

AN ABSTRACT OF THE THESIS OF

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Title: AN EVALUATION OF FAMILY INCOME VARIATIONS ON
LOW-INCOME FARMS IN WESTERN OREGON

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The primary purpose of this thesis is to determine the economic nature of low incomes on low-income farms in western Oregon. An economic model containing variables that contribute to family income is developed for farm operators in the study area. Regression analysis is used to determine the significant variables contributing to family income variation. From the results of the regression analysis, an income function is derived for low-income farm families of western Oregon. An analysis of the variables included in the income function is presented, as well as a discussion of the variables that were determined not to be significant from the regression analysis.

It is concluded that insufficient farm size, inadequate capital for farm expansion, lack of training or skill, inefficient use of available resources, age of the operator, lack of formal education, and lack of mobility are the main causes of low incomes in the thirteen

northwestern counties of Oregon. The findings of this study tend to support other studies of a similar nature.

Finally, policy alternatives and recommendations are given. It is determined the avenues of assistance open to older low-income farm operators and those with less formal education are direct aid programs. The training necessary to obtain non-farm employment is the most feasible means for the younger, low-income farm operators. It is determined that there is a relatively small number of low-income farm operators in western Oregon with adequate resources to "farm their way out of poverty."

An Evaluation of Family Income
Variation on Low-Income Farms
in Western Oregon

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AN EVALUATION OF FAMILY INCOME VARIATION ON LOW-INCOME FARMS IN WESTERN OREGON

CHAPTER I.

INTRODUCTION

During this decade, Americans have become aware of persons not enjoying the benefits of their society. After assuming the Office of the Presidency in 1963, Lyndon B. Johnson made the welfare of the deprived people of this nation the principal domestic task of his administration (4, p. 27). Governmental and university research defining the causes and symptoms of underprivileged persons was initiated after Mr. Johnson's directive. An informed and cooperating Congress enabled the Johnson administration to institute and implement the Economic Opportunity Act of 1964, which created the Office of Economic Opportunity. Under the leadership of Sargent Shriver, the Office of Economic Opportunity administered such programs as the Neighborhood Youth Corps, Project Headstart, VISTA, and Community Action Planning (4). The scopes of these programs were to alleviate the symptoms and causes of poverty.

Professor Moynihan has stated, "poverty is not having enough money." This is the absolute character of poverty, not being able to provide the basic necessities of food, shelter, and clothing; but poverty has a relative aspect as well. Not having some of the material benefits the non-poor take for granted is a form of poverty.

Because the poor of today are in a better financial position than the poor of fifty years ago does not mean that today's poor are in a better relative position, for there is greater abundance in the country today than fifty years ago. "To be poor when everyone else is poor, is one thing. To be poor when others are affluent and confident of becoming more affluent, is quite a different matter." (16, p. 3).

City slums, where the poor are concentrated in a relatively small area, are usually thought to be the heartland of the deprived and underprivileged. However, forty percent of the thirty-four million Americans classified as poor in 1965 were rural residents (15, p. 3). Fourteen million rural Americans scattered throughout the country live in poverty. Of farm residents, those whose main source of income is from farming, four million are classified as poor (15, p. 3). Since ten million rural poor are not farm residents, the problem of rural poverty is mainly a rural non-farm problem (16, p. 21). Farm poverty has been exported for years. Persons leaving farm poverty situations generally move into rural non-farm or urban poverty situations (2, p. 72). No matter how unattractive the urban ghettos are, they hold more opportunities for the poor than do the "rural ghettos" (16, p. 3). This chain of poverty movement must be broken if there is any hope to combat poverty.

Objectives

The broad social objective is to alleviate poverty by providing the opportunity and incentive for the poor to find and hold higher income flows either in rural or urban areas.

The specific objectives of this thesis are: 1) to identify the economic nature of rural poverty in western Oregon, 2) to determine the efficiency of resource use on low-income farms in western Oregon, and 3) to offer alternatives and policy recommendations to assist the rural poor in western Oregon.

Procedures

To determine the nature of rural poverty in the area, an income function will be derived from the data collected. The income function will contain demographic and economic variables which are believed to contribute to a farm family's income. Regression analysis will be used to determine the significant variables which contribute to a farm family's income. From these results some understanding of the economic nature of rural poverty in western Oregon may be obtained. An examination of the correlation coefficients and their implications derived from the regression analysis will enable statements to be made as to the efficiency of resource use on farms in the survey. New and existing programs will be analyzed, and the feasibility of their implementation in the area will be discussed.

Oregon's Rural Poor

Rural poverty in the United States is a perpetuating phenomenon and knows no geographical boundaries. Oregon has a large number of people living in rural areas with low incomes from farm sales. Approximately seventy-five percent of the farms identified in the 1964 Census of Oregon Agriculture have gross farm incomes of less than \$10,000 per year. This would result in a major group of farm operators having disposable farm incomes of less than \$3000 per year, the popular figure for identifying situations of poverty. This group of Oregon farms includes many people with other sources of income: nonfarm work, retirement income, and income from other property; but the extent of this other income is not known for it is not reported in the census. This study is an attempt to move toward filling this void.

Holmes's Study

The data in this thesis were taken from a study of low-income farms in western Oregon conducted in 1962 by O. Wendell Holmes, Jr.¹(8). The Holmes study was initiated to determine the extent and causes of low incomes of rural people and appraise the opportunities to adjust the use of resource to increase the level of income of low-income farm families in western Oregon (8, p. 10). The similarity

¹ Economist, Economic Development Division, Economic Research Service, USDA.

of the purposes of the Holmes study and this thesis are readily noted. The approach taken to accomplish the objectives in this thesis are hoped to go beyond the Holmes study in specifying the nature of low farm incomes. As will be shown in Chapter II, the Holmes study provided an adequate description of the results, but it is the intent of this study to elucidate further on this description.

Description of the Study Area

The study area consisted of the thirteen northwestern counties of Oregon, and, with the exception of the Willamette Valley floor and small coastal beaches, the region is rolling foothills, rough mountainous or forest land (8, p. 11). A wide variety of soil types and a favorable climate within the area permit production of a wide variety of crops (8, p. 11). Cities in the area provide markets for the farm produce and are the chief sources of consumer goods and services for farm families and employment opportunities for part-time farmers.

Review of Literature

A review of the literature on rural poverty revealed some insights on employment and part-time farmers. Donald D. Steward found in his study of southeastern Ohio that underemployment of labor is the major factor contributing to the low-income situation of rural

persons (12, p. 3). Approximately twenty-seven percent of the 469 farms in the survey had 100-199 days of surplus labor. The result of this labor surplus was that one-fifth of all rural families in the study had a net family income of less than \$1000 in 1956, and one-fifth had incomes of \$1000-\$1999. Of all rural families surveyed, three-fourths of the net family income was derived from off-farm employment, one-tenth from farming, and one-seventh from nonlabor sources.

Extensive underemployment of labor and other resources results in large losses in the potential production of economic goods and services wanted by society. Resultant low incomes are associated with relatively low standards of living, creating both economic and social problems (12, p. 4).

It is because of these "economic and social problems" that the President's National Advisory Commission on Rural Poverty in its report, The People Left Behind, recommended swift and effective action against rural poverty (15, p. 11). The Commission gave six reasons which justified their recommendations (15, p. 11). They stated that justice and humanitarian interests were of prime concern, and the rural poor should have the opportunities to enjoy the benefits of social and economic progress (15, p. 11). Secondly, the migration of rural poor to the cities in an attempt to better themselves economically and socially must cease (15, p. 11). The Commission stated that the rural poor have been "shortchanged in public programs

designed to improve transportation, housing, education, health services, area development, and income maintenance" (15, p. 11). It was stated in the report that the public programs in existence at the time were shortsighted and were designed to glaze over the symptoms of poverty, mainly urban poverty (15, p. 11). "If economic and social conditions are greatly improved in our central cities without comparable improvement in rural areas, additional incentives will be created for migration to the cities" (15, p. 11). Therefore some of the special programs for the central cities may in reality complicate the very problems that are trying to be solved.

Another reason given for immediate action was the erosion of the small rural communities and villages into obsolescence (15, p. 12). These communities which at one time served as social and economic centers are not now meeting the needs of their people. In other words, the facilities of many communities are not adequate for the needs of the people to participate in a modern economy (15, p. 12). Another problem in the same vein is the depreciation of the voice of rural people in government and the outdated manner in which local government operates in rural communities.

Finally, the Commission states that the farm programs are "relics from an earlier era" (15, p. 13). The thinking behind the programs has been that rural people, young and old, should stay in rural communities, and the welfare of farm families is closely

associated with conditions on farms.

It cannot be emphasized too strongly that the poverty in rural areas is self-perpetuating. There will be little or no abatement and no real solution unless specific steps are taken to cope with it. Moreover, since the basic structure of rural America has been altered, the old programs are not sufficient for coping with problems of today. A new approach is clearly required (15, p. 13).

E. J. R. Booth, in a recent article in the American Journal of Agricultural Economics, proposed a list of priorities for new policies affecting rural America (3, p. 434). He suggested:

1) phasing out farm income support programs. The programs are extended and amended but never abandoned, according to Booth. He believes the income support programs are retrogressive and may encourage immobility rather than mobility for low-income farmers (3, p. 434).

2) strengthen production and marketing programs. Farmers need marketing control through the increased use of market orders and agreements and price stabilization programs.

3) poverty programs. Booth suggests an income supplement program, for he feels the goal of poverty programs should be "money for those who lack it" (3, p. 436). The income supplement would consist of the government paying a family a dollar for each dollar earned, up to a predetermined level, depending on family size. After the family earned more than the specified level, the supplement would be reduced to fifty cents for each dollar earned until the supple-

ments ceased at a predetermined earned income level. Income tax would not be levied on income earned or received below a specified level determined by the Internal Revenue Service, which would administer the programs. For those families with no employable household head, Booth suggests direct government payments with no incentive clauses (3, p. 436). A more detailed discussion of this program will be presented in Chapter V.

4) employment programs. It is suggested that "the best long-run employment program is free school education up to age eighteen" (3, p. 439). Retraining programs are beneficial if there are jobs available when the training is completed. For this reason, Booth believes that private industry is best suited to carry out retraining programs. He goes on to state that public works programs, in his opinion, do not work (3, p. 439).

5) rural urbanization and industrialization. In the article, the author recommends government aid to a few selected growing medium-sized cities, based on their growth potential rather than the needs of the area. "There will never be enough funds to provide growth towns for all the rural areas, and it is always better to do a few things well than a lot badly" (3, p. 440).

Organization of the Thesis

In Chapter II a description of the data obtained by Holmes is presented. The analytical model derived for this thesis and a dis-

cussion of the variables included in it are given in Chapter III. Also contained in Chapter III are the results obtained by regression analysis and the derivation of the income function. Chapter IV presents an economic discussion of the statistical results and the variables contained in the income function. Conclusions of the analysis and recommendations for future actions in the study area are given in Chapter V.

CHAPTER II. DESCRIPTION OF THE DATA

Sampling Procedure

The study area consisted of thirteen northwestern counties of Oregon, which includes the Willamette Valley, north coastal counties, and the lower Columbia River area. The sampling technique used by Holmes (8, p. 9) consisted of four sampling strata based on soil productivity; and within each soil region, area sampling techniques were used. Holmes (8, p. 9) limited the sample by eliminating operators that were sixty-five years of age or older, operators with more than \$10,000 annual gross farm sales, operators with more than \$4000 annual earnings in off-farm work. The Census of Agriculture was used to estimate the number of farms that qualified in each sampling strata to determine a preliminary sampling rate (8, p. 10). Randomly selected blocks in each strata were enumerated in order until the entire questionnaire was completed on 207 farms (8, p. 10).

Amounts and Sources of Family Income

The farm families in the survey derived their incomes from 1) their farming operation, 2) nonfarm employment, and 3) other sources such as rent, interest, welfare, etc. The average family in the survey had a family income of \$2708. Of this amount, \$580 was from nonwork income such as rent, interest, welfare, etc.; \$720

was derived from off-farm work; and \$1452 was farm income. These figures are very misleading, for the range of family incomes was -\$500 to +\$10,000. Sixty-four percent of the farm families in the survey had family incomes of \$3000 or less, thus meeting the frequent income definition of poverty.

Farm Income

Nearly sixty percent of the farmers in Oregon were located in the study area, but only fourteen percent of the farmland in the state was in the study area (8, p. 13). The level of living index for the region was only slightly below the average value of the state, even though the average value of farm product sales per farm was considerably lower for the study area as compared to the entire state (8, p. 13). Thirty-seven percent of the families in the survey had family incomes of \$3000 or less and listed farming as their only source of income. Approximately twelve percent of all operators in the sample indicated a net loss from their farm operations in 1961. Table I presents a breakdown of the net cash farm income of the respondents.² Nearly sixty-eight percent of operators in the

² Net cash farm income is defined as the receipts from sales of farm produced goods less cash production expenses without allowances for returns to labor or invested capital (8, p. 13).

Table I. Distribution of net cash farm income for study farms in northwestern Oregon, 1961.

<u>AMOUNT RECEIVED</u>	<u>NUMBER</u>	<u>PERCENT</u>
Net loss	25	12.1
\$0 - \$1000	68	33.0
\$1000 - \$1999	43	20.9
\$2000 - \$2999	32	15.5
\$3000 - \$3999	22	10.7
\$4000 - \$4999	10	4.9
\$5000 and over	<u>6</u>	<u>2.9</u>
TOTALS	206	100.0

sample indicated their net cash farm income for 1961 was similar to that of previous years. Two main reasons cited as a cause for fluctuation in net cash farm income by the remaining thirty-two percent were a variation in weather and fluctuation in prices paid and received (8, p. 13).

It appears that the farming operations of families classified as poor and reporting farm income as their only source of income are too small in size and intensity to adequately meet the needs of the family. In situations such as this, the mismanagement and/or under-employment of resources is a major contributing factor. Unless the farming operation is very intensive on these units, there is inevitably an excess of labor, inadequate capital, and limited management. Couple these shortcomings with an insufficient amount of land, and

the result is rural farm poverty.

Nonfarm Income

The employment alternatives for the rural farm poor are limited. The Holmes study (8, p. 15) disclosed that less than half of the households received any income from nonfarm work sources (refer to Table II). The data also revealed that seventy percent of the farm operators with no off-farm employment had family incomes of \$3000 or less. Households with income from nonfarm work indicated it was less than \$2000 per year per household (8, p. 16). The sources of nonfarm work income varied, and few male household heads had any nonfarm training (8, p. 15).

Table II. Nonfarm earnings by household heads for study farms in northwestern Oregon, 1961.

<u>INCOME REPORTED</u>	<u>NUMBER REPORTING</u>	<u>PERCENT</u>
No nonfarm earnings	137	66.5
\$100 - \$ 999	14	6.8
\$1000 - \$1999	27	13.1
\$2000 - \$2999	7	3.4
\$3000 - \$3999	18	8.7
\$4000	3	1.5
TOTALS	<u>206</u>	<u>100.0</u>

Households in the study area reported that nonwork income, such as rent and interest, contributed very little to their family

incomes. Forty-seven percent of the households reported some type of nonwork income, but only thirteen percent of those classified as poor had any nonwork income.

Family Characteristics

There was an average of 3.1 persons per household in the sample (8, p. 19). The typical household head was over fifty years old and had less than ten years of formal schooling. His major activity was farming; however, ten percent of the household heads did not consider operating their farm as their major activity (8, p. 21). Though a few of the wives and children were employed off the farm, the principle activity of the household head, his wife, and children was the operation of their farming unit (8, p. 21).

Present Skills and Training Potential

Approximately seventy-five percent of the household heads and their wives had received no training for nonfarm work (8, p. 24). The training of the majority of the remaining twenty-five percent was on-the-job training as a laborer or in an agricultural job; however, a few had training for professional work (8, p. 24). The most frequent special training for sixty-seven percent of the wives was for teaching school, clerical, and secretarial work (8, p. 24). Fifty percent of the respondents reporting some form of nonfarm skills

indicated it had been at least ten years since they had any experience in nonfarm work (8, p. 25).

The majority of farmers had lived on their farms for some time and had received little training for skilled nonfarm work (8, p. 23). A small number of them had acquired skills, but no recent experience (8, p. 25). Even though most of the household heads reported they were in good health (8, p. 24), their age and lack of education make it difficult for them to obtain nonfarm jobs.

Farming Potential

The size of farm operated ranged from two acres to nearly seventeen hundred acres, but sixty-one percent of the respondents operated less than 100 acres (8, p. 26). The average farm operation consisted of 54 acres of crop land, 22 acres of range land, and 24 acres of wood land. Only seventeen percent of the farm operators reported irrigating any land, and fifty percent of these farm irrigated less than 20 acres (8, p. 26).

Due to the unavailability of feedgrains in the area, livestock production was a minor source of farm income. The average farm had eight head of dairy cattle, eight head of beef cattle, and eight head of sheep. The typical farm operation in the study area could be described as a general one. As stated earlier in this chapter and noted by Holmes (8, p. 27), the majority of farms were not of

sufficient size to provide full-time employment for the operator, unless they were farmed very intensively. The potential for enlarging farm operations and/or improving the productivity of individual farms did exist at the time the study was conducted. The limiting criterion to improvement of production or enlargement of the farm operation was the availability of capital to the individual operator. Over sixty percent of the respondents reported expenditures of over \$200 in the past three years for equipment, buildings, fences, repairs, or breeding stock (8, p. 28), with an average of almost \$1200 per farm for the three year period. Considering the limited potential for farmers to take nonfarm jobs, only very limited farm enlargement could occur as older farmers retire and rent or sell their farms to other operators (8, p. 29).

Attitudes

The majority of farm operators surveyed liked their present residence and had no intension of relocating (8, p. 31). The only changes respondents felt were needed in their areas were an improvement in the market facilities and more nonfarm employment opportunities (8, p. 33). Other services such as schools, churches, hospitals, roads, and shopping areas were believed to be adequate (8, p. 33). In other words, the farm operators "liked their communities the way they were" and could see no reason to change them.

Here is another factor, the farmer's attitude, which adds to a farm operator's immobility and "locks" him and his family into a given area.

CHAPTER III. DEVELOPMENT OF THE ANALYTICAL MODEL

A review of the literature on rural poverty disclosed limited information on income functions or other quantitative studies. There does exist a considerable controversy concerning the personal distribution of income. Personal distribution of income is defined as the share each individual or family receives of the total national income (1, p. 1). Friedman believes there is no economic theory for making normative statements about income distribution among members of a community or society (6, p. 226). This is a major gap in modern economic theory, according to Friedman (6, p. 226).

Our society is concerned with personal income distribution because of social values and objectives associated with economic justice (1, p. 3). In this respect, neoclassical economists refined the Ricardian functional theory of income distribution to what is known today as the marginal productivity theory of distribution, "which says that returns to a resource depend upon the price of the product, the productivity of the resource, and the quantity of the resource used in production" (1, p. 4). From this it can be asserted that personal income distribution, based on a given resource endowment, is no more than a subset of functional income distribution or marginal productivity theory. However, through the years the theory became more specialized and tended toward economic efficiency of

price and resource use rather than toward justice of personal income distribution (1, p. 4).

The income function will serve as a point of departure for determining the personal distribution of income. The income function will not determine the distribution of income among members of a community; but just as an entrepreneur's production function relates the quantity of variable inputs employed and the quantity of output produced (7, p. 44), an individual income function relates the quantity of skills employed and a given ownership of resources with the amount of income generated. An individual family's income function would be similar to the following: family income = f (age of household head, education of household head, amount of capital invested, and number of days worked). The above income function assumes the household head is the only individual directly contributing to the family's income.

It must be recognized there are many variables in a family's income function that are not quantifiable. The sociological implications concerning the values toward "living in the country" as compared to a city are certainly a part of these unmeasurable variables. Other sociological variables which are difficult to quantify are the parents' agrarian attitudes toward hard work, distrust of public officials and public assistance, the cultural tendencies of rural people to remain in the community close to their relatives, and lack

of desire for education (11, p. 2). If a child's parents hold these values, the probability the child will also hold the same values is very high. The sociological variables mentioned will not hold for every situation, but in various studies by the Economic Research Service they have been identified and do exist in the majority of regions throughout the United States (14).

The Analytical Model

The mathematical model selected to explain variations of incomes on low-income farms in western Oregon was $y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \epsilon$. Defining the terms in model:

y = the amount of family income = net farm income + non-farm income of the operator.

β_0 = the amount of family income generated by other members of the household, the intercept.

β_i = regression coefficient which relates the amount of family income to X_i .

X_1 = number of days of off-farm work performed by the household head.

X_2 = percent ownership of land operated.

X_3 = number of acres of crop land.

X_4 = number of acres of range and pasture land.

X_5 = number of acres of wood land.

X_6 = number of head of dairy cattle.

X_7 = number of head of beef cattle.

X_8 = number of head of sheep.

X_9 = number of years of education of the household head.

X_{10} = amount invested on specific items, such as equipment and repairs, over the past three years.

X_{11} = age of the household head.

X_{12} = amount of nonwork income such as interest, rent, and dividends received by the household.

ϵ = the sum of squares of the vertical deviations of the observed data from the regression line. In ϵ is grouped all that cannot be accounted for otherwise.

Discussion of the Variables Included in the Model

Age, education, and attitudes of low-income farm operators in northwestern Oregon definitely handicap them and their families in their ability to improve the material aspects of their lives. These three variables affect and determine the individual's motivation. Basically, man's desires are insatiable in the long-run (9, p. 3), and he is usually striving to better his position relative to other men. Once the desire for the basic necessities of food, shelter, and clothing has been met, the individual seeks the requisites for "the good life" as set forth by some mysterious and mythical force - society. The individual is then "scored" according to the level of his consumption of these predetermined "good" objects. The rating of his level of consumption provides this person with a certain status in

society.

The criterion most often used to rate an individual's status in our economy is per capita income. Persons with a per capita income that is high enough are said to have a "satisfactory" level of living.³ If the level is below the "satisfactory" index, those persons are said to be deprived and underprivileged and deserve a chance to improve their living standards. It is in this vein that the concepts of poverty and affluence have been molded. The discussion that follows centers around factors that contribute to per capita income on low-income farms in western Oregon.

The amount of income generated by an individual is determined by the resources, natural and human, he possesses and the efficiency with which he uses those resources. Here are additional criteria, the quantity and quality of resources possessed and the efficiency of resource use, which relate to the rating of an individual's status in the economy. An individual who utilizes the resources available to him efficiently can be expected to generate a higher income than a person who does not apply his resources in an efficient manner.

The primary resources possessed by farm operators in western Oregon are labor, land, and capital. Each of these will be considered in turn. The amount of income that is the result of a

³ Satisfactory level of living is a nebulous term and changes as human wants and desires change. The term must be considered in a relative time context.

person's labor varies according to the skills an individual possesses and his use of those skills. The skills, or quality of labor, an individual has are dependent on the training and education received by that person, as well as his endowment of natural abilities. In other words, the higher degree of skill an individual possesses, usually the higher income he will receive for using his skill.

A factor which is related to the quality of labor, but very difficult to measure, is the attitude of the individual and his family regarding work, the work-leisure choice. Work-leisure choice is a time concept which implies that during a given time period an individual can either work or not. Work is defined as that activity associated with earning an income, and leisure is that activity not associated with earning an income. It should be noted that some forms of leisure involve physical exertion and do contribute to the amount of income in some manner, such as a vegetable garden. These forms of leisure are usually disregarded in the work-leisure choice concept. In order to determine the attitude of an individual regarding work it would be necessary to derive his work-leisure utility function. This was beyond the objectives of this research project, but it is mentioned because there is a direct relationship between the amount of family income and the family's value system.

The number of acres of crop and pasture land and the number of head of livestock are primary sources of farm income and would

be expected to have a positive relationship with family income.⁴ The quality of land determines the quantity of land needed to provide an adequate family income. For example, 50 acres of Class I land may produce enough to generate an adequate income, while 150 acres of Class III land may not produce enough to provide an adequate income. The intensity of land use affects family income. Suppose a farm operator uses 50 acres of Class I land for grazing sheep instead of raising strawberries. He is using the land extensively and foregoing income. Management of natural resources such as land is a major factor in determining family income.

Closely related to the quantity of land needed to provide an adequate income is the percent ownership of lands operated. It follows that an owner-operator receives more farm income than a tenant-operator from the same acreage, even though the owner-operator has more expenses. Pride of ownership is an unquantifiable variable, but the owner-operator generally has more motivation than the tenant-operator because the owner-operator has more to gain. Thus percent ownership of land would be expected to have a direct relationship with the amount of family income.⁵

⁴ There does exist the possibility of having too much of one resource, land, and exhausting the amount of labor, capital, and management needed to obtain optimal production from the land.

⁵ This analogy has assumed the owner-operator and the tennant possessed an equal amount of resources and used them in an optimal manner.

Capital investment on specific items such as equipment and buildings relates the amount of improvement in the operation to the amount of family income. The amount of return on the capital investment is a measure of the progressiveness of the operator and would be expected to have a positive relationship with family income. Capital may be a function of time and considering a longer time period would probably give a more exact measure of the progressiveness of the operator and an indication of his intention to continue farming. Labor, land, and capital combine to generate income and wealth, but other factors also have a direct bearing on income.

Education of the household head is one of these factors. Presumably, the more education an individual possesses, the better equipped he is to handle a more responsible position and thus earn a better income. Therefore, education would be expected to have a positive effect on family income. Another indiscrete factor affecting family income is the age of the farm operator. One would expect to find a positive relationship between age and income during the peak earning years of the operator. Up to and beyond the range of the optimal earning years one might anticipate a negative relationship.

The preceding discussion of the factors believed to be affecting and contributing to family income on low-income farms in western Oregon lays the groundwork for a more formal analysis on the determinants of family income. Before entering into the analysis and

discussion of the analytical model, it is necessary to list the assumptions and limitations of regression analysis, the method used to analyze the variables contributing to family income.

Assumptions and Limitations of Regression Analysis

The basic assumptions underlying regression analysis are 1) the error terms have the same variance irrespective of the values of the independent variables; 2) the error terms are uncorrelated from one observation to another; 3) the independent variables are measured without error; and 4) the error terms are normally distributed for purposes of testing hypotheses (5, p. 17). Regression analysis can be restrictive, so one must realize its limitations. The basic purposes of regression analysis are to describe and predict. When using a model to predict, one must be careful not to go beyond the range of the X values in the data (5, p. 6). When the model is used to describe a situation, it should be kept in mind that the implications from the results of the model refer only to the area or sample under analysis (5, p. 6). For instance, the model to be developed in this thesis is based on data collected from the thirteen northwestern counties in Oregon, and any generalization of the results to a larger population could well be inaccurate.

Discussion of the Regression Equation

The results obtained from the analytical model were not anticipated. The correlation coefficients, presented in Table III, measure the linear relationship between the independent, X_i , and dependent, y , variables (5, p. 59). Only one variable, X_{12} - the amount

Table III. Simple correlation coefficients

<u>VARIABLE</u>	<u>COEFFICIENT</u>
X_1 versus y	+0.17
X_2 versus y	-0.05
X_3 versus y	-0.005
X_4 versus y	-0.03
X_5 versus y	-0.01
X_6 versus y	-0.09
X_7 versus y	+0.01
X_8 versus y	-0.02
X_9 versus y	+0.02
X_{10} versus y	+0.16
X_{11} versus y	+0.05
X_{12} versus y	+0.76

of nonwork income received by the household, with an $r = .76$ had a

high degree of linear relationship with the amount of family income. The variability in income explained by most of the remaining variables approached zero; only X_1 , the number of days of off-farm work performed by the household head, and X_{10} , the amount invested on specific items over the past three years, did not.

It was rather surprising to see the primary sources of farm income, land and livestock, have either small positive or negative correlation coefficients. This is saying, in essence, the variation of family income on low-income farms in western Oregon is not affected by the farming operation. An examination of the regression analysis should reveal additional information.

The coefficient of determination, R^2 , measures the amount of variation in the dependent variable which is accounted for by the linear relationship between the dependent and independent variables. Table IV presents the results of the regression analysis.

The most significant variable in the regression equation was the amount of nonwork income received by the household. This variable explained 58.5 percent of the variation in family income. The remaining eleven variables only added 4.7 percent to the explanation of variation in income, bringing the final R^2 value to 63.2 percent. The variables contributing to farm income, land and livestock, explained 0.2 percent of family income variation accounted for by the linear relationship between X_i and y and were not of significance

Table IV. Results of the multiple stepwise linear regression.

<u>STEP NO.</u>	<u>VARIABLE ENTERING</u>	<u>F-LEVEL</u>	<u>STANDARD ERROR OF Y*</u>	<u>R²</u>
1	12	180.16	1611.95	.585
2	1	10.21	1556.92	.616
3	10	3.13	1544.00	.625
4	11	1.47	1541.16	.629
5	9	0.28	1545.59	.630
6	7	0.23	1550.42	.631
7	3	0.16	1555.75	.631
8	2	0.10	1561.56	.632
9	4	0.07	1567.63	.632
10	5	0.02	1574.07	.632
11	8	0.001	1580.72	.632
12	6	0.001	1587.46	.632

* The standard error of y measures the variation of the dependent variable at each step that has not been explained by the independent variables already in the regression equation (5, p. 61). When the true model has been fitted, the standard error of y is an estimate of the variance of y (5, p. 61).

in the regression equation. Again these results support the hypothesis that farming operations on low-income farms in western Oregon contribute very little to family income.

The question that now arises is how many independent variables that entered the regression equation are of significance in determining the amount of family income? The partial F-test⁶, the trend of the standard error of y, and the R^2 value were the criteria used to make this determination. The tabular F, $F_{(1, 120).05} = 3.92$, would indicate only two variables of the twelve, X_{12} and X_1 with calculated $F = 180.16$ and 10.21 respectively, would be included in the model. However, the calculated F level of X_{10} at 3.13 is very close to the tabular F, and there is a significant decrease in the standard error of y when X_{10} is included in the model.

Referring to Table IV, it can be seen that X_{11} entering in step four is a "marginal" variable. There is a decrease in the standard error of y at this step, but the calculated F is 1.47 , far below the tabular F value at 3.92 , and the R^2 value increases only a small amount. It does not seem that including X_{11} , age of household head, in the fitted model aids in explaining the variation in family income. Therefore, the variables included in the fitted model are 1) the

⁶ The partial F-test measures the significance at each step, given that the variable from the previous step is included in the equation (5, p. 71).

amount of nonwork income received by the household, X_{12} ; 2) the number of days of off-farm work performed by the household head, X_1 ; and 3) the amount of investment on specific items over the past three years, X_{10} . The fitted model derived by regression analysis to explain the variation in family income is $y = 1654.73 + 6.87X_1 + 13.33X_{10} + 1.01X_{12}$. This model will be accepted for the purposes of this study. The model explains 62.5 percent of the variation in family income which is accounted for by the linear relationship between family income and the three independent variables.

It is now possible to determine an income function for farm families in the survey. Family income on low-income farms in western Oregon is a function of the amount of nonwork income received by the household, the number of days of off-farm work performed by the household head, and the amount of investment on specific items over the past three years.

CHAPTER IV. ANALYSIS OF THE PROBLEM

The income function derived for low-income farm families in western Oregon contains variables which reflect the alternatives and opportunities available to these people. The sources of income available to these farm families are varied, as shown in the statistical model developed for the study area. However, the question of the importance of the farming operation and its contribution to family income continues to remain unresolved. An examination of the economic aspects of the statistical model may reveal further information.

Economic Interpretation of the Statistical Results

Regression analysis yielded the statistical model: $y = 1654.73 + 6.87X_1 + 13.33X_{10} + 1.01X_{12}$. β_0 , 1654.73, is the amount of family income contributed by other members of the household as well as the amount not accounted for by the variables in the model. Thus income from the farming operation is included in this figure since factors contributing to farm income were not of significance in explaining the variation of family income.⁷ β_1 , 6.87, is the coefficient of the number of days of off-farm work performed by the household head and is interpreted as the average daily wage of the laborer.

⁷ This was explained in Chapter III by the criteria determining the variables that would be included in the fitted model.

The wage rate is very low due to the type of industry in the area. Basically, the type of employment required in these industries is unskilled labor, and many farmers are employed as part-time help as indicated by the number of farm operators who have nonfarm work.

The coefficient of the amount invested on specific items over the past three years, β_{10} , implies that for every \$100 spent on equipment or other improvements, there is an expected increase in gross family income of \$1333.00, which indicates a very high return to capital. β_{12} indicates that the amount of family income is increased by the amount of nonwork income received by the household since it is approximately one.

The opportunity cost of farm operators in the study area without a nonfarm job and nonwork income is very low, as indicated by β_0 . Farm income is the only source of income for these farm families, unless other household members hold nonfarm jobs. Even farm operators with off-farm employment have a limited opportunity cost because the average daily wage is so low. The amount of education and training, age, and the lack of mobility of the household head are major factors contributing to low opportunity costs.

Farm operators in the survey made substantial capital expenditures on equipment and other improvements for their farming operation. The majority of large investments were by families with in-

comes above the poverty level. However, a substantial number of farm operators with \$3000 or less family income made large investments in equipment and improvements. The major portion of these investments were by farm operators who worked off the farm 100 days or more during the year. It would seem that in an attempt to handle dual occupations these farm operators were substituting capital for labor and mechanizing their farming operations. Investments by farmers with no off-farm employment and incomes of less than \$3000 were of a smaller magnitude and consisted mainly of repairs on equipment. The economic reasoning behind the decisions to spend money on equipment and improvements for the farming operation of families with incomes below the poverty line should be questioned.

The amount of nonwork income, such as rent and interest, received by the household was the most significant variable in the regression equation. However, as stated in Chapter II, only thirteen percent of the farm operators classified as poor reported nonwork income. It would follow that since these farm families did not have a sufficient income to break the poverty line, they would not have enough income after purchasing consumption goods to invest or save. In other words, their consumption functions were such that their marginal propensity to consume was approaching one.

Family income was defined as net farm income plus nonfarm

income received by the household. It is possible there were two income functions per family instead of the one income function hypothesized. Farm income would be a function of the variables that contributed to it, such as acres of crop land, head of livestock, age of the operator, education of the operator, amount of labor available, capital investment in the farm, and management ability of the operator. There would also be an income function for nonfarm income. It would be determined by number of days worked off the farm, skills possessed, age, education, and investments in income producing property. There is some overlapping of the variables in the functions, and there are some interrelationships. For example, the size of the farm and intensity of its operation determine the amount of labor required for the farm. The amount of labor required on the farm determines the amount of labor available for nonfarm work.

However, the important point is that a variable may be significant in one of the functions, but when the functions are combined into a family income function, this same variable may not be significant. For example, in other studies education has been shown to be a significant variable in obtaining off-farm employment. It is possible that the level of formal education would not be as significant in determining the level of farm income. This is a plausible explanation why the amount of education was not a significant variable in the regression equation in this study. The percent ownership of land

operated would probably be important in the farm income function, but when included in the family income function it may not be of significance.

The limited livestock enterprises on the majority of farms in the survey would explain why they were not significant in the regression equation. The lack of livestock would also explain the reason the number of acres of range and pasture land was of no significance in determining the variation in family income in the survey. It is difficult to ascertain why the number of acres of crop land was not one of the main determinants of family income, since farm income accounted for more than fifty percent of family income. The number of acres of crop land would probably be a significant variable in the farm income function, but in the family income function it was not significant. Perhaps the lack of sufficient acreage would serve as an explanation.

CHAPTER V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Persons included in the survey were farm operators with farm incomes of \$10,000 or less, no more than 65 years old, with no more than 200 days of off-farm employment and with less than \$4000 earnings from nonfarm work. It was determined that rural farm poverty⁸ existed in western Oregon on sixty-five percent of the family farms surveyed. The income function derived in Chapter III revealed the main determinants of a farm family's income variation to be nonwork income received by the household, off-farm employment by the household head, and investment in equipment and other farm improvements. Approximately sixty-three percent of the variation in family income for low-income farms in western Oregon was accounted for by these variables, refer to Table IV. Even though farm income made up over half of family income, the factors contributing to farm income accounted for only one percent of the variation in family income. Seventy percent of farm families in the study area with no off-farm employment by the household head and eighty-seven percent with no nonwork income received by the household had family incomes of \$3000 or less.

⁸ Rural farm poverty is defined as those families receiving \$3000 or less income from all sources with farming as the main source of income.

Causes of Low Family Incomes in Western Oregon

Farm Potential and Size

The average farm size in the study area was approximately 100 acres. The potential for expanding the farming operation was limited to the type of land, the amount of land available for rent or sale, and the availability of capital. Many of the areas in the thirteen northwestern counties of Oregon consist of rolling foothills with land unsuitable for a profitable farming operation. The amount of land available for farming is rather fixed, and unless someone retires or quits farming, additional land is not available. The probability of low-income farm operators obtaining capital for farm expansion is very low because of their limited income potential and repayment ability.⁹ Thus, farm operators in the survey had insufficient potential to increase their farming operation.

The foregoing argument was based on the assumption that the size of the farming unit was too small to provide an adequate family income. The assumption would appear to be valid since seventy percent of the farm operators had no off-farm employment and income of less than \$3000. From this it can also be seen that there is an underemployment of the labor resource on the poverty level farms. Unless the farming operation is very intensive on these units, the

⁹ This is assuming the capital is borrowed and not internally derived.

labor supply of the household head is greater than the operation demands.

Age

The age of the farm operator may explain why his labor is underemployed. The average age of the respondent was fifty years, and sixty-five percent were over forty years of age. Farm operators who are over forty-five years old have less of a chance to make either internal or external adjustments to increase their incomes than young farmers. Also the labor represented by children is leaving home at this time if not already, and farmers start scaling down their operations. Motivation and desire often give way to a more leisurely attitude when operators reach a certain age. The older farm operator sacrifices employment opportunities, on and off the farm, because he does not care to work as hard as he once did.

Many farmers in western Oregon can obtain only unskilled employment without additional training. The skills possessed, based on the present type of work and experience, are important when these people consider acquiring non farm jobs. Even though the number of skilled, professional, and technical job opportunities has been increasing, the number of farm operators capable of filling any but unskilled positions is limited due to the number of years of education and age. A high school education is required in all but unskilled jobs, and the applicant usually must be forty years of age

or less.

Education

It has been shown in numerous studies that the amount of income is directly related to the level of education. Tweeten (13, p. 33) states in his article that in the short-run the level of education has a small effect on income. However, in the long-run after an education has been attained, the level of income is dependent on the number of years of education (13, p. 33). The earning potential of farm operators in the survey is severely handicapped by their educational level. The average educational attainment was approximately ten years, but one-third had less than an eighth grade education.

Attitudes

The goals and values of low-income farm families aid in explaining why the underlying causes of rural poverty exist. One factor affecting the success or failure of an individual, and hence his willingness to make adjustments, is the satisfaction with his present status. Ninety-eight percent of the farm operators in western Oregon indicated no desire to relocate in another area. If an individual has limited knowledge of agricultural and economic conditions in other areas, it is more difficult for him to make adjustments. Some people prefer to remain in their home area rather than venture out into the unknown where there is increased risk and uncertainty for

them. Therefore, a change in jobs or locations is undesirable.

Summary

Future economic growth and the development of rural resources in any area depends partially on the future plans of the residents. Proposed changes in the method of operation and the size of the farming unit indicate what can be expected from an area in terms of economic stability and growth. As has been shown, the farm operators in the study area are limited in the expansion and mode of operation of their farms because of the fixed supply of land, unavailability of capital, inefficient use of labor, and the age of the operator. The ability of rural farm residents in western Oregon to acquire off-farm employment is limited because of their age, education, lack of training or skill, and lack of mobility.¹⁰

The future growth of any low-income area is dependent on the young people of the area to break the "poverty cycle." Young people must be equipped with the tools to break the cycle, for these are deficiencies their parents possessed. The tools young people need are value reformulations in order to compete in the modern economy.

¹⁰ This is similar to the two income function analysis presented earlier, and may be more applicable for this study than the one income function analysis.

Recommendations

The value system and goals of the individual and his family contribute most significantly to their idea of their place in society. Our modern culture is one with humanitarian interests, possibly because we are affluent enough to afford it. That deprived and underprivileged persons deserve a chance and should be helped is the common attitude. However, many rural poor people do not in essence belong to our modern culture of interdependency. They live in a culture of freedom and independency. The idea that the rural environment and quality of rural life is better than a city or urban environment stems from this cultural inheritance. In many instances, income is foregone in order to retain this rural life.

The President's National Advisory Commission on Rural Poverty (15, pp. 17, 22, 41, 59) expressed the goals for rural areas as follows:

- 1) quality of opportunity with all other citizens for rural America. This must include equal access to jobs, medical care, housing, education, welfare, and all other public services, without regard to race, religion, or place of residence.
- 2) full employment.
- 3) adequate food, shelter, clothing, medical care, and education.
- 4) an adequate income.

The goals of the poverty commission seem rather idealistic and ambitious. It must be kept in mind that the problem of low incomes for the farm sector of rural people is concentrated where farms are small, there are poor natural resources, few capital resources, low quality human resources, or a combination of these factors. The possibility of reaching these goals is very slim.

Historically, the policy goals of the farm programs for the past forty years have been directed towards helping the small farmer. The results have been far from successful. An examination of the decline in the farm population from approximately twenty-five million in 1930 to about seven million at the present substantiates this. Benefits of the farm programs usually go to larger farmers who produce the most, earn the highest incomes, and hold the most physical assets.

In a series of pamphlets published by the Agricultural Policy Institute, McMurtry (10) concludes that very few low-income farmers can "farm their way out of poverty." New programs would have to be established in order to assist these small low-income farmers. The best alternatives to provide additional resources to this group are long-term, low-interest loans for land purchase and consolidation, and special funds earmarked for training and education in farm management practices (10). There are approximately twelve percent of the low-income farmers in western Oregon that would have

a chance to "farm their way out of poverty" if these programs were enacted. These farm operators have the resource base available to them to continue and expand their farm operations. The Cooperative Extension Service, with its farm management and improvement programs, could be of great assistance to these farm operators. The main drawbacks to programs of this nature are the costs of administering them and the social and economic controversy associated with them.

A more realistic approach to assist low-income farm operators is to increase or make available nonfarm opportunities. A lack of information and fear of failure are common reasons given by many rural poor as to why they do not actively seek off-farm employment. Nonfarm employment opportunities in Salem, Albany, Corvallis, Eugene, and Portland do exist and are within commuting distance for a large share of the rural poor in the study area. Education, training, and placement programs would be needed to provide some of these farmers with the skills necessary to compete in the labor market. Programs of this nature are in existence, but efforts need to be strengthened so that rural people will more fully understand and trust them.

The possibility of attracting new industries into a low-income rural area is given as a means of increasing nonfarm opportunities for the rural poor. However, most low-income rural areas lack

the human, capital, and natural resources necessary to accommodate a new industry, and western Oregon is no exception. The small towns in these low-income rural areas will continue their recession into oblivion until the residents of the community acquire enough income to increase the money flow. The Nixon Administration has proposed a subsidy payment or tax relief to industries locating in low-income rural areas. But the most feasible alternative for the young low-income farmer in western Oregon is to obtain the education and training necessary to acquire the skills needed in nonfarm employment.

The most disadvantaged group of rural poor people are the older citizens, those with relatively less formal education and non-farm skills, and those in isolated communities. These people also lack many services, such as health and welfare, in many instances due to the locale or inadequacies of their community. Approximately forty percent of the rural poor in the study area meet the above criteria. The avenues of assistance available to this group are direct aid programs. Existing and proposed programs of this nature consist of an operator's voluntary early retirement, food stamps, direct food distribution, and direct income subsidies (10).

The voluntary early retirement program requires the participant to own his farm. The owner would receive payments for placing his whole farm in an acreage retirement program. He

could continue to live on the farm and produce for home consumption only, not for commercial sale. Cash payments would be received until the operator was eligible for social security (10). This program could be used feasibly in western Oregon since a major share of the farm families with less than \$3000 income and the household head over fifty-five years of age did own their farms. The implementation, acceptance, and participation in such a program are quite a different matter.

The food stamp and direct food distribution programs are successful programs in existence in many areas of the country. Inadequate facilities in some rural areas make these programs very difficult to administer. However, they do provide low-income farm families with a substantial diet (10).

The most controversial of the direct aid programs is the direct income subsidy or negative income tax. "Those families below a certain level of taxable income would receive rebates to bring them to this level" (10). The local community would receive immediate benefits from the increased trade through increased money flow. For farm families who do not own their farms, for those who are too old to obtain off-farm employment, and for families whose household head is handicapped or disabled, the direct income subsidy is the only realistic manner in which assistance can be offered. Eighteen percent of the farm families in

western Oregon with family incomes of less than \$3000 were included in one of the above categories and could benefit from a program such as this.

The critics of the negative income tax say it is a "giveaway program" and would stifle the incentive of the recipients to work (10). On the other hand, many rural poor families may possess too much pride to accept the additional money. Another criticism advanced is that families with incomes just above the \$3000 poverty standard would not receive any payments and would thus be penalized (10). These families may possibly lose incentive to work in order to decrease their incomes so they could participate in the program.

On the "good side" of the negative income tax is the more equal distribution of income. The people paying for the program would be those who in essence could afford it. Idealistically, the direct income subsidy is a "Robin Hood" program. Just like the voluntary early retirement program, the implementation, acceptance, and participation of the negative income tax are quite a different matter. Because of the publicity a program of this nature has received in recent year, a change in attitude of the American public would seem to be necessary.

Summary

Variations in family income on low-income farms in western Oregon were caused by a lack of off-farm employment; inadequate capital investments on farm improvements; and a lack of income from rent, interest, and dividends. The majority of families without off-farm employment and nonwork income met the poverty classification. It was concluded that insufficient farm size, inadequate capital for farm expansion, lack of training or skill, inefficient use of available resources, age, lack of formal education, and lack of mobility were the main causes of low incomes in the thirteen northwestern counties of Oregon. The findings of this study would tend to support other studies of a similar nature.

For older farmers and those with little formal education with low incomes in western Oregon, the most sensible means of assistance are direct aid programs: voluntary early retirement, food stamps, direct food distribution, and income supplement or subsidies (10). Younger, low-income farm operators in the study area may receive training necessary to obtain nonfarm employment. Finally, there is a relatively small number of low-income farmers in western Oregon with adequate resources to "farm their way out of poverty." Through the Cooperative Extension Service, farm management and improvement programs could be enacted to assist

these farm operators. Long-term, low-interest loans for land purchase and improvements (10) could be administered through the Farmers Home Administration.

Need for Further Research

In order to reach the goals advanced by the President's National Advisory Commission on Rural Poverty (15, pp. 17, 22, 41, 59), continuing research is needed in the areas of individual attitudes and goals of low-income farm families, community and rural area development, and the determination of optimal public policy. In regard to the last point, there seems to be a general agreement on the policy goals, but there is a diversity of opinion as to the best methods of reaching the goals. Therefore, research in a given area is necessary to determine the optimal method of accomplishing and implementing the desired objectives.

Specifically, a follow-up study of the same individuals Holmes surveyed is needed to determine if circumstances similar to those found in this study are in effect today. A feasibility study is needed in the area of individual goals and attitudes to determine if the implementation of education and training programs and direct aid programs would be utilized and accepted by low-income farmers in western Oregon.

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