use. These are limitations of the study that should be considered in any ensuing study.

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APPENDIX

APPENDIX

DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY
THE UNIVERSITY OF TENNESSEE
ATTITUDES TOWARD THE USE OF CREDIT BY
FARMERS IN WEST TENNESSEE

1. Name _____

2. Address _____
(Route) (Town) (County)

Farm Characteristics

3. Size of Farm

a. Total acres in farm _____ acres

b. Total number of tillable acres _____ acres

1) Number owned _____ acres

2) Number rented _____ acres

c. Total number of tillable acres
farmed five years ago (1963) _____ acres

d. Was your total income from farming at least \$1,500 last year?
Yes _____ No _____

(IF NO, TERMINATE INTERVIEW.)

4. Type of Farm

a. Is most of your farm income from the sale of crops _____
livestock _____
livestock products _____

b. (IF CROPS) What are your principal crop acreages?

1) cotton _____ 3) corn _____ 5) wheat _____

2) soybeans _____ 4) vegetables _____ 6) other _____

c. (IF LIVESTOCK) What is the principal type of livestock?

1) beef _____ 2) hogs _____ 3) poultry _____

d. (IF LIVESTOCK PRODUCTS) What is the principal product?

1) milk _____ 2) eggs _____

5. Farm Operator Characteristics:

a. How many years have you been in farming? _____ years

b. Age _____

c. Did either you or your wife work off the farm as much as 100 days last year? Yes _____ No _____

(IF YES) Which one? Husband _____ Wife _____ Both _____

d. Have you any sons over 14 living at home? Yes _____ No _____

e. How many years of formal education did you (farm operator) complete?

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 G

6. Feelings About Credit:

a. Do most people around here use credit in one way or another? Yes _____ No _____

b. For those that do use credit, what types of credit do they most frequently use? _____

c. What is your feeling as to the wisdom of using credit?

7. Credit Facts and Fallacies:

(STRESS CORRECTNESS OF RESPONDENT'S ANSWERS!) The following questions are to be answered according to whether you agree or disagree and how strongly you feel about such agreement or disagreement.

- a. A good manager will use long term credit (over 7 years) to buy land if he feels he can increase his farm profits.

strongly agree	agree	un- certain	dis- agree	strongly disagree
☐	☐	☐	☐	☐

- b. The use of long term credit in your farming operations is necessary.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- c. The use of long term credit in your farm operations over the past ten years has increased rapidly.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- d. Farmers who use credit lose some of their freedom to make their own decisions.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- e. During the past ten years the lending agencies in this area have greatly improved the advertising of the services they have to offer farmers.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- f. It is easier for the average farmer to obtain long term credit now than it was ten years ago.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- g. An increased use of long term credit in West Tennessee would improve the income to farming to the area farmers and also help other business establishments.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- h. A lending agency needs to advertise to attract borrowers.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- i. Short (1 year) to intermediate term credit (2-7 years) is just as important as long term credit in your farming program.

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

- j. A farmer who is preparing to borrow money will check the cost of borrowing money from several sources before he chooses the agency from which he plans to borrow.
- k. Farmers who borrow money to put in their crops are not good managers.
- l. The credit agencies that supply money to farmers now provide all the credit farmers need.
- m. The importance of short and intermediate term credit has increased as a result of the shortage of labor that has taken place in West Tennessee agriculture.
- n. Short term credit is a very useful tool that farmers should find many uses for.
- o. The use of consumer credit for the purchase of household items is a sound financial practice.
- p. It is good financial practice for farmers to borrow money so they can make purchases in large volume, so they can receive a cash or volume discount.
- q. A good manager will use short term credit for operating expenses (such as fertilizer) if he feels he can increase his profit.
- r. A good manager will always let his implement dealer handle his carrying charges on purchased equipment instead of borrowing the money because no one else can give better terms than the implement dealer.

☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐☐ ☐ ☐ ☐ ☐

s. Bank's rates of interest on borrowed money are usually higher than the P.C.A. and the F.L.B.A.

☐ ☐ ☐ ☐ ☐

t. The Government should support credit agencies so that they can better supply credit to the farmer.

☐ ☐ ☐ ☐ ☐

u. A good farm manager will borrow money to buy land or put in his crops even if he has to mortgage some of his farm operation.

☐ ☐ ☐ ☐ ☐

v. Sometimes it is good business to borrow money for operating expenses even if you have the money available.

☐ ☐ ☐ ☐ ☐

w. The P.C.A. is one of the available credit institutions that offers farmers long term credit (over 7 years).

Agree	Uncertain	Disagree
☐	☐	☐

x. The F.L.B.A. is one of the available credit institutions that offers farmers both short and long term credit.

☐ ☐ ☐

y. The P.C.A. can make loans for less than a year up to a maximum of seven years.

☐ ☐ ☐

z. The F.L.B.A. can make loans for a minimum of five years up to a maximum of forty years.

☐ ☐ ☐

aa. The F.L.B.A. is government owned.

☐ ☐ ☐

bb. The P.C.A. is owned by both the farmers and the government.

☐ ☐ ☐

cc. The F.L.B.A. now charges the farmers 5% interest on all farm loans.

☐ ☐ ☐

- dd. The P.C.A. also charges the farmers 5% interest on borrowed money. ☐ ☐ ☐
- ee. Dyersburg is the location of the district office of the P.C.A. for your county. ☐ ☐ ☐
- ff. Jackson is the location of the district office of the F.L.B.A. for your county. ☐ ☐ ☐
- gg. Which of the following is most important in determining where you do your borrowing: _____
 1) the individual from which you borrowed
 2) the agency from which you borrowed
 3) the repayment plan
 4) the interest rate
- hh. Which is the next most important? _____
- ii. Which is least important? _____
- jj. Do you have a long term loan(s)? Yes _____ No _____
- kk. What source(s) did you borrow from? _____

- ll. What interest rate do you pay on the loan(s)? _____

- mm. Do you have a short term loan(s)? Yes _____ No _____
- nn. What source(s) did you borrow from? _____

- oo. What interest rate do you pay on the loan(s) ? _____

- pp. What sources of long term credit have you used in the last 5 years? _____

qq. What sources of short term credit have you used in the last 5 years? _____

rr. (IF P.C.A. NOT MENTIONED ABOVE) Have you ever borrowed from P.C.A.? Yes _____ No _____

Reasons for Discontinuing Use of P.C.A. Credit

Check

- _____ -1-Death of farm operator
- _____ -2-Farmer retired
- _____ -3-Sold farm
- _____ -4-Didn't need short term credit
- _____ -5-Interest rates higher than new source of credit
- _____ -6-Dissatisfied with P.C.A. service
- _____ -7-Found better repayment plan with new credit source
- _____ -8-New credit source closer to home than P.C.A. office
- _____ -9-Other _____

1. Do you expect to use P.C.A. credit in the next few years? Yes _____
No _____

2. Did P.C.A. supply to you the type of service you want from a credit agency? Yes _____ No _____. Why or why not? _____

3. Did you find all of the P.C.A. personnel helpful and friendly during your contact with P.C.A.? _____

4. Can P.C.A. make any improvements that would make it a more desirable place to borrow from? _____

VITA

Ralph William Barnett was born July 3, 1945, in Los Angeles, California, the son of Mr. and Mrs. R. W. Barnett. He was reared on a farm in Humboldt, Tennessee and graduated from Humboldt High School in May, 1963. In September, 1963, he entered The University of Tennessee at Martin as a student in the College of Agriculture, majoring in General Agriculture. He received his Bachelor of Science degree in Agriculture in June, 1967. He received the PCA Fellowship in Agricultural Economics, and began work toward a Master's degree. He is presently employed by Humboldt City Schools.

He is married to the former Lillie Martha Hunter of Brownsville, Tennessee, and has a son, Robert Hunter.