FARM-NONFARM LABOR FLOWS, 1917-62, WITH EMPHASIS ON RECENT MANPOWER AND CREDIT PROGRAMS

Thesis for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY

Bob F. Jones

1964

THESIS



This is to certify that the

thesis entitled

FARM-NONFARM LABOR FLOWS, 1917-62,
WITH EMPHASIS ON RECENT
MANPOWER AND CREDIT PROGRAMS

presented by

Bob F. Jones

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Agricultural Economics

Glenn L. Johnson
Major professor

Date 1964

O-169

TH

THE

ABSTRACT

FARM-NONFARM LABOR FLOWS, 1917-62, WITH EMPHASIS ON RECENT MANPOWER AND CREDIT PROGRAMS

by Bob F. Jones

There were two general objectives of this study. These objectives were (1) to describe and analyze the flow of labor resources between the farm and nonfarm sectors of the U. S. economy, 1917-62, and (2) to determine the major impacts of selected government programs on labor use and labor flows.

The programs studied were: (1) federal credit programs designed to assist in individual farm development and (2) manpower and related policies since 1940.

The methodology involved extension of an available theoretical model and deduction of hypotheses from that model relevant to labor flows and labor uses. Most of the tests of hypotheses consisted of examination of various kinds of data for logical and empirical consistency with the hypotheses.

Secondary data, mostly from publications of the U.S. Department of Agriculture, Bureau of the Census, and the Selective Service System provided the factual basis for the study. Unpublished data on persons and loan funds in loan programs were provided by the Washington office of the Farmers Home Administration.

Bob F. Jones

Examination of seven different time-series on labor use in agriculture showed that no single measure was sufficient for analysis of labor flows. Hence, labor flows were measured in terms of changes in farm population, farm labor force and farm labor requirements.

Acquisition costs and salvage values were defined specifically for farm labor. A study on intersectoral labor flows utilizing Old Age and Survivors Insurance Data was found to provide estimates of salvage value for farm labor. Nonfarm earnings by members of the hired farm working force indicated salvage values for hired farm workers.

An expected salvage value series for labor which weighted average annual factory worker income by the probability of employment was developed. Comparison of the salvage value series with data from other studies led to the conclusion that the salvage value series represents an upper limit to salvage values for labor. Thus, the series applies to the labor services of younger farm workers (under 35). This same series, when adjusted for intersectoral transportation costs, was used to represent acquisition costs for labor.

At the aggregate level the historical relationships between acquisition costs, salvage values and marginal value productivities for labor imply the labor flows which have occurred between the farm and nonfarm economy since 1917. At a lower level of aggregation, it was found that total labor use has declined least on the larger, higher income

THES

farms in comparison to smaller farms (sales under $2,500) where labor use has declined most. Use of farm operator labor decreased least in the upper economic classes of farms. Off-farm work by operators in this group has been less important and has increased less than for operators in the lower economic classes. Also, hired labor has decreased less on the larger farms.

Analysis of labor flows by age of operator shows that adjustment to rising wages has involved reduced entry rates more than increased withdrawal rates. Older workers (over 35) become "trapped" on farms because the marginal value product of their labor is greater than their salvage value off the farm.

Analysis of federal credit programs shows that persons involved in loan programs represent a relatively small proportion of all farm operators. However, the policy of dealing mostly with younger operators makes it possible for such credit to affect entry rates provided all persons receiving loans remain employed on the farm. The major conclusions about credit programs were (1) loans for farm operation probably increased family labor employment in the short run but (2) that in the long run loans of this type probably had a small effect on farm employment.

Agricultural draft deferments during World War II determined which farm youth remained on farms but deferment policies did not maintain entry rates for farm operators

under 35 years of age. There were some indications that deferment policies for 30-37 year old farm males increased entry rates during the 1940-45 period. Draft deferments were relatively unimportant as a source of labor during the Korean Conflict.

A greater proportion of farm veterans took advantage of G I educational benefits than any other occupational group. Farm veterans enrolled almost exclusively in on-farm training. On-farm training was considerably more attractive to World War II veterans than to Korean veterans. This appears to be the result of more favorable subsistence allowances and more favorable farming opportunities for World War II veterans in comparison to Korean veterans. The general conclusion was that the type of training taken by the large majority of veterans of World War II with farm backgrounds probably hindered or at least did not facilitate occupational mobility.

THES

FARM-NONFARM LABOR FLOWS, 1917-62, WITH EMPHASIS ON RECENT MANPOWER AND CREDIT PROGRAMS

by

Bob F. Jones

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

1964

THE

A 38247
7-9-65

ACKNOWLEDGMENTS

The author wishes to express his gratitude for the guidance and assistance which he received in the development of this thesis. Sincere thanks are extended to Dr. Glenn L. Johnson for guidance during graduate study and for his helpful criticisms and supervision of the thesis.

During Professor Johnson's extended absence from the campus, first Dr. Dale E. Hathaway and later Dr. David Boyne provided valuable criticisms and suggestions which were helpful in developing the study. This assistance is greatly appreciated, particularly the encouragement given by Dr. Boyne when both Dr. Johnson and Dr. Hathaway were away from campus.

The generous financial assistance provided by Resources for the Future and the Department of Agricultural Economics, Dr. L. L. Boger, Chairman, is greatly appreciated. Without this assistance graduate work at Michigan State University would not have been possible.

The author wishes to thank the personnel in the Washington office of the Farmers Home Administration for providing unpublished data on FHA programs.

The bibliographical assistance on institutional on-farm training provided by Mr. Harry E. Niesman of the

THES

Michigan office of Vocational Education is appreciated.

Finally, the author appreciates the quiet encouragement and understanding of his wife, Mary Lou, while the work was in progress.

Of course, any errors remaining in the thesis are the responsibility of the author.

THES

TABLE OF CONTENTS

Chapter		Page
	ACKNOWLEDGMENTS	ii
	LIST OF TABLES	viii
	LIST OF ILLUSTRATIONS	xv
I.	INTRODUCTION	1
	The Problem	1
	Objectives	6
	Data and Methodology	8
	Order of Presentation	9
II.	A FRAMEWORK FOR ANALYSIS--ASSET FIXITY THEORY	12
	Criteria for Efficiency of Labor Use in the Economy	12
	Fixed Asset Theory	18
	Determinants of the Shape and Position of Region V	32
	Technology assumed fixed	33
	Technology assumed variable	35
	Firm-Industry Relationships	47
	Acquisition Costs and Salvage Values and Their Application to Labor	50
III.	THE AGRICULTURAL LABOR FORCE: ITS STRUCTURE AND EARNINGS	61
	Composition of the Agricultural Labor Force in 1959-60	62
	Importance of each class of workers to the total agricultural labor input	65
	Differences in composition	71
	Skill level of the work force	76
	Summary	77
	Major Movements of Labor from the Farm Sector	78
	Farm population	79

THES

Chapter Page

Farm labor force 82
Labor requirements 85

Farm Income and Labor Earnings 86

Time-series comparisons of farm and nonfarm income 87
Median income comparisons for 1959.. 91

Farm income by type of farm 95
Marginal returns to labor 100
Non-conventional pecuniary income.. 102
Wages of hired farm labor, 1917-62. 103

Summary and Tentative Conclusions 105

IV. THE AGRICULTURAL LABOR FORCE: ITS ADJUSTMENT TO CHANGE 107

Explanation Sketch 107
Determinants of the Quantity of Labor Used 111

Demand factors 112

Technical coefficients of production 112
Relative prices of factors 117
Product prices 121

Supply factors 122

Relative incomes and unemployment rates 122
Rural replacements 124

Theoretical considerations 126

Estimates of Acquisition Cost and Salvage Value for Labor 126

Hired farm work force data 127
Old age and survivors insurance data 130
A derived series 136
Sources of off-farm employment 142
Conclusions 146

A Further Look at the Key Variables Over the Long Period 147

THESI

Chapter Page

Changes in acquisition costs, salvage values and the MVP of labor considered ... 148
Capital gains and losses in agriculture 158
Conclusions--need for analysis at a lower level of aggregation 160

Adjustments by Economic Class of Farm 161
Adjustment by Different Age Groups of Farm Operators 171
Summary and Conclusions 185

General--over the entire time period 186
By 5-year periods 188

1917-19 188
1920-24 189
1925-29 190
1930-34 191
1935-39 193
1940-44 195
1945-49 196
1950-54 198
1955-59 199
1960-62 200

V. FEDERAL CREDIT PROGRAMS TO ASSIST INDIVIDUAL FARMERS 202

Enabling Legislation and Other Authorization 205
Objectives of the Programs 208
Magnitude of the Programs 212
Characteristics and Description of Borrowers 216
Uses of Loan Funds 221
Some Effects of the Credit Programs 224

Rates of entry and exit 224
Family labor employment 228
Productivity of labor of borrowers.. 236
Output, income and price effects ... 242
Effects of loans on mobility--further comments 245

Summary and Conclusions 246

THESI

Chapter Page

VI. AGRICULTURAL DRAFT DEFERMENT, MILITARY SERVICE AND EDUCATIONAL PROGRAMS FOR VETERANS, 1940-62 251

Agricultural Draft Deferment 253

Deferments granted, 1941-45 258
Deferments during the Korean Conflict 263

Military Service by Farmers 264
Changes in Farm Employment, 1940-45 267
How Draft Deferment Reduced Mobility 276
Educational Programs for Veterans 281

World War II 281

General enabling legislation and choice of training ... 281
Institutional on-farm training. 283

Special legislation 283
The subsistence allowance.. 286
Qualifying for training.... 286
Magnitude of the program... 290
Some effects of the training 292

Other training programs 300

The Korean Conflict 303

General enabling legislation... 303
Institutional on-farm training. 303

The subsistence allowance.. 303
Qualifying for training.... 304
Magnitude of the program... 305

Other training programs 305

Conclusions concerning different impacts of the World War II and Korean training program ... 306

Conclusions 307

VII. SUMMARY AND CONCLUSIONS 311

APPENDIX A 323

APPENDIX B 349

BIBLIOGRAPHY 356

THES

LIST OF TABLES

Table		Page
II-1	Some possible adjustments in resource use when a farm is initially organized in each of the nine regions considering technology variable	41
III-1	Employment of seasonal hired agricultural workers by origin of workers, United States, by months, 1960	65
III-2	Percent distribution of the agricultural labor force by class of worker, United States, 1959-60	67
III-3	Agricultural employment by class of worker 14 years of age and older and percent distribution by class of worker, United States, 1940-62	69
III-4	Number of agricultural wage workers, average and total days worked, and percent distribution by duration of work, United States, 1960	70
III-5	Number and percent distribution of agricultural workers on farms during week preceding enumeration by class of worker, United States, by division, 1959	73
III-6	Percent distribution of number of farms, estimated value of product sold, number of farms reporting by regular or seasonal hired workers, and workers hired by number of workers per farm by selected economic classes, conterminous United States, 1959 ...	75
III-7	Changes in the farm population, farm labor force, and farm labor requirements, for selected periods, United States, 1917-62	80
III-8	Changes in the farm population and net outmigration from the farm population for selected periods, United States, 1920-60	83

THES

Table		Page
III-9	Percent changes in the farm population, farm labor force, and farm labor requirements, for selected periods, United States, 1917-62	85
III-10	Per capita personal income of farm and nonfarm population from farm and nonfarm sources, United States, 1934-62	88
III-11	Total money income per family by occupation of head of family, United States, 1959	92
III-12	Total money income of male persons by occupation, United States, 1959	94
III-13	Residual returns per hour for operator and family labor by type of farm for selected periods, 1930-62	97
III-14	Marginal earnings of labor, selected types of farms in selected locations, at indicated dates	101
III-15	Total farm wages and average hourly wage rates for farm workers and industrial workers, 1917-62	104
IV-1	Man-hours per acre and per unit of production as a percent of man-hour requirements, 1915-19, for selected crops, United States, 1915-62	114
IV-2	Man-hours per unit of livestock and per unit of production as a percent of man-hours in indicated years, United States, 1915-62	116
IV-3	Average days worked and wages earned at farm and nonfarm wage work by persons who did 25 days or more of farm wage work and number of workers, selected years, United States, 1945-62	129
IV-4	Median income earnings from farm employment, from nonfarm sector employment the following year and differential of median income, United States, 1956-58	131
IV-5	Mean annual income differentials for persons transferring from farm employment to nonfarm employment by age, United States, 1955-59	133

THESI

Table		Page
IV-6	Mean income differentials of off-farm movers by farm employment status, United States, 1955-59	135
IV-7	Average annual income per employed factory worker and expected annual salvage value of farm labor in current dollars and 1947-49 dollars, United States, 1917-62	139
IV-8	Industrial distribution of wage jobs taken by farm operators in the 1956-57 and the 1957-58 mobility periods, United States	143
IV-9	Average hourly earnings in selected industries, United States, 1917-62	145
IV-10	Index of price expectations (one year) and index of prices received, all farm products, United States, 1917-62, (1947-49=100)	150
IV-11	Value of agricultural assets at beginning of period, and total change in asset position of agriculture during period for selected periods, United States, 1917-62	160
IV-12	Number of farms and percent change in number from 1950 to 1959 by value of sales per farm, United States	164
IV-13	Number of farm operators reporting work off farms and percent change in number from 1950 to 1959, by value of sales per farm, United States	166
IV-14	Percent of operators of commercial farms reporting work off farms and change in percentage points from 1950 to 1959 by value of sales per farm, United States	167
IV-15	Regular hired workers on farms by value of farm products sold, United States, 1950-59	169
IV-16	Regular hired workers per 100 commercial farms by value of farm products sold, United States, 1950-59	170
IV-17	Age-specific rates of entry and withdrawal for farm operators, United States, 1910-59	176

THESI

Table		Page
IV-18	Rates of entry, rates of withdrawal and net rates of change for all farm operators, United States, 1910-59	177
IV-19	Net percent change in number of farm operators, by age, after adjusting for survival rates, United States, 1910-59	184
V-1	Initial farm operating loans as a percent of all farm operators at end of the period, United States, for selected periods, 1936-62	213
V-2	Farm ownership loans, total, initial and subsequent, extended by the Farm Security Administration and Farmers Home Administration for selected periods, 1938-62, United States	217
V-3	Age distribution of all farm operators and of borrowers from the Farmers Home Administration and its predecessors for selected years, United States	218
V-4	Number of initial farm-operating loans during a decade as a percent of total farm operators at end of the decade by age, United States	220
V-5	Tenure status during year before receiving farm operating loan for selected years, United States, 1936-62	221
V-6	Percent change in number of farm operators by age after adjusting for survival rates, total and excluding all persons who received initial farm operating loans during the decade, United States, 1935-60	226
V-7	Family labor employment functions fitted by least squares to annual data 1920-63 omitting 1942-45 with regression coefficients, standard errors in parentheses and related statistics	233
V-8	Selected measures of inputs, output, and related factors for operating loan borrowers for year before loan and for last year reported for persons paying-off their farm operating loans, United States, 1955-62	237

THES

Table		Page
V-9	Selected measures of inputs, output, and related factors for farm ownership loan borrowers who remained active borrowers and continued to farm five years after the initial loan, United States, 1955-62	240
VI-1	Occupational deferments of registrants by age group for the United States, for selected dates December 31, 1942 through August 1, 1945	259
VI-2	Deferred registrants as a percent of the employed male labor force by age group, July 1, 1944 and August 1, 1945, United States	261
VI-3	Agricultural deferments as a percent of total workers on farms June 1, 1944 and as a percent of the 1940 farm labor force of comparable age, August 1, 1945, United States, by geographic region	262
VI-4	Number of farmers and farm laborers inducted and enlisted in the army and navy, and as a percent of the male labor force in agriculture in 1940, U.S., by region, June 30, 1945	266
VI-5	Average acreage per farm of all land in farms, average value of all farm products sold or used per farm and average number of persons working per farm reporting, United States, by region, 1940	268
VI-6	Estimates of farm population January 1, 1940 and 1945, and percent change for period by regions, United States	269
VI-7	Farm employment December 1, 1944 and December 1, 1945 as a percent of average 1935-39, December employment, United States, by regions	271
VI-8	Net percent change in number of farm operators by age after adjusting for survival rates by 10-year periods, 1910-59, including 1945-55, United States	272
VI-9	Average annual percent change in number of farm operators by age for selected periods, 1910-60, United States	273

THESI

Table		Page
VI-10	Farm income--total, per worker, per family worker--and value of agricultural assets each in current and constant dollars, 1940 45, United States	279
VI-11	Monthly education and training subsistence rates for institutional on-farm training for World War II and Korean veterans	287
VI-12	Veterans of World War II who entered institutional on-farm training under P.L. 346, cumulative through fall of 1955, total and as a percent of all farmers and farm laborers who were inducted into or enlisted in the army or navy, United States, by region	291
VI-13	Institutional on-farm training enrollees as a percent of all farmers and farm laborers inducted or enlisted in the army or navy during W W II and the average value of all farm products sold or used per farm, 1940 and 1945	293
VI-14	Veterans who entered training as a percent of all veterans in civil life by type of training for World War II and Korean veterans, cumulative through fall of 1955	300
A-1	Comparison of trends in annual average farm employment estimates using linear regression for specified estimates and time periods, United States	345
A-2	Annual averages of total and hired agricultural workers for the U.S. as estimated by the Statistical Reporting Service and Current Population Survey with percentage differences between the two estimates, 1940-62	347
B-1	Man-hours per acre and per unit of production for designated crops, United States, 1915-62	350
B-2	Man-hours per unit of livestock and per unit of production, United States, 1915-62	351
B-3	Net incomes originating in agriculture, total change in asset position of agriculture, government payments, and total, current dollars, United States, 1917-59	352

THES

Table | Page

B-4 Value of assets in agriculture at beginning of year, total change in asset position of agriculture during year due to price change and percent change in asset position during year, United States, 1917-19 353

B-5 Age distribution of borrowers, number of borrowers by age by decade, total farm operators at end of decade and initial farm operating loans as a percent of total operators by decade, United States 354

B-6 Farm operating loans by fiscal year, United States, 1935-63 355

THES

LIST OF ILLUSTRATIONS

Figure		Page
IV-1	Index of labor requirements, index of mechanical power and machinery and index of the ratio of the wage rate for hired labor to the price of farm machinery, United States, 1915-62, (1910-14=100)	119
IV-2	Index numbers of prices paid by farmers for selected production items, by groups, United States, 1915-62	120
IV-3	Expected salvage value of farm labor in constant dollars and average daily wage in constant dollars at nonfarm work by persons in the hired farm work force who did 25 or more days of nonfarm work during the year	141
IV-4	Expected salvage value and annual farm income per family farm worker	153
A-1	Comparison of total annual average farm employment estimates, Statistical Reporting Service series, monthly report on labor force series and labor requirements series converted to full-time worker equivalent, United States, 1940-62	344

THES

CHAPTER I

INTRODUCTION

The Problem

For more than 30 years the Federal government has been engaged in some type of farm price or income-raising plan on a large scale. It has been the policy of the national government to redirect part of the income earned by the total economy in order to increase incomes going to the farm population. For the most part, reliance has been placed on price supports and output restrictions as the methods for increasing farm incomes.

Starting with the early 1950's and continuing to date, there has been much discussion of the inadequacies of price supports for simultaneously increasing farm incomes and bringing about the adjustments which are called for in agriculture. For the so-called basic commodities the accumulated stocks and accompanied storage, handling and disposal costs have been much discussed and are well documented. Despite, or possibly partly as a result of continued efforts by the Federal government, farm incomes have remained unsatisfactory as judged by farmers, many

THESI

agricultural economists, Congressmen, and other interested observers, according to numerous criteria by which incomes and resource earnings can be compared.

Today, in contrast to the diagnosis of the early 1950's that surpluses and consequently low incomes were of a transitory nature arising from demand, there has been growing agreement that surplus commodities and overcapacity to produce can be expected to remain as problems for sometime into the future. The belief was held by many, particularly those with a part in policy formulation, as well as their advisors that only temporary measures were needed for dealing with the surplus problem. Population growth was expected to "catch-up" with supply at least by 1975 or perhaps considerably sooner. In the meantime with developments currently anticipated with respect to technological change and capacity to produce, the European Common Market, limited means of payment on the part of non-European countries, and growing reluctance on the part of American taxpayers to subsidize foreign shipments there has been further recognition that additional adjustments in production and resource use must take place within domestic agriculture.

Other studies of overproduction and low returns in agriculture typically have been commodity oriented.[1]

---

[1]There is at least one notable exception to this statement. See Earl O. Heady and Luther G. Tweeten, Resource Demand and Structure of the Agricultural Industry, (Ames, Iowa: Iowa State University Press), 1963.

Inadequate attention has been directed to resource flows and to the role which the fixing of resources in production play in explaining overproduction. This is particularly true when one looks at the effect of (1) price supports on resource flows and (2) various resource policies operating along with price policies to limit aggregate production.

There is general, although not complete, agreement that there are too many resources devoted to agricultural production. Labor in particular has been over-abundantly supplied to agriculture. Without doubt, at least in the long run, price supports have stimulated movements of resources into agriculture through providing income with which to purchase inputs and through their effect on price expectations and have thus tended to make the eventual adjustment problem more difficult.

Moreover, domestic agricultural policies have worked at cross purposes in committing resources to agriculture. On the one hand, price support activities when accompanied by marketing quotas attempt, however feebly, to restrict output yet encourage greater production and greater use of inputs via the higher price. On the other hand, various resource policies encourage and permit resources to flow into agriculture. Despite overproduction at acceptable prices, the Federal government has engaged in credit programs for individual farmers which facilitate the purchase of capital inputs and have probably encouraged other resources to remain in

THESI

agriculture. Reclamation projects have added land capital and perhaps labor to the total agricultural plant. Watershed development projects and the Agricultural Conservation Program by subsidizing the purchase of inputs have contributed to increased output.

Other policies have dealt more directly with labor. Direct manpower policy which utilized draft exemptions for agricultural workers when the nation mobilized for wars or for keeping the peace has permitted labor to remain in agriculture. Veteran's educational programs which included on-farm training may have added workers to agriculture.

The policy of importing foreign nationals for work on U.S. farms has contributed to the supply of labor in agriculture. Although started early in World War II during a period of general manpower shortage on farms, as well as in the remainder of the economy, the program has continued through 1963.

A major study has been undertaken to provide useful information on and evaluation of the above mentioned programs as well as other agricultural policies since 1918.[1] The major study has the following specific objectives:

1. To describe the national impacts of selected U.S. agricultural programs, 1918 to date on output and

---

[1]This study is under the direction of Dr. Glenn L. Johnson and is supported by a grant from Resources for the Future, Washington, D.C.

THESI

resource utilization in U.S. agriculture. Programs to be selected will be those designed to influence:

a. Product prices.

b. Input prices both directly and indirectly (by influencing the availability of credit and other means).

c. The quantity of capital facilities and service furnished by society to agriculture.

d. The output of agricultural products.

2. To develop and state normative concepts for use in evaluating the programs studied.

3. To evaluate the programs studied in view of results obtained in 1 and 2 above.[1]

Page two of the project statement indicates that the major study is to concentrate on resource flows and commitments in contrast to other studies which have been commodity oriented.[2]

Because of the number of programs involved and the complexity of the problem this study is not as all-inclusive as the above would indicate. Since this study is only one part of the major project a division of work has been

---

[1]Project statement submitted by Professor Johnson to Resources for the Future.

[2]Ibid.

THESI

possible. This study is directed specifically to a study of labor flows between the farm and nonfarm sectors and to utilization of labor in agriculture. The period for this study is 1917 to 1962.

Better understanding of labor flows and of the factors affecting farm employment should be useful to students of policy, Congressmen, and to others interested in rational and effective policies for agriculture. Labor flows and labor use are particularly important to agriculture in the aggregate since labor is a major input. Furthermore, labor services represent an important asset to the individual involved as it is the sale or allocation of those services which play an important part in the income which he receives.

Objectives

There are two general objectives of this study. They are:

1. To describe and analyze the flow of labor resources between the farm and nonfarm sectors of the U.S.
2. To determine the major impacts of selected government programs on labor use and labor flows.

Of course, an implicit objective is to provide information which can be combined with information on other inputs (land and capital) for the overall evaluation of policies as envisioned in the parent study.

Asset fixity theory is utilized as a framework for analysis of labor flows. This framework was selected for

two reasons. First, the parent study utilizes this line of reasoning. Second, it was selected because of its apparent usefulness in explaining overproduction in agriculture, low labor and capital returns, and the economic fixity of resources in use despite low returns. Use of the theory requires that it be elaborated, extended, and made applicable specifically to labor. Thus, a secondary objective of the thesis is to clarify and extend asset fixity theory and to specify relevant definitions required in its application to labor flows.

Of the aforementioned programs, only those believed to have had a significant effect on either getting people into agriculture or on keeping them in agriculture are considered. This includes federal credit programs for individual farm development. Specifically, loan programs which provide credit to individuals for farm operation (working capital) or farm purchase (land and improvements) are analyzed. Manpower policies and subsequent related policies are analyzed for their effect on entry rates into and withdrawal rates from agriculture. This includes analysis of agricultural draft deferments during World War II and the Korean Conflict, military service by males from the farm labor force, and educational programs for veterans with farm backgrounds.

Although this is intended as a fairly comprehensive analysis of labor flows and of the policies affecting labor supplied to agriculture, one important program is not

considered. This is the national program currently authorized by Public Law 78 for the importation of foreign nationals for farm work.

This important source of agricultural labor is not included because of its complexity and far-reaching implications. It is felt that the economic, social, and political aspects of this program merit a separate study and that only superficial treatment of it could be given here.

As indicated above the analysis of programs centers on the question of how the programs affect entry into agriculture or withdrawal from agriculture. Additional questions which aid in evaluating the general question are: who is involved in these programs, i.e. what are their education, skill and age characteristics? How does the specific program operate and how does it effect entry and exit rates?

Data and Methodology

Secondary data, mostly from publications of the U.S. Department of Agriculture, Bureau of the Census, and the Selective Service System provide the basis for the study. Some unpublished data on persons and funds involved in loan programs have been provided by the Washington office of the Farmers Home Administration. The use of secondary data is essentially dictated by the nature and the scope of the study.

THESI

The methodology is not easily characterized as no formal model-fitting is done. Rather, a theoretical model is presented and then various hypotheses are presented which appear to be consistent with the model. These hypotheses are presented at the beginning of each chapter and are then subjected to various sorts of informal tests. Most of the tests consist of examination of various kinds of data for logical and empirical consistency with the hypotheses.

Order of Presentation

The theoretical framework for analysis is presented in Chapter II. The criteria for efficiency of labor use in the economy are presented prior to the theory. These criteria indicate the need for modification of the general theory of resource use. Following the presentation of the theory, the price, technological and institutional factors which determine asset fixity are discussed. The acquisition costs and salvage value concepts are discussed and applied specifically to labor as an input.

Chapter III provides the empirical setting for the study. It is a description of the structure and earnings of the agricultural labor force. The composition of the agricultural labor force in 1959-1960 is presented. This is followed by description of the major movements of labor from the farm sector since 1917. Changes in farm population,

THES

the farm labor force, and labor requirements are considered by 5-year periods.

The fourth chapter consists of analysis of the changes which have occurred in the agricultural labor force since 1917. Estimates of acquisition cost and salvage value for labor are presented. These estimates are brought together from other studies. A derived time-series believed to represent the salvage value of farm labor is presented. This series is compared to other data on labor earnings to determine whether it is a valid estimate. The salvage value series is related to labor flows by 5-year periods. Labor flows between the farm and nonfarm sectors are compared to flows expected on the basis of movement in the expected salvage value series and its relation to the marginal value product of labor.

Changes in labor utilization and adjustments by size of farm as indicated by economic class of farm are presented. These changes are compared to the changes deducible from the theoretical model. Also, changes in the size of farm operator cohorts are compared to expected changes.

Chapter V comprises the analysis of federal credit programs to aid individual farms. It covers the objectives of the programs, the magnitude of the programs and the characteristics and description of persons involved. This is followed by a section on uses of loan funds along with an analysis of how expenditures affect the productivity of

THES

labor. The analysis of the effects of the program on entry and exit rates consists of relating the number of people involved to the number of farm operators by age by decade. A multiple regression analysis of family labor employment completes the chapter.

Chapter VI covers agricultural draft deferments during World War II and the Korean Conflict, military service for farm males and educational programs for veterans with farm backgrounds. Inferences about the effects of draft deferments and educational programs on rates of entry into and withdrawal from agriculture are made. These inferences are based on changes in number of farm operators at different stages of the cohort and on changes in different cohorts as they complete the same age-stage. Educational programs for veterans are briefly described along with a regional distribution of the number of persons involved. The analysis considers the importance of the subsistence allowance and the veteran's previous education for the choice of type of training undertaken. Some conclusions are stated about the probable effects of the training on occupational mobility.

Chapter VII consists of summary and conclusions. Essentially, the chapter consists of bringing together conclusions reached in previous chapters. The previously reached conclusions are integrated to the extent found possible.

THES

CHAPTER II

A FRAMEWORK FOR ANALYSIS--ASSET FIXITY THEORY

Historically, labor has been the most important single input in agricultural production. In 1917 the labor input was 51.9 percent of total inputs used in agriculture.[1] By 1962 the labor input accounted for 24.2 percent of all inputs and it continued to be the leading single input. Both the efficiency with which labor is used in agriculture and the income distribution which results from its employment have an effect on the general welfare of the farm and nonfarm population.

Criteria for Efficiency of Labor Use in the Economy

Efficiency of farm production is of concern to farmers as entrepreneurs and to nonfarmers as consumers of farm and nonfarm products. Farmers are concerned because their efficiency is a determinant of the net incomes which they receive. Nonfarmers are concerned because efficiency

---

[1] Ralph A. Loomis and Glen F. Barton, Productivity of Agriculture, U.S. Dept. of Agriculture, ARS, Tech. Bul. No. 1238, (Washington: U.S. Government Printing Office, 1961), pp.60-61.

THES

affects the cost of producing farm products. But perhaps more important, the efficiency with which farmers produce determines the amount of resources devoted to farm production. Fewer resources in agriculture mean more resources to produce nonfarm products.

The first efficiency criterion for resource use is met when the marginal value product of the resource is equal to the marginal factor cost of the resource. This criterion is met by adjusting the amount and combination of resources used. It is possible to make all of these adjustments only as all factors become variable.

Also important to the nonfarm sector is the second efficiency criterion. It prescribes the way in which resources are allocated among products in the farm sector as well as among all other production processes. A given quantity of labor or any resource is employed in its optimum use when the marginal value product of labor in each use is equal to the marginal value product of labor in all other uses in all sectors. If marginal value products for comparable labor are not equal in all uses, a shift from the product where value product is lower to the product where value product is higher will result in an increase in total output. Again, these adjustments are possible only as all factors become variable. Thus, it is necessary to examine the criteria when assets are fixed to firms and to the industry.

THESI

In the short run the industry operates with a given size plant with some inputs fixed to the firm and to the industry. The quantity of other inputs is variable. It is the nature of fixed assets which is of interest here.

To adjust the level of resource use in attempting to fulfill the efficiency criteria firms acquire and dispose of assets. Associated with acquiring an asset is an acquisition price. Here acquisition price is defined as that price which must be paid to get a unit of the input (asset) at the location of the production process. When firms attempt to dispose of an asset they are concerned with salvage prices. Salvage price is defined as the net return which would be received for a unit of the input if it were sold rather than used in farm production.

Acquisition and salvage prices for a specific input differ at one point in time or over time. The gap considered here between the two prices is not due to depreciation but exists independent of depreciation. This gap between acquisition and salvage prices for inputs exists due to the geographic dispersion of farms from each other and with respect to input suppliers. This geographic dispersion leads to transportation costs for inputs. In other cases the spread between acquisition and salvage prices is due to institutional arrangements associated with exchange such as land transfers and machinery and equipment transfers from franchised dealers. With respect to labor, rigidities in

the labor market help to account for the spread between the two prices.

Given the existence of the spread between acquisition and salvage prices for an input, a divergence between the marginal value product of the input and the marginal cost of the input occurs for resources in use depending upon which input price is used. This means that the marginal value product may change within a specified range as a result of product price changes without causing any change in employment of the resource. As long as the marginal value product is less than the acquisition cost of another unit of the input it would not be profitable to acquire more of the input. Conversely, if the marginal value product is greater than the salvage value of the input it is more profitable to keep the given amount of resources employed. The presence of economic fixity of assets requires that the efficiency criteria be reexamined.

Frequently, an asset is used in more than one production period and thus may be considered as a stock asset which provides services to the production process. Considering an asset as a stock, the first efficiency criterion is met when the marginal value product of the flow of services for a given period exceeds the salvage value of that flow of services but is less than the acquisition cost of a similar flow of such services. Fulfilling this efficiency criterion may mean that more of an asset is being used than would be called for if assets were valued at acquisition

THES

costs. Yet, the asset is there, is earning more than salvage price, and thus remains fixed to the production process.

Asset fixity leads to alteration or nonfulfillment of both efficiency criteria. When acquisition and salvage values for an input differ, the firm and industry may find it more profitable or less unprofitable to keep the quantity of a resource unchanged as product prices change. Keeping the resource in production as long as its marginal value product is greater than salvage value, may lead to unequal marginal returns for comparable inputs when employed in different industries or sectors. Unequal marginal returns may persist for a long period of time if the asset has long physical life.

Historically, marginal returns for comparable resources have not been equal in the farm and nonfarm sectors. There is much evidence that marginal returns for labor and other inputs used in agriculture have been persistently lower than returns for comparable resources in nonfarm uses.

Under the assumptions of the competitive model, it is predicted that resources will move out of firms and the industry when returns to resources are below returns to similar resources in comparable uses. Also, it is expected that resources will not move into an industry which is characterized by earnings below those being earned in other

THES

industries. Further, there is much evidence that in many instances resources do earn less in agriculture than do the same resources in nonfarm uses. But contrary to what is expected, more resources remain employed in agriculture and more resources continue to be attracted into agricultural use than would be expected in view of relative earnings. What, then, is the explanation for this apparent contradiction to expectations?

One model which seems to be useful in explaining the persistance of low returns to resources, the tendency for overcommitment of resources to agriculture, and consequently overproduction, is G. L. Johnson's so-called fixed asset theory. Because of its explanatory value this model will be the focus around which this study will be developed. The model provides one method by which various resource policies can be analyzed.

From its initial formulation by Johnson, fixed asset theory has been further developed and modified by Johnson and Hardin, and Edwards.[1] Due to clarifications and changes

---

[1]Fixed asset theory, essentially a refinement to and extension of neoclassical economic theory, was first presented in published form in Economics of Forage Evaluation, by Glenn L. Johnson and Lowell S. Hardin, Station Bull. 623, (Lafayette, Ind., Agr. Expt. Station), April 1955. Proofs and extension of the theory can be found in Resource Fixity, Credit Availability and Agricultural Organization, unpublished Ph.D. thesis by Clark Edwards, Mich. State Univ., 1958; "The State of Agricultural Supply Analysis," by Glenn L. Johnson, in the Journal of Farm Economics, XLII, May 1960, pp. 435-452. Another exposition of the theory is found in Government and Agriculture by Dale E. Hathaway, (New York: The MacMillan Company), 1963.

THE

which have been made in the theory and also to the fact that all sources of information on fixed asset theory may not be readily available to all readers, the theory will be presented here. This formulation of the theory is not intended as a complete presentation covering all aspects of the theory. Rather, it is intended that enough be presented so that the reader can grasp the general concept of the theory together with its implications and can then turn to references cited for additional materials. Also, the only case to be considered is where three inputs or classes of inputs are used.

Following the presentation of the theory, it will be shown how it will be used to analyze the impact of resource policies on labor commitment to or release from agriculture.

Fixed Asset Theory[1]

A major premise of the fixed asset model is that the acquisition price for an input differs from the salvage value of that input. As stated above the acquisition price for an input is that price which the firm has paid or would have to pay to get a unit of input, including transportation costs, to the location of the production process. Salvage value is that net price which would be received for a unit

---

[1]This section has been developed from sources cited in the preceding footnote.

of input if it were sold rather than used in farm production.

At this point, it is assumed that there exists a significant difference between acquisition prices and salvage values for many of the inputs used in agriculture at any one instance in time or over time. Development of the acquisition and salvage price concepts with respect to specific inputs, particularly labor, is presented following general presentation of the model.

We will consider a model for a single firm producing either one product or an aggregate of products measured by an appropriate value product index. For simplicity, assume three inputs and a production function of the general form:

$$Y = f(X_1, X_2, X_3)$$

where: Y = value product

X_1 = undifferentiated variable labor

X_2 = undifferentiated variable capital

X_3 = a third unspecified input which is fixed to the firm so long as its marginal value product is less than the acquisition cost of an additional unit but greater than the salvage or sale value of a unit. Further, only the case where the marginal value product of X_3 is less than the acquisition price of X_3 but greater than the salvage value of a unit of input will be considered. Fixity of at least one resource leads to operation of the law of diminishing returns and insures the necessary shape of the production

THES

function for the location of the customary optimum points.

To be somewhat more specific, it is assumed that the parameters of the production function are known and that the quantity of X_3 is given. Under assumptions of the competitive model and assuming at present no divergence between acquisition and salvage prices for inputs, the profit-maximizing proportions of X_1 and X_2 to be used are determined by equating:

$$(1) \qquad \frac{MVP_{X_1}}{P_{X_1}} = \frac{MVP_{X_2}}{P_{X_2}}$$

where MVP refers to the marginal value product of the input in the production of Y and P_X refers to the price of a unit of the input. On a factor-factor diagram the proportions for combining X_1 and X_2 in order to get a least-cost input combination can be determined graphically by observing the tangency points of the iso-value product curves with the input price ratio line.

Graphically, the profit-maximizing level of use of X_1 and X_2 cannot be determined utilizing only Figure II-1. Point A is arbitrarily selected as the high profit point, a point which can be determined precisely when equation (1) is set equal to one and solved, assuming divisibilities of inputs and a continuous production function.

Now, assume that acquisition and salvage prices are different for both inputs. Further, assume that the

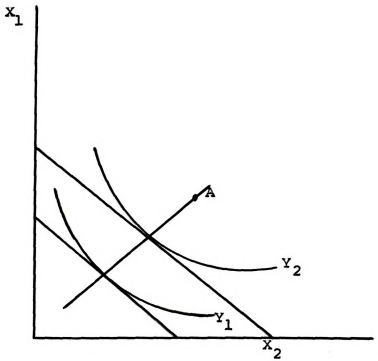


Figure II-1

shortfall of the salvage price for X_1 is not in the same proportion to the acquisition price of X_1 as the salvage price of X_2 is to the acquisition price of X_2.[1] Figure II-2 shows that the optimum combination of X_1 and X_2 for a given level of output changes when both inputs are valued at salvage prices rather than at acquisition prices.

---

[1] If the salvage value of each input is the same percentage of its acquisition cost, the input price ratio lines for salvage values would have the same slope as for the price ratio line when acquisition price was used, thus, location of the line of least cost combination (LLCC) would not change. However, three LLCC's would exist even if the salvage value of each input was the same percentage of acquisition cost. The necessary condition for three lines is the existence of a divergence between acquisition and salvage prices.

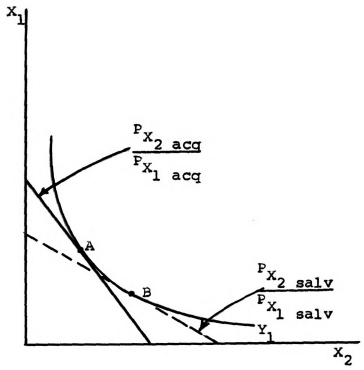


Figure II-2

Point A, Figure II-2, would be the least-cost combination if both inputs are valued at acquisition price. But, now assuming that X_2 has the larger proportional difference between acquisition and salvage price, the optimum combination of X_1 and X_2 moves to point B for a given output, Y_1. Point B shows the same quantity of product as at point A since both points are on the same iso-product curve. But points A and B are on different iso-cost lines. On the assumption that salvage values are lower than acquisition costs the broken line represents a lower iso-cost line than the solid line. Now if we assume that A was the high profit point when inputs were valued at acquisition

costs the new high profit point cannot be point B but must be at some output greater than Y_1. However, the important point here is that the optimum combination of resources depends on which prices are considered for inputs. The consequences of and the possibilities for input reorganization are considered later.

When acquisition and salvage prices differ, not one, but four lines of least cost combinations (LLCC) are traced. In order to keep lines on the figures to a minimum, only the four LLCC's and value product lines are shown without price ratio lines. In Figure II-3, line a is the locus of all points where the iso-value product curves are tangent to the price ratio lines with X_1 priced at its salvage value and X_2 priced at its acquisition cost. On line a, point 2 is assumed to be the "high profit point" which could be determined mathematically. Line b is the LLCC when both inputs are priced at acquisition price; c when both are priced at salvage value; and d is the LLCC when X_1 is priced at acquisition cost and X_2 is priced at salvage value. Points 1, 2, 3, and 4 would be expected to fall in approximately the same relative position as shown in Figure III-3 so long as acquisition prices are greater than salvage values. Point 1 would be at the lowest output since both inputs are valued at acquisition prices and 3 would be at the greatest output since both inputs are valued at salvage value. It would be expected that both 2 and 4 would show less output than 3 since one input is valued at acquisition price, the other at

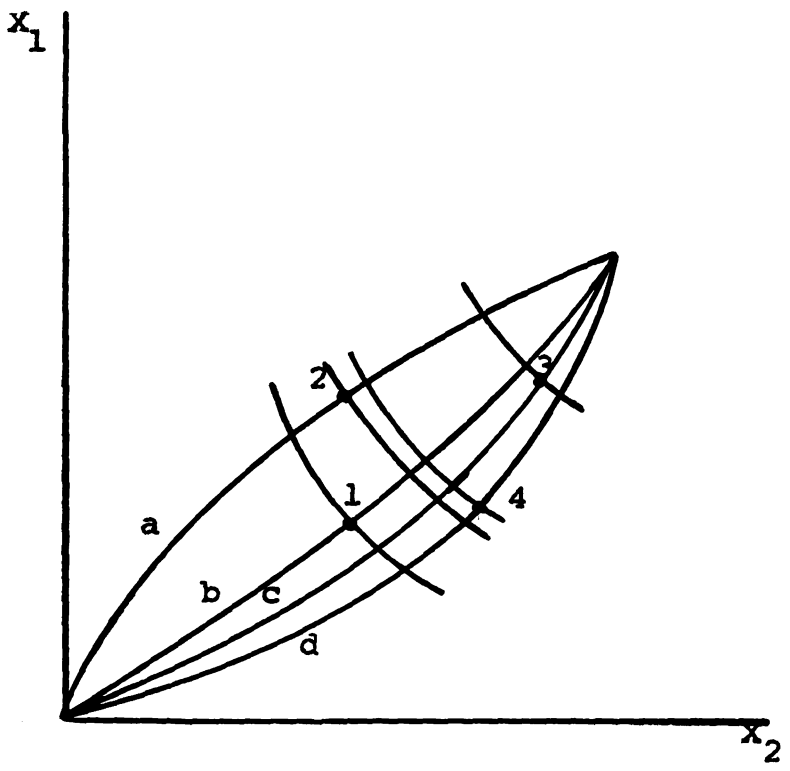


Figure II-3

the lower salvage value. By the same reasoning 2 and 4 would always be at an output greater than at 1.

Now having established that four different LLCC's could and will exist when acquisition and salvage price differ, we can delimit the area in which X_1 and X_2 will be fixed to the farm. Points 1 through 4 are connected in Figure II-4 which correspond to the same points from Figure II-3.

The solid portions of lines e, f, g, and h now have special meaning. The following comments about lines in Figure II-4 apply only to the unbroken parts of those lines.

For example, the solid portion of line f is the locus of all points where the MVP of X_2 equals the acquisition price of X_2. Or stated another way, the marginal value product of X_2 remains constant for the various combinations of X_1 and X_2 traced out by line f. (This assumes that input prices are constant.) Likewise, g is the locus of all combinations of X_1 and X_2 where the marginal value product of X_2 is equal

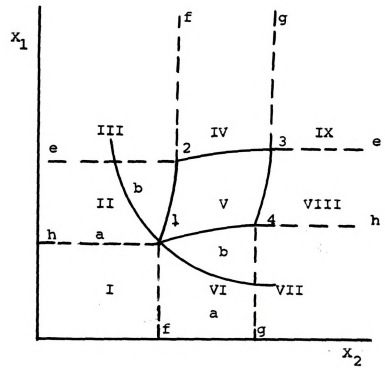
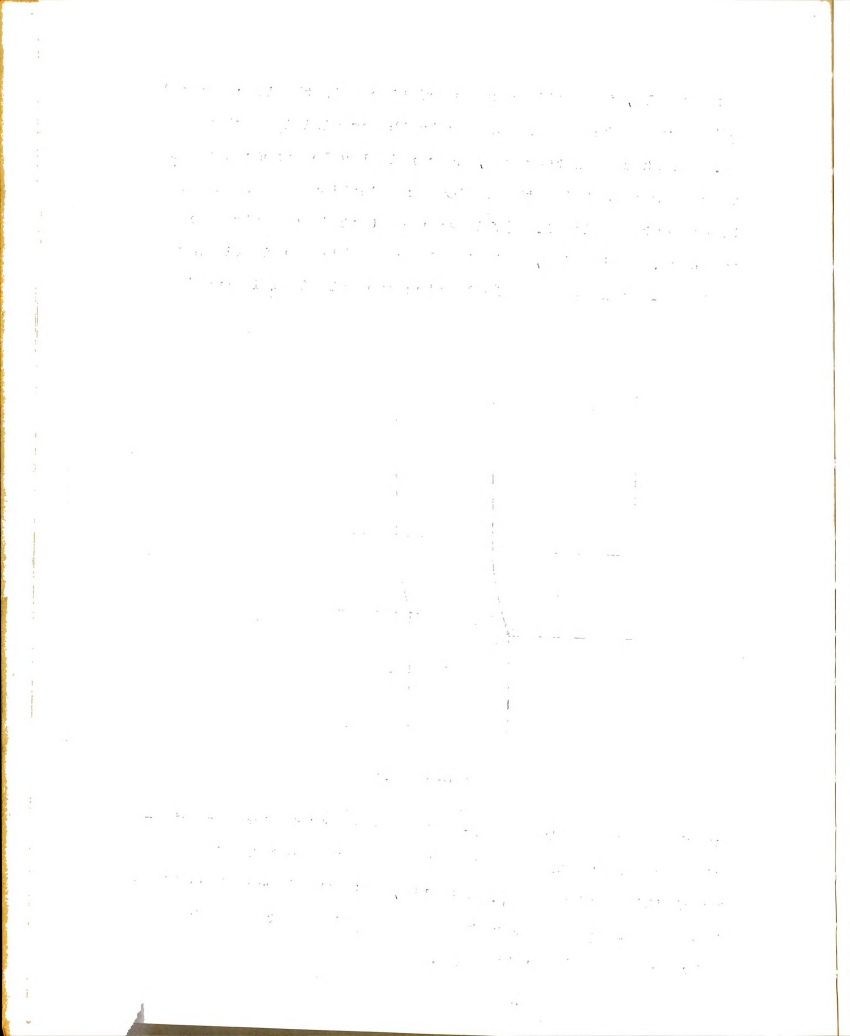


Figure II-4

to the salvage value of X_2; h the curve which shows combinations of X_1 and X_2 where the MVP of X_1 is equal to the acquisition price of X_1. Finally, e is the locus of combinations of X_1 and X_2 where the MVP of X_1 is equated to the salvage value of a unit of X_1.



The usefulness of the model now appears for appraising economic organizations of farms or potential reorganizations. We need now to recall a general rule of economics with respect to resource use. Profit will be increased if an additional unit of a resource can be purchased for less than what it contributes to total value product, i.e., the unit should be purchased if its MVP is greater than its price. On the other hand, a unit of resource should be sold if its MVP is less than its salvage value. The third alternative is to neither buy nor sell a unit of resource if the MVP of the resource is less than its acquisition price but greater than its salvage value. Application of the rule permits an analysis of each of the nine separate divisions of the production surface shown in Figure II-4.

At this point, consider that variable inputs are divisible and can be acquired or sold, an assumption which will be reconsidered later. In region I, and in fact in all regions, point 1 is the only combination of resources which would be an economically optimum long-run organization of resources when resource combinations are evaluated prior to any resource commitment. At this point inputs are earning a return equal to their acquisition price. This is an equilibrium for both the farm and the general economy if we further assume that in the remainder of the economy productive resources are so employed as to earn marginal value products

equal to their acquisition costs.[1]

In the discussion of a farm organized in each of the 9 regions we assume that the regions are defined in an ex ante sense. This diagram pertains to the optimum organization prior to any commitment of resources. A profit-maximizing firm which possessed perfect knowledge would organize at point 1. Investment at this point would be the optimum investment for the relevant time period. Over-investment and consequently overproduction has occurred if in a subsequent time period actual product prices fall below expected product prices. Also, overinvestment or over-commitment of resources has occurred if alternative expected resource earnings in the nonfarm economy were underestimated at the time of the initial decision. Any overinvestment situation results in overproduction with respect to the ex ante most profitable level of production, i.e. where assets earn returns which support acquisition costs. At this point, we are less concerned with why firms are organized at other than the high profit organization. Rather, our interest is in comparing a possible actual organization with the ex ante

---

[1]Equilibrium as used here has a meaning somewhat different from the usual meaning. Equilibrium is frequently defined as a condition in which opposing economic forces are in balance or as a point from which there is no incentive to change. These definitions often imply that there is only one equilibrium position. In Figure II-4 there are numerous positions all in region V from which there may be no incentive to change, but there is only one point where inputs are earning returns equal to their acquisition costs. This is point 1.

optimum organization and considering the adjustments which should be made in order to increase the profitability or decrease the loss of the firm.

Consider that a farm is organized in region I at some point other than point 1. A farm organized in such a way could always improve its profit or loss position by moving to point 1. This move would require more of either X_1 or X_2, or both depending upon the initial position. It would pay to acquire more of a resource since each unit would add more to product than its acquisition cost. At the final reorganization the farm would be at point 1, the point which would have been an optimum resource organization prior to acquisition of either X_1 or X_2.

A farm organized in region II, if any place other than on line f, could improve its organization by acquiring more X_2. It would not pay to acquire more X_1 nor would it pay to dispose of any X_1. In this position X_1 would be earning less than its acquisition cost but more than its salvage value. To dispose of X_1 at less than its marginal value product would be equivalent to increasing the capital loss on the resource.[1] Incurrance of the loss can be postponed or decreased if more X_2 is acquired and the farm is reorganized on line f. A movement to line f would result in greater product with no chance of returning to point 1 unless

---

[1] Specifically a capital loss has occurred if the sum of past earnings plus salvage value is less than acquisition cost of the input.

the capital loss is taken. After reorganization the farm is overproducing with respect to the ex-ante optimum output.

Region VI is comparable to region II, except that the roles of X_1 and X_2 are reversed. X_1 should be acquired with X_2 remaining fixed. It should be noted that regions II and VI can be subdivided on the basis of the iso-product curve which passes through point 1. Organizations below the isocost curve in subregion a are underproducing. Those above the line in subregion b are initially overproducing.

The possibilities for reorganization are different for region III. In this region some X_1 should be salvaged and more X_2 should be acquired since X_1 is earning less than salvage value and the MVP of X_2 is greater than its acquisition cost. The most profitable combination of resources for reorganization is at the intersection of lines e and f. The technical coefficients of production and the initial position will determine whether production is greater or less after reorganization.

Region VII compares to region III, except that X_2 should be sold and more X_1 should be acquired. The intersection of lines h and g determines the most profitable recombination of resources.

Region V is different from all other regions. A farm organized in this region would find it unprofitable to acquire or dispose of either input. Both inputs are fixed from an economic point of view since they are earning more

than salvage value but less than acquisition cost. A farm organized any place in region V other than at point 1 would be overproducing with respect to point 1.

Regions IV and VIII are similar. In region IV it would not pay to change the amount of X_2 being used but it would pay to decrease the amount of X_1. The MVP of X_1 is less than salvage value, thus it would pay to dispose of some X_1 even though a capital loss would be incurred. In region VIII some X_2 should be sold even at a loss with the amount of X_1 remaining fixed. Under both adjustments production would decrease and capital losses would occur.

In region IX both X_1 and X_2 should be used in smaller amounts. A capital loss would occur but disposal would minimize losses and overproduction, although decreased, would continue after reorganization at the intersection of lines e and g.

Summing up adjustments, we see that there are six different possible decisions which the farmer could make. The farmer could either buy more of both inputs, buy one and hold the other fixed, sell one and hold the other fixed, buy some of one and sell some of the other, salvage some of both inputs or make no change. It is the initial organization which determines the optimum reorganization of the farm.

It is notable that overproduction occurs at all reorganizations except those which originate in region I. Errors of investment in that region can be corrected without

capital loss or overproduction. For regions II-b and VI-b the reorganization results in additional overproduction. For II-a and VI-a the adjustment is from a position of underproduction to overproduction. Overproduction can either increase or decrease for regions III and VII but it cannot be eliminated. Also, adjustments in regions IV, VIII and IX reduce but do not eliminate the amount of overproduction. Since no adjustment occurs in region V overproduction is not affected.

A question to be considered now when we know that point 1 is the most profitable organization is: why was a farm organized at some point other than at point 1? Other than optimum organizations would not occur under the assumptions of profit-maximization with given technology, product and input prices, and perfect knowledge of the present and future.

However, if we relax the assumptions, introduce some dynamics and generalize it is easy to see how errors of organization could occur. Optimum ex-ante organizations are based on expected product and input prices and expected productivities of inputs. Actual prices and productivities often differ from expectations. The entrepreneur's decision to commit his resources to the firm in part depends upon his estimate of their expected earnings in agriculture relative to expected earnings in alternative nonfarm uses. Expected resource returns in farming depend upon expected product prices and the expected productivity of the inputs. It

follows that existence of noncompensating errors anywhere in the decision process can result in errors of under or over-commitment of resources.

It is hypothesized that mistakes of resource commitment are not random but are made on the side of overcommitment. However, this is not a necessary condition for eventual overcommitment of resources and overproduction. Assume that all errors are random. We have shown that as adjustment occurs correction of only those errors in region 1 results in no overproduction. The situation after adjustment in all other regions leads either to additional overproduction or to less overproduction. No adjustment results in complete elimination of the excess production. Thus, nonrandomness on the side of overcommitment is a sufficient but not a necessary condition in the explanation of overproduction.

Determinants of the Shape and Position of Region V

Divergence of acquisition and salvage prices for inputs is a necessary condition for the existence of region V as shown in Figure II-IV. If the two prices coincide the quadrilateral shrinks to the point most commonly considered in production theory. Therefore, the size of the region is directly proportional to the difference between acquisition and salvage values. It follows that the extent of overcommitment of resources, overproduction and potential capital losses depend upon the size of region V. In addition the

shape and position of the region together with the existing resource combination determines the extent of additional overcommitment of resources as reorganization takes place. Thus, attention is directed to an investigation of the factors which determine the shape and location of region V on the production surface.

The location of region V is determined by technical production relationships in combination with product and input prices. In analysis of the effect of these factors, changes in region V will be considered under two assumptions: (1) with technology fixed and (2) with technology as the variable under study. We will make the usual assumption that only one change at a time is considered.

Technology Assumed Fixed

Fixed technology is represented by a given production surface or function. Units of input as well as output are assumed to be homogeneous. Thus, two distinct points on a production surface which show different resource combinations do not represent a different technology. A change from one combination of resources to another then represents an economic adjustment to a change in product or input prices. It suffices here to say that a change in technology has not occurred unless the production function or production surface has changed. However, not all shifts in the production function are a result of new technology. Changes in

relative prices which result in changed levels of previously fixed resources also bring about shifts in the production function. The latter shifts are not considered as technological change. It is the introduction into the production process of a new input not previously in existence which results in technological change. Thus, a change in the production function as a result of use a new input is an indicator of technological change.

For a given technology any change in product price will cause the iso-MVP curve to shift. An increase in the price of the product will shift region V upward and to the right. A shift to the right and upward represents greater total product as well as greater use of inputs if the higher level of product is to be obtained. A product price decrease will shift region V down and to the left, cet. par.

An increase in the acquisition price of an input will move the iso-MVP curves down or to the left. Other things equal, fewer resources will be acquired by a farm firm when acquisition prices increase. A decrease in price will shift the boundary of region V upward or to the right.

Salvage prices for inputs determine the upper and right boundary of region V. An increase in salvage prices causes the iso-MVP curves to move down or to the left. Any price decrease causes a shift upward or to the right.

Other things equal, region V will become smaller if salvage prices increase relative to acquisition prices. In fact, as implied above, if acquisition and salvage prices

were equal the region would shrink to a point and refinement of the theory would not be necessary.

Technology Assumed Variable

As stated above a given level of technology can be represented by a production function or surface.[1] Or stated another way, the product forthcoming under a given technology from various combinations of resources can be represented by a production function. To show input-output relations for two different technologies two production functions are required.

Figure II-5 shows hypothetical production functions when two levels of technology are used. Consider X_1 to be undifferentiated variable labor, X_2 fixed capital which provides a flow of services to the production process and $X_3 \ldots X_n$ as other unspecified fixed inputs. X_2 represents

---

[1]Technology and technological advance are abstract terms frequently used by economists for which there are no clear-cut definitions. Probably the most often used definition is that technology is the state of the arts. Willard Cochrane in Farm Prices, Myth and Reality, (Minneapolis: University of Minnesota Press,) 1958, p. 46, has given the following definition. "Technological advance may be defined as follows: an increase in output per unit of input resulting from a new organization, or configuration, of inputs where a new and more productive production function is involved." Glenn L. Johnson and Curtis Lard in an unpublished manuscript have given this definition: "A new technology is the discovery of a new input (which did not exist before), where inputs are defined to include ideas..."

The above statements are only to indicate that there is not agreement on a definition. For a discussion of the conceptual and measurement problems associated with technology see Technology: Its Effect on the Wheat Industry, John B. Sjo, unpublished Ph.D. thesis, Michigan State University, 1960, pp. 7-34, 40-48.

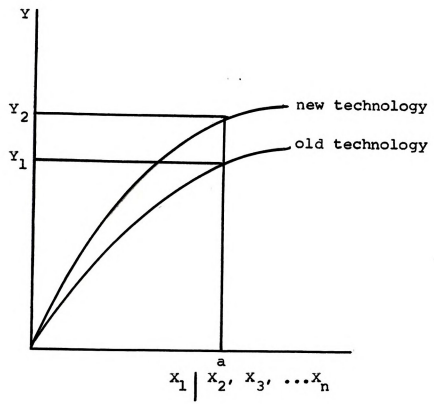


Figure II-5

a specific bundle of inputs associated with a given technology. For an example consider that X_{2old} consists of a tractor with 2-row equipment including a cultivator, plow, planter with fertilizer attachment which places fertilizer in the corn row, and a corn picker. When this bundle of inputs is combined with oa of X_1 the product forthcoming is measured by oy_1. Now assume that new information becomes known about fertilizer placement and tillage practices. X_2 is now rearranged so that X_{2new} consists of the same tractor, plow, and picker but with a modification on the planter which places the fertilizer to the side and beneath the seed.

Also, the cultivator is replaced by a chemical weed sprayer. Now using oa of X_1 with X_{2new}, production is increased from oy_1 to oy_2. The changes in X_2 which have occurred as the result of new knowledge being put to use have increased the product for a given quantity of labor.

For the individual farm technological improvement has occurred in comparison to the old technology if (1) the same man hours of labor and the same dollar amount of capital equipment result in more product, or (2) fewer man hours of labor and the same dollar amount of capital equipment result in the old quantity of product, or (3) the same man hours of labor with fewer dollars invested in capital equipment can produce the old quantity of product.

Coincident with the difficulty of defining technology is the problem of separating capital from technology. Almost without exception a particular piece of equipment or a tool represents a specific kind or level of technology. Thus changes in the kind of technology often require purchase of one or more new inputs. In most cases it is not possible to separate the effects of more capital from the effects of "new technology."

A three dimensional diagram is appropriate for showing the effect on the marginal value product or an input when a change in technology occurs. However, for simplicity contours are labelled and a two dimensional diagram is used. With labor on the vertical axis and capital in dollars on the horizontal axis Figure II-6 show the effect of a change

in technology. An improvement in technology moves a given iso-MVP curve for capital to a higher location on the production surface.[1] The hypothetical example shows that under the old technology the MVP of capital is $1.00 when 10 units of labor are combined with 6 units of capital. The addition of two units of capital to the fixed quantity of labor reduces the MVP of capital to $ .50. But suppose that the kind of capital is changed, i.e. new technology is used. In the new situation the MVP of capital is $1.25 when 10 units

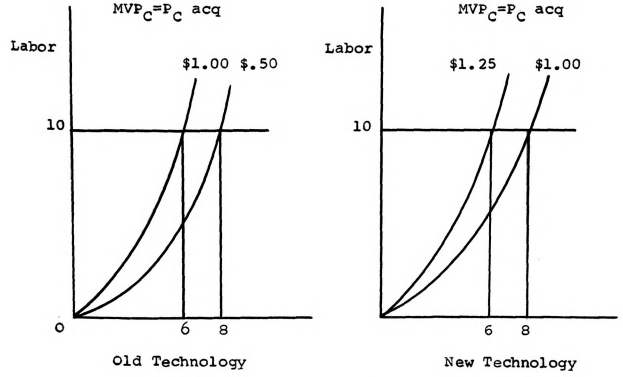


Figure II-6

[1]There is more than one possible direction of movement of the iso-MVP curve as technology is changed. Oscar Lange in "A Note on Innovations," Review of Economic Statistics, XXV, (Feb. 1943), p. 23, has considered that innovations may be factor-saving, factor-neutral or factor-using. However, it seems reasonable to believe that in many if not most cases new technology is either capital-neutral or capital-using.

of labor and 6 units of capital are combined. Two additional units of capital lower its MVP to $1.00 under the new technology.

Considering the iso-MVP of capital curve as the locus of all combinations of labor and capital where the MVP of capital is equal to the cost of capital (acquisition), a movement of the curve from $1 under old technology to $1.25 with new technology has the effect of moving the left boundary of previously defined region V (Figure II-4) to the right. The same directional movement would occur for the right boundary as technology is changed. It follows that region V shifts to the right.

Whether region V moves up, down or remains fixed as determined by the marginal value product for labor depends upon the technical relationships between capital and labor.[1]

Inclusion of technology as a variable which alters the marginal value product of resources should enable us to more closely approximate reality as faced by a farm firm. Under competition as faced by most farm firms it seems reasonable to assume that (1) product prices are given, and (2) input prices on both the salvage and acquisition side are given.

---

[1]Under given technology and assuming two variable inputs, an increased quantity of one input will decrease the marginal physical product of the second input if the two inputs are close substitutes. If the two resources are complementary an increase in the first will increase the marginal physical product of the second input. See Richard H. Leftwich, The Price System and Resource Allocation, (New York: Holt, Rinehart and Winston), 1955 revised edition, pp. 286-7 for a presentation of the theory. It would appear that the same general conclusions follow under variable technology as considered here.

The firm considers these prices as given to it and not affected by the quantities which it buys or sells. This leaves technology and choice of product as the important variables over which the firm has some control. Inasmuch as we are concerned with aggregate production choice of product is not important here.

An analysis of Figure II-4 showed the resource adjustments which would occur if a farm were initially organized in each of the 9 regions assuming that the shape and location of each region remained fixed. Now, assume that the firm has an initial economic organization, but that it is possible for the farm firm to alter the shape and position of the different regions, i.e., the firm can change its production function by changing the technology employed. Some possible reorganizations are summarized in Table II-1. For the reorganizations considered it is presumed that (1) the firm prefers to hold the quantity of labor supplied to the firm fixed or to increase the quantity if it is economically possible to do so, and (2) acquisition of additional capital consists of acquisition of new technology which increases the marginal physical products of one or both inputs, or new technology could be acquired which would increase the marginal physical product of one input but would decrease the marginal physical product of the other. For a given product technology would not be adopted which decreased the marginal product of both inputs.

Table II-1. Some possible adjustments in resource use when a farm is initially organized in each of the nine regions considering technology variable

Regions[a]	Possible Adjustment	Conditions Additional to Those Shown in Figure II-4 Necessary for Adjustment to be Made	Estimated Probability of this Adjustment
I	acq. labor[b] acq. capital	none	likely
II	hold labor acq. capital	MVP of labor can increase or decrease MVP of capital must increase	likely
III	hold labor acq. capital	MVP of labor must increase MVP of capital must increase	unlikely
IV	hold labor acq. capital	MVP of labor must increase MVP of capital must increase	unlikely
V	hold labor acq. capital	MVP of labor can increase or decrease MVP of capital must increase	likely
VI	acq. labor acq. capital	MVP of labor can increase or decrease MVP of capital must increase	likely
VII	acq. labor acq. capital	MVP of labor can increase or decrease MVP of capital must increase by large amount	unlikely
VIII	hold labor acq. capital	MVP of labor can increase or decrease MVP of capital must increase by large amount	unlikely
IX	hold labor acq. capital	MVP of labor must increase MVP of capital must increase by large amount	unlikely

[a] Regions correspond to those shown in Figure II-4.

[b] Acquisition abbreviated acq.

The following reasoning lies behind the estimates in the column headed, "estimated probability of this adjustment," given in Table II-1. Much of the non-land capital and its associated technology used in agriculture substitutes for labor and thus is labor-saving. Thus additional capital of a similar, though not necessarily identical kind, lowers the marginal product for a given quantity of labor. But through changes in the physical capital involved, i.e., change in technology, additional dollars invested in capital goods raise the marginal value product of a dollar of capital. Thus new technology is likely to increase the marginal product of capital and at the same time reduce the marginal product of the given quantity of labor.[1]

An estimate of the probability of an adjustment depends upon what happens to the MVP of an input when new technology is acquired. If in order for a given adjustment to occur the only requirement is that the MVP of capital must be increased then this adjustment seems possible and likely. It seems reasonable to believe that new technology can be acquired which will increase the MVP of capital. However, if an increase in the MVP of labor is also required it seems less likely that the adjustment will occur. There would appear to be few changes in technology which increase the

---

[1]After the capital-labor substitution has occurred the MVP of labor may be greater, less or the same as before the change.

MVP of both capital and labor. If the adjustment is economically possible even though the marginal product of labor is decreased then the adjustment seems even more likely. If the adjustment requires a very large increase in the marginal product of capital, the possibility of adoption of new technology seems small especially if an increase in the MVP of labor is also required.

Adjustments have been considered as likely if the necessary requirements are that the new technology increase the MVP of capital while the MVP of labor can either increase or decrease. On the other hand the adjustment seems unlikely if the MVP of capital must increase by a large amount while the MVP of labor can either increase or decrease. The given adjustment seems unlikely if the MVP of both capital and labor must increase.

In contrast to the analysis of Figure II-4 where technology was assumed fixed, Table II-1 shows no adjustments which require salvage of any input. Inputs are either held in use or more of an input is required. If we eliminate those adjustments in Table II-1 which appear unlikely because technology has been called on to "do too much" we see that the previous analysis of Figure II-4 probably holds for regions I, III, IV, VII, VIII and IX. Under variable technology different adjustments are expected for regions II, V and VI.

With technology given, the adjustment in region II would consist of acquisition of additional capital of the

same type. Capital would be acquired until the marginal value product of capital equalled the acquisition price of capital. However, with labor fixed it (labor) would be earning less than expected earnings but more than salvage value. There would be pressure to acquire more capital and new technology so that total earnings would increase. New technology would be acquired via additional capital so long as the MVP of labor was not lowered below its salvage price.

In contrast to the former analysis of region V where both capital and labor are fixed in use, capital becomes variable if technology is permitted to vary. If introduction of new technology increases the MVP of capital, acquisition of capital will occur even in region V in order to avoid the reduced earnings on existing capital and to increase labor earnings.

The fixed technology adjustment for region VI was to acquire labor and hold the quantity of capital fixed. With variable technology it would pay to acquire both labor and capital if new technology raised the MVP of capital. If it were not possible to acquire new technology so that the MVP of new capital was not greater than acquisition price of new capital the new organization would not occur, only more labor would be acquired.

The big difference between the fixed technology and the variable technology model is in the demand for capital goods. Under the modified assumptions, firms in both regions V and VI would seek new capital in contrast to no demand for

capital under the fixed technology model. In region II more capital would be demanded under the variable than under the fixed technology assumption as the demand for new technology would exist.

Figure II-7 shows firms initially organized at three different input combinations (and output levels) represented by A, B and C. With the assumption of fixed technology A would acquire capital,B would neither acquire nor salvage inputs and C would acquire labor. But with acquisition of new technology under control of the firm these three firms would attempt to "push" the diamond upward or to the right. Given the changes in labor use that have occurred on farms, the most likely adjustment would be to "push" the diamond to the right. This adjustment would permit the firm to produce a greater output without hiring additional labor or without requiring greater use of family or operator labor.

To get to a new higher output position as shown by D in Figure II-7 additional capital would be required by all three firms. Firm C and perhaps firm B would require additional labor. Point D in Figure II-7 is not intended to represent the optimum adjustment for all three firms. Rather it is used to show that the most profitable adjustment for any of the three firms lies to the right or above points A, B and C. The most profitable resource adjustment depends upon the individual firms' ability to secure capital and acquire new technology in order to raise the marginal products of capital and/or labor.

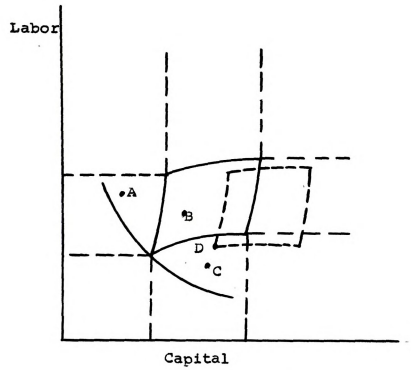


Figure II-7

Figure II-7 suggests interesting possibilities for analysis of federal credit policies included in this study. Typically federal credit which has been extended on rehabilitation loans or farm operating loans has been accompanied by farm plans and management supervision. Development of farm plans with assistance of a loan supervisor could well be considered as application of new technology to the individual farm. Use of more resources on the individual farm is possible through acquisition of the loan but it is also new technology which increases productivity of existing resources that encourages the firm to seek such a loan.

Firm-Industry Relationships

To this point we have discussed the theoretical model as it applies to the individual firm. The same model applies to the industry, but aggregation of all firms to a single model would not be a simple process. If we consider the model as it applies to an individual firm in an ex-post sense but prior to any reorganization, the resource combination for the farm lies in some one of the nine regions as indicated in Figure II-4. If the firm found itself in any region outside of region V the adjustment would consist of movement into or to the boundary of that region or movement of region V to encompass the present organization.

At any one point in time, we find on American farms an extremely large number of different combinations of inputs with various quantities of product. Farms with different organizations deviate from the ex-ante most profitable organization for a number of reasons. Farms have been organized in different time periods and under a wide variety of conditions. At the time of organization, farm operators or managers held different price expectations with respect to both products and inputs. Operators held different degrees of knowledge about technical production relationships. Also, there are wide differences in the quantities and qualities of resources owned or controlled by the farm operator.

With farms organized at other than the most profitable ex-ante high profit point, they will be attempting to alter their resource position if they are outside region V. As indicated before it is unlikely that the reorganized farm will be able to reach the ex-ante high profit point but reorganization will occur. Evidence that farms are organized or have been organized in all regions of Figure II-4 is given by the fact that simultaneous reorganizations are occurring in the farm economy which include (1) farmers buying capital inputs from the non-farm economy, (2) farmers selling inputs, particularly their own labor to the nonfarm economy through working off the farm part time or leaving the farm completely, and (3) transfer of ownership of resources between farms within the farm economy.

The simultaneous adjustments occurring in agriculture could be visualized as firms all moving their resource combinations toward some hypothetical region V which applied to all farms. This visualization however would only be appropriate if firms were classified according to amount of resources owned or controlled and to level of technology. Each of these factors would cause region V to be located in a different position which in a sense would be the "true" location of region V for farms of a given size and level of technology.

In the agricultural industry which is characterized by a large number of firms, what appears to be the optimum resource adjustment for an individual firm may turn out to be something quite different. For the individual firm we have

assumed supply schedules for inputs as perfectly elastic. Neither of these assumptions is appropriate at the industry level. If all firms or a large number of them attempt to expand output by acquiring inputs from the non-farm economy, input prices will likely rise and product prices are likely to fall. Thus actual input prices are likely to be higher and product prices lower than expected prices. In terms of moving region V as in Figure II-7, the actual location of the region is not likely to be as high or as far to the right as the expected location of region V. The inability of firms to see the consequences of their own actions may lead to the trapping of larger quantities of resources at higher levels of output with marginal returns to resources below their acquisition costs rather than returns equal to acquisition costs.

The principal use of fixed asset theory in this study will be to use the model shown in Figure II-4 to explain how resources remain committed to agriculture as well as explain how resources continue to be attracted to agriculture even though resource earnings are low. Also, it will be a purpose of this study to show how various governmental policies have affected the acquisition costs and salvage value of resources. Thus, we will be attempting to determine the impact of specific governmental policies on the shape and position of region V and the organization of farms relative to that region.

Now that we have outlined the theory and have given some explanation of how it is to be used we need to consider the acquisition and salvage value concepts and apply them specifically. This we do now.

Acquisition and Salvage Values and Their Application to Labor

Inputs used in agricultural production could be classified in a number of different ways. One way which is useful in understanding asset fixity is to place inputs into categories which are reasonably homogeneous with respect to the behavior of acquisition costs, salvage values and marginal value products of the inputs. Johnson has classified inputs according to these criteria as follows:[1]

1. Non-farm produced durables, e.g., tractors, combines, tiling, etc.
2. Unspecialized farm durables, e.g., fence posts, pasture seedings, soil improvements, etc.
3. Specialized farm durables, e.g., dairy cows, orchards, sows, ewes, beef breeding stock, etc.
4. Unspecialized farm expendables, e.g., corn, hay, etc.
5. Specialized farm expendables, e.g., seed corn, grass seeds, etc.
6. Non-farm expendables, e.g., fuel, oil, commercial fertilizers, etc.
7. Hired labor
8. Family and operator's labor
9. Land

---

[1]Glenn L. Johnson, "Supply Function--Some Facts and Notions," Agricultural Adjustment Problems in a Growing Economy, (Ames, Iowa: Iowa State Univ. Press), 1956.

Along with this classification, Johnson presents a discussion of the divergence of acquisition costs and salvage prices and then some hypotheses about resource employment and the general level of employment and business activity.[1] Hathaway has also considered the whole range of inputs and has utilized approximately the same classification.[2]

Since this study is directed toward labor rather than the whole range of resources, attention is turned to the labor input.

For farm operators for the farm sector, it is appropriate to consider acquisition costs and salvage values for labor on a life-time basis. Ideally, acquisition cost for an operator entering the farm sector is the present value of the operator's expected future net income from labor in the nonfarm economy for the best off-farm job he can enter or is in at that age. Important factors in the calculation are the expected life-span, unemployment, the alternative jobs available and the rate of discount.

The life-time salvage value for an operator leaving the farm sector is computed as for acquisition cost. The divergence between acquisition costs and salvage value because of transfer costs and kinds of jobs available depends on whether the man is or is not in agriculture and increases as age increases from 20 to retirement.

---

[1] Ibid., pp. 79-86.

[2] Hathaway, Dale E., Government and Agriculture, pp. 118-125.

The marginal value product of a farm operator's labor on a life-time basis is the present value of the operator's future net income from labor in farming in the most productive farm organization he can command. This calculation also takes into account the expected life span, the rate of discount and price uncertainties which, in some sense, correspond to the employment uncertainty in the nonfarm economy.

It is clear that acquisition costs (and salvage values) differ between age groups. Thus, it is informative to consider acquisition costs by age group. For simplicity two classes, 20-25 year-olds and 40-45 year-olds, are considered.

Since our knowledge of the appropriate planning horizon is very limited, computations in this thesis are simplified by considering acquisition costs, salvage values and MVP's on an annual basis. Quite inappropriate time periods permit fairly valid comparisons as long as the same time periods are used for each series. In this case the time period is one year. However, comparisons on an annual basis do have limitations. One of these is that annual periods do not take into account differential growth rates between sectors, a factor which is important and incorporated in this analysis on only a limited, mainly qualitative historical basis.

Though the primary interest is in the intersectoral shifts of labor in this thesis, it is informative to consider other shifts here as limited emphasis is placed on them later in the thesis. Resources used in farm production shift between

the farm and nonfarm sectors, among farms and among various enterprises on multiple enterprise farms. Hence, labor acquisition costs and salvage values are discussed here for the farm sector (industry), farms (firms) and enterprises.

To be more specific, acquisition costs and salvage values are considered for three levels of aggregation, two classes of labor and two age groups particularly in the operator class.

At the industry level, acquisition cost computations for hired labor are based on the nonfarm wage rate. Acquisition costs computations for operator labor are based on nonfarm wage rates, i.e. the largest available nonfarm wage appropriately adjusted upward for transportation costs to the farm sector and the other factors mentioned above.

Within the farm sector, acquisition cost computations for hired labor are based on the farm wage rate. Acquisition cost computations for operator labor are also based on the largest farm wages available within the sector or on the largest net self-employed earnings in alternative farm organizations on a given farm or on alternative farms which may be available to the operator.

At the enterprise level, acquisition cost computations for hired labor are based on the farm wage rate for the given required skill level. Opportunity cost in alternative enterprises on a given farm determines acquisition cost for operator labor.

Salvage values for hired labor are defined in a similar fashion except that these returns do not accrue to the firm but to the individuals involved and thus do not enter into decisions about the amount of labor used. However, the laborer makes these calculations and when salvage values exceed farm earnings the laborer shifts to alternative employment. At this point the loss of labor to the sector, farm, or enterprise enters the decisions made about resource use.

Between the farm and nonfarm sectors, salvage value computations for hired labor are based on the largest net off-farm wages available. Likewise, salvage value computations for operator labor are based on net off-farm wages available. Gross wages are adjusted downward by the appropriate transfer costs to the nonfarm job.

At the farm level, salvage value computations for hired labor are based on the market price for labor on other farms. Salvage value computations for operator labor are based on the wage rate for hired labor on a different farm or by alternative operator earnings on a different farm or on the same farm with the most productive alternative organization.

Salvage value computations for hired labor working in a given enterprise are based on the net wage rate for the same type of labor working in the alternative enterprise on the given farm. Salvage value for operator labor is determined by earnings in alternative enterprises on a given farm.

For 20-25 year olds, the gap between acquisition costs

and salvage values for a specific type of farm operator labor at the industry level is determined primarily by transfer costs. As transfer costs are low at this age, salvage values approach acquisition costs for 20-25 year olds.

Since off-farm wages are larger for 20-25 year olds than 40-45 year olds (because of different types of jobs available to the different age groups), the spread between acquisition costs and salvage values for 20-25 year olds is much less than the gap for 40-45 year olds. Furthermore, the gap between salvage values and acquisition costs for 40-45 year olds is explained in large part by the differences in off-farm wages available to those who did and who did not work at nonfarm jobs at age 20-25. Those who did start nonfarm work have acquired promotions, wage increases, tenure, vested retirement benefits, etc. Their wages are high relative to potential wages for the farm operator who has been engaged in farming for 20 or more years and who has acquired little if any industrial skills and who wishes to transfer to nonfarm employment at age 45.

Transfer costs increase with increasing age of the person in the farm sector. These costs increase as productive assets, homes, furniture, etc. are acquired and which must be moved or disposed of as the move is made.

The above reasoning indicates that the spread between salvage values and acquisition costs for a specific type of farm operator labor widens with age of the worker. By the time

persons are 45 or older the spread is so great that relatively few permanent nonfarm to farm transfers are made by persons past that age. One would expect few highly skilled industrial workers 40-45 year olds to be moving into farming as potential on-farm earnings cannot support the relatively high acquisition costs for these workers. Those of this age group who do move into agriculture do so under special circumstances of inheritance or with large amounts of available capital. Also, persons who are unable to make a satisfactory attachment to nonfarm jobs shift back to equally low-paying farm jobs.

When discussion is shifted from a specific type of labor to a consideration of the total employed farm operator force vs. potential new entrants, additional reasons for the spread between acquisition costs and salvage values appear. The age structure, the acquired skill level and the education level are factors which determine the kinds of jobs available to farm operators and thus are important factors in determining salvage values for operator labor. These characteristics do not compare favorably with the age level, the skill level and educational attainments of young, potential entrants or with the skill level of experienced industrial workers. Hence, acquisition costs for more labor to the farm sector exceeds salvage values for currently employed farm labor.

The spread between acquisition costs and salvage values which results from differences in characteristics of the groups involved exists at a point in time. Another characteristic of the industrial economy, cyclical unemployment and business activity, causes the spread to widen and narrow over time. Characteristics of the two labor markets cause cyclical swings to have larger impact on salvage value than on acquisition cost. As unemployment increases, the migrant or potential migrant finds intense competition for jobs from unemployed industrial workers. When unemployment reaches some critical level, the migrant finds it impossible to get an industrial job. The effective salvage value of labor at the margin has reached zero.

Acquisition cost also declines with increased unemployment and declining business activity. As workers are let out of jobs some of them seek work in agriculture. However, unemployment compensation for industrial workers puts a floor under acquisition costs. Laid-off industrial workers prefer unemployment benefits (which they have in part paid for) to work in the farm sector. Since no payments strictly comparable to unemployment benefits are available to farm laborers, acquisition costs decrease less than salvage values over the business cycle.

The spread between acquisition costs and salvage values probably narrows at peak economic activity. As industry gets near the "bottom of the barrel" for additional workers as during World War II it is more willing to take

older and less skilled workers. Then there is more incentive to provide training to workers and a willingness to accept workers into retirement plans at an older age.

Acquisition costs for additional labor affect the size and economic organization of a given farm as well as the number of workers employed in the farm sector. Salvage value has relevance for determining the number of farm operators who remain in agriculture especially in view of the level of farm income relative to nonfarm incomes.

The model which has been presented has relevance for explaining resource combinations and is useful in predicting and evaluating economic organizations and reorganizations of farms. It is presumed that entrepreneurs have some knowledge of such a model, although not in a formal sense, and that they behave in a way consistent with the model.

There is evidence that farmers do follow reasoning similar to the model presented. Johnson has reached this conclusion based on answers to specific questions asked in the Interstate Managerial Study.[1] Analysis of replies to questions concerning farm business organization showed that the farmer's general approach involved fitting an economic organization to the characteristics of an important asset on hand such as land, livestock herd, or supply of family labor.[2]

---

[1]Glenn L. Johnson, An Evaluation of U.S. Agricultural Policies and Programs, 1956 to 1960, unpublished background paper for the Committee for Economic Development, 1961.

[2]Ibid., p. 42.

Use of the model for analysis of farm organizations and the effect of governmental policy on decisions of organization requires that we return to the assumption that inputs are available in infinitely small amounts. At the industry level this is a valid assumption. But typically, at the firm level labor cannot be acquired in divisible amounts but is furnished in units of one or more men who work on a yearly or monthly basis. However, hired labor often can be acquired on a daily or piece work basis. Divisible units of operator labor are possible for the person who combines farm work with off-farm work. It seems reasonable to consider that alternatives consist of full-time farming, a combination of part-time farming with off-farm work, and nonfarm work exclusively. With these alternatives in mind, we will consider the probable effects of government programs on resource combinations along with resource acquisition and transferal of resources out of agriculture.

It will be hypothesized that a given program changes the shape or location of the area (Figure II-4) in which assets are fixed to the farm. Depending upon the specific program considered it will be hypothesized that the program increased or decreased salvage value of labor or other inputs and hence labor was stimulated to remain in agriculture or received an incentive to move out of agriculture.

Programs which affect the acquisition price of inputs cause inputs to either remain in agriculture, move into agriculture, or shift out of agriculture. For example, it is

hypothesized that a reduction in the cost of credit obtained through an operating loan from the Farmers' Home Administration results in more credit being used by the borrower than would have been available from private credit sources. If more capital equipment is secured via the operating loan, income expectations of the borrower may be improved and thus, he will remain in agriculture where otherwise he might have transferred to a nonfarm job. On the other hand, it may not be the reduced cost of credit, but the terms in which credit is made available which allows a person to remain in agriculture.

It would be possible to conduct this analysis of programs in a different framework. Rather than develop the study around acquisition and salvage values of inputs, the analysis could center around programs which increase or decrease mobility of resources. Yet another alternative could be to consider programs in terms of their effect on the elasticity of supply of factors to agriculture. And no doubt, these terms are more familiar to most agricultural economists.

However, asset fixity theory which considers acquisition and salvage values of inputs in relation to their marginal value productivity appears to have greater power for explaining resource use in agriculture. Hence, the unconventional terms and concepts will be used.

Chapter III

THE AGRICULTURAL LABOR FORCE: ITS STRUCTURE AND EARNINGS

Chapters III and IV present the empirical setting for labor utilization and adjustment in agriculture. The general purpose of Chapter III is to describe the current use of labor, historical changes in the use of labor, shifts of labor between the farm and nonfarm sectors, labor earnings and incomes in agriculture. Chapter IV consists of description and analysis of the process by which agriculture has adjusted to changing wage rates, changing prices of other inputs and changing product prices. Labor-saving technological advance is treated both as an adjustment to advancing wage rates and as an independent variable. Specific objectives of Chapter IV are to (1) determine on which farms adjustments in labor use have occurred, (2) determine the adjustments made by different age-groups of farm operators, (3) explain why adjustments have occurred on certain economic classes of farms and by certain persons and not others, and (4) to examine the role of income expectations in committing persons to agriculture.

The fourth objective stated above represents a new approach toward explaining the excess supply of labor to agriculture. It is an attempt to use expected incomes and

imperfect knowledge about relative incomes to explain the over-commitment of labor to agriculture.

Composition of the Agricultural Labor Force in 1959-60

Descriptive data on the farm work force are available from seven or more basic sources. These sources provide different estimates, some for presumably the same components of the labor force. Estimates vary because of different definitions and concepts used in determining who is included in the farm work force. Estimates also differ as a result of the methods used in collecting data. Furthermore, because of the heterogeneity of participation in the farm work force and the complexities involved in determining who should be included in the work force it was necessary to review critically the different time-series estimates of farm employment. This review comprises Appendix A of this thesis and it is referred to when the composition of a given estimate is unclear or when two estimates differ.

The agricultural labor force is comprised of farm operators, unpaid members of the operator's family, and hired laborers. Hired labor is classified as permanent or non-seasonal as one class with seasonal as the remaining class. Seasonal labor is comprised of local or migratory persons depending upon their usual place of residence with respect to the community in which they work. Migratory labor is subdivided as domestic or foreign according to citizenship status.

In 1959 there were 6.3 million persons working on farms during the week[1] preceding the enumeration.[2] Of this total, 4.7 million were family workers of which 3.0 million were farm operators and 1.7 million were unpaid members of farm operator families. The remaining 1.6 million persons were hired farm laborers.

The typical farm operator performs the managerial function for the farm and in addition contributes to the labor force of the farm. He may provide all the labor for the farm, receive some assistance from unpaid members of his family, hire workers, or use some combination of workers. For 1959, 44.2 percent of all farm operators reported that they operated their farms without any family or hired help during the week preceding the enumeration.[3] For the entire year, slightly less than one-half (48.2 percent) of all farms reported expenditures for hired labor for 1959.[4] Considering the group which reported hired labor, 75.8 percent of the farms spent less than $1,000 for hired labor. Thus, most farms are operated primarily with labor provided by the operator and his family.

---

[1]November 22-28 was the approximate average date for the enumeration.

[2]U.S. Bureau of the Census, U.S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chapter iv, p. 233.

[3]Ibid.

[4]Ibid., p. 346.

The farm operator's wife and their children under age 25 comprise most of the unpaid family worker category of farm workers.[1] Participation by family workers in the farm work force varies greatly by season depending upon work to be done and whether school is in session. The number of family workers in the farm labor force is twice as large during the summer as during the winter.[2]

The Census of Agriculture classifies hired workers as regular hired workers if they are employed at farm wage work 150 or more days during the year. Workers are classified as seasonal workers if they work less than 150 days. For 1959, the Census of Agriculture reported that 316,030 farms employed 685,794 regular hired workers or an average of 2.2 persons per farm during the week preceding the enumeration. Seasonal workers were reported on 306,123 farms with 881,788 persons engaged in seasonal farm work during the week preceding enumeration.[3]

In contrast to the agricultural census which reported workers for the week preceding the enumeration in the fall of 1959, the Bureau of Employment Security provides estimates of seasonal workers by months for the entire year. These estimates for 1960 are shown in Table III-1. To meet the

---

[1]Other unpaid family workers include brothers or other relatives who operate a farm under a partnership or similar arrangement.

[2]U.S. Bureau of the Census, Ibid., p. 230.

[3]Ibid., p. 236.

Table III-1. Employment of seasonal hired agricultural workers by origin of workers, United States by months, 1960

Origin of Workers	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.
Total	343	328	309	417	766	1,226	1,200	1,112	1,282	1,316	743	406
U.S. workers	265[a]	256	238	336	657	1,089	1,077	979	1,099	1,079	582	318
Local	223	218	205	284	543	867	784	716	848	823	463	260
Migrant	42	38	34	52	114	221	293	263	251	256	119	58
Foreign	77	72	71	81	109	137	123	133	184	237	161	88
	Percent Distribution											
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Total	100	100	100	100	100	100	100	100	100	100	100	100
U.S. workers	77	78	77	81	86	89	90	88	86	82	78	78
Local	65	66	66	68	71	71	65	64	66	63	62	64
Migrant	12	12	11	13	15	18	25	24	20	19	16	14
Foreign	23	22	23	19	14	11	10	12	14	18	22	22

[a]Totals do not always agree due to unadjusted rounding.

Source: U. S. Bureau of Employment Security, Farm Labor Market Development, Jan. 1961, p. 19.

seasonal needs for agricultural labor, workers are drawn from local areas, other in-state areas, other states and from foreign countries. The employment of seasonal workers is greatest during the months of May through November (Table III-1). In 1960, October was the peak month for seasonal farm employment. Of the total seasonal workers, domestic workers comprised from 77 percent of all hired seasonal workers in January and March to 90 percent of all workers in July. Local workers comprised from 62 to 71 percent of all U. S. workers compared to 12 to 25 percent for migrant workers. Domestic migrant workers outnumbered foreign workers from May through October of 1960 with the situation reversed for the other months of the year.

Importance of Each Class of Workers to the Total Agricultural Labor Input

Table III-2 presents additional evidence that family labor is the most important source of labor to U.S. agriculture. Both the Monthly Report on the Labor Force (MRLF) series and the agricultural census show that farm operators comprise about one-half the labor force working on farms despite the different concepts involved in making the estimates. The Statistical Reporting Service (SRS) does not provide separate estimates for operator labor but includes all operator and family labor as one class. All three series show that operators and their families comprised from 71.1 percent to 75.1 percent of the total number of persons working in agriculture in 1959.

Table III-2. Percent distribution of the agricultural labor force by class of worker, United States, 1959-60

Source of Estimate	Year	Number of Workers	Operator Labor	Family Labor Other Than Operator	Hired Labor
		Thou.	Pct.	Pct.	Pct.
(1) MRLF[a]	1959	5,836	51.9	19.2	28.9
	1960	5,723	49.0	18.4	32.6
(2) SRS[b]	1959	7,342	73.4[c]	---	26.6
	1960	7,057	73.3	---	26.7
(3) Agricultural census	1959	6,306	48.2	26.9	24.9

[a]Monthly Report on the Labor Force (MRLF)

[b]Statistical Reporting Service (SRS)

[c]Includes both operator and family labor since the Statistical Reporting Service does not provide separate estimates.

Source: (1) U.S. Bureau of Labor Statistics, Employment and Earnings, Annual Supplement Issues, 1959, 1960. (2) U.S. Department of Agriculture, ERS, Farm Cost Situation, Nov. 1963. (3) U. S. Bureau of the Census, U. S. Census of Agriculture, 1959, II, General Report, Statistics by Subjects, Chap. iv.

The MRLF and agricultural census estimates of unpaid family labor are quite different. Some difference is expected since the MRLF estimates are annual averages and the agricultural census estimate is for the week preceding the enumeration.

About one out of every four persons (24.9 to 28.9 percent) working in agriculture in 1959 was a hired wage worker. The MRLF series, in which workers are classified

according to the occupation in which they put in the most hours during the survey week, shows the highest proportion of workers as hired wage workers.

To estimate the proportion of the total hired labor input contributed by seasonal workers, it is appropriate to use data from the Hired Farm Work Force (HFWF) series since this series includes more detailed information on days worked per worker. Although data for both the MRLF and HFWF series are collected by the same agency, very different estimates are presented of the number of persons working for agricultural wages. This is a consequence of the HFWF series including all persons who work for any agricultural wages during the year in contrast to the MRLF series which includes as farm workers only those persons who contribute more than one-half of their employed hours to agriculture.

For 1960 the MRLF series, Table III-3, shows a monthly average of 1,866,000 persons working for wages and salaries in agriculture. The HFWF series, Table III-4, shows 3,693,000 persons as hired farm workers. But Table III-4 shows that 77.6 percent of all agricultural wage workers were seasonal workers who were employed less than 150 days at farm wage work during the year. Furthermore, more than one-half of all seasonal workers did less than 25 days of farm work in 1960.

Although seasonal workers comprise the largest proportion of the hired farm work force, their contribution in terms of the total number of days worked by the group is

Table III-3. Agricultural employment by class of worker 14 years of age and older and percent distribution by class of worker, United States, 1940-62

Year	Total Workers	Self-Employed Workers	Unpaid Family Workers	Wage or Salary Workers	Total Workers	Self-Employed Workers	Unpaid Family Workers	Wage or Salary Workers
	Thou.	Thou.	Thou.	Thou.	Pct.	Pct.	Pct.	Pct.
1940	9,540	5,480	1,580	2,480	100	57	17	26
1941	9,100	5,160	1,710	2,230	100	57	19	24
1942	9,250	4,580	2,080	2,590	100	50	22	28
1943	9,080	4,530	2,300	2,250	100	50	25	25
1944	8,950	4,740	2,210	2,000	100	53	25	22
1945	8,580	4,680	2,140	1,760	100	55	25	20
1946	8,320	4,810	1,840	1,670	100	58	22	20
1947	8,266	5,029	1,550	1,677	100	61	19	20
1948	7,973	4,671	1,556	1,746	100	59	19	22
1949	8,026	4,618	1,563	1,845	100	58	19	23
1950	7,507	4,346	1,427	1,733	100	58	19	23
1951	7,054	4,022	1,386	1,647	100	57	20	23
1952	6,805	3,936	1,342	1,526	100	58	20	22
1953	6,562	3,821	1,273	1,467	100	58	20	22
1954	6,504	3,821	1,230	1,452	100	59	19	22
1955	6,730	3,731	1,299	1,700	100	56	19	25
1956	6,585	3,570	1,323	1,692	100	54	20	26
1957	6,222	3,304	1,231	1,687	100	53	20	27
1958	5,844	3,087	1,086	1,671	100	53	18	29
1959	5,836	3,027	1,121	1,689	100	52	19	29
1960	5,723	2,802	1,054	1,866	100	49	18	33
1961	5,463	2,744	985	1,733	100	50	18	32
1962	5,190	2,619	905	1,666	100	51	17	32

Note: Percent decrease 1940-62: total workers, 45.6 pct., self-employed workers, 52.2 pct., unpaid family workers, 42.7 pct., wage or salary workers, 32.8 pct.

Source: U.S. Bureau of the Census, Annual Reports on the Labor Force, 1940-1958; U.S. Bureau of Labor Statistics, Employment and Earnings, Annual Supplement Issues, 1961, 1963.

relatively small. They account for over three-fourths of the hired work force but contribute less than one-third (32.2 percent) of the total man-days worked. Persons working fewer than 25 days comprise 41.5 percent of the hired labor force but provide only 5.3 percent of the total number of man-days of hired labor.

Table III-4. Number of agricultural wage workers, average and total days worked, and percent distribution by duration of work, United States, 1960

Duration of Farm Wage Work	Number of Workers	Average Days Worked	Total Days Worked	Pct. Distribution: Number of Workers	Pct. Distribution: Total Days Worked by Duration of Work
	Thou.	Days	Thou.	Pct.	Pct.
Total	3,693	86	317,598	100	100
Days worked					
Seasonal	2,864	...	102,153	77.6	32.2
Less than 25	1,531	11	16,841	41.5	5.3
25-149	1,333	64	85,312	36.1	26.9
Regular	828	...	215,088	22.4	67.8
150-249	390	191	74,490	10.5	23.5
250 and over	438	321	140,598	11.9	44.3

Source: Reed E. Friend and Robert R. Stanberry, Jr., The Hired Farm Working Force of 1960, U. S. Dept. of Agriculture, ERS, Ag. Info. Bul. 266, July 1962, p. 33.

Fewer than one out of four hired workers put in more than 150 days at farm wage work in 1960. But as a result of working more days per employed persons, regular hired workers contributed 67.8 percent of the total number of man-days of agricultural wage labor in 1960.

From the above discussion, it is clear that seasonal laborers make only a small contribution to the total agricultural labor input in terms of hours worked. These data, however, underestimate the importance of seasonal labor to agriculture. On many farms seasonal workers are hired only for harvesting the crop. But the availability of an adequate number of persons at harvest time may determine whether the crop is harvested when it is ready or is allowed to deteriorate and thereby reduced in value or lost.

Differences in Composition

The total number of agricultural workers declined 45.6 percent from 1940 to 1962. The decline occurred among all three major groups of workers but not at a uniform rate. The number of self-employed workers decreased most with hired workers decreasing least (Table III-3). Different rates of decrease, of course, have altered the composition of the labor force.

Table III-3 shows that 57 percent of all agricultural workers were self-employed in 1940. By 1962 this group of workers accounted for 51 percent of the total workers. The relative decline in self-employed workers was essentially offset by the relative increase of wage and salary workers from 26 percent of all workers in 1940 to 32 percent in 1962. Unpaid family workers accounted for the same percentage of all workers (17 percent) in 1962 as in 1940. As a class, unpaid family workers were more important during the war years, 1943-45, but have since declined in importance to their former position.

The composition of the farm labor force is not the same for all regions or geographic divisions of the United States. Farms in the North Central states are predominantly operated with family labor with over 86 percent of all workers classified as family workers (Table III-5). Furthermore, in the North Central states, both operator and other family workers comprise a larger proportion of the labor force than in other states. In this region unpaid family workers accounted for over 30 percent of the total labor force.

Of course, with farm operator families providing most of the labor to farms in the North Central states, few workers were hired laborers. In the West North Central states only 11.3 percent of the persons in the work force were classified as hired workers. At the opposite extreme were the Pacific states where 44.3 percent of all workers were hired workers. North East and West South Central states were not far behind Pacific states in the proportion of total workers classed as hired workers. In addition to the groups of states just listed, South Atlantic and Mountain states also had more than three out of every ten workers in agriculture who were hired workers in 1959.

Unpaid family workers were least important to the labor force in Pacific and West South Central states where they comprised 20.1 percent or less of the farm work force.

The general pattern over the United States of the relative importance of operator, unpaid family labor, and

Table III-5. Number and percent distribution of agricultural workers on farms during week preceding enumeration by class of worker, the United States, by division, 1959

Geographic Division	Total Workers	Total Family Workers	Total Operators	Unpaid Members of Operator's Family	Hired Workers
	Units	Units	Units	Units	Units
United States[a]	6,305,974	4,738,392	3,042,449	1,695,943	1,567,582
North East	113,768	72,483	48,268	24,215	41,285
Middle Atlantic	376,192	277,973	171,787	106,186	98,219
East North Central	1,065,246	918,646	580,349	338,297	146,600
West North Central	1,299,892	1,152,905	708,590	444,315	146,987
South Atlantic	994,704	687,673	449,515	238,158	307,031
East South Central	881,741	641,036	420,674	220,362	240,705
West South Central	875,164	563,448	387,195	176,253	311,716
Mountain	292,837	197,705	123,555	74,150	95,132
Pacific[a]	406,430	226,523	152,516	74,007	179,907
	Percent Distribution				
	Pct.	Pct.	Pct.	Pct.	Pct.
United States[a]	100	75.1	48.2	26.9	24.9
North East	100	63.7	42.4	21.3	36.3
Middle Atlantic	100	73.9	45.7	28.2	26.1
East North Central	100	86.2	54.5	31.8	13.8
West North Central	100	88.7	54.5	34.2	11.3
South Atlantic	100	69.1	45.2	23.9	30.9
East South Central	100	72.7	47.7	25.0	27.3
West South Central	100	64.4	44.2	20.1	35.6
Mountain	100	67.5	42.2	25.3	32.5
Pacific[a]	100	55.7	37.5	18.2	44.3

[a]Conterminous area

Source: U.S. Bureau of the Census, U.S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chap. iv, p. 308.

hired labor is as follows: family labor, including operator and unpaid family labor, is most important in North Central states, hired labor is more important in the South, the West and in the North East than in other states, and unpaid labor is least important in Pacific and adjoining Southern states.

Those farms which sell the largest volume of products would be expected to hire the most workers. Table III-6 shows that economic classes I through IV which include all farms with sales of $5,000 or more during the year accounted for 76.8 percent of all farms reporting hired labor in 1959.[1] Together, classes I-IV hired 83.3 percent of all persons working in the hired work force. Class I farms which include only 2.8 percent of all farms employed 34.6 percent of all hired workers during the week preceding the census enumeration for 1959. Classes I and II combined which included only 8.5 percent of all farms employed 52.0 percent of the hired work force in 1959.

Disaggregation of the hired work force to regular and hired workers shows the importance of regular hired workers to farms in the upper economic classes. Of all farms reporting regular hired workers, 88.0 percent were in economic classes I through IV (Table III-6). These farms employed 91.8 percent of all workers while the remaining 60.9 percent of

---

[1]Class limits in 1959 were determined by value of farm products sold as follows: Economic class I - $40,000 and over
II - $20,000 to $39,999
III - $10,000 to $19,999
IV - $5,000 to $9,999

Table III-6. Percent distribution of number of farms, estimated value of product sold, number of farms reporting by regular or seasonal hired workers, and workers hired by numbers of workers per farm by selected economic classes, conterminous United States, 1959

Item	All Farms	Class I	Class II	Class III	Class IV	Total First Four Classes	All other Farms
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Farms-number	100.0	2.8	5.7	13.0	17.6	39.1	60.9
Est. value of all farm products sold	100.0	31.2	18.5	22.0	15.4	87.1	12.8
Total hired workers							
Number farms reporting	100.0	14.2	19.4	24.6	18.6	76.8	23.2
Number of persons	100.0	34.6	17.4	17.8	13.5	83.3	16.6
Regular hired workers							
Farms reporting							
Total	100.0	21.8	25.0	26.0	15.2	88.0	12.0
1 hired worker	100.0	12.0	24.2	30.3	18.7	85.2	14.9
2 or more hired workers	100.0	40.2	26.6	18.0	8.4	93.2	6.8
Number of workers on farms							
Total	100.0	45.9	20.0	16.8	9.1	91.8	8.2
With 1 hired worker	100.0	12.0	24.2	30.3	18.7	85.2	14.9
With 2 or more hired workers	100.0	60.5	18.2	11.0	5.0	94.7	5.3
Seasonal hired workers							
Farms reporting							
Total	100.0	10.5	15.4	22.5	20.4	68.8	31.2
1 hired worker	100.0	7.8	15.9	24.5	20.9	69.1	30.9
2 or more hired workers	100.0	14.2	14.7	19.8	19.7	68.4	31.5
Number of workers on farms							
Total	100.0	25.8	15.4	18.6	17.0	76.8	23.2
With 1 hired worker	100.0	7.8	15.9	24.5	20.9	69.1	30.9
With 2 or more hired workers	100.0	30.3	15.3	17.2	16.0	78.8	21.3

Source: Calculated from U.S. Bureau of the Census, U.S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects - Chap. xi, pp. 1192, 1213, 1220; Chap. iv, p. 236.

the farms employed 8.2 percent of the regular hired workers. Economic class I, alone, employed 45.9 percent of all regular hired workers.

Slightly more than two out of three farms employing seasonal hired labor in 1959 were in economic classes I through IV. Of those farms reporting seasonal labor, 10.5 percent were in economic class I. This compares with only 2.8 percent of all farms in class I. This means that value of sales is positively related to the use of seasonal labor. However, a smaller proportion of the farms in class I reported hiring seasonal laborers than reported hiring regular hired workers (10.5 percent compared to 21.8 percent).

Farms in economic classes I through IV employed 76.8 percent of all seasonal workers during the specified week for which the 1959 agricultural census was taken. This means that all other farms or 60.9 percent of all farms were employing only 23.2 percent of all seasonal workers. However, the percentage distribution of seasonal workers among economic classes of farms should be viewed with caution since, by the very nature of the seasonal worker classification, it is clear that a census taken during some other month of the year could produce a different percentage distribution.

Skill Level of the Work Force

Overall performance of the agricultural sector and its ability to provide an abundance of food is a general indication of the managerial and labor skill possessed by the

farm labor force. However, little specific information is available at the macro level as to the skill level possessed by farm operators and their families. Specific information is available on skill level and educational attainment of the hired farm work force.

In 1961 the following characteristics typified farm wage workers 25 years old or over: 73 percent had no more than a grade school education (8 or fewer years of school completed), three out of ten were functionally illiterate and only one out of seven was a high school graduate.[1] As one would expect skill levels were also low. Hand or stoop labor was the highest skilled farm job held by 32 percent of all hired workers. Truck or tractor driver was the highest skilled job held during 1961 by 31 percent of all wage workers.[2]

The inference to be drawn here is that most persons in the hired farm work force possess few of the skills which are in greatest demand in the nonfarm labor market. These persons could qualify only for unskilled jobs in the nonfarm sector. Their difficulties in finding employment are compounded by the long-term decline in the relative proportion of jobs which require little training and skill.

Summary

To recapitulate, the agricultural labor force consists

---

[1] James D. Cowhig, Education, Skill Level, and Earnings of the Hired Farm Working Force of 1961, U.S. Department of Agriculture, Ag. Ec. Report No. 26, 1963, p. v.

[2] Ibid., p. 10.

of self-employed operators, unpaid family workers and wage workers. Hired workers are sub-classified as permanent or seasonal with seasonal laborers supplied from local or migrant sources. Migrant workers are supplied from domestic or foreign sources.

The total agricultural work force declined by almost one-half from 1940 to 1962 with an average of about 200,000 workers shifting out of agricultural work each year. Although farm operator and unpaid family labor have declined some in relative importance, the farm operator and his family remain as the major source of labor in agriculture. Hired labor is more important in the South, the West and in Northeastern states. Also, as expected hired labor is a more important source of labor on farms in the upper economic classes.

Major Movements of Labor from the Farm Sector

From 1920 to 1960, the size of the farm population declined 15.4 million persons. Dividing this period of time into two sub-periods of equal length, 1920 to 1939 and 1940 to 1959 shows that almost all the movement has occurred during the latter period when the farm population decreased by 14.0 million persons as contrasted to the first period when farm population decreased only 1.1 million. This very large difference between periods suggests that it would be useful to further subdivide the period. Thus, 5-year periods are used for analysis of differences by period. Population

estimates for shorter periods suffer from greater probability of being in error; longer periods disclose less of the temporal variation.

Farm Population

Changes in the size of the farm population by 5-year periods show substantially different rates for each period. In contrast with all other 5-year periods, farm population increased 1.8 million persons from 1930 to 1934 (Table III-7). This increase was followed by a decrease of 1.3 million from 1935 to 1939 which means that the farm population increased over the decade. The 1940-44 period shows a huge out-movement of the farm population of over 8.0 million persons which led to a net decrease of over 5.7 million persons during the period. In one year, 1942, over 3.1 million persons left the farm population.

The very large decrease in the farm population was followed by a very small decrease of .2 million persons for 1945-49. This small decrease does not reveal the events which occurred during the period. During this period the farm population increased by .7 million persons in 1945 then decreased by 1.9 million in 1947.[1] After the reversal of trend in the 1945-49 period, the large off-farm movement

---

[1]Vera J. Banks, Calvin L. Beale and Gladys K. Bowles, Farm Population Estimates for 1910-62, U. S. Dept. of Agriculture, ERS-130, Oct. 1963, p. 23.

Table III-7. Changes in the farm population, farm labor force, and farm labor requirements, for selected periods, United States, 1917-62

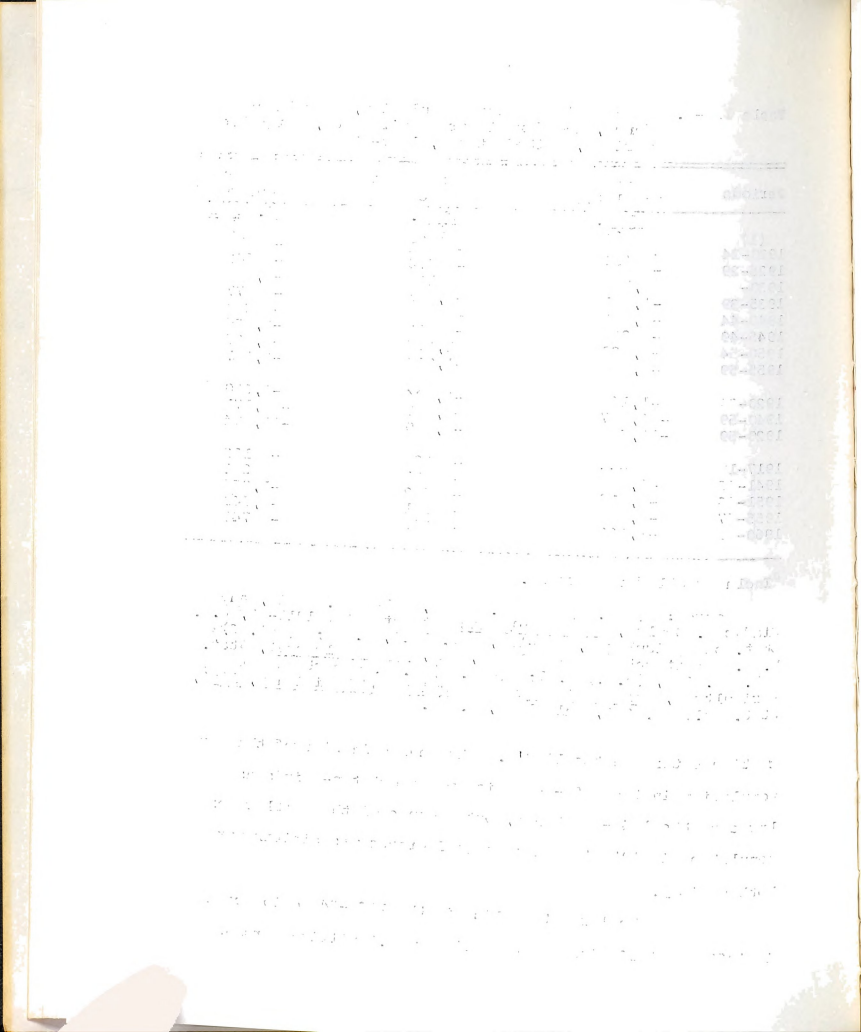
Periods	Farm Population	Farm Labor Force[a]	Labor Requirements
	Thou.	Thou.	Mil. hours
(1)	(2)	(3)	(4)
1920-24	- 797	- 401	- 672
1925-29	- 610	- 674	- 642
1930-34	1,776	130	-2,689
1935-39	-1,321	-1,395	- 377
1940-44	-5,732	- 760	- 309
1945-49	- 226	- 36	-2,636
1950-54	-4,029	-1,275	-1,827
1955-59	-2,486	-1,039	-2,507
1920-39	-1,134	-2,094	-3,320
1940-59	-13,957	-3,637	-10,171
1920-59	-15,382	-6,090	-13,694
1917-19	---	- 325	- 122
1941-43	-3,932	- 223	251
1951-53	-2,016	- 682	-1,256
1955-57	-1,422	- 781	-1,749
1960-62	-1,322	- 357	- 740

[a]Includes all farm workers.

Source: (Col. 2) Vera J. Banks, Calvin L. Beale, and Gladys K. Bowles, Farm Population Estimates for 1910-62, U.S. Dept. of Agriculture, ERS-130, Oct. 1963, p. 23; (Col. 3) U. S. Department of Agriculture, SRS, Farm Employment, Stat. Bul. No. 334, (n.d.) p. 7; (Col. 4) U. S. Department of Agriculture, Changes in Farm Production and Efficiency, 1963, Stat. Bul. No. 233, July 1963, p. 34.

continued through the 1950's. The change in size of the farm population in the 1950-54 period was about two-thirds as large as the 1940-44 change, but because of the smaller farm population in 1950 the percentage decrease was similar for both periods.

The largest decline in the 1950-54 period came in 1952 and 1953 with a net decline of 4.0 million persons



for the period. After a downturn in the rate of off-farm movement near the end of the 1950-54 period, the rate increased and 1.3 million persons left the farm population in 1956. For the 5-year period including 1956, the total decline in the farm population consisted of 2.5 million persons who had comprised more than one-eighth of the 1955 farm population.

Large off-farm movements continued into the 1960's as a net annual average of 910 thousand persons left the farm population from 1960 to 1963.[1] It is clear that a major change in the rate of off-farm migration occurred about 1941. This increased rate of off-farm migration, although erratic, has continued to date.

Changes in the size of the farm population for a given period are a function of the number in the group at the beginning of the period, the excess of births over deaths and migration from or to the farm population. For each of the years 1920-62 births have exceeded deaths; thus, barring migration there would have been a natural increase in the size of the farm population. For the farm population to decrease in size, net out-migration must exceed the natural increase. Two figures for the 1920-59 period show the importance of natural increase as a factor in maintaining the

---

[1] U. S. Department of Agriculture, ERS, Farm Population-Estimates for 1963, ERS-177, July 1964, p. 3.

farm population. During this period 31.6 million persons migrated from the farm. This was essentially the size of the farm population in 1920 as net out-migration for the period consisted of 99.0 percent of the initial population. However, as a result of natural increase the net decrease in the size of the farm population was 48.1 percent during the period (Table III-8).

Net out-migration by 5-year periods has exceeded 10 percent of the initial farm population in all periods except 1925-29 and 1930-34. Since 1940 migration by 5-year periods has amounted to about 25 percent of the initial population for each period except for the 1945-49 period when net migration dropped to 13.9 percent. Out-migration amounted to only .9 percent for 1930-34 which contributed to the 5.8 percent increase in size of the farm population.

In summary, large net movements of the farm population off the farm occurred in these periods: 1940-44, 1950-54 and 1955-59. Net movements to the farm occurred in the 1930-34 period and during 1945.

Farm Labor Force

Off-farm movements of the farm population do not coincide with changes in the farm work force. The major differences in rates of change can be summarized by comparing movements by 20-year periods.[1] The farm work force decreased

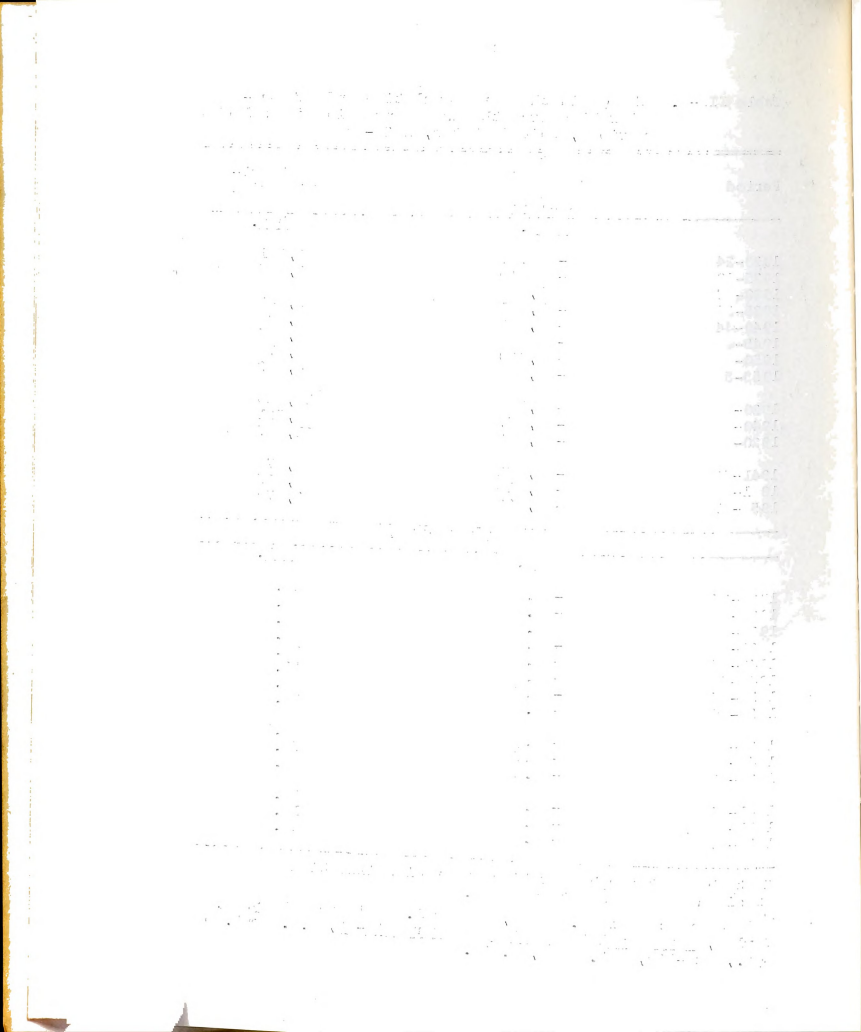
[1]Changes in three measures of the total labor input--farm population, the farm labor force and labor requirements--are presented here. An analysis of these changes is included in Chapter IV following p.151.

Table III-8. Change in the farm population and net out-migration from the farm population for selected periods, United States, 1920-60

Period	Net Change in Farm Population	Net Out-Migration[a]
	Thou.	Thou.
1920-24	- 797	3,331
1925-29	- 610	2,965
1930-34	1,776	288
1935-39	- 1,321	3,542
1940-44	- 5,732	8,008
1945-49	- 226	3,385
1950-54	- 4,029	5,576
1955-59	- 2,486	4,552
1920-39	- 1,134	10,126
1940-59	-13,957	21,521
1920-59	-15,382	31,647
1941-43	- 3,932	6,472
1951-53	- 2,016	3,835
1955-57	- 1,422	2,670
	Percent Distribution	
	Pct.	Pct.
1920-24	- 2.5	10.4
1925-29	- 2.0	9.5
1930-34	5.8	.9
1935-39	- 4.1	11.0
1940-44	-18.8	26.2
1945-49	- .9	13.9
1950-54	-17.5	24.2
1955-59	-13.0	23.9
1920-39	- 3.5	31.7
1940-59	-45.7	70.5
1920-59	-48.1	99.0
1941-43	-13.1	21.5
1951-53	- 9.2	17.5
1955-57	- 7.5	14.0

[a]Net change through migration and reclassification of residence from farm to nonfarm.

Source: Vera J. Banks, Calvin L. Beale and Gladys K. Bowles, Farm Population Estimates for 1910-62, U.S. Dept. of Agr., ERS-130, Oct. 1963, p. 23.



15.6 percent from 1920-39 but the farm population decreased only 3.5 percent (Table III-9). During 1940-59, the work force decreased 33.1 percent, a percentage change more than double that for the previous period. This contrasts to the 1940-59 period with 45.7 percent decrease in the farm population. The percentage change of the farm population during the second period was over 13 times that for the first period. Large differences in rates of change for the two series also appear when the series are compared by 5-year periods. For 1930-34 the farm population increased 5.8 percent but the farm work force increased only 1.0 percent. In the subsequent 5-year period, the farm work force decreased by 1.4 million workers or by 11.0 percent. But the farm population declined only 4.1 percent which comprised 1.3 million persons. The large 18.8 percent decline of the farm population in the 1940-44 period reduced the farm labor force only 6.9 percent.

The farm work force declined more than 12 percent during both 5-year periods of the 1950's with the larger absolute decline of 255 thousand workers per year in the first period compared to a loss of 208 thousand workers per year in the 1955-59 period.

Summing up, two periods, 1930-34 and 1945-49, featured very small changes in the farm work force. Three periods, 1935-39, 1950-54 and 1955-59, showed large declines in the size of the farm work force.

Table III-9. Percent changes[a] in the farm population, farm labor force, and farm labor requirements, for selected periods, United States, 1917-62

Periods	Farm Population	Farm Labor Force	Labor Requirements
	Pct.	Pct.	Pct.
1920-24	- 2.5	- 3.0	- 2.8
1925-29	- 2.0	- 5.2	- 2.7
1930-34	5.8	1.0	-11.7
1935-39	- 4.1	-11.0	- 1.8
1940-44	-18.8	- 6.9	- 1.5
1945-49	- .9	- .4	-14.0
1950-54	-17.5	-12.8	-12.1
1955-59	-13.0	-12.4	-19.6
1920-39	- 3.5	-15.6	-13.8
1940-59	-45.7	-33.1	-49.7
1920-59	-48.1	-45.3	-57.1
1917-19	---	- 2.4	- .5
1941-43	-13.1	- 2.1	1.3
1951-53	- 9.2	- 7.1	- 8.3
1955-57	- 7.5	- 9.3	-13.7
1960-62	- 8.5	- 5.1	- 7.5

[a]Change is calculated as percent of initial quantity.

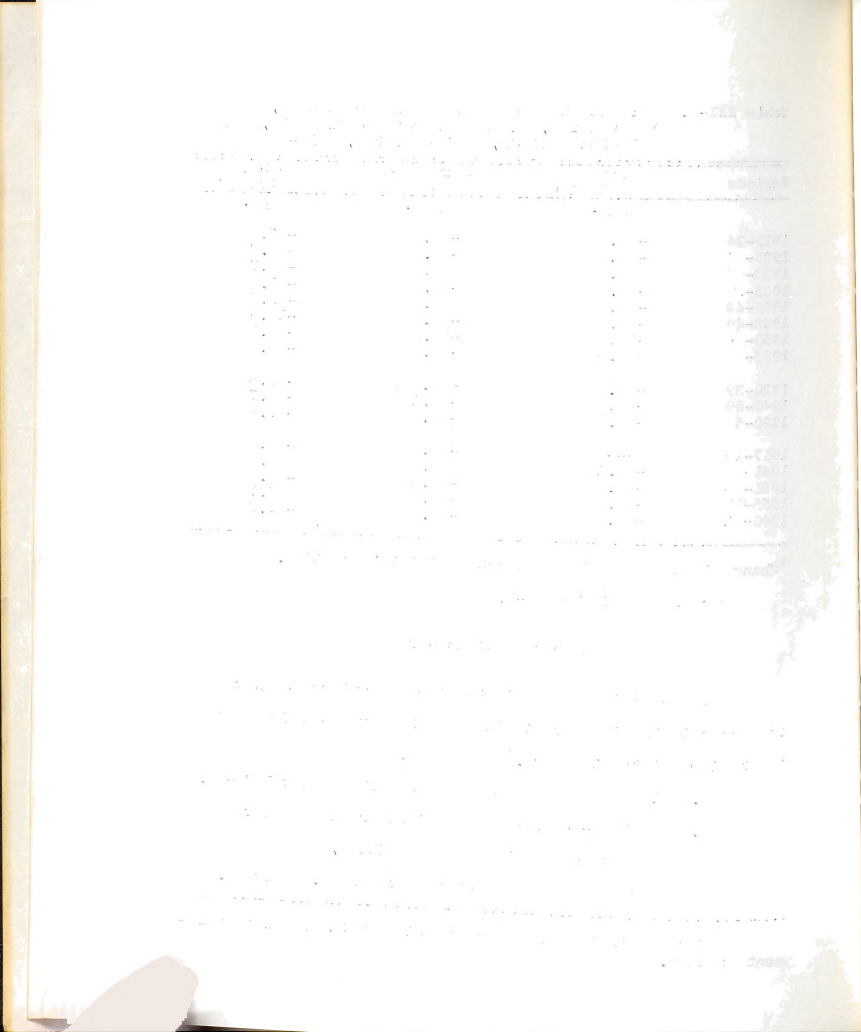
Source: See Table III-7.

Labor Requirements

On comparing change in the labor requirements series to change in the farm population and the farm work force at least five points stand out.[1] They are:

1. All three measures show small change for 1920-29.
2. For 1930-34 there was an increase in the farm population and the farm work force, but a decrease in labor requirements of 11.7 percent.

[1]See Appendix A for a description of the labor requirements series.



3. Almost no change occurred in labor requirements for 1940-44 concurrent with the largest decrease in the farm population of any period. The farm labor force declined almost 7 percent during this period.
4. Change in the size of the farm population and the farm labor force was negligible during the 1945-49 period but labor requirements dropped by a substantial 14.0 percent.
5. Large adjustments occurred in all three series more or less simultaneously for both periods during the 1950's. Decreases were 12 percent or more in all three series.

The above five points show clearly that adjustment in labor use is not a smooth continuous process. It occurs in spurts with backward and forward movements.

Farm Income and Labor Earnings

Annual farm income is difficult to measure. The task is complicated because of questions over what should be included as income, how changes in inventory are to be valued, value of home produced goods consumed on the farm, rent on owner occupied houses, etc. One way to approach the problem is to compare several sources of income data which involve different concepts rather than place reliance on one source of information, only.

For more than 30 years, economists have been pretty much in agreement that incomes of persons in agriculture are lower than incomes in the nonfarm economy. Frequently, data published by the U. S. Department of Agriculture have been cited to support this consensus. Incomes of the farm population and incomes of farm workers are used for comparison with incomes of their counterpart in the nonfarm economy. Some of these estimates of income are examined first.

Time-series Comparisons of Farm and Nonfarm Income

Table III-10 compares per capita income of the farm population with per capita income of the nonfarm population. Per capita income of the farm population in 1962 was $1,436 compared to $2,445 for persons in the nonfarm sector. Historically, this was the highest recorded per capita income for the farm population, yet it was only 59 percent as much as per capita nonfarm income.[1] From 1942 to 1962, per capita farm income was in the range of 47 to 63 percent of per capita nonfarm income. The gap between per capita farm and nonfarm income was smallest in 1948 when farm income was 63.0 percent of per capita nonfarm income.

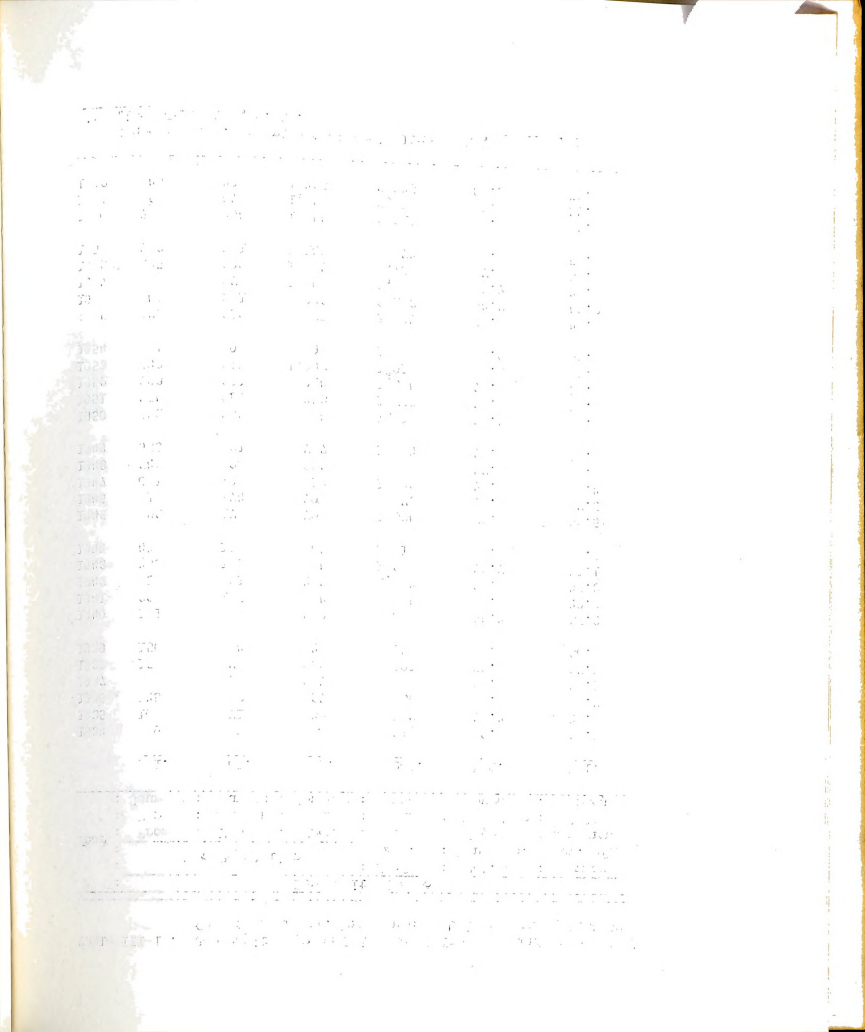
---

[1] Equilibrium in labor use does not require equal incomes in the two sectors. See D. Gale Johnson, "Labor Mobility and Agricultural Adjustment," in Agricultural Adjustment Problems in a Growing Economy, ed. by E. O. Heady, et al. (Ames, Iowa: Iowa State Univ. Press), 1958, pp. 163-72 and Hathaway, Government in Agriculture, pp. 34-35 for adjustment factors to account for differences in characteristics of the farm and nonfarm work forces which permit comparison of farm and nonfarm incomes.

Table III-10. Per capita personal income of farm and nonfarm population from farm and nonfarm sources, United States, 1934-62

Year	Per Capita Income					
	Farm Population			Nonfarm Pop.	Pct. of Farm Pop. Income From Farm	Farm as Pct. of Nonfarm, All
	From Farm Sources	From Nonfarm Sources	From All Sources	From All Sources	Sources	Sources
	Dol.	Dol.	Dol.	Dol.	Pct.	Pct.
1934	99	67	166	512	59.6	32.4
1935	169	71	240	552	70.4	43.5
1936	145	82	227	636	63.9	35.7
1937	201	86	287	666	70.0	43.1
1938	153	79	232	621	65.9	37.4
1939	156	84	240	655	65.0	36.6
1940	161	89	250	699	64.4	35.8
1941	229	105	334	835	68.6	40.0
1942	353	131	484	1,034	72.9	46.8
1943	466	158	624	1,222	74.7	51.1
1944	496	169	665	1,314	74.6	50.6
1945	528	172	700	1,334	75.4	52.5
1946	616	174	790	1,373	78.0	57.5
1947	621	193	814	1,442	76.3	56.4
1948	743	220	963	1,529	77.2	63.0
1949	556	231	787	1,514	70.6	52.0
1950	622	262	884	1,618	70.4	54.6
1951	754	289	1,043	1,765	72.3	59.1
1952	723	301	1,024	1,854	70.6	55.2
1953	693	315	1,008	1,919	68.8	52.5
1954	691	308	999	1,889	69.2	52.9
1955	638	322	960	1,997	66.5	48.1
1956	642	351	993	2,103	64.7	47.2
1957	690	376	1,066	2,166	64.7	49.2
1958	805	392	1,197	2,165	67.3	55.3
1959	713	431	1,144	2,274	62.3	50.3
1960	790	464	1,254	2,311	63.0	54.3
1961	882	476	1,358	2,350	64.9	57.8
1962	940	496	1,436	2,445	65.5	58.7

Source: U. S. Department of Agriculture, ERS, Farm Income Situation, July 1963, p. 39.



For the period 1934-1962, the median ratio of per capita farm income to per capita nonfarm income was 51.1 percent. In six of the eight years prior to 1942 the ratio of farm income to nonfarm income was 40.0 percent or less.

Average annual farm income per worker in 1962 was $2,328. This compares unfavorably with the average annual wage per employed factory worker of $5,021.[1] This unfavorable relation for agriculture has persisted since 1917. Although farm income per worker has been lower than income per employed factory worker for the entire period under consideration, the ratio of farm to nonfarm income moved especially favorably to farmers during two periods. During the years 1917-19 and 1945-48 the index of farm income was higher than the index (1910-14=100) of the annual wage for employed factory workers. Yet per capita farm income remained below nonfarm income.

The index of income per farm worker was 689 in 1962 contrasted to 918 for income per employed factory worker (1910-14=100). From 1946 to 1962 there was a dramatic rise in factory worker wages as the index rose from 412 to 918. During the same period, the index of farm worker incomes rose from 511 to 689.[2]

---

[1] U. S. Department of Agriculture, ERS, Farm Income Situation, July 1963, p. 41.

[2] Ibid.

Increases in income per farm worker have been less steady than increases in the annual wage for employed factory workers. For the 45 years preceding 1962, per capita farm income increased from one year to the next in 28 instances. Farm income decreased in 15 instances. Two times during the period the index did not change from one year to the succeeding year. By contrast, income per employed factory worker increased from one year to the next in 35 instances and decreased in only nine instances. No significant change was registered for one year.

Comparison of incomes of persons in the rural and urban populations can be misleading since the classification depends on place of residence. Place of residence does not necessarily correspond to occupation, a factor which is becoming increasingly important. Also, the proportion of persons of working age is higher in the nonfarm population than in the farm population. Comparison of incomes of farm and factory workers without qualification can also be misleading.[1] Income per farm worker as reported by the USDA is underestimated because total agricultural income is divided by too large a number. The denominator, the estimated number of workers, includes many persons who contribute few hours to the farm labor force.[2] On the other hand annual income of

---

[1]For example, see the comparison of farm worker and factory workers incomes in U. S. Department of Agriculture, ERS, Farm Income Situation, July 1963, p. 41.

[2]See Appendix A, Statistical Reporting Service Farm Employment Series.

factory workers is overestimated as it is the product of weekly earnings times 52. This makes no allowance for wages lost through unemployment which is important in the industrial sector. Also, farm worker income makes no allowance for off-farm earnings, a source of earnings which has become increasingly important since the 1940's. (Table III-10)

Median Income Comparisons for 1959

A source of income data which avoids some of the above criticisms is available. The Current Population Survey (CPS) collects income data and reports it for persons and families classified according to the occupation in which the person or the head of the household worked the most hours during the survey week. Thus, persons are assigned to one occupation and it can be inferred that this is the occupation which provides the major source of income.

CPS consumer income estimates by occupation are free of the criticism that farm income is underestimated because of an inflated estimate of the number of farm workers. CPS farm income estimates also take into account income from off-farm sources. Since income estimates are determined from responses to direct questions rather than derivations from weekly earnings times 52 weeks, the problem of unemployment is taken into account. Of course, one criticism of CPS income estimates is that the procedure of assigning a person to one occupation eliminates many persons from the farm labor force. This is important because of the large number of farmers who

are multiple job holders. The criticism is correct, but for certain policy purposes it may be more meaningful to consider persons in the occupation which provides the bulk of their support.

When incomes are compared by occupation, farm people rank near the bottom of the income scale. Income data in Table III-11 is total money income received by the family during 1959. Total income includes income from wages and salaries, interest, dividends, and rent. Thus, it is a return to all factors of production owned by the family. As previously stated, families are classified according to the occupation in which the head of the family works the most hours.

Table III-11. Total money income per family by occupation of head of family, United States, 1959

Occupation	Median Family Income
	Dol.
Prof., tech. and kindred workers	8,112
Self-employed	11,194
Salaried	7,890
Managers, off. and prop. except farm	7,592
self-employed	6,395
salaried	8,500
Sales workers	6,754
Craftsmen, foremen and kindred workers	6,368
Clerical and kindred workers	6,002
Operatives and kindred workers	5,419
Service workers except private household	4,635
Laborers except farm and mine	4,401
Farmers and farm managers	2,611
Farm laborers and foremen	2,265
Private household workers	1,596

Source: Herman P. Miller, Trends in the Income of Families and Persons in the United States: 1947 to 1960, U. S. Bureau of the Census, Tech. Paper No. 8, 1963, p. 152.

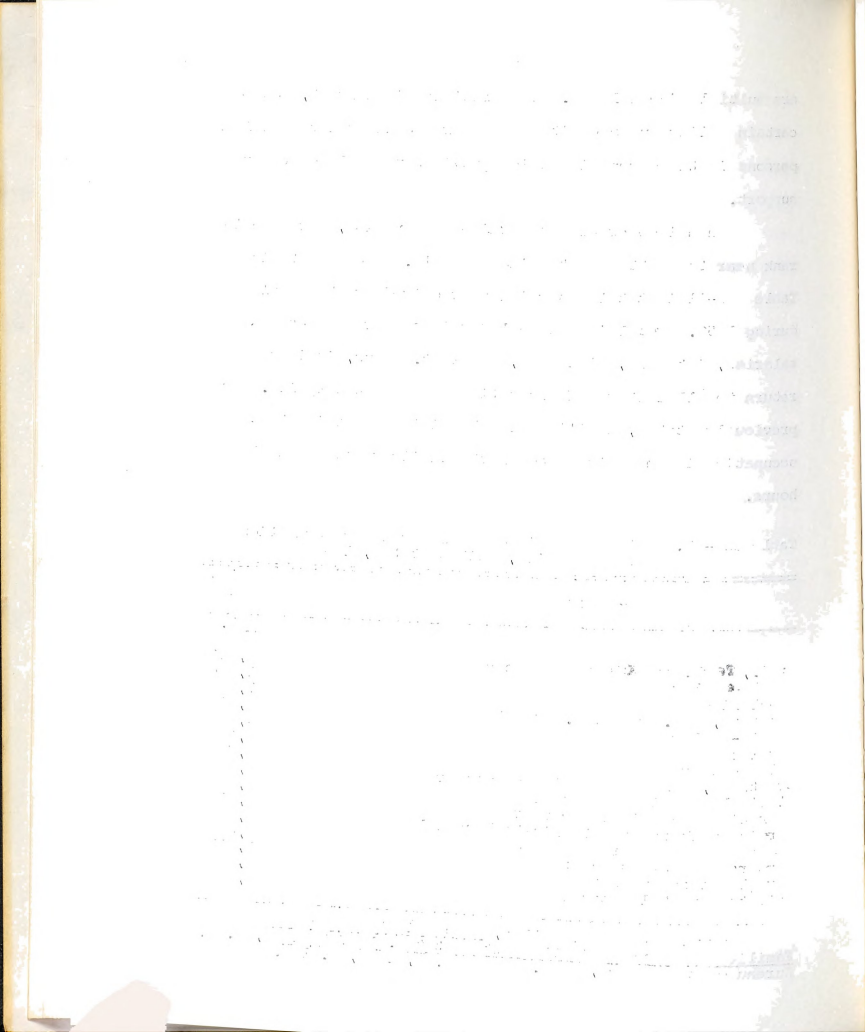


Table III-11 shows median incomes of families by occupation of the head of the family in 1959. For illustration, families which reported a sales worker as head of the family had a median income of $6,754 in 1959. Families headed by professional, technical and kindred workers were at the top of the scale with median incomes of $8,112 income. At the opposite end of the scale were private household workers with $1,596 family income.

Families whose heads were farm laborers and foremen were next above private household workers. Not far above this group were farmers and farm managers with median family incomes of $2,611. Families headed by laborers except farm and mine workers were considerably above farmers and farm managers.

Part of the variation in family incomes among occupations is a result of the composition of families and of the participation of members of the family in the work force. Thus, it is useful to compare incomes of persons by occupation.

Table III-12 shows the money income from all sources for male persons in 1959. Incomes by occupation are in terms of median incomes for all persons within the occupation. On a per person basis, professional, technical and kindred workers again are at the top of the list with $6,710 of income. Within this group self-employed workers had a median income of $10,593.

When occupations are ranked by income of persons, farm laborers and foremen are at the extreme low end of the

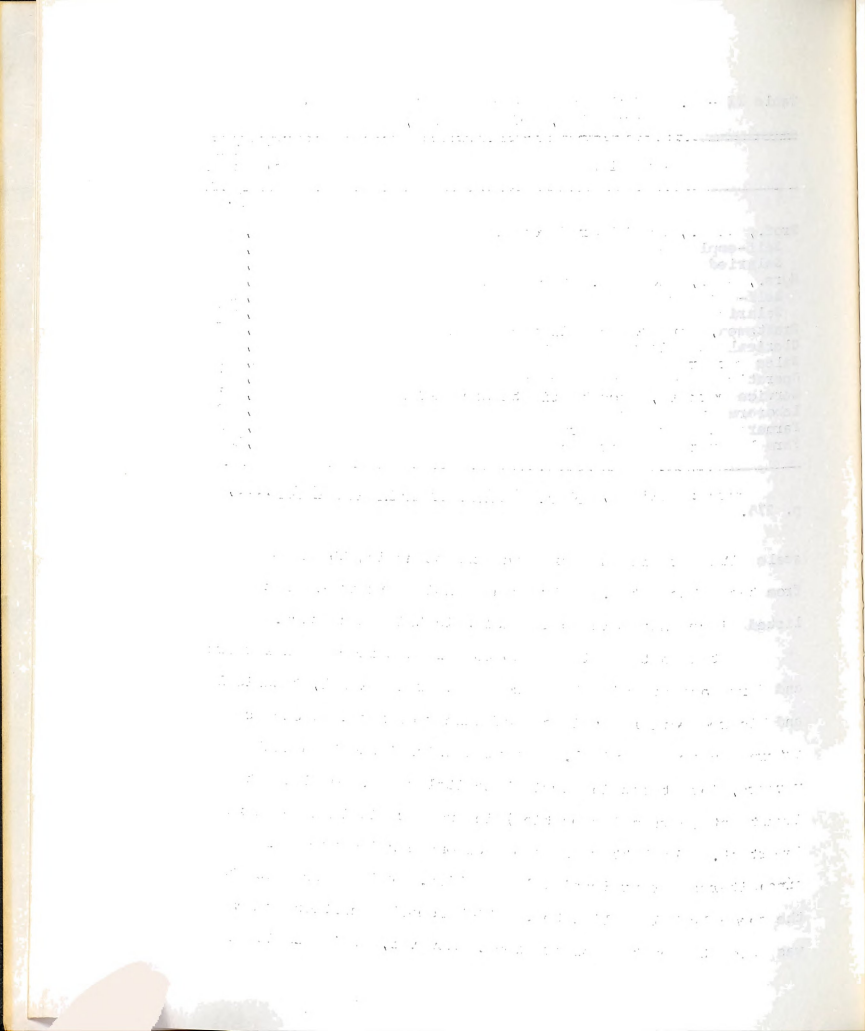
Table III-12. Total money income of male persons by occupation, United States, 1959

Occupation	Median Income of Persons Dol.
Prof., tech., and kindred workers	6,710
Self-employed	10,593
Salaried	6,529
Mgrs., off., and prop. except farm	6,333
Self-employed	5,299
Salaried	7,080
Craftsmen, foremen and kindred workers	5,355
Clerical and kindred workers	4,904
Sales workers	4,892
Operatives and kindred workers	4,281
Service workers, except private household	3,391
Laborers except farm and mine	3,150
Farmers and farm managers	1,901
Farm laborers and foremen	1,204

Source: Miller, Trends in the Incomes of Families...., p. 276.

scale with farmers and farm managers occupying the second from the bottom step. Private household workers are not listed since there are so few males in this occupation.

It is not meaningful to compare the incomes of farmers and farm managers with the incomes of professional, technical and kindred workers as income of farmer operators includes returns on owned capital. For professional and technical workers, investment in physical capital may be smaller but investment (personal education) in human capital may be more important. The latter group of persons has incurred large expenditures for professional education. This is compared to the commonly held belief that a high school education or less was adequate for the former group. However, it is meaningful



to compare the incomes of farm laborers and foremen to the incomes of nonfarm laborers.

There are small differences in the education and skill requirements for laborers regardless of their occupation. Required special skills usually can be acquired through short periods of on-the-job training. Because of similarities of these two groups of laborers one would expect smaller differences in the median incomes of the two groups.

If there were sufficient mobility of labor between occupations, one would expect the income of farmers and farm managers to be above the income of nonfarm laborers. Even if one assumed that education and skill requirements were the same for both groups, one would expect farmer's incomes to be higher because the capital invested in livestock, machinery and land by the farmer is much larger than the investment in tools and equipment by the typical laborer. If the farmer were to receive labor returns comparable to the nonfarm laborer, one would expect the farmer's total income to be considerably higher than that of the laborer.

Farm Income by Type of Farm

Two other kinds of data are useful in understanding labor returns in agriculture. These are returns by type of farm and marginal returns to labor as estimated in numerous studies. Labor returns by type of farm are available since 1930 from a USDA series. The USDA has published estimates of costs and returns for 25 or more representative types of

farms at different locations in the U. S. Representative farms are synthetic farms which have been built up from agricultural census data, special surveys conducted by the USDA and cooperating experiment stations, and from other sources of information. Probably a farm could not be found which exactly fits the organization prescribed as a representative farm, yet the organization can be considered as a close approximation to farms as they actually exist.

Returns to labor by type of farm are computed as residual returns to labor. Usual farm accounting techniques are used to determine operating and depreciation expenses. A charge is made for a return on capital invested with the residual representing labor income. This means that the allocation of returns to labor and capital are arbitrary as a given percent is allocated to invested capital regardless of its actual earnings.

To smooth out year-to-year fluctuations in income in order to get a clearer understanding of labor returns, annual returns have been averaged over 5-year periods. These averages are shown in Table III-13. Returns per hour for operator and family labor are shown for 33 types or subtypes of farms at widely scattered geographic locations. During the 1955-59 period 22 of 33 farms show labor returns of less than $1.00 per hour. Sixteen farms in this group show returns below $ .75 per hour with two farms showing no returns to operator and family labor. On two farms with negative

Table III-13. Residual returns per hour for operator and family labor by type of farm for selected periods, indicated locations, 1930-62

Type of Farm	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Dairy farms							
Central Northeast	.07	.11	.36	.72	.69	.77	.66
Eastern Wisconsin	---[a]	.07	.24	.46	.42	.28	.39
Western Wisconsin	-.02	.10	.25	.45	.55	.54	.71
Dairy-hog farms							
Southeastern Minnesota	-.01	.15	.35	.66	.71	.60	.58
Corn Belt farms							
Hog-dairy	-.03	.21	.53	1.02	.99	.80	.75
Hog-beef raising	-.10	.12	.42	.77	.74	.54	.41
Hog-beef fattening	-.03	.36	.91	2.02	1.65	1.05	1.05
Cash grain	-.12	.41	1.08	2.15	1.91	1.14	1.33
Poultry farms, New Jersey	---	---	---	.71	.44	-.05	---
Cotton farms							
Southern Piedmont	.04	.09	.20	.38	.45	.50	.52
Black Prairie, Texas	.09	.20	.35	.72	.73	.36	.48
High Plains, Texas							
Non-irrigated	---	.37[b]	1.22	1.81	1.06	1.55	3.17
Irrigated	---	---	1.82[c]	2.78	3.81	3.30	5.71
Delta-small	---	---	.41[c]	.55	.56	.51	---
Peanut-Cotton farms							
Southern Coastal Plains	---	---	.40[c]	.52	.61	.76	.97
Tobacco farms							
North Carolina Coastal Plain							
Tobacco-cotton	---	---	.52	.81	.85	.81	---
Large tobacco-cotton	---	---	.57[d]	.88	.89	.84	---
Small tobacco	---	---	.48	.61	.69	.70	---

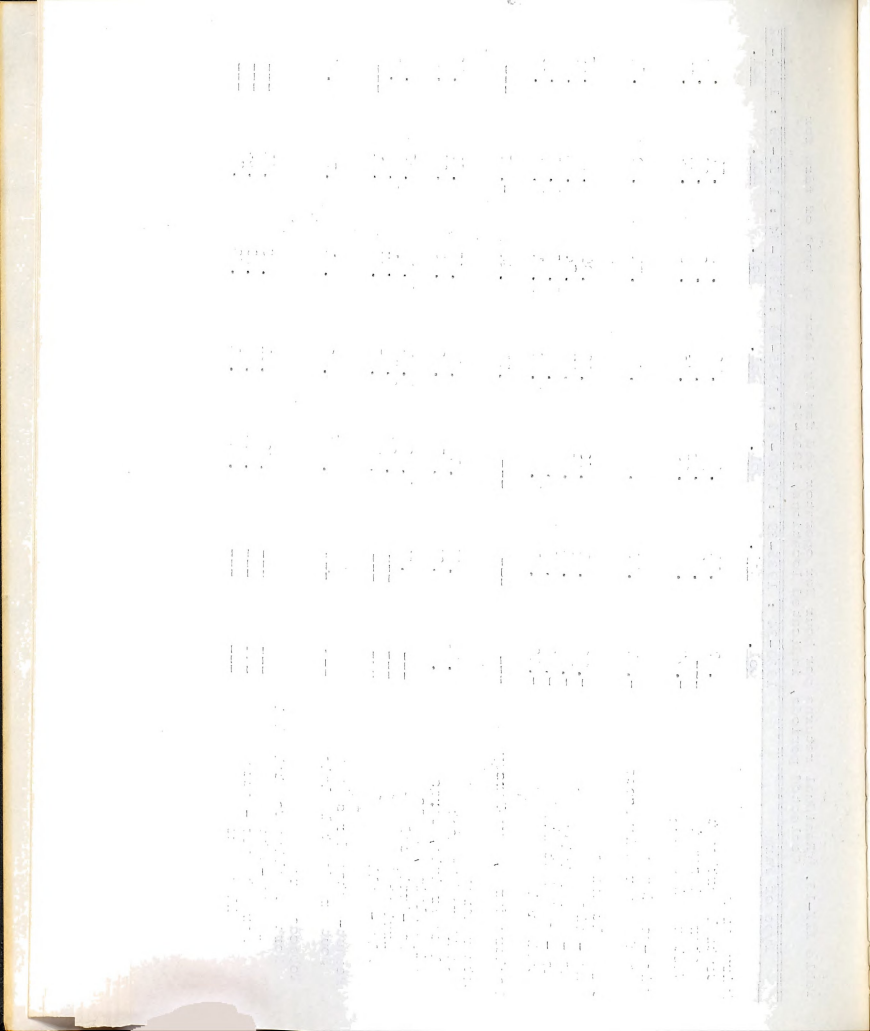


Table III-13 Continued

Type of Farm	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Kentucky Bluegrass							
Tobacco-livestock inner area	---	---	---	1.02	.99	.77	1.14
Tobacco-dairy							
Intermediate area	---	---	---	.43	.44	.48	.52
Outer area	---	---	---	.56	.61	.72	.80
Spring wheat farms, Northern Plains							
Wheat-small grain-livestock	-.24	-.10	1.01	2.04	1.12	1.33	1.36
Wheat-corn-livestock	-.15	-.01	.70	1.40	.82	.65	.96
Wheat-roughage-livestock	-.32	-.25	.90	1.50	.79	.59	1.21
Winter wheat farms							
Southern Plains							
Wheat	-.25	-.05	1.47	2.96	2.47	1.58	2.55
Wheat-grain sorghum	-.41	-.07	.87	1.89	.24	1.03	2.77
Pacific Northwest							
Wheat-pea	---	.56	3.68	4.37	4.05	2.39	1.96
Wheat-fallow	.54	.23	1.56	4.12	3.70	2.00	2.31
Cattle ranches							
Northern Plains	-.10	-.23	.63	.99	.83	.36	.84
Inter-mountain region	.04	.22	.67	1.27	1.45	1.48	1.64
Southwest	---	---	.12	.39	.66	.27	.54
Sheep ranches							
Northern Plains	.09	.14	1.02	1.03	1.27	1.25	1.31
Southwest	---	---	.71	.23	-1.06	-.33	.32

[a]Less than one-half cent; [b]3 years only; [c]1 year only; [d]2 years only.

Source: Wylie D. Goodsell and Isabel Jenkins, Costs and Returns on Commercial Farms, Long Term Study, 1930-57, U.S. Dept. of Agriculture, Stat. Bul. 297, 1961; U.S. Department of Agriculture, Farm Costs and Returns, Ag. Inf. Bul. No. 230, Revised June 1961; Ibid. Revised June 1963.

Table III-13 Continued

Type of Farm	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Kentucky Bluegrass							
Tobacco-livestock inner area	---	---	---	1.02	.99	.77	1.14
Tobacco-dairy							
Intermediate area	---	---	---	.43	.44	.48	.52
Outer area	---	---	---	.56	.61	.72	.80
Spring wheat farms, Northern Plains							
Wheat-small grain-livestock	-.24	-.10	1.01	2.04	1.12	1.33	1.36
Wheat-corn-livestock	-.15	-.01	.70	1.40	.82	.65	.96
Wheat-roughage-livestock	-.32	-.25	.90	1.50	.79	.59	1.21
Winter wheat farms							
Southern Plains							
Wheat	-.25	-.05	1.47	2.96	2.47	1.58	2.55
Wheat-grain sorghum	-.41	-.07	.87	1.89	.24	1.03	2.77
Pacific Northwest							
Wheat-pea	---	.56	3.68	4.37	4.05	2.39	1.96
Wheat-fallow	.54	.23	1.56	4.12	3.70	2.00	2.31
Cattle ranches							
Northern Plains	-.10	-.23	.63	.99	.83	.36	.84
Inter-mountain region	.04	.22	.67	1.27	1.45	1.48	1.64
Southwest	---	---	.12	.39	.66	.27	.54
Sheep ranches							
Northern Plains	.09	.14	1.02	1.03	1.27	1.25	1.31
Southwest	---	---	.71	.23	-1.06	-.33	.32

[a]Less than one-half cent; [b]3 years only; [c]1 year only; [d]2 years only.

Source: Wylie D. Goodsell and Isabel Jenkins, Costs and Returns on Commercial Farms, Long Term Study, 1930-57, U.S. Dept. of Agriculture, Stat. Bul. 297, 1961; U.S. Department of Agriculture, Farm Costs and Returns, Ag. Inf. Bul. No. 230, Revised June 1961; Ibid. Revised June 1963.

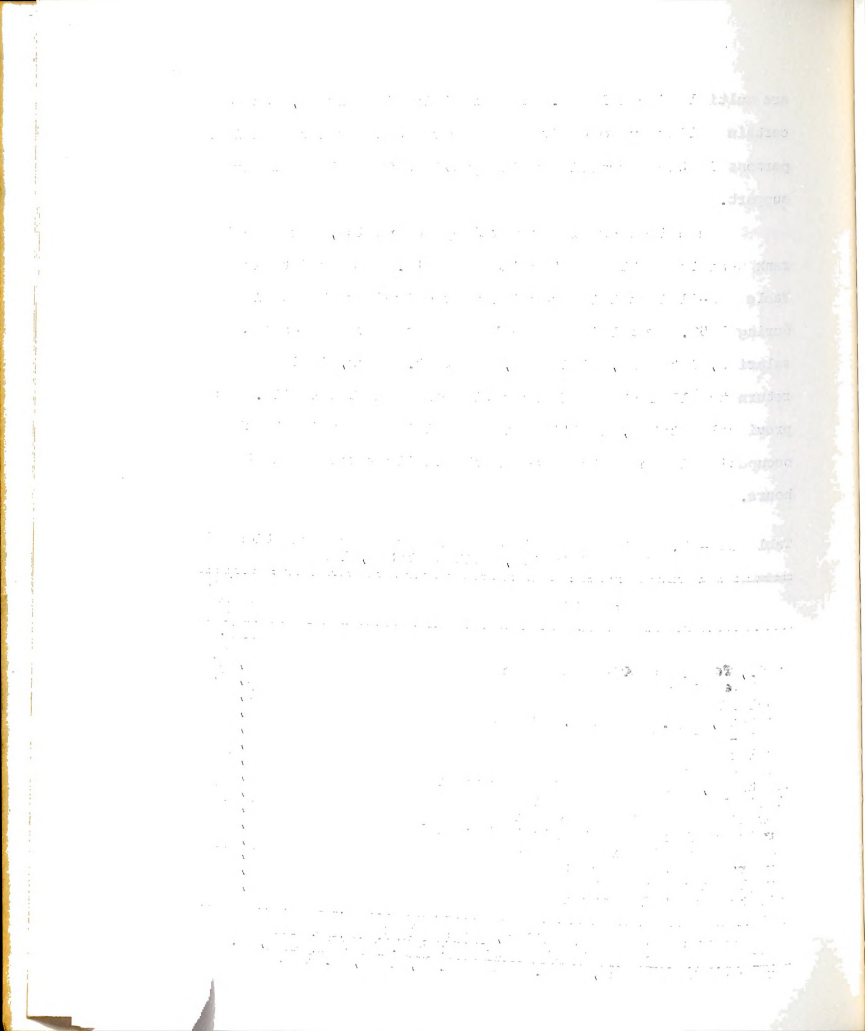


Table III-11 shows median incomes of families by occupation of the head of the family in 1959. For illustration, families which reported a sales worker as head of the family had a median income of $6,754 in 1959. Families headed by professional, technical and kindred workers were at the top of the scale with median incomes of $8,112 income. At the opposite end of the scale were private household workers with $1,596 family income.

Families whose heads were farm laborers and foremen were next above private household workers. Not far above this group were farmers and farm managers with median family incomes of $2,611. Families headed by laborers except farm and mine workers were considerably above farmers and farm managers.

Part of the variation in family incomes among occupations is a result of the composition of families and of the participation of members of the family in the work force. Thus, it is useful to compare incomes of persons by occupation.

Table III-12 shows the money income from all sources for male persons in 1959. Incomes by occupation are in terms of median incomes for all persons within the occupation. On a per person basis, professional, technical and kindred workers again are at the top of the list with $6,710 of income. Within this group self-employed workers had a median income of $10,593.

When occupations are ranked by income of persons, farm laborers and foremen are at the extreme low end of the

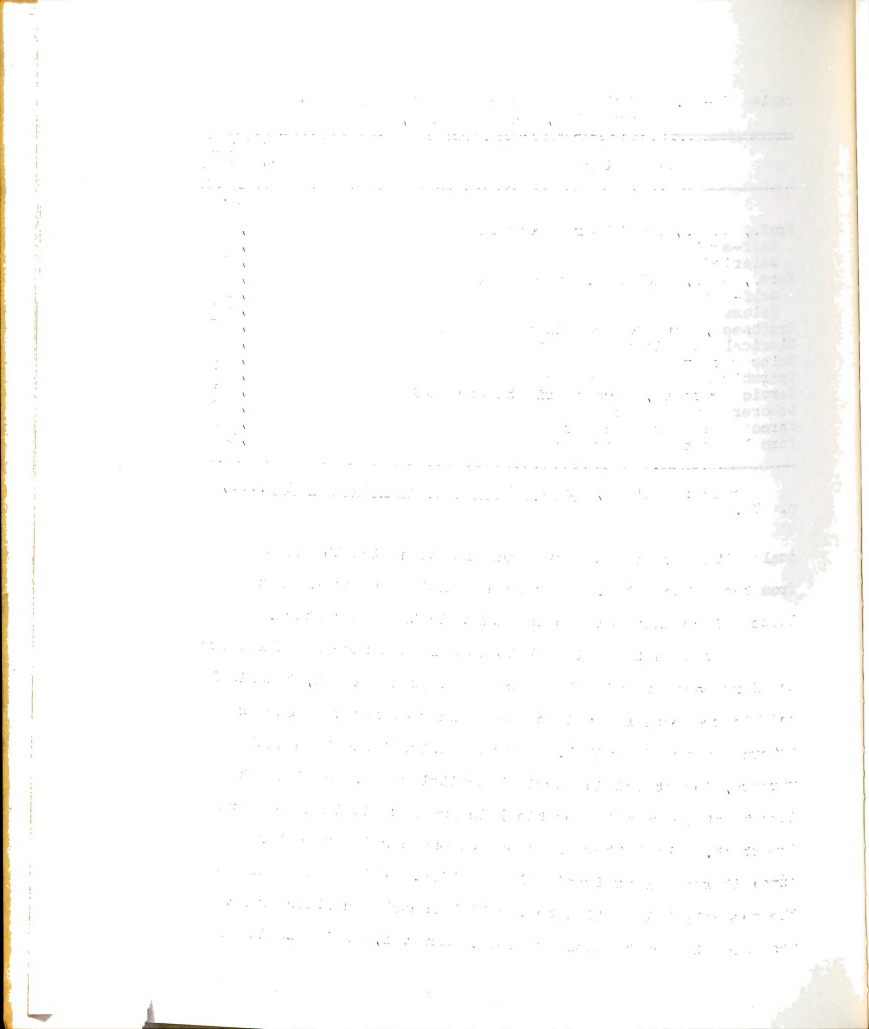
Table III-12. Total money income of male persons by occupation, United States, 1959

Occupation	Median Income of Persons Dol.
Prof., tech., and kindred workers	6,710
Self-employed	10,593
Salaried	6,529
Mgrs., off., and prop. except farm	6,333
Self-employed	5,299
Salaried	7,080
Craftsmen, foremen and kindred workers	5,355
Clerical and kindred workers	4,904
Sales workers	4,892
Operatives and kindred workers	4,281
Service workers, except private household	3,391
Laborers except farm and mine	3,150
Farmers and farm managers	1,901
Farm laborers and foremen	1,204

Source: Miller, Trends in the Incomes of Families...., p. 276.

scale with farmers and farm managers occupying the second from the bottom step. Private household workers are not listed since there are so few males in this occupation.

It is not meaningful to compare the incomes of farmers and farm managers with the incomes of professional, technical and kindred workers as income of farmer operators includes returns on owned capital. For professional and technical workers, investment in physical capital may be smaller but investment (personal education) in human capital may be more important. The latter group of persons has incurred large expenditures for professional education. This is compared to the commonly held belief that a high school education or less was adequate for the former group. However, it is meaningful



to compare the incomes of farm laborers and foremen to the incomes of nonfarm laborers.

There are small differences in the education and skill requirements for laborers regardless of their occupation. Required special skills usually can be acquired through short periods of on-the-job training. Because of similarities of these two groups of laborers one would expect smaller differences in the median incomes of the two groups.

If there were sufficient mobility of labor between occupations, one would expect the income of farmers and farm managers to be above the income of nonfarm laborers. Even if one assumed that education and skill requirements were the same for both groups, one would expect farmer's incomes to be higher because the capital invested in livestock, machinery and land by the farmer is much larger than the investment in tools and equipment by the typical laborer. If the farmer were to receive labor returns comparable to the nonfarm laborer, one would expect the farmer's total income to be considerably higher than that of the laborer.

Farm Income by Type of Farm

Two other kinds of data are useful in understanding labor returns in agriculture. These are returns by type of farm and marginal returns to labor as estimated in numerous studies. Labor returns by type of farm are available since 1930 from a USDA series. The USDA has published estimates of costs and returns for 25 or more representative types of

farms at different locations in the U. S. Representative farms are synthetic farms which have been built up from agricultural census data, special surveys conducted by the USDA and cooperating experiment stations, and from other sources of information. Probably a farm could not be found which exactly fits the organization prescribed as a representative farm, yet the organization can be considered as a close approximation to farms as they actually exist.

Returns to labor by type of farm are computed as residual returns to labor. Usual farm accounting techniques are used to determine operating and depreciation expenses. A charge is made for a return on capital invested with the residual representing labor income. This means that the allocation of returns to labor and capital are arbitrary as a given percent is allocated to invested capital regardless of its actual earnings.

To smooth out year-to-year fluctuations in income in order to get a clearer understanding of labor returns, annual returns have been averaged over 5-year periods. These averages are shown in Table III-13. Returns per hour for operator and family labor are shown for 33 types or subtypes of farms at widely scattered geographic locations. During the 1955-59 period 22 of 33 farms show labor returns of less than $1.00 per hour. Sixteen farms in this group show returns below $ .75 per hour with two farms showing no returns to operator and family labor. On two farms with negative

Table III-13. Residual returns per hour for operator and family labor by type of farm for selected periods, indicated locations, 1930-62

Type of Farm	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Dairy farms							
Central Northeast	.07	.11	.36	.72	.69	.77	.66
Eastern Wisconsin	---[a]	.07	.24	.46	.42	.28	.39
Western Wisconsin	-.02	.10	.25	.45	.55	.54	.71
Dairy-hog farms							
Southeastern Minnesota	-.01	.15	.35	.66	.71	.60	.58
Corn Belt farms							
Hog-dairy	-.03	.21	.53	1.02	.99	.80	.75
Hog-beef raising	-.10	.12	.42	.77	.74	.54	.41
Hog-beef fattening	-.03	.36	.91	2.02	1.65	1.05	1.05
Cash grain	-.12	.41	1.08	2.15	1.91	1.14	1.33
Poultry farms, New Jersey	---	---	---	.71	.44	-.05	---
Cotton farms							
Southern Piedmont	.04	.09	.20	.38	.45	.50	.52
Black Prairie, Texas	.09	.20	.35	.72	.73	.36	.48
High Plains, Texas							
Non-irrigated	---	.37[b]	1.22	1.81	1.06	1.55	3.17
Irrigated	---	---	1.82[c]	2.78	3.81	3.30	5.71
Delta-small	---	---	.41[c]	.55	.56	.51	---
Peanut-Cotton farms							
Southern Coastal Plains	---	---	.40[c]	.52	.61	.76	.97
Tobacco farms							
North Carolina Coastal Plain							
Tobacco-cotton	---	---	.52	.81	.85	.81	---
Large tobacco-cotton	---	---	.57[d]	.88	.89	.84	---
Small tobacco	---	---	.48[d]	.61	.69	.70	---

Table III-13 Continued

Type of Farm	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Kentucky Bluegrass Tobacco-livestock inner area	---	---	---	1.02	.99	.77	1.14
Tobacco-dairy							
Intermediate area	---	---	---	.43	.44	.48	.52
Outer area	---	---	---	.56	.61	.72	.80
Spring wheat farms, Northern Plains							
Wheat-small grain-livestock	-.24	-.10	1.01	2.04	1.12	1.33	1.36
Wheat-corn-livestock	-.15	-.01	.70	1.40	.82	.65	.96
Wheat-roughage-livestock	-.32	-.25	.90	1.50	.79	.59	1.21
Winter wheat farms							
Southern Plains							
Wheat	-.25	-.05	1.47	2.96	2.47	1.58	2.55
Wheat-grain sorghum	-.41	-.07	.87	1.89	.24	1.03	2.77
Pacific Northwest							
Wheat-pea	---	.56	3.68	4.37	4.05	2.39	1.96
Wheat-fallow	.54	.23	1.56	4.12	3.70	2.00	2.31
Cattle ranches							
Northern Plains	-.10	-.23	.63	.99	.83	.36	.84
Inter-mountain region	.04	.22	.67	1.27	1.45	1.48	1.64
Southwest	---	---	.12	.39	.66	.27	.54
Sheep ranches							
Northern Plains	.09	.14	1.02	1.03	1.27	1.25	1.31
Southwest	---	---	.71	.23	-1.06	-.33	.32

[a]Less than one-half cent; [b]3 years only; [c]1 year only; [d]2 years only.

Source: Wylie D. Goodsell and Isabel Jenkins, Costs and Returns on Commercial Farms, Long Term Study, 1930-57, U.S. Dept. of Agriculture, Stat. Bul. 297, 1961; U.S. Department of Agriculture, Farm Costs and Returns, Ag. Inf. Bul. No. 230, Revised June 1961; Ibid. Revised June 1963.

returns to labor, income was too small to cover the allowance for return on the investment. Of the other 11 farms, six had returns of $1.00 to $1.50; three show returns of $1.50 to $2.00. Only two farms provided labor returns of over $2.00 per hour during this period.

It is informative to contrast returns to operator and family labor with returns to unskilled labor employed in construction and road building. Wages of common labor in construction averaged $2.30 per hour over the 1955-59 period. Unskilled labor employed at road building earned $1.91 per hour during the same period.[1] Thus, only two farms provided labor returns equal to or exceeding unskilled wages in construction. Labor returns on only three farms exceeded the $1.91 per hour earned by unskilled road builders.

Even during the period 1945-49 when farm prices were high in relation to previous periods, labor returns remained low on many farms. During that period, 18 of 33 farm types had labor returns of $1.00 or less per hour. Out of the 18, 14 had labor returns per hour for operator and family labor of less than $ .75 per hour. Six farms show returns of $1.01 to $1.50; two show $1.51 to $2.00; and seven show returns of over $2.00 per hour. No other period shows as many farms with labor returns over $2.00 per hour. In contrast to labor returns of $ .75 or less per hour on 14 types of farms, unskilled workers in construction jobs earned $1.19 per hour

---

[1] Office of Business Economics, Business Statistics, U. S. Dept. of Commerce, 1963 edition, p. 83.

and unskilled road workers received $ .93 per hour during this period.[1]

The effect of the depression on farm labor returns is clear for the 1930-34 period. Hourly returns are available for 19 types of farms during this period. Of the 19 types, 12 show negative returns to labor; two show returns of less than $ .25 per hour and only one shows returns above $ .25.

A comparison of types of farms over all sub-periods for the 1930-62 period shows that labor returns have never exceeded $1.00 per hour for 16 of 33 farms. Hourly returns on an additional four types have never exceeded $1.25 per hour. A few farms show relatively high returns especially during certain periods. Particularly, irrigated cotton farms on Texas high plains and Pacific Northwest wheat-pea and wheat-fallow farms show returns well over $2.00 per hour during several periods.

Marginal Returns to Labor

Studies which estimate marginal returns to labor avoid the arbitrary nature of residual returns as the level of labor earnings does not depend upon returns to other factors. More than 50 such studies have been made since the 1940's. Although results of available studies cover a relatively short time period and a limited area of the U. S., they do provide additional supporting evidence that farm labor returns are low. Of the 22 studies shown in Table III-14, nine show that

---

[1] Ibid.

an additional month of labor was worth less than $50 to the farm firm. Seven studies show marginal labor returns of $50-100 per month and 10 show returns above $100. Also, it should be pointed out that farm product prices during the 1950-54 period were the highest of record, a factor which affects the marginal value product of any input.[1]

Table III-14. Marginal earnings of labor, selected types of farms in selected locations, at indicated dates

Description of Study and Date	Marginal Earnings of Labor per Month
	Dol.
Trigg County, Upland, Ky., 1951	52
Trigg County, Bottomland, Ky., 1951	97
Graves County, Bottomland, Ky., 1951	43
Western Ky., Upland, 1951	55
Western Ky., Bottomland, 1951	105
Ingham County, Dairy, Mich., 1952	25
North Lower Peninsula, Mich., 1952	12
Burnside Twshp., Lapeer County, Mich., 1953	113
Almount Twshp., Lapeer County, Mich., 1953	84
N. W. Illinois, Hog Enterprise, 1950	8
N. W. Illinois, Dairy Enterprise, 1950	126
N. W. Illinois, Crop Enterprise, 1950	132
Ogemaw-Arenac County, Mich., Beef, 1953	182
Ogemaw-Arenac County, Mich., Process Milk, 1953	137
Ogemaw-Arenac County, Mich., Fluid Milk, 1953	114
Marshall County, Ky., Upland, 1950	32
Graysen County, Ky., Upland, 1951	61
McCracken County, Ky., Upland, 1951	32
Calloway County, Ky., Upland, 1951	8
Calloway County, Ky., Bottomland, 1951	38
Calloway County, Ky., Bottomland, Large Farms, 1951	53
McCracken County, Ky., Upland, Large Farms, 1951	53
Central Ind., Hog-feeder Cattle, 1953	218
Central Ind., Hog-dairy Cattle, 1953	277
Central Ind., Hog-dairy Cattle, 1953	231
S. Central Mich., Soil B, Dairy, 1953	37

Source: Glenn L. Johnson, An Evaluation of U. S. Agricultural Policies and Programs 1956-1960. July 1961, p. 9.

[1] U. S. Department of Agriculture, Agricultural Statistics, 1961, p. 474.

Non-conventional Pecuniary Income

To this point conventional income, only, has been considered. Non-conventional pecuniary income is defined as changes in the real wealth position of owners of assets or real capital gains. An increase in the real value of assets held by a person could be counted as income since consumption could be increased without diminishing the former real value of assets held by the person. Also, if the increased real wealth were not converted to liquid assets and consumed, it could serve as an enlarged credit base on which a person could borrow in order to get control over more working capital and thereby increase his future income stream.

Boyne has developed estimates of changes in the real wealth position of farm operators for the period 1940-1960. He has estimated that the combined real wealth gains to farm operators during that period totaled 29.4 billion 1960 dollars.[1]

If the increase in real wealth had occurred at an even rate, which it did not, real wealth in the hands of farm operators would have increased 1.47 billion 1960 dollars per year. Thus, annual farm income would have averaged 1.47 billion dollars higher from 1940 to 1960 if farm income is defined as the sum of conventional and non-conventional income. Implications of the importance of non-conventional

---

[1]David H. Boyne, Changes in the Real Wealth Position of Owners of Agricultural Assets, 1940-1960, Unpublished Ph.D. thesis, University of Chicago, 1962, p. 115.

income to the entry and departure of farmers to and from farming is considered in subsequent chapters. (See pp.158-59, 278-80).

Wages of Hired Farm Labor, 1917-62

Wages paid to hired farm laborers represent income to the receivers. Particularly in agriculture, wages paid to hired workers take on many forms. Wages are paid on a monthly, weekly, daily or an hourly basis; also, payment on a piece-work basis is common in some areas and for some types of work. Total payments to workers may or may not include housing, meals, and other perquisites.

The composite hired wage rate developed and maintained by the USDA represents an attempt to convert the various methods of payment of wages to an hourly wage rate. Table III-15 shows that the average hourly wage to farm workers has been consistently far below the average wage to industrial workers. At the beginning of the period shown in Table III-15, hourly farm wage rates were roughly two-thirds as much as the industrial wage rate. As both rates advanced the spread between the two hourly rates widened as the industrial wage rate rose more rapidly. By 1962 the farm wage rate was only 36 percent of the hourly industrial rate.

As hired wage rates have risen, the total farm wage bill has increased as would be expected. However, the wage bill has not increased as rapidly as the hourly wage rate.

Table III-15. Total farm wages and average hourly wage rates for farm workers and industrial workers, United States 1917-62

Year	Total Farm Wages[a]	Average Hourly Wage Rates		Year	Total Farm Wages[a]	Average Hourly Wage Rates	
		Farm Workers	Industrial Workers			Farm Workers	Industrial Workers
	Mil.Dol.	Dol.	Dol.		Mil.Dol.	Dol.	Dol.
1917	1127	.19	.31	1940	1029	.17	.66
1918	1337	.23	.40	1941	1249	.21	.73
1919	1515	.27	.47	1942	1631	.27	.85
1920	1790	.32	.55	1943	2027	.36	.96
1921	1170	.20	.51	1944	2202	.43	1.01
1922	1127	.20	.48	1945	2299	.48	1.02
1923	1251	.23	.52	1946	2544	.52	1.08
1924	1248	.24	.54	1947	2810	.55	1.22
1925	1267	.24	.54	1948	3034	.58	1.33
1926	1330	.24	.54	1949	2865	.56	1.38
1927	1302	.24	.54	1950	2678	.56	1.44
1928	1290	.24	.56	1951	2800	.62	1.56
1929	1300	.24	.56	1952	2802	.66	1.65
1930	1177	.23	.55	1953	2793	.67	1.74
1931	914	.17	.51	1954	2716	.66	1.78
1932	669	.13	.44	1955	2736	.68	1.86
1933	617	.12	.44	1956	2733	.70	1.95
1934	679	.13	.53	1957	2785	.73	2.05
1935	775	.14	.54	1958	2895	.76	2.11
1936	868	.15	.55	1959	2960	.80	2.19
1937	988	.17	.62	1960	2949	.82	2.26
1938	979	.17	.62	1961	3019	.83	2.32
1939	988	.17	.63	1962	3008	.86	2.39

[a]Includes value of perquisites furnished.

Source: U. S. Department of Agriculture, ERS, Farm Income Situation, July 1963, pp. 41, 50; U. S. Department of Agriculture, ERS, Farm Cost Situation, Nov. 1962, p. 7.

From 1917 to 1962 the wage bill increased 267 percent but the composite wage rate increased 453 percent. Of course, this is consistent with the decrease in the size of the hired farm work force. This emphasizes that the demand for hired farm labor is not perfectly inelastic.

Summary and Tentative Conclusions

Farm incomes of individuals have been little more than one half the incomes earned by persons in the nonfarm sector. Low relative incomes for equivalent labor resources indicate disequilibrium in labor use. This disequilibrium has persisted throughout the period under study despite very large releases of labor from agriculture. Since 1920 farm population has decreased 17.7 million persons. The farm labor force has decreased 6.7 million persons. Meanwhile, labor requirements in agriculture fell 14.9 billion man-hours. During the same time period, farm output almost doubled. These adjustments have been neither smooth nor simultaneous over time.

For the 5-year period, 1930-34, farm population increased 5.8 percent; the farm labor force decreased 1.0 percent; and labor requirements decreased 11.0 percent. This is in contrast to the 1940-44 period when farm population declined 18.8 percent; the labor force decreased 6.9 percent; and labor requirements decreased only 1.5 percent. The picture becomes even more confused in the 1945-49 period when the farm population decreased .9 percent; the farm labor force declined .4 percent; but labor requirements

decreased 14.0 percent. Fluidity of movement appeared in the next five years as farm population decreased 17.5 percent; the farm labor force 12.8 percent and labor requirements decreased 12.1 percent. For the 1955-59 period and the 1960-62 period adjustments occurred rapidly and movements in all three series were essentially simultaneous.

From these facts the major question which appears is this: why has adjustment occurred so unevenly over time and for the different measures of labor? There are other puzzling aspects of the adjustment. Why have not even more people left agriculture if returns are really as low as seems apparent? What explains the major change in the rate of off-farm movement since 1940? What has happened to the off-farm opportunity cost of labor during periods when major changes have occurred in the rate of decrease in farm employment? Possible answers to these questions lie in an analysis of the labor adjustment process as it has occurred on farms and between the farm and nonfarm sectors. This analysis must be directed toward both the non-human factors and the human agents involved. It should focus on the important factors which affect labor utilization in agriculture. It should determine on which farms which adjustments have occurred. Furthermore, it should determine the impact of adjustment on the components of the labor force preferably by age group.

Chapter IV

THE AGRICULTURAL LABOR FORCE: ITS ADJUSTMENT TO CHANGE

The current structure, composition, and earnings of the farm labor force along with historical changes were the subject of Chapter III. This chapter concentrates on the process by which the farm sector has adjusted to changing product and factor prices and to improved technical knowledge. Before proceeding with analysis of the adjustment process, a sketch of the explanation to be developed is presented.

Explanation Sketch

As economic development has occurred, the increase in demand for farm products (food) has been less than proportional to the increase in consumer income. Farm product prices have declined relative to the prices of nonfarm products. Lower relative prices have reduced the real marginal value product of labor and other inputs used in agriculture. On the other hand, input prices have changed both absolutely and relatively over time. Labor has become expensive relative to the cost of other inputs. Particularly since 1940, as nonfarm wage rates have risen, farm operators have been unable to secure hired laborers at prevailing wages. As a consequence, there has been pressure on

the hired wage level and on equipment suppliers to produce new labor-saving equipment (pressure on suppliers occurs through increases in demand). As it has been developed, labor-saving equipment has been rapidly adopted on farms where it has been profitable to sell or discard old equipment. But labor-saving equipment reduces the marginal physical product of a given quantity of labor and thus requires either reduction in the quantity of labor used on individual farms or expansion of farm size. As farm size has expanded in order to maintain or increase the marginal physical product of labor, fewer farm operators have been required in agriculture. Expansion of farm size has been accomplished by those operators who have been the better managers. Labor use, then, has decreased least on the larger, better managed farms where the marginal value product of labor is more nearly equal to the hired wage rate or to the appropriate off-farm opportunity cost of labor.[1] Small farms where the value productivity of labor has been lower have gone out of business with their land absorbed by the larger farms as operators have taken off-farm jobs. However, not all operators of small farms have transferred to nonfarm jobs. Although the MVP of labor has been low on these farms, it has exceded the off-farm salvage value of labor.

---

[1]Labor use refers to total labor input per farm. Labor input per unit of output has probably decreased most on larger, more highly mechanized farms.

The acquisition price for both hired and operator labor has risen substantially. Both acquisition costs and salvage prices for the labor services of young potential farm operators have risen along with rising nonfarm wages. Salvage values for older operator and family labor (40-50 years of age) have increased less than the salvage values for young actual or potential entrants. Thus, older workers have remained "trapped"on farms. They can earn more there than elsewhere, primarily because they can't get jobs in the nonfarm sector.

Young persons have continued to enter agriculture. Some because they have access to adequate resources through family ownership, others because of mistaken estimates of farm earnings vs. nonfarm earnings. New entrants have overestimated potential incomes in agriculture. Also they have failed to anticipate the rise in incomes in the nonfarm sector. If all new entrants possessed perfect knowledge of the future, many would not have chosen agriculture as an industry for employment, but perfect knowledge has not been available.

As indicated in Chapter II it is hypothesized that mistakes of resource commitment are not random. Mistakes are made on the side of overcommitment. Particularly for labor there is a basis for the belief that decisions have been based on imperfect knowledge of relative earnings. Many rural-farm males have underestimated the level of wages in the nonfarm sector. Rural males are less familiar with

off-farm jobs than farm jobs. Also, it is likely that they discount off-farm earnings because of uncertain knowledge about probable earnings and for the probable intermittant loss of earnings from anticipated industrial unemployment. On the other hand, expected farm earnings are probably overestimated as a result of the overestimation of product prices.

Considering the difficulty of accurately predicting expected relative earnings for a short period of time, the probability of correct estimates for the productive life-span of a person seems even smaller. It is quite likely that potential entrants fail to correctly estimate the trend in off-farm earnings as well as the current level. It is also likely that potential entrants fail to correctly evaluate the returns to higher education in the nonfarm sector. Furthermore, it is likely that the trend in farm earnings is incorrectly estimated. Unless the knowledge possessed by rural-farm youth over most of the past 45 years exceeded that provided to them by their educational institutions, farm youth have failed to correctly anticipate the decline of real product prices for agriculture relative to the price of nonfarm products as economic development has occurred.[1]

---

[1]For essentially the same argument see Earl O. Heady, Agricultural Policy Under Economic Development, (Ames, Iowa: Iowa State University Press), 1962, pp. 194-96. There he argues that educational institutions provided an abundance of production information to farmers. But the meaning and interpretation of income elasticities of demand have not been explained. Information was at hand for raising pigs and corn but little was available for counseling the children on earnings and occupational outlook. In general, little information on the structure of the economy was transmitted to farmers.

Mistakes of overestimation of farm earnings and underestimation of off-farm earnings lead to overcommitment of labor to agriculture, overinvestment in other inputs in agriculture and to overproduction. The analysis of Figure II-4 has shown that only a few of these mistakes can be corrected without capital losses and without continued or increased overproduction.

This completes the outline of the explanation which is to be developed. The task now is to consider the relevant economic variables in the adjustment process and to provide empirical support for their interrelationships.

Determinants of the Quantity of Labor Used

The theory presented in Chapter II indicated that product prices, factor prices, and technological relationships determine the quantity of labor used in the farm sector. These factors can be classified as primarily demand factors or supply factors. Demand for labor in the farm sector is a function of the price of labor, the price for substitute and complementary inputs, product prices, institutional factors including government programs, and technological relationships or transformation ratios. The supply of labor to the nonfarm sector is a function of the price of labor, wages in the nonfarm sector, unemployment rates in the nonfarm economy, and indirectly of replacement ratios for the rural farm population. With two exceptions statistical supply and demand functions for hired and family

labor reported by Heady and Tweeten substantiated that these are relevant economic variables.[1] Except for one instance in which they attempted to determine the effect of acreage allotments and marketing quotas on farm employment, they did not explicitly consider government programs or replacement rates for rural-farm males in their statistical analysis.

Conceptually, production function analysis should be adequate for analysis of the effects of changing factor and product prices. However, it is not adequate for analysis of technological change since technology is one of the factors assumed to be fixed for a given production function. Thus it is necessary to use other less formal procedures and descriptive data from which inferences can be made.

Demand Factors

Technical Coefficients of Production

At a point in time there exist numerous different ways in which a product can be produced. For example, milking facilities on different farms may consist of ordinary stanchions, elevated stalls, or the herringbone system just to name a few, each of which is associated with different labor requirements for caring for one cow. The method used on a given farm is a result of the knowledge which the operator had about the different systems at time of installation, the availability of equipment needed for the various systems, the relative prices of inputs associated with the

---

[1] Heady and Tweeten, pp. 194-263. They used numerous functional forms and estimating procedures including regression and limited information techniques to establish relationships for various time periods for 1910-56.

different techniques, and the price of the product. Thus, economic factors combine with noneconomic factors to determine labor requirements at any point in time. Per unit labor requirements by enterprise, as estimated by the USDA, indicate technological change although they are catch-all figures which measure economic adjustment to change as well as technological change. Estimated requirements represent a sort of average technique which has been employed on farms. A change in technique, a change in any of the factors, a new factor, or price changes change "requirements".

Table IV-1 shows how average man-hour requirements for selected crops grown in the United States have changed from 1915-19 to 1960-62. These data are in terms of index numbers with 1915-19 equal to 100. The same data in terms of man-hours are presented in Appendix B, Table B-1. Likewise, Table IV-2 and Table B-2 show average man-hour requirements for selected livestock for 1915-19 to 1960-62. Man-hour requirements for crops are shown per acre of crop and per unit of production.

Changes in man-hours per acre have been accomplished primarily from changes in technique associated with substituting machines and equipment for labor. Changes in man-hours required per unit of production are a result of increased yields per acre and the substitution of machinery for labor.

Table IV-1. Man-hours per acre and per unit of production as a percent of man-hour requirements, 1915-19 for selected crops, United States, 1915-62

Crop	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Corn for grain										
per acre	100	96	89	82	82	75	56	39	29	21
per bushel	100	92	87	93	82	60	40	26	15	9
Wheat										
per acre	100	91	77	69	65	55	42	34	28	21
per bushel	100	92	75	71	68	45	35	28	17	12
Rice										
per acre	100	91	72	64	62	55	40	28	26	24
per bushel	100	89	65	53	48	47	33	20	14	12
Potatoes										
per acre	100	102	99	92	94	93	93	86	72	66
per bushel	100	88	81	81	77	65	46	31	23	19
Cotton										
per acre	100	91	91	92	94	94	79	63	63	47
per bale	100	99	90	84	70	61	49	36	25	17
Tobacco										
per acre	100	100	105	105	118	125	130	131	135	138
per pound	100	105	109	107	107	98	89	82	70	61
Peanuts										
per acre	100	98	99	96	98	86	65	54	41	33
per pound	100	107	100	107	98	91	71	45	28	18

Source: Calculated from Robert C. McElroy, Reuben W. Hecht, and Earle E. Gavett, Labor Used to Produce Field Crops, U.S. Dept. of Agriculture, ERS, Stat. Bul. No. 346, May 1964, pp. 5-6.

For corn, wheat and rice, per acre man-hour requirements in 1960-62 were 21, 21, and 24 percent respectively of requirements in 1915-19. On a per unit of product basis the changes were even more pronounced with a bushel of corn requiring only nine percent as many man-hours of labor in 1960-62 as in 1915-19. Crops which have traditionally been heavier users of labor show smaller changes in man-hour requirements per acre. Labor requirements per acre of potatoes declined least for any crop while there was an increase of 38 percent in the man-hour requirements per acre of tobacco. However, these crops show large decreases in man-hours required per unit of product with the exception that tobacco in 1960-62 required 61 percent as much labor per pound as it did in 1915-19.

Table IV-2 shows that in general man-hour requirements per unit of livestock product have decreased less than man-hour requirements per unit of crop product. The outstanding exception to this statement is shown by changes in requirements for broilers and turkeys. Broilers required only 13 percent as much labor in 1960-62 per 100 birds as was required in 1935-39. Turkeys required only 10 percent as much labor in 1960-62 per hundred weight of product as compared to 1915-19. Requirements for dairy cows illustrate how changes in animal productivity have contributed to changes in labor requirements per unit of production. Per cow requirements were 68 percent as great in 1960-62 as in 1915-19 but due to greatly increased milk production per cow, man-hour requirements per 100 pounds of milk decreased to 35 percent over the same period of time.

Table IV-2. Man-hours per unit of livestock and per unit of production as a percent of man-hours in indicated years, United States, 1915-62

Kind of Livestock and Item	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Milk cows										
Man-hours per cow	100	101	103	104	105	101	91	86	77	68
Man-hours per cwt. of milk	100	97	89	92	92	84	70	59	46	35
Cattle and calves										
Man-hours per cwt. of beef produced	100	100	96	96	93	89	89	80	71	64
Hogs										
Man-hours per cwt. produced	100	97	92	89	89	83	83	75	67	61
Chickens-broilers										
Man-hours per 100 birds	...	...	...	...	100	92	63	30	17	13
Man-hours per cwt. produced	...	...	...	...	100	91	60	28	15	12
Turkeys										
Man-hours per cwt. produced	100	96	92	86	76	63	42	22	14	10

Source: Calculated from Reuben W. Hecht, Labor Used to Produce Livestock, Estimates by States, 1959, U. S. Dept. of Agriculture, ERS, Stat. Bul. No. 336, Sept. 1963, p. 3.

The inference which can be made is that as labor-saving machinery and methods have been adopted, both the average and marginal physical product of a given quantity of labor have decreased drastically. For example, 79 of each 100 hours (100-21) of labor devoted to corn production in 1915-19 would have been essentially superfluous if it had remained in corn production in 1960-62 given the methods used in the later period. On the other hand, increased yields due to newer, more productive seed, chemicals, and new knowledge about spacing and tillage increase the physical productivity of labor. On balance it has been essential for labor to shift from corn production to production of other agricultural products or to production of nonfarm products. These same statements apply to labor used in production of other products where labor-saving machinery has been put into use.

Relative Prices of Factors

Over time, prices of inputs used in agriculture have changed in absolute terms and relative to each other. Changes have occurred in the quality of these inputs. It is these changes in relative prices and changes in quality of inputs which have helped to bring about changes in the composition of the total input mix used in agriculture. Both labor and land have decreased in importance in the total input mix with labor showing by far the greatest decrease.[1] While the aforementioned input groups have

[1] Loomis and Barton, pp. 60-61.

decreased in importance, mechanical power and machinery, fertilizer and lime, feed, seed, livestock purchases, and miscellaneous inputs have all increased in importance.

The substitution of mechanical methods for hand methods has been the result of several factors. The availability and knowledge of mechanical means as well as income or credit with which to purchase the new inputs have contributed to their substitution for labor. Changes in factor price ratios have also contributed to this substitution.

Movements in the quantity index of mechanical power and machinery, in the index of farm labor requirements, and in the index of the ratio of farm wage rates to the price of mechanical power and machinery show the expected relationships (Figure IV-1). With minor exception, these series for 1917-40 show the expected substitution of mechanical methods for labor as labor has become relatively more expensive. From 1940 to 1962, the expected relationships persist but are less consistent. This is an indication of an incomplete analysis; only part of the substitution is explained by the ratio of factor prices.

From 1917 to 1940 except for 1920-21, the indexes of the price ratio and the quantity of mechanical power and machinery show parallel movements. The labor quantity index declined at a very modest rate from 103 to 1917 to 98 in 1940. From 1940 to 1945 the index of the ratio of wages to the price of machinery rose rapidly from 84 to 204. During the same period labor requirements declined modestly but machine inputs jumped from 187 to 241. Probably machine inputs would have increased

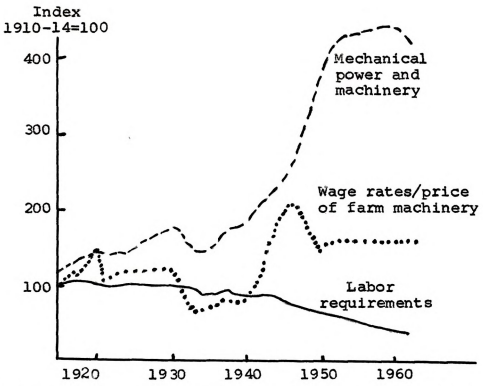


Figure IV-1. Index of labor requirements, index of mechanical power and machinery and index of the ratio of the wage rate for hired labor to the price of farm machinery, United States, 1915-62, (1910-14=100)

Source: Calculated from U.S. Department of Agriculture, SRS, Agricultural Prices, Sept. 15, 1962, pp. 55-56, U.S. Department of Agriculture, Changes in Farm Production and Efficiency, 1963, Stat. Bul. No. 233, July 1963, pp. 46-47.

considerably more if machinery production had not been curtailed during the war.

During the 1945-50 period, the price ratio rose to 213 then fell to 153 as machinery prices increased more rapidly than wage rates. Despite the drop in the ratio, machines continued to be substituted for labor. The machinery index increased from 241 to 384 and labor requirements continued downward from 81 to 65. The price ratio remained stable from 1950 to 1962, labor requirements decreased steadily and machinery and power inputs continued to increase. However, after 1954



the quantity of mechanical power shows small change.

A more general view of changes in the relative prices of inputs can be obtained from Figure IV-2 which gives index numbers of prices paid by farmers for selected production items. Prices of motor vehicles and farm machinery have roughly parallel movements. Parallel price movements have not been the case for other input prices shown. Fertilizer prices have advanced least while wage rates have advanced most.

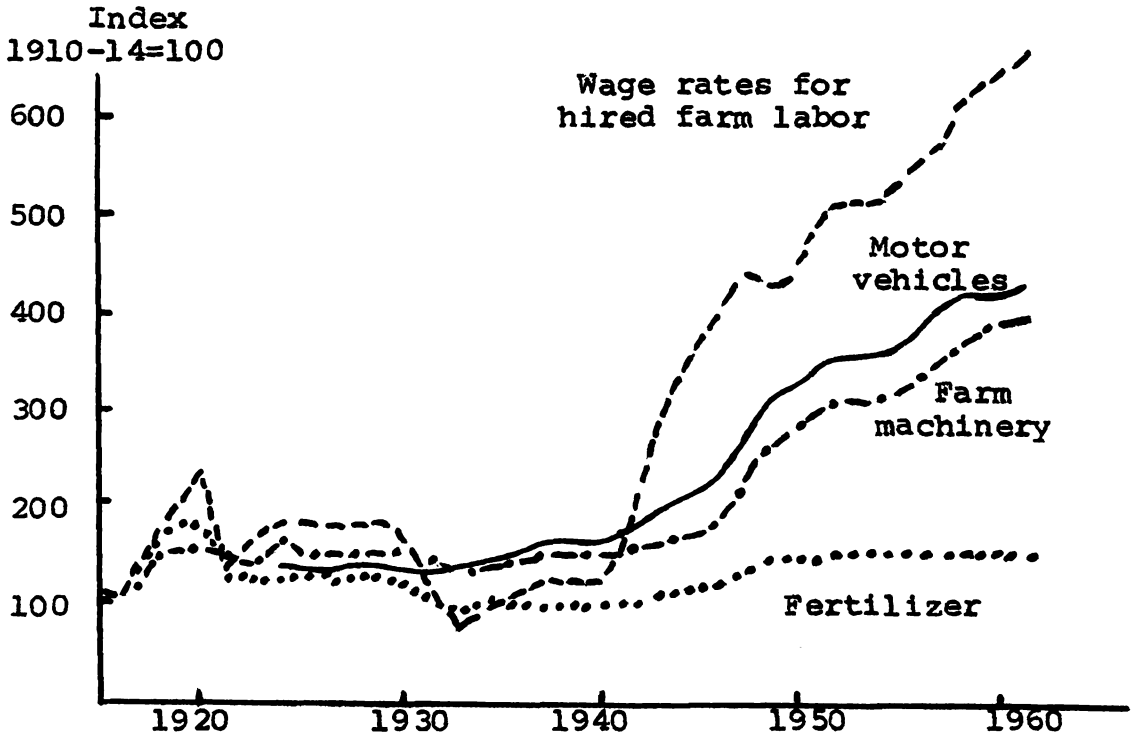


Figure IV-2. Index numbers of prices paid by farmers for selected production items, by groups, United States, 1915-62 (1910-14=100)

Source: U.S. Department of Agriculture, SRS, Agricultural Prices, Sept. 15, 1962, pp. 55-56.

For 1962, the ratio of wage rates for hired farm labor



to fertilizer prices was 4.34 compared to 1.0 in 1910-14. The ratio of farm machinery prices to fertilizer prices was 2.66 also compared to 1.0 in 1910-14. While fertilizer is not a direct substitute for labor, indirectly it can be considered as such.[1]

Product Prices

Changes in product prices have a direct effect on the quantity of an input used. This effect works through changing the marginal value product of the input since the MVP is, in part at least, the arithmetic product of the marginal physical product of an input and the unit price of the product. Other things equal, an increase in price for the product shifts the demand schedule for an input upward. A decrease in product price has the opposite effect.

To estimate the effect of a change in product prices on farm employment, Heady and Tweeten used the ratio of the index of prices received to the index of prices paid as an indicator of the relative profitability of farming.[2] In

---

[1]Labor substitutes for fertilizer via the following process. In the production of a given crop, land and labor tend to be complementary inputs which are combined in relatively fixed proportions. Output can be increased by utilizing additional units of land and labor or by applying fertilizer to the fixed quantity of land. In most situations, application of additional fertilizer requires only small amounts of additional labor except possibly for harvesting the larger crop, and with modern harvest methods, this does not add materially to the labor used. Thus, a change in relative fertilizer-labor prices may result in a new combination of these inputs.

[2]Heady and Tweeten, p. 214.

general, they found that coefficients for this variable were statistically significant for the 1910-57 period and all sub-periods considered in estimating hired farm employment.

With the exception of institutional factors, this completes the discussion of variables which determine the demand for farm labor. Institutional factors, particularly government programs and policies, will be considered in the chapters on analysis of policies. Factors affecting the supply of farm labor remain to be considered.

Supply Factors

Relative Incomes and Unemployment Rates

There is sound a priori basis for the belief that the supply of labor to the farm sector is a function of earnings in the farm sector relative to earnings in the nonfarm sector. One would expect persons to move into agriculture as farm incomes improved relative to nonfarm income. The opposite movement would be expected as farm incomes deteriorate relative to nonfarm incomes. On the contrary, Bishop found by using linear regression that outmovement from agriculture increased when farm incomes were improving and decreased when farm incomes were declining relative to nonfarm incomes.[1] From this finding, he was led

[1]C. E. Bishop, "Economic Aspects of Changes in Farm Labor Force," Chap. iv, Labor Mobility and Population in Agriculture, (Ames, Iowa: Iowa State University Press), 1961, pp. 36-49.

to an analysis of the availability of off-farm jobs and movement of persons from farming. He found that unemployment in the nonfarm sector was negatively correlated with off-farm movement.

To determine the effects of the level of unemployment on out-migration, he divided his data into two groups. One set of data contained only those years when unemployment rates were greater than the median rate, 5.3 percent; the other set contained the remaining years. A regression for the first set of data indicated that off-farm movement increased as farm earnings increased relative to nonfarm earnings. The second set of data with unemployment rates less than the median reversed the relationship. An increase in farm earnings decreased off-farm migration.

From these findings he concluded that at a given ratio of earnings in the two sectors, persons were ready to move to nonfarm jobs; whether they did migrate depended upon the amount of industrial unemployment. Furthermore, he concluded that the wage ratio was so far from equilibrium that farm incomes could have improved substantially yet movement to nonfarm jobs would have occurred.[1]

Heady and Tweeten carried the analysis a step further as they attempted to determine the effect of a

---

[1]Our investigation of farm employment (rather than farm population) indicated that the number of persons employed on farms increased as farm incomes improved relative to nonfarm incomes when unemployment rates were taken into account (see Table V-7).

[1] Some farmers [illegible] that [illegible] [illegible] [illegible]

change in the ratio of earnings for various levels of unemployment in the nonfarm sector. For short-run estimates, they found that given no industrial unemployment the maximum short-run elasticity of family labor movements with respect to changes in the relative income ratio is probably no greater than -.1. This can be interpreted to mean that a 10 percent decline in the income of farm workers relative to the income of factory workers would decrease the number of farm workers only one percent. If the unemployment rate were 15 to 20 percent, a 10 percent decline in the earnings ratio would have no effect on the number of family workers in agriculture. On the other hand, they found the long-run response to change in the ratio to be greater. For unemployment in the range of 5 to 10 percent, they found that a 10 percent fall in relative farm income decreased the number of family workers up to 3.5 percent.[1]

Given the relative farm-nonfarm wages that have prevailed over most of the past 45 years, it is clear that availability of jobs in the nonfarm economy was an important factor in determining the supply of labor to the farm sector. Farm labor appeared to be well aware of the signal given by relative wages; whether it could and did respond depended upon available nonfarm jobs.

Rural Replacements

Historically, the farm sector has produced more replacements than are required to maintain a static farm

[1]Heady and Tweeten, p. 252.

labor force. If all males born and reared in the farm population were to find employment in the farm sector, it would be necessary for the farm labor force and perhaps the number of farms to expand. Thus, assuming farm males prefer farming, there is constant pressure on the supply of labor to the farm sector.

One way to estimate the pressure on the farm labor supply from internally produced replacements is to calculate farm replacement ratios. Replacement ratios for a decade are determined by two numbers. These numbers are (1) the number of young men in the rural-farm population who can be expected to enter the working age group and survive to the end of the decade, and (2) the number of men in the age group who can be expected to leave the work force because of death or retirement. This ratio does not take into account migration to or from the rural-farm population.

For the United States during the decade 1940-50 there were 167 rural-farm males expected to enter the working age group aged 25-69 for each 100 expected to leave the same age group in the rural-farm population because of death or retirement.[1] This means that for the rural-farm male population to remain the same size, 67 males would be required to shift to the nonfarm sector.

As a consequence of declining farm birth rates the replacement ratio declined to 135 for the 1950-60 decade.

---

[1]Gladys K. Bowles and Conrad Taeuber, "Rural-Farm Males Entering and Leaving Working Ages, 1940-50 and 1950-60," Farm Population, U. S. Dept. of Agriculture, AMS and U. S. Bureau of the Census, Series Census - AMS (P-27) No. 22, Aug. 1956, p. 9.

Yet this was substantially more than enough to maintain the farm work force from rural sources. Pressure on the work force was even greater in South Atlantic and East South Central states where ratios were 169 and 159 respectively for the 1950-60 period. This represented a decrease for these two regions from 190 or above for the previous decade.

Replacements have special meaning in agriculture because of the close relationship between the firm and the household. Agriculture is one of the few industries where replacements are in a sense born into the firm.

Theoretical Considerations

Theoretical considerations presented in Chapter II suggested that the explanatory power of production theory and of factor supply-demand analysis can be increased when it is recognized that more than one price prevails for inputs at a given point in time. Thus, our attention is directed toward empirical estimates of acquisition and salvage prices for farm labor as an input.

Estimates of Acquisition Cost and Salvage Value for Labor

In Chapter II it was concluded that except for transportation costs, acquisition costs and salvage values for labor are essentially equal for young men entering agriculture but this equality disappears when the acquisition cost of additional laborers to the farm sector is compared to the salvage value of farm employed labor. The purpose of this section is to examine the available empirical

Estimates of Acquisition Cost and Salvage Value for Labor

data on salvage value and acquisition cost. Since most of the data pertains to salvage value, comments about acquisition cost depend heavily upon the deductive process.

It is helpful to separate hired labor from operator and family labor in order to get meaningful estimates of acquisition and salvage values for each category of labor. For both the individual firm and the farm sector, the acquisition cost of hired labor is the hired farm wage rate since this represents the cost of securing an additional unit of labor at the location of the firm. The composite hired wage rate compiled by the USDA (Table III-15) converts the various methods by which farm workers receive payment to an hourly wage rate. This wage represents an average wage at the aggregate level and can be considered as the industry's acquisition cost for hired labor.

Salvage value for hired labor is not an important concept from the firms' viewpoint. Hired labor is a flow of services provided to the firm on a daily, weekly, or monthly contract basis. An operator contracting for hired labor plans to use the services and is not concerned with salvage value. Upon termination of the contract, salvage value does not accrue to the firm but to the person providing the labor services.

Hired Farm Work Force Data

For the farm sector, salvage value of hired labor is the wage which can be earned in the nonfarm sector.

Thus, nonfarm earnings for persons in the farm labor force represent salvage value for their labor when working outside of agriculture. Nonfarm earnings are presented in Table IV-3. Nonfarm wages earned by persons who also work as farm laborers are considerably higher on a daily basis than wages earned by the same persons when doing farm work. Although daily wages were higher, the number of days worked in the nonfarm sector were considerably fewer than the number worked in the farm sector. Furthermore, the total days worked per year in both sectors represent little more than one half-time employment.

The effects of the post-war recessions on off-farm earnings of persons in the hired farm work force are also evident from Table IV-3. Daily nonfarm wages increased from 1947 through 1952 then fell during the 1954 recession. Daily rates had recovered by 1956 but decreased again during the 1957 recession. With recovery, rates were relatively stable until the 1961 recession when daily wage rates declined below 1957 rates. Following the 1961 recession, daily wages increased to $9.65 per day, the highest rate of record.

Persons in the hired farm work force who also have some earnings from non-farm employment appear to shift from farm to nonfarm employment and back again as opportunities arise. This shifting between jobs may have been the result of (1) preference for more than one job during a year, (2) equal "real" daily earnings regardless of the

Table IV-3. Average days worked and wages earned at farm and nonfarm wage work by persons who did 25 days or more of farm wage work and number of workers selected years, United States, 1945-1962

Year	Farm Wage Work			Nonfarm Wage Work			Total Number of Workers
	Average Days Worked	Wages Per Year	Earned Per Day Worked	Average Days Worked	Wages Per Year	Earned Per Day Worked	
	Days	Dol.	Dol./Day	Days	Dol.	Dol./Day	Thou.
1945	---	---	---	---	---	---	1,965
1946	---	---	---	---	---	---	1,953
1947	156	596	3.80	27	138	5.05	2,215
1949	140	557	3.95	26	145	5.65	2,510
1951	146	683	4.70	28	196	7.00	2,156
1952	132	684	5.15	30	224	7.45	1,972
1954	142	799	5.65	26	182	7.10	1,908
1956	136	799	5.85	23	190	8.30	2,078
1957	125	738	5.90	19	154	7.95	2,200
1958	128	766	6.00	22	195	8.80	2,319
1959	138	829	6.00	23	209	9.00	2,166
1960	139	879	6.30	28	246	8.65	2,162
1961	134	881	6.55	22	173	7.90	1,889
1962	134	913	6.80	26	251	9.65	2,067

Source: Samuel Baum, Reed E. Friend and Robert R. Stansberry, Jr., The Hired Farm Work Force of 1961, U. S. Dept. of Agriculture, ERS, Ag. Ec. Rept. No. 36, 1963, pp. 2, 9; U. S. Department of Agriculture, Advance Report on the Hired Farm Working Force of 1962, ERS-141, 1963, p. 6.

sector in which worked, or (3) lack of employment opportunities in one or both sectors to provide full-time employment. All three arguments probably have some relevance. The first argument seems rather trivial and the second argument can be in part refuted when it is recognized that change of jobs probably does not entail change of residence.[1] Except for perquisites furnished on some farm jobs, daily wages in the two sectors are directly comparable. Thus, average daily

[1] For migratory workers, change of residence or location of work was required; however, in 1961 only 18.6 percent of all workers in the hired farm work force who worked 25 or more days at hired farm work were migratory workers. See Samuel Baum, Reed E. Friend and Robert R. Stansberry, Jr., The Hired Farm Work Force of 1961, p. 31.

"real" wages earned in the nonfarm sector are higher than "real" wages in the farm sector.

The third argument is more difficult to evaluate. Judging from the age distribution of the hired farm work force which shows that 78 percent of all males were ages 18-64, it is difficult to believe that they preferred to work only 156 days out of the year.[1] It seems more plausible to believe that these workers preferred either more work in the farm or nonfarm sector than was available. Since nonfarm jobs paid more per day and workers had only short periods of nonfarm employment, it would appear that it is the lack of jobs which limits permanent transfer from farm jobs. Our conclusion is that the salvage value of this labor is higher than the farm wage rate but that a sufficient amount of employment is not available at the higher wage.

Old Age and Survivors Insurance Data

The above discussion considered hired labor, only. Estimates of nonfarm earnings by former farm operators are available from Old Age and Survivors Insurance (OASI) data for 1956-1958. Using OASI data, Perkins was able to determine occupational mobility and earnings by sector.[2] He considered persons in the farm sector in year t with exclusively nonfarm earnings in year t+1 as having shifted

---

[1] Ibid., p. 29.

[2] Brian B. Perkins, The Mobility of Labor Between the Farm and Nonfarm Sector. Unpublished Ph.D. thesis, Michigan State University, 1964.

from farm to nonfarm employment. (He considered the opposite transfer, nonfarm to farm, also.) He compared the median farm income in year t for the group which had changed employment to the group's median income in year t+1. An example from Table IV-4 illustrates the procedure. Persons with exclusively nonfarm earnings in 1956 but who had reported farm earnings in 1955 were farm to nonfarm movers.[1] The median income for persons in this group in 1956 was $1,942. The median income for the same group when farm employed was $1,295. This represents a median income differential of $647 in favor of nonfarm employment for the group which did make the occupational shift. This would suggest that the first year salvage value for labor was $647 more than farm earnings.

Table IV-4. Median income earnings from farm employment, from nonfarm sector employment the following year and differential of median incomes, United States, 1956-58

Year	Median Income from Nonfarm Employment	Median Income from Farm Employment, Year Before Change in Employment	Differential of Median Incomes Following Change in Employment	Median Income of Persons Farm Employed in Both Years
	Dol.	Dol.	Dol.	Dol.
1956	1,942	1,295	647	1,480
1957	1,766	1,367	399	1,468
1958	1,654	1,484	170	1,600

Source: Perkins, Table V-9, p. 87.

[1] This means occupational and not necessarily geographic mobility.

For the three years shown in Table IV-4, median incomes were higher for movers when their earnings were derived from the nonfarm sector than when they were derived from farm sources. However, the gain was only about one-fourth as great in 1958 as in 1956. During this period, the median farm income increased as the median income from nonfarm employment declined. As expected, a comparison of the median farm income of movers with the median farm income of those who remained in the farm sector both years shows that movers were from the group with farm incomes below the median.

Since these estimates of salvage value apply to the first year following the occupational shift, they should be considered as a lower limit to salvage value. With experience gained in the nonfarm labor market, it would be expected that wages would increase as a more permanent attachment to nonfarm employment was made.

Perkins' classification of farm to nonfarm movers by age and by type of farm employment throws additional light on salvage value for labor. Our hypothesis has been that salvage value of the labor services of operators 40-45 years old and older is low and that the gap between their salvage value and the acquisition cost to the agricultural sector of more labor widens with increased age. Although Table IV-5 does not show the level of salvage value or acquisition costs, it does show the difference between earnings in the farm sector and the nonfarm sector by age. This

shows the income gains from making the occupational change. From these data it is clear that there is an inverse relation between age and income differential. For persons over 35 the annual mean differential for earnings in the two sectors did not exceed $100 except for one period, 1955-56. Even more striking is the loss in income suffered by persons over 45 who transferred to the nonfarm sector. This loss was greater than $300 for persons 55 and over for three of the mobility periods. From the classification by age it is clear that the salvage value for age-groups over 45 is either very close to or substantially less than average farm earnings.

Table IV-5. Mean annual income differentials for persons transferring from farm employment to nonfarm employment by age, United States, 1955-59

Age	Mobility Periods			
	1955-56	1956-57	1957-58	1958-59
	Dol.	Dol.	Dol.	Dol.
Under 25	540	417	231	565
25-34	350	193	53	339
35-44	232	8	-49	78
45-54	72	-18	-185	36
55 and over	-7	-339	-336	-303

NOTE: Differentials are calculated for persons employed in the farm sector in the initial year of the period and who transfer to and report earnings in the nonfarm sector in the following year. The difference between mean farm earnings and mean nonfarm earnings is the mean income differential.

Source: Perkins, Table D, 6, p. 175.

Perkins' classification of farm to nonfarm movers by prior farm employment status presents some puzzling income differentials for off-farm movers. Table IV-6 shows mean income differentials for off-farm movers by prior farm employment status. Persons with either a single job in farming or with multiple jobs, one of which was in farming, were classified as in the farm sector. Hence, movement of a single job operator to nonfarm employment or quitting of the job in agriculture by the multiple job holder constituted a farm to nonfarm employment shift. The puzzling aspect of Table IV-6 is that wage workers received substantial gains from changing employment whereas farm operators suffered losses from the occupational change. One might expect wage workers to make the larger gains since the median income of farm laborers and foremen is considerably less than the median income for farmers and farm managers when both groups are farm employed. In 1959 this difference was $697 in favor of farmers and farm managers. (See Table III-12) However, on the basis of farm employment status there is no reason to expect income losses for farm operators who changed to nonfarm employment.[1] The probable explanation lies in specific characteristics of each group.

---

[1]It has been pointed out by Professor Johnson that another explanation is possible. Farm operators leaving the farm may not have reinvested their capital in income-producing assets. Instead they may have invested in a house or other consumption items. Implicit returns on such an investment did not appear in the OASI income data and thus total nonfarm income may have been understated.

Table IV-6. Mean income differentials of off-farm movers by farm employment status, United States, 1955-59

Farm Employment Status	Mobility Period			
	1955-56	1956-57	1957-58	1958-59
	Dol.	Dol.	Dol.	Dol.
Single job operators	117	-73	-150	-158
Multiple job operators	-49	-318	-411	-378
Single job wage workers	368	364	149	414
Multiple job wage workers	430	271	141	484
All off-farm movers	286	110	-21	229

Source: Perkins, p. 175.

Previously, it was shown that gains from farm to nonfarm employment transfer are inversely related to age of the movers. When it is realized that the median age of all wage workers was about 28 years compared to the median age of about 46 years for farm operators, the puzzle clears.[1] The apparent conclusion is that farm operators had substantial income losses from farm to nonfarm movements because they were a substantially older group and thus could secure only the lower paying jobs.

Use of nonfarm earnings as an estimator for salvage value of farm labor has two important limitations. One is that nonfarm earnings apply only to those who make the transfer, thus no estimate is provided for salvage value of those

[1] Perkins, p. 100.

who remain in agriculture. The second limitation pertains to use of actual salvage value rather than expected salvage value. This is important since decisions are based on expected salvage value. In view of the apparent income losses suffered by older workers as a result of their employment shift, it is difficult to believe that their expected nonfarm income (salvage value) was as low as the income which materialized.

A Derived Series

It has been established that industrial unemployment is an important factor which helps to explain the rate of migration from the farm population. Also, it has been shown that industrial unemployment is one of the factors which affects the number of family workers employed in the farm sector. The interaction between unemployment rates and relative sector earnings can be interpreted as a factor which affects the salvage value of farm labor. Thus, to estimate expected salvage value, a method is needed for adjusting nonfarm earnings which takes into account industrial unemployment.

Heady and Tweeten in their study of supply and demand for farm labor speculated that inclusion of a variable in their farm employment function for family labor which takes into account the critical level of unemployment would improve the explanatory power of the function.[1]

[1]Heady and Tweeten, pp. 243-252.

Their reasoning was that as unemployment reaches some critical level, relative earnings become unimportant as a force attracting persons from the farm sector since earnings for the urban unemployed are nonexistent. This is to say that at the margin relative earnings are zero. As this condition is approached the attractiveness of urban jobs diminishes and workers seek employment in the farm sector even though average earnings for employed industrial workers remain substantially above farm earnings.

The composite variable which Heady and Tweeten constructed to account for the interaction of relative earnings and annual unemployment rates was the product of Y_R, relative income in the two sectors, and (1-aU) where U was the industrial unemployment rate and "a" was an arbitrary constant. Employment functions were fitted using this variable where "a" was assumed to be 1, 3, 5 or 7. Current and lagged values of both Y_R and U were used in various combinations. The best fit in terms of the multiple correlation coefficient and other criteria was obtained when current values of Y_R and U were used and with "a" equal to 5. This would be equivalent to a critical unemployment level of 20 percent and at this point relative sector earnings cease to attract workers from agriculture.

Using our terminology, the effective salvage value for labor decreases as unemployment increases and it approaches zero as unemployment reaches 20 percent.

Utilizing this information, it is possible to construct an historical series of salvage values for farm labor. This is labelled as the expected salvage value for farm labor. The reason for the terminology is this; the salvage value of a farm worker's labor is the wage or income which he receives from nonfarm work. Whether he gets a job in the nonfarm sector is a function of unemployment in that sector. Hence the expected salvage value is a product of the actual wage and the probability of a job. The procedure used by Heady and Tweeten suggests the weights to attach to industrial wage rates, i.e. (1-5U). Thus the expected salvage value is calculated as

$$W_S = W_I \ (I-5U)$$

where W_S is the expected annual salvage value, W_I the annual industrial wage for employed factory workers and U the national unemployment rate. This calculation was made for each year 1917 to 1962. The results are shown in Table IV-7. Also, salvage values were converted to constant dollars using the index of prices paid for family living.

The annual salvage value of farm labor as calculated varied from less than nothing in the 1930's to $3,615 per year in 1962. Since negative wages do not have meaning, they should be interpreted as zero wages. The zero wages should be interpreted as the expected value of a nonexistent job opportunity.

Table IV-7 shows for some years that the series is extremely variable from year-to-year. If these incomes are interpreted as incomes at the margin, the large variability

Table IV-7. Average annual income per employed factory worker and expected annual salvage value of farm labor in current dollars and 1947-49 dollars, United States, 1917-62

Year	Annual Income Per Employed Factory Worker	Expected Annual Salvage Value			Year	Annual Income Per Employed Factory Worker	Expected Annual Salvage Value		
		Current Dollars	Constant Dollars				Current Dollars	Constant Dollars	
			Dollars	Index (1947-49 =100)				Dollars	Index (1947-49 =100)
(1)	Dol. (2)	Dol. (3)	Dol. (4)	Pct. (5)	(1)	Dol. (2)	Dol. (3)	Dol. (4)	Pct. (5)
1917	778	591	1,002	48	1940	1,298	350	700	34
1918	994	924	1,320	63	1941	1,533	766	1,445	69
1919	1,136	1,000	1,205	58	1942	1,907	1,449	2,375	114
1920	1,353	1,082	1,151	55	1943	2,240	2,016	2,965	143
1921	1,141	456	681	33	1944	2,376	2,233	3,101	149
1922	1,107	686	1,089	52	1945	2,298	2,068	2,757	132
1923	1,225	1,029	1,608	77	1946	2,253	1,802	2,171	104
1924	1,231	886	1,384	67	1947	2,557	2,046	2,109	101
1925	1,254	1,003	1,520	73	1948	2,762	2,237	2,172	104
1926	1,268	1,141	1,755	84	1949	2,802	1,961	1,961	94
1927	1,272	1,018	1,591	76	1950	3,033	2,244	2,222	107
1928	1,284	1,002	1,566	75	1951	3,294	2,767	2,515	121
1929	1,288	1,082	1,717	83	1952	3,492	2,933	2,642	127
1930	1,196	682	1,156	56	1953	3,664	3,151	2,865	138
1931	1,073	215	422	20	1954	3,665	2,639	2,377	114
1932	878	- 158	- 359	-17	1955	3,936	3,070	2,766	133
1933	866	- 208	- 473	-23	1956	4,097	3,257	2,890	139
1934	946	- 76	- 152	- 7	1957	4,243	3,310	2,853	137
1935	1,035	0	0	0	1958	4,301	2,845	2,411	116
1936	1,121	179	351	17	1959	4,590	3,305	2,801	135
1937	1,239	347	655	31	1960	4,665	3,359	2,823	136
1938	1,148	57	114	5	1961	4,802	3,169	2,663	128
1939	1,229	172	351	17	1962	5,021	3,615	2,988	144

Source: Col. 2. U.S. Department of Agriculture, ERS, Farm Income Situation, July 1963, p. 41. Col. 3. See text for method of estimation; Col. 4. is Col. 2 adjusted by the index of prices paid for family living; Col. 5. Derived from 4.

is probably in accord with reality. A change in industrial unemployment can have a drastic effect upon the availability of a job and consequently upon the expected wage.

A test is needed to determine whether this is a valid procedure for estimating salvage values for labor. Actual earnings by persons who have made the occupational transfer should provide some basis for a test. Nonfarm wages earned by persons in the hired farm work force are one indicator of the salvage value of farm labor. Although nonfarm work done by members of the hired farm work force is of short duration, the wages which are earned apply to the kind of jobs available to persons with little industrial skill. If nonfarm wages earned by farm workers were closely correlated to the derived salvage values, we would have reason to believe that the derived series has some validity. But this test cannot be a conclusive one for the entire time period since the series of nonfarm wages earned by members of the hired farm work force is available for only selected years since 1947. However, 12 observations are available. These 12 observations were deflated by the index of prices paid for family living and then converted to an index with 1947-49 equal to 100. Years for which observations were available were paired with estimated salvage values from the derived series also deflated by the same price index. Figure IV-3 shows a surprisingly close relationship between movements of the two series. The correlation coefficient for the two series is .83 which is significant beyond the 99 percent level.

This suggests that since 1947 movements in the calculated series which depend heavily upon industrial unemployment rates follow the movements in the off-farm earnings series rather closely. The conclusion is that the calculated series provides a reasonable approximation to actual salvage values. However, the test is not appropriate for determining that the calculated series is a valid estimate of the level of salvage values.

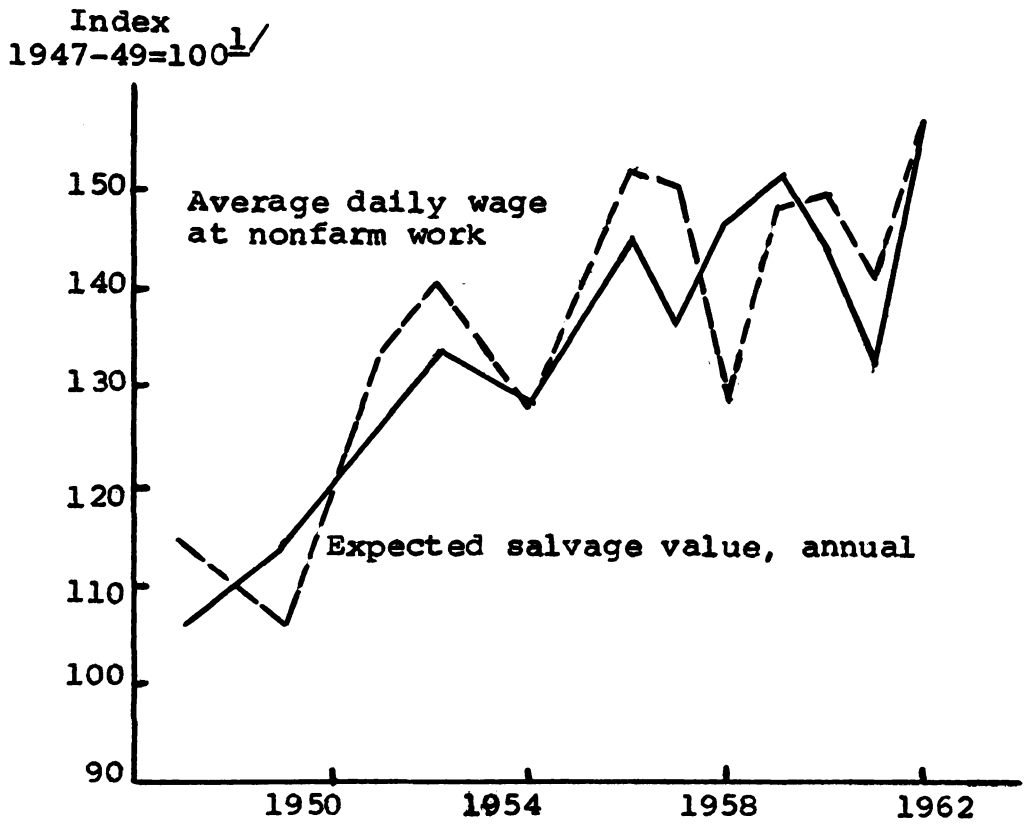
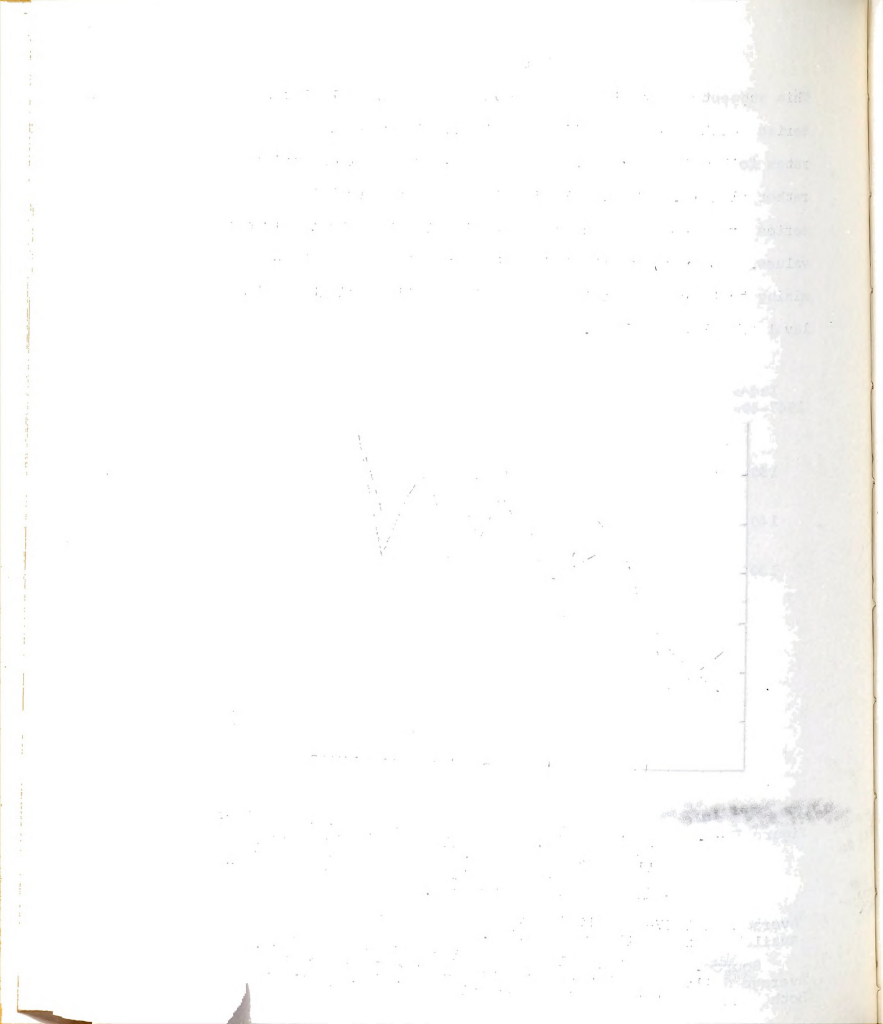


Figure IV-3. Expected salvage value of farm labor in constant dollars and average daily wage in constant dollars at nonfarm work by persons in the hired farm work force who did 25 or more days of nonfarm work during the year.

[a]Average of 1947-49 omitting 1948 as data for 1948 is not available from daily wage series.

Source: Expected salvage calculated from Table IV-7. Average daily wage at nonfarm work calculated from Table IV-3. Both series deflated by index of prices paid for family living.



Sources of Off-farm Employment

Estimated salvage values which were determined by adjusting the annual factory wage of employed factory workers by the unemployment rate, as previously described, are substantially greater than earnings as reported from OASI data (Tables IV-4 and IV-7). However, the data are not strictly comparable since OASI data is median income and the expected income series is in terms of the mean. With this limitation in mind, the median income is only 53 to 60 percent as great as expected annual income. This raises a question about the validity of using factory worker income as the appropriate income for salvage value. What kinds of jobs do farm workers take as they leave farm employment?

Perkins found that four industries employed over three-fourths of all farm workers who transferred to non-farm employment (Table IV-8). The four industries were construction, manufacturing, wholesale and retail trade and government. Manufacturing was most important in 1957 and only slightly less important in 1958 than wholesale and retail trade.

A survey in 1957 of State Employment Service managers in Kansas by Schnittker and Owens reports similar types of jobs most commonly available to farmers. Managers listed jobs in order of importance as (1) construction labor,

Table IV-8. Industrial distribution of wage jobs taken by farm operators in the 1956-57 and the 1957-58 mobility periods, United States

Industry	1957	1958
	Pct.	Pct.
Agriculture, forestry and fisheries	2.7	2.4
Mining	4.2	2.6
Construction	15.2	14.8
Manufacturing	22.3	21.3
Utilities	4.5	4.9
Wholesale and retail trade	18.1	21.9
Finance, insurance and real estate	2.3	2.4
Services	8.2	10.3
Government	21.1	17.9
Other	1.3	1.5
All Industries	100.0	100.0

Source: Perkins, p. 95.

(2) machine shop and mechanical work, (3) factory work, (4) retail trade employment, and (5) wholesale trade employment.[1] Other jobs listed as being available to farm labor include: truck driving, service station attendant, custodial work, farm equipment sales, oil field work, feed milling and mixing and heavy equipment operator. Although this list is more detailed it is very similar to the distribution of jobs found by Perkins to be important sources of employment with the notable exception that he found government jobs to be an important source of employment.

[1] John A. Schnittker and Gerald P. Owens, Farm to City Migration: Perspective and Problems, Ag. Ec. Report No. 84, Kansas Ag. Exp. Sta., 1959, p. 28.

Since manufacturing was only one of the four most important sources of employment, information on wages for other types of jobs available to farm workers is necessary in order to evaluate the appropriateness of factory wages as an indicator of salvage values. Table IV-9 shows average wages paid to unskilled labor in construction and road building jobs and to workers in wholesale and retail jobs. Construction wages follow factory wages quite closely until 1948. From that date, construction wages exceed factory wages and by a substantial amount in 1962. However, in view of the irregularity of work on construction jobs due to weather stoppages, the annual incomes would be more similar than hourly wages indicate.

Road building wages were roughly 70 to 80 percent of factory wages prior to 1948. After that date, the spread decreased until wages were almost equal in 1962. Wages in wholesale trade were very similar to factory wages but wages in retail trade differed more from the factory wage than any of the other series.

An unweighted average of the four series for a few selected years shows small difference between that average and the average factory wage. Averages of the four series for 1935, 1940, 1950 and 1962 are $ .54, $ .59, $1.30, and $2.34 respectively compared to factory wages for the same dates of $ .54, $ .66, $1.44 and $2.39. The conclusion is that the average factory wage is a reasonably good indicator of the expected wage available to farm workers when adjusted

Table IV-9. Average hourly earnings in selected industries, United States, 1917-1962

Year	Common Labor: Construction	Common Labor: Road building	Trade: Wholesale	Trade: Retail	Manufacturing	Year	Common Labor: Construction	Common Labor: Road building	Trade: Wholesale	Trade: Retail	Manufacturing
	Dol.	Dol.	Dol.	Dol.	Dol.		Dol.	Dol.	Dol.	Dol.	Dol.
(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
1917	.28	.28	...	...	.31	1940	.70	.45	.71	.49	.66
1918	.38	.36	...	...	.40	1941	.74	.47	.76	.52	.73
1919	.47	.41	...	...	.47	1942	.80	.56	.83	.56	.85
1920	.58	.49	...	...	.55	1943	.85	.70	.90	.61	.96
1921	.54	.36	...	...	.51	1944	.88	.72	.95	.65	1.01
1922	.44	.32	...	...	.48	1945	.91	.78	.99	.70	1.02
1923	.52	.38	...	...	.52	1946	1.03	.81	1.11	.80	1.08
1924	.56	.38	...	...	.54	1947	1.19	.91	1.22	.90	1.22
1925	.54	.38	...	...	.54	1948	1.35	1.02	1.31	.97	1.33
1926	.55	.39	...	...	.54	1949	1.45	1.13	1.36	1.02	1.38
1927	.55	.39	...	...	.54	1950	1.53	1.19	1.43	1.05	1.44
1928	.56	.40	...	...	.56	1951	1.62	1.27	1.52	1.13	1.56
1929	.55	.39	...	...	.56	1952	1.74	1.41	1.61	1.18	1.65
1930	.56	.39	...	...	.55	1953	1.87	1.49	1.70	1.25	1.74
1931	.50	.36	...	...	.51	1954	1.98	1.53	1.76	1.29	1.78
1932	.43	.32	...	...	.44	1955	2.06	1.71	1.83	1.34	1.86
1933	.46	.38	...	...	.44	1956	2.16	1.79	1.94	1.40	1.95
1934	.53	.42	...	...	.53	1957	2.28	1.90	2.02	1.47	2.05
1935	.53	.41	.65	...	.54	1958	2.44	2.04	2.09	1.52	2.11
1936	.56	.40	.67	...	.55	1959	2.57	2.09	2.18	1.57	2.19
1937	.64	.40	.70	...	.62	1960	2.70	2.09	2.24	1.62	2.26
1938	.68	.40	.70	...	.62	1961	2.83	2.14	2.31	1.68	2.32
1939	.68	.42	.69	.48	.63	1962	2.95	2.31	2.37	1.74	2.39

Source: Cols. 2-5, U. S. Office of Business Economics, Business Statistics, 1963 ed., p. 83; 1957 ed., p. 78; 1938 Supplement, p. 50; 1932 Annual Supplement, pp. 70-71. Col. 6, U. S. Department of Agriculture, ERS, Farm Income Situation, July 1963, p. 41.

by the probability of securing a job.

If we accept the wage paid to factory workers as an approximation to the expected salvage value of farm labor, how is the gap between expected salvage value and wages reported by Perkins explained? On the one hand as previously stated, the gap is not as large as indicated since salvage value is in terms of mean annual income and Perkins data is median annual income. It is almost certain that the gap would be smaller if OASI data were in terms of the mean. Also, OASI data represent first year nonfarm income which would be expected to be lower than income in subsequent years. On the other hand, the gap between expected salvage value and realized salvage value may be fairly large. If all or most farm to nonfarm employment shifts were permanent, i.e., persons remained employed in the nonfarm sector, the implication would be that expected incomes were realized. If many returned to the farm sector after a trial period at nonfarm work, there would be reason to believe that expectations were not realized. Perkins' data show quite clearly that returns to the farm sector were very large in comparison to off-farm movements indicating that for a large group of movers expected incomes were not realized.[1]

Conclusions

The estimated salvage value series derived from annual factory worker income and unemployment rates appears

---

[1]See Perkins, pp. 43, 50.

to represent the upper limit to expected salvage values of farm labor. If this is the upper limit to salvage value, it applies to persons below age 35 whose labor services are most in demand in the nonfarm labor market. The salvage value of the labor services of the average worker in the farm sector may be as much as 40 percent below the upper limit as indicated by OASI data. More research is needed here to determine the salvage value of labor of older workers.

With qualification, the upper limit to salvage value can be considered as acquisition cost for new entrants in agriculture since it was concluded in Chapter II that both are determined by the same opportunity costs. The reason for this statement is that most workers take up farm employment prior to age 35 when acquisition costs and salvage values are essentially equal. The "true" expected salvage value of labor lies somewhere below the calculated value due to the cost of getting to and from work in the nonfarm sector. Since the 1930's, the "true" acquisition cost of labor has not dipped quite as low as salvage value during recessions due to unemployment benefits available to nonfarm laborers. This applies only to potential entrants from the nonfarm labor market, a relatively unimportant source, and not to entrants from the rural farm population.

A Further Look at the Key Variables Over the Long Period

Now that we have some reasonably acceptable estimates of acquisition costs and salvage value for labor, it is

informative to take another look at the key variables in the labor adjustment process. Thus, this section considers the historical relationships between acquisition costs and salvage values for labor and the marginal value productivity of labor in agriculture.

Changes in Acquisition Costs, Salvage Values and the MVP of Labor Considered

Before we can proceed we need some additional information about the expected MVP of labor. We recognize that decisions to enter or remain in agriculture are based in part on expected product prices and expected incomes. An index of expected incomes would be helpful in understanding labor flows but to our knowledge none is available. However, an index of expected product prices is available and from this inferences about expected incomes can be made.

The available index is a short-run (one year) index of expected product prices prepared by M. Lerohl.[1] Table IV-10 shows the index of price expectations for all farm products along with the index of prices received. The index of price expectations for aggregate farm output pertains to price estimates assumed to be representative of those formulated by farmers prior to a given year and apply to the one

---

[1] M. Lerohl, Ph.D. thesis in progress, Michigan State University, 1964. Lerohl's work was done independent of this work and prior to this analysis of labor flows.

year only. The method for developing the index is characterized as an "outlook" model. Lerohl visualized himself as a decision-maker who utilized existing outlook information and other supply-demand information available prior to the year for which the estimate was made and believed to be useful in predicting farm prices. Analysis of trends along with the outlook information provided estimates of prices for categories of farm products. These estimates were aggregated using the weights used by the USDA in preparing the index of total farm output.

Some comments about the index of price expectations shown in Table IV-10 are in order. These estimates were prepared for 45 years since 1917. Of the 45 years, prices received exceeded expectations in only 11 instances for an average of 3.5 index points per year. Twice, prices received were exactly equal to expected prices. But on the other hand prices were overestimated in 32 instances or over 75 percent of the time. The estimates which were as much as 25 percent too high in some years averaged 5.7 index points per year in excess of realized prices.

For this discussion of the key variables, we assume that the salvage value of labor series presented in Table IV-7 represents an upper limit to expected nonfarm wages. This will also be considered as the acquisition cost for new entrants, keeping in mind that there is some difference due to transportation costs. Salvage value for the "average" farm employed person is assumed to lie as much as 30 to 40 percent

Table IV-10. Index of price expectations (one year) and index of prices received, all farm products, United States, 1917-62, (1947-49=100)

Year	Index of Price Expectations	Index of Prices Received	Year	Index of Price Expectations	Index of Prices Received
1915	---	37	1940	43	37
1916	---	44	1941	44	46
1917	62	66	1942	60	59
1918	78	76	1943	71	71
1919	81	80	1944	77	73
1920	88	78	1945	74	76
1921	60	46	1946	79	87
1922	54	48	1947	97	102
1923	59	52	1948	102	106
1924	56	53	1949	101	92
1925	56	58	1950	91	95
1926	63	54	1951	107	112
1927	58	52	1952	112	106
1928	59	55	1953	101	94
1929	58	55	1954	97	92
1930	53	46	1955	99	87
1931	41	32	1956	87	85
1932	29	24	1957	91	87
1933	30	26	1958	89	92
1934	39	33	1959	92	89
1935	43	40	1960	88	88
1936	47	42	1961	87	89
1937	51	45	1962	---	89
1938	43	36			
1939	41	35			

Source: Index of price expectations from M. Lerohl, Ph. D. thesis in process, Michigan State University, 1964. Index of prices received, U. S. Department of Agriculture, Major Statistical Series of the U. S. Department of Agriculture, Vol. 1; Agricultural Prices and Parity, Agricultural Hbk. No. 118, p. 30; U. S. Department of Agriculture, Agricultural Prices, Jan. 1963, p. 7.

below the upper limit. Furthermore, variations in the series are assumed to approximate variations in, if not the level of, salvage value for all workers.

Attempts have beenmade to estimate statistically the marginal value product of labor from aggregate time-series production functions. To date these attempts have met with little success in providing statistically significant coefficients for labor. Consequently, there is small basis for the belief that the marginal value product of labor calculated to date from these functions represent reliable estimates. Because of this lack of success, the alternative used here is average net annual farm income per farm family worker. This is aggregate net farm income from farm sources plus government payments divided by the number of family farm workers. In calculating net farm incomes an allowance has been made for return to capital invested; hence the net income represents a residual return to labor and management.

Inferences about changes in the marginal value product of labor are made and are based on changes in the product price level, and on changes in the marginal physical product (MPP) of labor. Some statements about the marginal physical product of labor can be deduced from the relation between "labor requirements," variations in the number of workers on farms, and trends in adoption of new machinery and equipment.

The discussion which follows centers on Figure IV-4 and is divided into three time periods, 1915-29, 1929-41, and 1941 to 1962. These divisions, although arbitrary, appear to be rather "natural" divisions based on long-run trends

in the expected salvage value series and on major events which occurred in 1929 and 1941.

The expected salvage value of farm labor increased from $591 in 1917 to $1,082 in 1920. Almost all the increase occurred during World War I with the new high maintained through 1920. But by 1921 expected salvage value dropped sharply to $456 and thus was lower in 1921 than in 1917. Following this very sharp drop, salvage value increased and remained at a fairly stable level until 1929.

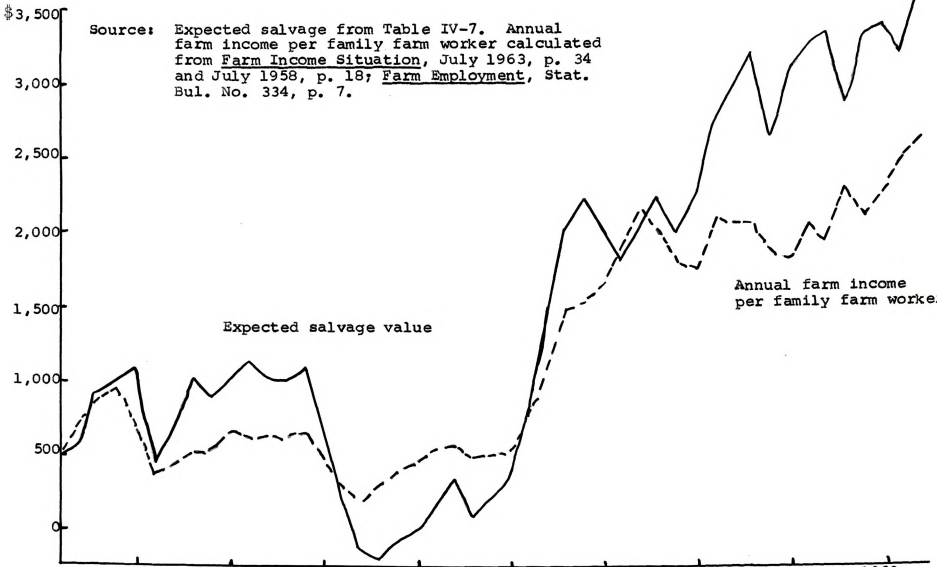
Judging by industrial unemployment rates, jobs were available in most years during the period to persons who wished to leave the farm except for 1921 and 1922 when unemployment rates were 11.9 and 7.6 percent, respectively.[1]

The MVP of labor increased sharply from 1915 through 1920 as indicated by the index of prices received which rose from 37 in 1915 to 78 in 1920 (1947-49=100). Labor requirements were essentially unchanged during the period with the index four points higher in 1920 than in 1915. Further evidence of the increase in the MVP of labor is shown by the increase in average farm income per farm family worker from $384 in 1915 to $952 in 1920.

Following the sharp break in prices for farm products which occurred in 1921, prices remained relatively stable to 1929. The same statements can be made about

---

[1] U. S. Congress, Joint Economic Committee Staff, Productivity Prices and Income, 85th Cong., 1st Sess., Joint Committee Print, 1957, p. 87.



Source: Expected salvage from Table IV-7. Annual farm income per family farm worker calculated from Farm Income Situation, July 1963, p. 34 and July 1958, p. 18; Farm Employment, Stat. Bul. No. 334, p. 7.

Figure IV-4. Expected salvage value and annual farm income per family farm worker.

income per family worker in agriculture. Labor requirements decreased slightly from 143 to 138 for the 1920 to 1929 period (1947-49=100).

Since there was a fairly steady inflow of mechanical power and machinery from 1915 through 1929 with only slight change in labor requirements, the marginal physical product of labor probably declined during this period. Net out-movement of the farm population, roughly in the magnitude of the natural increase, occurred during the entire period. Thus, the conclusion is that the MVP of labor declined substantially after 1921 as a result of both lower product prices and declining MPP of labor.

Apparently rising prices associated with the war and "war" psychology had a significant impact on product price expectations. Except for 1917 and 1925, expected prices exceeded realized prices for every year during the 1917 to 1929 period (Table IV-10). In one year, 1921, expected prices exceeded realized prices by 14 index points.

After 1921, with the expected salvage value of labor almost double annual income per farm family worker and with declining MPP and MVP labor, it is puzzling why out-movement from agriculture was not greater during this period.

Many of the events which occurred during the 1929-41 period and which affect labor flows are well-known. However, it is helpful to review these events and put them in our framework. The expected salvage series dropped sharply from 1929 to its all-time low in 1933, then it increased

slowly to about three-fourths the 1929 level by 1941. Industrial unemployment rates were in excess of 20 percent from 1932 through 1935. Almost 10 percent of industrial workers remained unemployed as recent as 1941. The method for constructing the expected salvage value series resulted in very low values throughout this period. In fact when unemployment exceeded 20 percent, the expected salvage series shows negative values which in reality should be interpreted as zero values.

Although annual farm income per worker was very low during the 1931-40 period, it exceeded expected salvage value in every year. In 1941 the two were essentially equal at $766 and $767. On the other hand, average annual income did not drop below $866 at any time for the factory worker who remained employed for a full year during the period.

Inferences about the MPP of labor in agriculture during this period are less clear than for the previous period. The inflow of labor and machinery slowed substantially during the first part of the period. After 1934 the inflow continued and by 1940 the quantity of mechanical power and machinery exceeded the quantity on farms in 1930 by three index points. Net out-movement from the farm population was reversed during 1931 and 1932. This in-movement occurred in spite of the fact that labor requirements decreased 18 index points from 1929 to 1941. Thus, it appears that the

MPP of labor fell at least during the first years of this period. It is clear that the MVP of farm labor declined during this period as farm prices were substantially lower than they were in the 1920's.

As in the previous period, farmers were more optimistic about product prices than was justified. The index of price expectations shows that realized prices were below expected prices in all years except 1941.

The 1941 to 1962 period presents a very different picture than the previous periods. Expected salvage value increased from $766 in 1941 to $3,615 in 1962. Annual income per farm family worker advanced from $767 to $2,584 over the same period. During 1946 and 1947 farm income per family worker was in excess of expected salvage value. After 1947 expected salvage value increased more rapidly and the gap between the two series widened. Both series show irregular movements after 1944, especially the expected salvage value series. The latter is primarily the result of the four recessions since World War II.

The trend in the MPP of farm labor during this period is not clear. The index of mechanical power and machinery increased from 61 in 1941 to 133 in 1962 (1947-49=100). In the meantime the index of labor requirements dropped from 120 to 54 (1947-49=100). The decrease in labor requirements occurred at a steady rate during the period. On the other hand, the increase in mechanical power

and machinery occurred prior to 1953. After that date increases were very moderate and in fact a slight decline occurred after 1959. It is quite possible that the MPP of labor decreased up to 1953 then began to increase as the introduction of machinery and equipment was slowed and labor continued to be released from farms.

The MVP of labor advanced sharply from 1941 through 1946 relative to previous values and relative to expected salvage value. After a sharp drop in 1949, product prices continued to advance through 1951 with the MVP of labor reaching a new peak in 1951. After 1951 product prices dropped substantially. The MVP of labor probably declined from 1951 through 1962 as the price decline was probably not offset by rising MPP's of labor, if in fact they did rise.

The period since 1949 was characterized as a period in which salvage value and acquisition costs for labor to the farm sector were rising relative to the MVP of agricultural labor. The decline in the MVP of labor brought about by declining product prices and adoption of new labor-saving equipment was slowed by the rapid removal of workers from the farm work force.

For all except three years during the 1941-51 period, expected prices were less than prices which materialized. After 1951 the relation was reversed for six succeeding years with expected prices as much as 12 index points above realized prices. Deviations of expected prices from realized prices were small after 1958.

Capital Gains and Losses in Agriculture

Information about an additional characteristic of agriculture is helpful in understanding labor flows into and out of agriculture. Real capital gains (see Chapter III) provide an expanded credit base. Also farm operators gain (lose) from changes in the prices of assets to the extent that they are net debtors (creditors).[1] In addition, capital gains in purely monetary terms encourage credit expansion and new investment to the extent that farmers and their financiers have money illusion. Within agriculture, the effect of capital gains on investment decisions is determined by the distribution of gains between operators, retirees, off-farm landlords and others. Little is known about this distribution with respect to either real or monetary capital gains and losses. However, the data on monetary capital gains and losses do apply mainly to those having productive investments in agriculture. For these reasons it is appropriate to look at changes in asset values due to price changes.

Appendix Table B-3 shows the importance of capital gains and losses to agriculture. Table B-4 relates changes in asset values to current income originating in agriculture.

In 15 of the 43 years shown, capital gains exceeded $5 billion per year. Gains exceeded $10 billion in seven years; 1919, 1946-47, 1950-51 and 1957-58. In 1919, 1950 and 1958, the gains approached the magnitude of net income originating in agriculture. Capital losses in excess of $5

[1] See Boyne, pp. 150-53, for a review of the literature on changes in real wealth.

billion were sustained in seven years. Capital losses exceeded net income in agriculture during 1921 and 1930-34.

Appendix Table B-3 relates the capital gains and losses during the year to the beginning year value of assets in agriculture. Capital gains due to price change exceeded 10 percent of the value of assets at the beginning of the year in 1919, 1942-43, 1946-47 and in 1950-51. Seven other years show gains in excess of 5 percent. On the other hand, capital losses in excess of 10 percent were sustained in 1920-21 and 1930-32.

Table IV-11 summarizes the changes from Table B-3 by 5-year periods. Net capital losses occurred in the first three 5-year periods shown. For 1920-24 and 1930-34 net losses over the period exceeded $20 billion. Capital gains in excess of $20 billion occurred in each 5-year period following 1940. Relative to the value of assets at the beginning of the year, the capital gains for the 1940-44 period were larger than any other period.

With capital gains and losses of these magnitudes, it is clear that such gains and losses have had a significant impact on expectations in agriculture and that they quite likely were confused in part with current income. It is equally clear that gains have been of such magnitude during certain periods that they have provided a base for credit and thus have contributed to expansion of agricultural output.

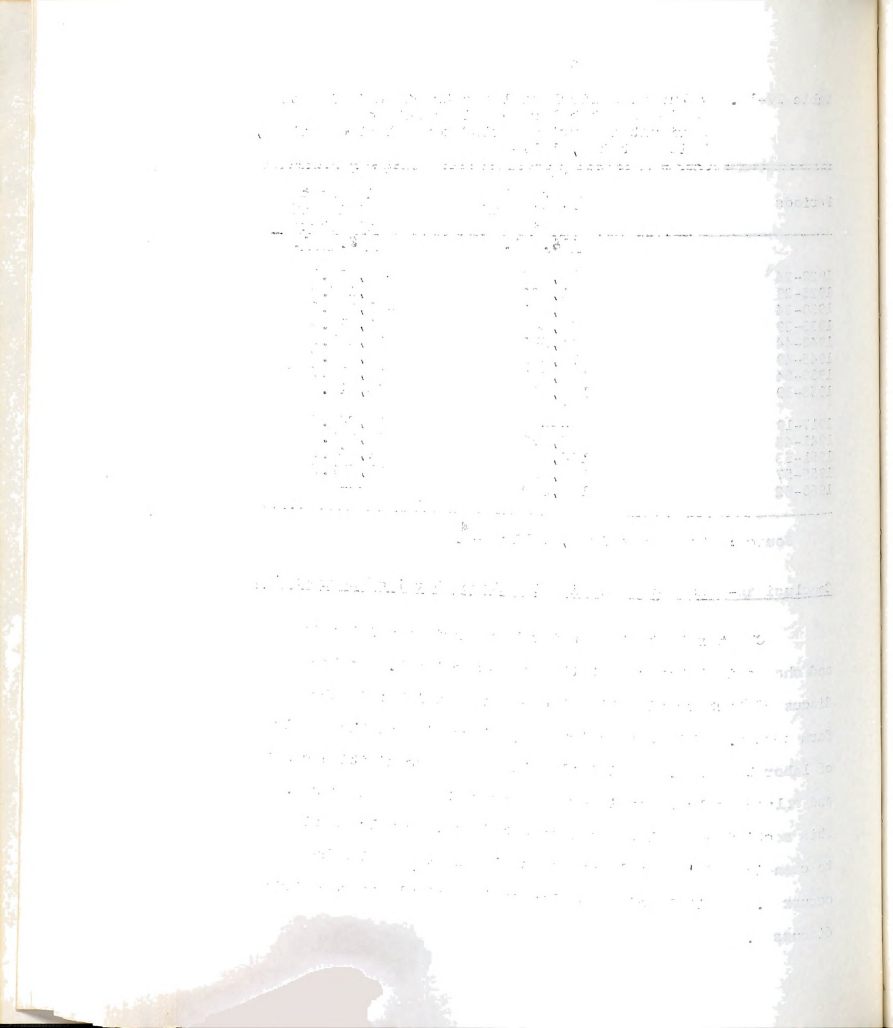
Table IV-11. Value of agricultural assets at beginning of period and total change in asset position of agriculture during period for selected periods, United States, 1917-62

Periods	Value of Assets at Beginning of Period	Total Change in Asset Position of Agriculture
	Mil. Dol.	Mil. Dol.
1920-24	84,388	-22,338.1
1925-29	61,022	- 2,162.0
1930-34	60,822	-21,216.2
1935-39	40,548	2,170.6
1940-44	44,593	25,251.7
1945-49	76,605	26,905.2
1950-54	108,765	20,310.7
1955-59	135,800	36,810.8
1917-19	---	24,346.4
1941-43	46,376	18,542.2
1951-53	124,802	1,740.7
1955-57	135,800	21,792.5
1960-62	176,800	---

Source: See Appendix B, Table B-3.

Conclusions-Need for Analysis at a Lower Level of Aggregation

Chapter IV to this point has considered labor flows and change in labor use at the aggregate level. We have discussed factors affecting the demand for labor in the farm sector. This was followed by discussion of the supply of labor to farms. Empirical estimates of acquisition costs and salvage values for labor were presented and discussed. This section has related the expected salvage value series to changing MVP's for labor and to labor flows which have occurred. Capital gains and losses in agriculture have been discussed.



To improve our understanding of labor use and labor flows, it is necessary to consider changes at a lower level of aggregation. Two general questions are important and are related to the general acquisition cost - salvage value - asset fixity hypothesis. On which farms have changes occurred, i.e., have changes in labor use depended upon the initial size of farms? How have rising acquisition and salvage values for labor affected the age-composition of the farm labor force and the rate of entry into and exit from farming? The impact by size of farms is considered first.

Adjustments by Economic Class of Farm

As the size of the agricultural labor force has decreased, the question arises: on which farms has the decrease occurred? This question is important as there is a logical basis for the belief that the marginal physical product of labor and salvage value of labor are related to size of farm where size of farm is measured by value of product sold. The economic organization of the farm is an important factor in determining the marginal physical product of labor. And the larger the bundle of inputs with which a given quantity of labor is combined the greater the marginal product of labor. A larger bundle of inputs requires more capable management and thus larger farms are managed by persons who have greater alternative earning opportunities than are available to managers of small farms.

Past studies have shown that persons who shift from farm to nonfarm occupations have experienced a wide range of farm incomes. Persons with low farm incomes and persons with high farm incomes have shifted to nonfarm occupations. Yet, one would predict that labor use would decline most on farms where the return to labor is lowest and least on farms where the returns to labor are highest. Thus, questions are raised about which farms have experienced the greatest decrease in labor use.

The above reasoning suggests that the changes in the use of agricultural labor are a negative function of the productivity of labor in agriculture, i.e., labor use or employment in agriculture has declined least where its marginal value product in agriculture is highest. And conversely, the decline in labor use has been greatest on farms where its marginal value product is lowest. This reasoning can be partially evaluated by considering answers to the following questions pertaining to the three different components of the farm labor force.

Has the decline in number of farm operators taken place on farms where the marginal value product of labor is lowest relative to other farms? Has multiple job holding by farm operators been less important on farms where the on-farm productivity of labor is highest? Over time has multiple job holding become more important for operators of farms with small value of sales than for operators where value of sales is larger? Has hired labor use declined least on farms where its marginal value product is highest?

Data are available from the Census of Agriculture which permit partial answers to these questions. These data, however, have several limitations. Labor data for farms by value of product sold are available for only 1950, 1954 and 1959, a relatively short time span. Data for unpaid family labor or for the amount of farm operator labor utilized on farms are not available for farms classified by value of product sold. However, some meaningful conclusions can be drawn by considering the number of farms as a proxy for the number of farm operators, the procedure used in the census.

If labor productivity increases with value of product sold, it can be predicted that over time farm operator numbers would increase (or decrease least) in the upper economic classes of farms. On the other hand, numbers would decline most in the lower economic classes. Table IV-12 supports this prediction if it is assumed that the number of farm operators can be equated to the number of farms.

The number of farms selling $2,500 of product or more changed surprisingly little from 1950 to 1959. However, subclassification shows that the number of farms selling above $10,000 increased by two-thirds with the number in other classes declining. Since the total number of farms selling $2,500 of product or more remained essentially the same, a plausible explanation is that some farms selling from $2,500 to $9,999 of product increased their sales and moved to the next higher class. But farms moving up and out of the class were not replaced by farms moving past the $2,500

Table IV-12. Number of farms and percent change in number from 1950 to 1959 by value of sales per farm, United States

Value of Sales Per Farm[a]	Number of Farms			Change, 1950-59
	1950	1954	1959	
	Thou.	Thou.	Thou.	Pct.
$10,000 and over	484	583	794	64.0
$5,000 to $9,999	721	707	653	-9.4
$2,500 to $4,999	882	812	617	-30.0
Total $2,500 and over	2,087	2,102	2,064	-1.1
Com. farms under $2,500	1,619	1,226	348	-78.5
Total com. farms[b]	3,706	3,328	2,412	-34.9

[a]Value intervals are in current dollars but they also approximate constant dollars as the index of prices received for all farm products was 250,246 and 240 (1910-14=100) in 1949, 1954 and 1959 respectively, Agricultural Statistics, 1961, p. 474.

[b]Commercial farms as defined by Census of Agriculture.

Source: U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, General Report, Statistics by Subjects, Chap. xi, pp. 1192. Ibid. 1954, p. 1132.

mark. Undoubtedly some farms did move from below $2,500 of sales to above; if these data are interpreted as net changes, a few farms selling above $2,500 went out of business or had a smaller value of sales in 1959 than 1950.

The number of farms selling below $2,500 of product decreased by more than three-fourths from 1950 to 1959. Thismeans that about 3 out of 4 farm operators producing less than $2,500 of product in 1950 were not in this category in 1959. Two criteria used in the 1959 classification may

have removed farms and farm labor from the under-$2,500-of-sales or class VI category.[1] If the operator had $2,500 of sales but worked off the farm 100 or more days, the farm would not have been in class VI in 1959. Or if income received from off-farm sources exceeded total product sales, the farm would not have been in class VI in 1959. Removal of farms from this category for these reasons, however, is consistent with the argument under consideration.[2] The data clearly indicate that the greatest decline in operator labor has occurred on those farms where the value productivity of labor is lowest.

Waldo has shown that multiple job holding rates for farm operators in 1955 were inversely related to value of sales per farm.[3] Changes in multiple job holding rates indicate that off-farm work by farm operators has increased most on farms in the lower economic classes. The number of operators working off their farms more than doubled from 1950 to 1959 for farms with over $10,000 of sales (Table IV-13). And the increase in

---

[1] See U.S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chap. xi, p. 1192 for the criteria for economic class of farms.

[2] Of course, farms could have been removed from the category for yet another reason--change in the definition of a farm. The 1959 census did not include 232,000 farms which would have been counted if the 1954 definition had been used in 1959. If all the farms removed by change in definition were from class VI (which greatly overestimates actuality), the number of commercial farms selling under $2,500 of product would have decreased 64 percent from 1950 to 1959.

[3] Arley D. Waldo, The Off-Farm Employment of Farm Operators in the United States, Unpublished Ph.D. thesis, Michigan State University, 1962, pp. 105-45.

off-farm work or multiple job holding by operators was progressively smaller as value of sales decreased. This could lead one to conclude that demand for farm income expressed as value of sales is not independent of demand for off-farm income. Although this conclusion may not be entirely incorrect a more plausible explanation is available.

Table IV-13. Number of farm operators reporting work off farms and percent change in number from 1950 to 1959, by value of sales per farm, United States

Value of Sales Per Farm	Number of Operators			Change, 1950-59
	1950	1954	1959	
	Thou.	Thou.	Thou.	Pct.
$10,000 and over	102	149	212	107.8
$5,000 to $9,999	173	220	230	32.9
$2,500 to $4,999	249	295	268	7.6
Total $2,500 and over	524	664	710	35.5
Com. farms under $2,500	466	448	99	-78.8
Total com. farms	990	1,113	808	-18.4

Source: U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chap. xi, p. 1212. Ibid., 1954, p. 1146.

For farms in the top economic class shown in Table IV-12 both the number of farms and the number of operators within the class working off the farm increased from 1950 to 1959 (Table IV-13). In the two classes between $2,500 and $9,999 the number of farms decreased and at the same time the number of operators within the classes who worked off the farm increased. Thus, a better measure of the amount of off-farm work by a given number of operators is to

consider changes in the proportion of farm operators working off the farm. Within all three classes above $2,500 of sales, the proportion of operators working off their farms increased from the beginning to the end of the period (Table IV-14). Furthermore, as value of sales decreased, the change in the proportion of farm operators working off their farms increased. The change in percentage points of operators working off their farms was about three times as large for the $2,500 to $4,999 class as for the over $10,000 class. It is interesting to note that for commercial farms with less than $2,500 of sales there was a very small decrease in the proportion of farm operators reporting off-farm work.

Table IV-14. Percent of operators of commercial farms reporting work off farms and change in percentage points from 1950 to 1959 by value of sales per farm, United States

Value of Sales Per Farm	Operators of Commercial Farms Reporting Work Off Farm			Change, 1950-1959
	1950	1954	1959	
	Pct.	Pct.	Pct.	Percentage points
$10,000 and over	21.1	25.6	26.7	5.6
$5,000 to $9,999	24.0	31.1	35.2	11.2
$2,500 to $4,999	28.2	36.3	43.4	15.2
Total $2,500 and over	25.1	31.6	34.4	9.3
Com. farms under $2,500	28.8	36.5	28.4	-.4
Total com. farms	26.7	33.4	33.5	6.8

Source: Calculated from Tables IV-12 and IV-13.

It is somewhat more difficult to answer the questions about changes in the use of hired labor by value of sales per farm since data are available by economic class of farm for only regular hired workers (150 or more days worked during the year). Also as stated elsewhere, census data on hired labor are not always fully comparable for different years since the data pertains to only the week preceding the census. Although data for only one week during the year do not adequately describe labor use for the entire year, it is reasonable to compare 1950 to 1959 since the two enumeration periods covered approximately the same weeks of the respective years.

Employment of regular hired workers decreased for all economic classes of farms from 1950 to 1959 (Table IV-15). The decline in hired labor use was much greater for farms with under $2,500 of sales than for farms with greater sales. For farms with over $2,500 of sales, the number of regular hired workers declined only 25 percent in contrast to a 94 percent decline for farms with sales of less than $2,500. Within classes above $2,500, the decline was much greater for farms near the low end of the scale compared to farms at the top of the scale.

Changes in the number of regular hired workers shown in Table IV-15 do not take into account changes in the number of farms which have occurred in each class of farm. Table IV-16 shows the average number of regular hired workers

Table IV-15. Regular hired workers on farms by value of farm products sold, United States, 1950-59

Value of Sales Per Farm	Number of Regular Hired Workers			Change, 1950-1959
	1950	1954	1959	
	Thou.	Thou.	Thou.	Pct.
$10,000 and over	624	512	581	-6.9
$ 5,000 to $9,999	175	94	62	-64.6
$ 2,500 to $4,999	96	43	27	-71.9
Total $2,500 and over	895	649	670	-25.1
Under $2,500	66	21	4	-93.9
Total workers hired on commercial farms	961	670	674	-29.9

Source: U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects. Chap. xi, pp. 1216-17; Ibid, 1954, p. 1150.

for 100 commercial farms by value of farm products sold. These data take into account both the change in number of regular hired workers and the number of farms. Conversion of the data to hired workers per 100 farms shows a large percent decline in number of hired workers even on farms in the upper economic class but the same general relation remains as was shown by Table IV-15.

When the data are converted to workers per farm one rather puzzling statistic appears. For all commercial farms taken together there was a small increase in the number of workers per farm but for every subclass there was a decrease in number of workers per farm. The explanation is that

Table [illegible]. [illegible]

Value of [illegible] Per Farm	[illegible]	[illegible]	[illegible]	[illegible]
$10,000 and over	[illegible]	[illegible]	[illegible]	[illegible]
$ 5,000 to [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
$ 2,500 to [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total $2,[illegible] and over	[illegible]	[illegible]	[illegible]	[illegible]
Under [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total work [illegible] on [illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

Table IV-16. Regular hired workers per 100 commercial farms by value of farm products sold, United States, 1950-59

Value of Sales Per Farm	Regular Hired Workers			Change, 1950-59
	1950	1954	1959	
	Units	Units	Units	Pct.
$10,000 and over	129	88	73	-43.2
$5,000 to $9,999	24	13	9	-60.9
$2,500 to $4,999	11	5	4	-59.8
Total $2,500 and over	43	30	32	-24.3
Under $2,500	4	2	1	-72.0
All commercial farms	26	20	27	7.8

Source: Computed from number of farms in Table IV-12 and number of hired workers in Table IV-15.

since farms with sales over $10,000 employed more workers than all other farms combined, the very small decline in number of workers on these farms in the predominating class caused the average for all farms to increase.

To recapitulate, available evidence from census data clearly indicates that labor use decreased most from 1950 to 1959 on farms where labor productivity was lowest and decreased least on farms where productivity was highest. Farm operator numbers decreased much less on farms with over $2,500 of sales than on farms with smaller amounts of sales. Off-farm work by farm operators (multiple job holding) increased less on the larger farms than on the smaller farms. Also, the number of regular hired workers decreased least on the larger, more productive farms.

Adjustment by Different Age Groups of Farm Operators

The average age of farm operators increased from 48.7 years in 1950 to 50.5 years in 1959.[1] Change in the average age of farm operators is a result of changes in the rate of entry of young men into farming, changes in the longevity of persons and of the age selectivity of movements to and from the farm.

The new technique of cohort analysis used by Kanel and Clawson emphasizes the importance of the rate of entry into agriculture for the size of the agricultural labor force.[2] Essentially, a cohort of farm operators is defined as the group of farm operators born during a specified time period. In a closed population, once the group of individuals in a cohort has reached working age its size can be increased only by persons starting farm operations. The size of the group can decrease through death, retirement, or change of occupation. An increase in the size of a cohort is considered as entry to the cohort of farm operators. A decrease in size represents withdrawal from farm operatorship.

At a given census date, it is possible to estimate change in the size of a given cohort of farm operators by

---

[1] U. S. Census of Agriculture, 1959, II, General Report, Statistics by Subjects, Chap. xi, p. 84.

[2] Dan Kanel, "Age Components of Decrease in Number of Farmers, North Central States, 1890-1954," Journal of Farm Economics, XLIII, (May 1961), pp. 247-263; Marion Clawson, "Aging Farmers and Agricultural Policy," Journal of Farm Economics, XLV,(Feb. 1963), pp. 13-20.

observing the number of persons who were in the group 10 years younger at the previous decennial census and comparing that number with the number in the group at the given census date. For example, the 1940 census enumerated 992 thousand farm operators between ages of 25 and 34. In the 1950 census the 35-44 age group comprised 1,266 thousand farm operators, all of whom were born during the same decade as the 992 thousand counted as age 25 to 34 in 1940. Thus, this particular cohort increased by 274 thousand persons or by 27.6 percent from 1940 to 1950.

As used here, changes in size of a cohort are net changes. A farm operator cohort can increase in size through entry from the farm or nonfarm population and it can decrease through withdrawal from the group. It is possible for net inflows and outflows exactly to balance with no net change in size of the cohort.

Clawson has shown that the typical cohort of farm operators reaches maximum size at age 35-44.[1] For the six farm operator cohorts which have completed the maximum size stage, he shows that the average cohort increased from 85 percent ofmaximum size at age 25-34, reached a maximum,, then declined to 96 percent of maximum size for ages 45 to 54. Thus, there is small net change in the size of a given cohort once it is established, a fact which emphasizes the importance of factors which determine the rate of entry into

---

[1]Clawson, p. 19.

farming. Apparently adjustment to social and economic forces determines the size of the cohort through changes in the rate of entry into and exit from farming. And once the size is established the cohort continues as a fairly stable component of the stock of labor in agriculture.

Before continuing with cohort analysis as a method for estimating rates of entry and withdrawal from farming, two limitations of the data and analysis should be indicated. One has been mentioned; only net rates of change are measurable. The other is that this type of analysis is applicable only to farm operator labor since comparable basic data are not available for either unpaid family labor or hired labor. The latter is a fairly important limitation. However, farm operator labor comprises more than one-half the total labor input. Also changes in family labor use are believed to follow changes in farm operator labor fairly closely. Thus, cohort analysis permits analysis of a substantial segment of the labor input.

The age structure of the farm operator group and the implied structure of salvage values for operators' labor services along with known characteristics of new entrants to agriculture imply that there is a substantial gap between the acquisition cost of more labor to the farm sector and the salvage value of farm employed labor in certain age groups. Since acquisition and salvage values for new entrants are substantially greater than the salvage value of the services of farm employed labor, one can readily

hypothesize that adjustment in the size of the farm work force has occurred through reduced rates of entry for young workers rather than through increased rates of withdrawal for employed workers. This hypothesized adjustment is consistent with the theory of Chapter II. For the farm operator over 35 with low salvage value of his own labor, it could be to his advantage to acquire additional non-labor inputs to increase the productivity of his labor on the farm. For the younger worker with greater salvage value for his labor, it would be more profitable to shift to the non-farm occupation when the on-farm MVP of his labor is compared to the salvage value of his labor.

Rates of change in the number of farm operators have been calculated for each decade since 1910. The net rate of change was calculated as the difference between the rate of entry into farm operatorship during the decade and the rate of withdrawal during the decade. Specifically, the rate of entry for a decade is the difference between the number of farm operators under age 35 at the beginning of the decade and the number of operators at the end of the decade under age 45 divided by the total number of operators at the beginning of the decade times 100. The rate of withdrawal is calculated as the difference in total number of farm operators over age 35 at the beginning of the decade and the total number of farm operators over age 45 at the end of the decade divided by the total number of farm

operators at the beginning of the decade times 100. These calculations made no distinction between withdrawal by death, retirement, or change of occupation nor do they show changes for specific age groups.

The net rate of change in number of farm operators during a decade has increased substantially since the decade following 1910 (Table IV-17). A large increase has occurred since 1950. Although the net rate of change shows a persistent downtrend, the components of change show a variable pattern. From 1920 to 1950 the rate of entry was very nearly constant, and, in fact, increased slightly for the 1940 to 1950 period. This raises a question about the effects of manpower policy on entry rates during this period. A drastic decrease in rate of entry occurred in the 1950-59 decade when the total rate dropped from 84.9 percent in the 1940's to 33.2 percent in the 1950-59 decade.

Total rates of withdrawal were between 20.1 and 22.3 percent for the first three decades shown in Table IV-17. The rate of withdrawal increased sharply to 29.0 for the 1940-50 decade. The rate of withdrawal continued to increase through the 1950's; it measured 33.2 percent for the decade.

Over the five decades, it appears that change in the rate of entry of farm operators has been greater than change in the rate of withdrawal. From the initial period to the most recent decade, the rate of entry has decreased by 17.4

Table IV-17. Age-specific rates of entry and withdrawal for farm operators, United States, 1910-59[a]

Age at Beginning of Decade	1910-20	1920-30	1930-40	1940-50	1950-59[b]	1950-59
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Rates of Entry						
15-24	221.0	179.4	157.7	246.1	146.6	132.9
25-34	13.4	11.3	20.3	27.6	2.1	-3.7
Total	82.0	71.0	72.8	84.9	33.2	25.8
Rates of Withdrawal						
35-44	4.7	6.0	.8	5.6	17.7	21.9
45-54	30.0	26.7	20.8	28.5	31.0	34.4
55.64	37.8	30.4	21.5	33.7	35.9	41.6
65 and over[c]	100.0	100.0	100.0	100.0	100.0	100.0
Total	22.3	21.6	20.1	29.0	33.2	36.1

[a] See text for method of calculation.

[b] Adjusted to include operators on farms not included in the 1959 census which would have been included under the definitions used in 1950.

[c] By assumption all persons over 65 at the beginning of the decade have discontinued farm operation by the end of the decade.

Source: Basic data from U. S. Census of Agriculture, (See Table IV-18).

percentage points (Table IV-18). During the same period, the rate of withdrawal increased by 10.9 percentage points. Thus there appears to be support for the hypothesis that change in the rate of entry has made a more important contribution to the adjustment process than change in the rate of withdrawal.

Table IV-18. Rates of entry, rates of withdrawal and net rates of change for all farm operators, United States, 1910-59[a]

Period	Rate of Entry	Rate of Withdrawal	Net Rate of Change
	Pct.	Pct.	Pct.
1910-20	23.7	22.3	1.4
1920-30	19.2	21.6	-2.5
1930-40	17.0	20.1	-3.0
1940-50	17.2	29.0	-11.8
1950-59[b]	6.3	33.2	-26.9
1950-59	4.9	36.1	-31.2

[a]See text for method of calculation.

[b]Adjusted to include farms not counted in the 1959 census which would have been included under the definitions used in 1950.

Source: Calculated from: U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chapter ii, p. 124; U. S. Bureau of the Census, Sixteenth Census of the United States: 1940, Agriculture, III, General Report, Statistics by Subjects, pp. 359-362; U. S. Bureau of the Census, Fifteenth Census of the United States: 1930, Agriculture, IV, General Report, Statistics by Subjects, pp. 318-321; U. S. Bureau of the Census, Fourteenth Census of the United States: 1920, Agriculture, V, General Report and Analytical Tables, pp. 355-359.

Clawson has shown that despite differences in the size of farm operator cohorts a similar pattern is exhibited by each cohort as it progresses through time. However, more detailed analysis which compares age-specific rates of entry and withdrawal for different cohorts shows variation in the general pattern. These differences coincide with major political and economic events. But before considering

changes in rates of entry and withdrawal and their relationship to political and economic events the method of determining age-specific rates of change is presented.

Age-specific rates of entry were calculated as the difference between the number in a given age group at the beginning of a decade and the number in the cohort at the beginning of the subsequent decade. The difference divided by the number of farm operators in the specific age group at the beginning of the decade multiplied by 100 is the age-specific rate of entry expressed as a percent. Since the size of the cohort increases until age 45, rates of entry were calculated for the two cohorts age 15-24 and 25-34 at the beginning of the decade.

Age-specific rates of withdrawal were calculated by the same procedure. Withdrawal rates were calculated for the cohorts whose age at the beginning of the decade was 35-44, 45-54, and 55-64.

With age-specific rates of entry and withdrawal it is possible to compare cohorts as they complete the same stage in the life-cycle of the cohort. This comparison is made by reading across a row in Table IV-17. The first figure in the 15-24 row shows that the cohort of farm operators born between 1885 and 1895 increased 221.0 percent between 1910 and 1920.[1] The next figure in the same row and under

[1]One feature unique to this stage of the cohort explains some of the differences when comparing the change to other age groups within a decade or when comparing other decades within the age group. Typically, a cohort is being formed at this stage and is relatively small compared to its maximum size at age 35-44 as Clawson shows that the average cohort is 25 percent of maximum size between ages 15 and 24 (see Clawson). Thus, a small absolute change at this stage appears as a relatively large percent change. For this reason one might expect more percent variation over time in the 15-24 age group than for other age groups.

the heading 1920-30 shows that the cohort of operators born between 1895 and 1905 increased 179.4 percent from 1920-30.

By reading on the diagonal it is possible to trace the same cohort at subsequent decennial census dates. The cohort of operators born between 1885 and 1895 and which increased 221.0 percent from 1910-20 shows a net increase of 11.3 percent for the 1920-30 decade as measured from 1920. The size of this cohort decreased .8 percent from 1930 to 1940 and 28.5 percent from 1940 to 1950.

Rates of entry for the 15-24 age group show substantially higher rates for 1910-20 and 1940-50 than for other decades. Major wars and inflations which improved agricultural prices relative to nonfarm prices occurred during both decades. A highly plausible argument is that even though jobs were more plentiful in the nonfarm economy during these periods, rising farm prices encouraged more young persons to enter farming than during other periods. Also, the effect of manpower policy on entry rates during these periods is not clear.

Rather surprisingly, the rate of entry for 15-24 year olds prior to 1950 was at its lowest point during the 1930's when industrial unemployment rates were highest in history. Even though farm incomes were very unfavorable during this period of time, one might have presumed that due to the

scarcity of nonfarm jobs the rate of entry into farming would have been higher. There are several possible explanations why entry rates for this group were low during the severe depression. Young persons (15-24 at the beginning of the decade) may have (1) been able to get nonfarm jobs despite high unemployment rates, (2) chosen unemployment over low returns in farming, (3) remained as unpaid family workers, or (4) remained family or become hired farm workers because they could not finance entry. Some evidence is available to refute a portion of the latter alternative. The number of hired farm workers did not increase from 1930 to 1939 but actually declined 15 percent during the period.[1] A more likely explanation for persons in this age group is that they remained as part of the unpaid family labor force because they were not able to become either farm operators or industrial employees.

For the 25-34 age group, rates of entry were substantially higher in the 1930-40 and 1940-50 decades than for other decades (Table IV-17). Economic conditions during these two periods were vastly different, yet in both periods rates were higher than in other periods. The high entry rate for 1930-40 probably can be attributed to the lack of nonfarm jobs available to persons of this age group. For the 1940-50 period a different explanation is probable.

---

[1] U. S. Department of Agriculture, SRS, Farm Employment, Stat. Bul. No. 334, p. 7.

Farm prices and incomes were higher relative to nonfarm prices and incomes than in previous periods, thereby attracting young persons into farming. Also, agricultural draft deferments may have had an effect on entry rates for this age group.

There appears to have been a major change in the rates of entry during 1950-59 for 15-24 and 25-34 year olds. Although industrial unemployment ranged from 2.9 to 6.8 percent of the civilian labor force during the decade, the 25-34 year old farm operator group increased only 2.1 percent during the decade.[1] This was a very small increase compared to the 11.3 to 27.6 percent increases in previous decades. Thus, the very low rate of entry would suggest that with declining farm prices and increasing capital requirements in agriculture young persons were not entering farming but were finding nonfarm jobs despite the relatively high unemployment rates of the 1950's.

Table IV-17 shows that a major change in withdrawal rates for 1950-59 occurred for 35-44 year olds when rates are compared for other decades. However, almost no increase in the rate of withdrawal for 45-54 and 55-64 year olds occurred. Thus, the sharp drop in rate of entry for 25-34 year olds plus the increased rate of withdrawal for 35-44 year old operators was mainly responsible for the 26.9 percent decline in number of farm operators during the decade. (See Table IV-18)

---

[1] Economic Report of the President, (Washington: U.S. Government Printing Office, 1963), p. 198.

Table IV-17 shows clearly the effect of the depression of the 1930's on the rate of change in the number of older farmer operators. Net withdrawal rates for all "older" groups were substantially lower for the 1930's than for any other decade.

As was stated above entry rates for 15 to 24 year olds during the 1910's and 1940's and for 25-34 year olds during the 1940's were higher than usual. These higher entry rates occurred at a time when farm incomes improved relative to nonfarm incomes. Coinciding with the increased entry rates were increased withdrawal rates for operators 45-54 years old and particularly for the 55-64 year old operator group. If entry rates had increased and withdrawal rates had decreased, behavior would have been consistent with rising farm prices and farm incomes associated with wars during both periods. But withdrawal rates did not decrease; they increased. This seems to be puzzling behavior which we leave for analysis in chapter VI.

In one sense age-specific rates of entry and withdrawal are net rates of change, in another sense they are gross rates. They are net rates in that they measure difference in number of farm operators at the beginning and at the end of the decade, but do not measure in and out movement during a decade. Therefore, persons who become farm operators after a census is taken but withdraw before the subsequent census would not appear in either entry or withdrawal

rates. Thus, net rates underestimate the total changes which occur. Age-specific rates of withdrawal are gross rates in that they measure all change in numbers irrespective of cause. Since there is no distinction between retirement, death, or change of occupation, gross rates overestimate rates of change in occupation.

Adjusted net rates of change in number of farm operators are estimated by comparing the number of operators in a cohort at the beginning of a decade who are expected to survive to the end of the decade to the number in the cohort at the end of the decade.[1] The difference expressed as a percent of the expected number at the end of the decade is a net rate of out-migration for farm operators. A positive change indicates movement into the farm operator group, a negative change indicates out-movement.

Although the same general pattern appears in Table IV-19 as shown by age-specific rates of entry and withdrawal, two notable exceptions appear. Gross withdrawal rates for 35-44 year olds presented in Table IV-17 show that this group declined during all decades. Although highly variable between decades, each decade shows a decrease. This is in contrast to adjusted net rates for 35-44 year olds which show an increase for all years except the 1950's. The increase was particularly high in the 1930's when industrial unemployment rates were high. Age-specific rates of withdrawal were higher for 55-64 year olds than 45-54 year olds

[1]To avoid confusion with other rates, these rates are called "adjusted" net rates. They appear in Table IV-19.

Table IV-19. Net percent change in number of farm operators, by age, after adjusting for survival rates, United States, 1910-59

Age at Beginning of Decade	1910-20	1920-30	1930-40	1940-50	1950-59	Average Over All Periods
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Under 25	261.4	189.8	169.1	260.9	145.4	205.3
25-34	22.2	12.5	22.3	30.8	1.5	17.9
35-44	3.5	.4	7.6	2.5	- 15.1	- .2
45-54	- 11.9	- 9.5	- 3.4	- 13.4	- 22.7	- 12.2
55-64	- 8.1	- 1.5	8.2	- 9.1	- 16.1	- 8.6
65 and over[a]	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0

[a] By assumption all persons over 75 have discontinued farm operatorship by the end of the decade.

Notes: The percent change in number of farm operators or net migration rate consists of change of occupation with or without change of residence. Prior to calculation of rates of change, farm operator numbers as reported by the Census were adjusted to include operators not reporting age. To make the adjustment operators not reporting age were distributed among age classes in proportion to operators who did report age.

The percent change in number of farm operators was calculated as follows:

1. The number of operators expected to survive to the end of the decade is the product of the number in the age group at the beginning of the decade and the forward census survival rate.

2. The number of operators 10 years older enumerated in the subsequent decennial census less the expected number of survived operators is equal to the net change in number of farm operators.

3. The net change divided by the expected number times 100 is the net percent change in number of farm operators. A positive change indicates movement into the farm operator group during a decade, a negative change indicates out-movement or out-migration.

Table IV-19 (Continued)

Source: Farm operator numbers from U. S. Censuses of Agriculture (see Table IV-18). Forward census survival rates for 1910 to 1950 from E. S. Lee et al., Population Redistribution and Economic Growth - United States, 1870-1950, prepared under supervision of Simon Kuznets and D. S. Thomas, (Philadelphia: The American Philosophical Society) 1957, pp. 18-19. Survival rates for 1950-1960 were estimated from data taken from U. S. Bureau of the Census, U. S. Census of Population, 1960, PC(1) 1D U.S. Summary, pp. 359-60 using the same procedure as used by Lee.

in all cases (Table IV-17). Adjusted net changes shown in Table IV-19 reverse these relationships. A smaller proportion of 55-64 year olds than 45-54 year olds out-migrated.

Specific decades illustrate the age selectivity of out-migration. During the 1920's only 1.5 percent of the 55-64 group transferred from farm operation compared with 9.5 percent of the 45-54 group. Adjusted net rates illustrate even more dramatically the effect of the depression of the 1930's on migration of 55-64 year olds. For all other decades this group decreased by 1.5 to 16.1 percent, but during the 1930's this group increased 8.2 percent.

Summary and Conclusions

This summary and conclusions section consists of two parts. First, some general statements are made which apply over the entire time period under study. The second part consists of a summary of events by 5-year periods. These events are summarized by period, conclusions are drawn, and unanswered questions are indicated.

General--Over the Entire Time Period

From the postulates of economics it is possible to deduce which factors determine the quantity of labor used in agriculture. From various empirical studies it has been possible to conclude that these are the relevant variables. However, in some instances response to change in earnings has been in the opposite direction to that expected. When it is recognized that the theoretical response depends upon an initial equilibrium where labor returns are equal at the margin in the two sectors, observed behavior may be and in this study was found to be consistent with the theory. For a given level of unemployment in the nonfarm sector, an increase in relative earnings produces the expected directional flow of labor. However, in the short run the supply of labor to the farm sector is very inelastic, and only somewhat less inelastic in the long run.

Considerable difficulty was encountered in defining and estimating salvage values and acquisition costs for labor, the latter due to lack of appropriate data. Yet, the conclusion is that this is a useful concept in predicting labor flows between the two sectors. If actual flows had been less consistent with expected flows when salvage value estimates were related to labor flows, the usefulness would have been questioned.

The off-farm salvage value of farm labor, determined by the kinds of jobs available to farm labor, wages at those jobs, and industrial unemployment rates, appears to be the single most important factor which explains the uneven adjustment in labor use on farms. When nonfarm jobs are

plentiful, the adjustment process takes place without pockets of underemployment developing in certain areas. When nonfarm jobs become more difficult to get, labor available to farms accumulates, depressing the marginal physical product of labor on farms.

Disaggregation of the labor force shows that labor movements from the farm sector are an inverse function of size of farm as measured by economic class of farm. Farm operator labor has decreased least on farms in the upper economic classes. Off-farm work by farm operators has been less important and has increased less on farms in the upper economic classes. Also, hired labor use has decreased less on farms in the upper economic classes.

Analysis of labor movements by age-group shows that decreased labor requirements in agriculture have been adjusted to by decreasing the rate of entry of new workers into agriculture. Withdrawal rates have also increased substantially but these changes have been less important than changes in entry rates. However, the large increase in withdrawal rates preceded by a decade the large decrease in entry rates which occurred in the 1950's. This clearly suggests that increased farm earnings during the 1940's as well as national manpower policy during this period may have contributed to high entry rates.

Although adjustment has occurred, average labor earnings in agriculture have remained low. Not all farm operators with small amounts of sales (below $2,500) have gone out of business or have taken supplemental off-farm jobs.

Part of this may be due to low motivation, lack of clear objectives, indolence, or other factors which affect demand for income. But it is difficult to believe that persons would have remained in agriculture if their off-farm salvage value had been substantially greater than farm earnings. Labor earnings for operators with sales under $2,500, although very low, have probably equalled or exceeded earnings in the next best alternative.

If entry rates for farm operators remain at or below the greatly reduced rates attained in the 1950's, the number of persons seeking a living in agriculture will decline substantially by the 1970's. This is particularly important when one considers the current age structure of farm operators. Eventually reduced entry rates may improve earnings for those in agriculture but it will not ease the transfer out of agriculture for those currently employed and receiving low earnings.

By 5-Year Periods

1917-19

Both the expected salvage value of labor and farm income per family worker increased substantially during this period. The increase in salvage value was almost double that of the increase in farm income. Salvage value continued to rise to 1920 but farm income dropped to less than its level in 1917. The farm labor force decreased 2.4 percent from 1917 to 1919 as labor requirements remained essentially unchanged. Thus the marginal physical product

of labor probably increased slightly during the period. The MVP of labor in current dollars increased substantially as the index of prices received increased from 66 to 80 during the period (1947-49=100). The decrease in the farm labor force during this 3-year period was almost as large as that during the subsequent 5-year period.

Farm operator entry rates were higher during the 1910-20 decade than during the two subsequent decades. Our data do not permit us to determine when during the decade entry rates increased, but there is reason to believe that they occurred during the latter part of the decade. Draft deferments were available for agricultural workers. The asset value position of agriculture increased due to price change by more than $24 billion during the three years. Agriculture was in an expansionary phase, a condition conducive to entry of new operators.

1920-24

The expected salvage value of farm labor dropped over 50 percent from 1920 to 1921. The downward slide of farm income which began in 1919 continued through 1921. After 1921 both expected salvage value and annual farm income started an upward trend with farm income rising slowly but steadily. Expected product prices were in excess of received prices during every year. Furthermore, this excess was the largest of any of the 5-year periods under study. The expected salvage value of labor rose sharply from 1922

to 1923 but lost part of the gain by 1924.

During this period the farm population decreased a modest 2.5 percent as the farm labor force and labor requirements each declined three percent or less. Thus, during this period there was essentially no change in the marginal physical product of labor. Prices of farm products continued to decline during the period, with the index of prices received falling from 78 to 53 (1947-49=100). Thus, the MVP of labor in current dollars declined substantially.

Capital losses of over $22 billion, which almost equalled the gain from 1917-19, occurred during the period. Over $20.8 billion of these losses were incurred during 1920 and 1921.

1925-29

Both expected salvage value of labor and annual farm income remained relatively stable throughout this 5-year period with farm income the more stable of the two. For the entire period, salvage value was $350 to more than $500 greater than annual farm income. Despite this large and persistent differential, the farm population decreased only 2.0 percent, a smaller decrease than during the previous period. The farm labor force declined 5.2 percent as labor requirements fell 2.7 percent.

The MPP of labor probably decreased during this period. The index of mechanical power and machinery in agriculture increased from 45 to 53 during the period. With this increase in inputs, part of which substituted for labor,

one would expect the MPP of labor to fall unless sufficient labor were released from farms. But the release appears to have not been sufficient to maintain MPP's for labor. Since product prices were essentially stable over the period any decrease in the MVP for labor was a result of the probable slight decline in the MPP of labor.

Economic conditions indicate this was a period when substantial out-movement from agriculture was needed in order to increase labor MVP's in agriculture. Cohort analysis indicates some decrease in entry rates over the decade of the 1920's and only a very moderate increase in withdrawal rates.

Capital losses continued during this period although they were relatively small compared to losses in the previous 5-yearperiod. Apparently the capital losses and low farm prices following 1921 had not yet made a sufficient impact on price and income expectations required to bring them in line with realized prices and incomes. In addition to unrealistic price expectations, large mortgages acquired following the war probably "tied" persons to the farm despite salvage values for labor substantially greater than farm incomes.

1930-34

The salvage value of farm labor was very low during this period as it dropped from over $1,000 in 1929 to zero at the margin in 1932. With the very large number of industrial unemployed persons, it became very difficult for

a person to transfer from a farm job to industrial employment. During this period annual farm income reached an all-time low of $194 per family farm worker. By the end of the period, farm income had slowly regained some of the lost ground and had reached $396 in 1934.

Although farm income was very low, it exceeded expected salvage value and the income of industrially unemployed persons. As a consequence the trend of previous net off-farm movement was reversed and the farm population increased 1.8 million persons or 5.8 percent during the 5-year period. During two years of the period, 1931 and 1932, in-migration exceeded out-migration to the extent that a net increase of 763,000 persons occurred exclusive of the net of births over deaths. Over the remainder of the period, net out-migration was insufficiently larger than the net of births over death to overcome the influx during 1931 and 1932.

With the increased farm population, the farm labor force increased slightly but labor requirements decreased almost 12 percent. The inference is that there was a substantial decrease in the marginal physical product of labor. With severe industrial unemployment, persons returned to the farm where incomes were low but where jobs provided some means of subsistence.

The decrease in the MPP of labor was not as great as the increase in the labor force would indicate since the quantity of machinery and equipment in agriculture actually decreased during this period. With low incomes, and capital

losses it was not possible to acquire machinery. On the other hand, the very low wage rates made it more profitable to substitute labor for machinery and equipment.

Farm prices were almost halved from 1930 to 1932. Part of the loss was regained by 1934 but prices remained over 28 percent below 1930 levels in 1934. With the decreased MPP for labor and lower prices it is clear that the MVP of labor was lowered during this period.

Substantial capital losses were incurred. Relative to the value of assets at the beginning of the period, these losses were the largest of any period.

The effect of low incomes and capital losses on entry of operators for this period are discussed for this and the subsequent period in the next section.

1935-39

Farm income remained low and relatively stable. Average annual income per family worker did not reach $600 any time during the period. Although expected salvage values were very low, there was a sharp rise from 1935 through 1937, then a return to low levels during the relapse of economic activity during 1938. The recovery of expected salvage values contributed to a net off-farm movement of 4.1 percent of the farm population. Out-migration exceeded 3.5 million persons during the period but this did not offset the excess of births over deaths and the number of persons who returned to the farm sector during the previous

period. A large part of the underemployment in the farm sector which developed during the previous 5-years was removed from the farm sector since labor requirements remained relatively unchanged as the farm work force declined 11 percent.

The MPP of labor probably increased during this period as a consequence of the decrease in the labor force. The reason for our lack of certainty is that machinery and equipment use increased as indicated by the change of the index from 45 to 55 over the period (1947-49=100). With an increase of this magnitude, it is not certain that sufficient workers did leave the farm to maintain or increase the MPP of the remaining labor. Since farm prices were only slightly higher in 1939 than 1935, changes in the MVP of labor were determined largely by the changes in the MPP of labor.

Small capital gains were made during this period. These gains occurred during the first three years of the period and were partly offset by losses during the latter two years.

Considering both this period and the previous one, the number of farm operators decreased 3.0 percent over the 10 years. Age-specific rates of entry show that rates of entry for operators under 25 at the end of the period were lower than for any previous period. In fact, they were only slightly above the rate for the 1950-59 period. The severe

capital losses at the beginning of the period probably contributed to lowered entry rates. Persons who got started farming during the period but who were not able to "hold on" because of low equity in their assets would not have appeared in the cohort at the end of the period. Also, the lack of credit and the effect of public credit on entry rates are not clear inasmuch as it was during this period that public credit was made available to individuals for farm development.

1940-44

Annual farm income increased $1,012 during this period but the expected salvage value of labor increased even more--$1,883. By the end of the period salvage value exceeded farm income by $704. This substantial rise in the expected salvage value of labor was a result of the increased demand for labor brought about by the all-out war effort and the decreased supply of labor attributable to large numbers of persons serving in the armed forces. As a result of these combined forces the industrial unemployment rate was less than 2 percent in 1943 and 1944. With the tremendous need for manpower in the industrial and military sectors, the farm population decreased 18.8 percent. Underemployment on farms was further reduced as the farm labor force decreased 6.9 percent while labor requirements remained essentially unchanged for the second straight 5-year period.

Two important forces were at work which affected the MPP of labor. The number of workers decreased which

increased the MPP of labor. Machinery and equipment were acquired which shifted the MPP curve downward. Since the machinery index increased 12 index points (1947-49=100) and the labor force decreased 6.9 percent it is not possible from this analysis to be certain that the MPP increased. But since labor requirements did not decrease as a result of the expanded output, on balance the MPP of labor probably increased.

It is clear that the MVP of agricultural labor in current dollars increased substantially during this period as product prices almost doubled during the period. The general price increase resulted in capital gains of over $25 billion during the period. Since cohort analysis is not applicable to 5-year periods, comments about entry rates are made in the subsequent section and will apply to the 1940's.

1945-49

Both the expected salvage value of farm labor and farm income moved unevenly during this period. Farm income per family farm worker reached a new peak in 1947 of $2,132. By the end of the period much of the gain had been lost as farm income per family worker fell to $1,788. For 1946 and 1947 farm income exceeded salvage value, the only time this has occurred since 1941. This also means that the acquisition cost of more workers for agriculture was less than the MVP of agricultural labor.

With the return of veterans from military service and workers from closed war plants, net migration to farms occurred during 1945. For the 5-year period the net decrease in the size of the farm population was only .9 percent. The farm labor force decreased by a very small amount, .4 percent, but labor requirements dropped 14.0 percent. This means that with veterans and war-workers returning to rural communities the labor available to farms increased substantially. The increased labor also means that the MPP of labor on farms was reduced. Furthermore, machinery and equipment on farms increased 50 percent over the period. These two factors set the stage for large reductions in the labor force in the subsequent periods.

Prices for farm products continued to increase during the period. With opposing forces at work on the MVP of labor it is not clear whether it rose or fell during this period.

Although returning veterans contributed to the very small net change in the farm population and farm work force during this period in contrast to much larger decreases over the previous 10 years, it cannot be argued that the return to farms was without economic motivation. With farm income essentially equal to salvage value during most of the period a movement to the farm sector was to be expected. This is consistent with the theory of Chapter II.

Entry rates for farm operators were larger in both the 15-24 and 25-34 age groups during the 1940-50 period than

for any other period. At this point it is not clear whether these rates were due to (1) large capital gains during the period, (2) an abundance of credit available to farmers, (3) expected farm incomes, or (4) to manpower policy in operation during this period.

1950-54

With the advent of the Korean conflict, both farm income and the expected salvage value of labor increased sharply. After 1951, farm income leveled off then decreased by the end of the period to near the 1950 level. Salvage value continued to rise rapidly through 1953 then dropped with the recession of 1954. With the continued rise of salvage value following 1951, the gap between farm income and salvage value widened to $1,099 in 1953 which meant that salvage value was 54 percent greater than farm income.

The industrial unemployment rate was 3 percent or lower during 1951-1953. This increase in demand for labor in the industrial sector together with declining farm income contributed to the 17.5 percent decrease in the farm population. The farm labor force decreased 12.8 percent and labor requirements fell 12.1 percent. This was the largest relative decrease in the farm work force of any full 5-year period. This large adjustment occurred as farm output increased 8 percent.

Machinery and equipment continued to be acquired during this period. The index shows a 14 percent increase during this period. Judging from the magnitude of the

decrease in the labor force during this period and the increase in farm machinery, the MPP of labor was probably stable or rising slightly during this period. During the period the MVP of labor probably rose but by the end of the period it was probably at about the same level as in 1950, depending upon actual location of the MPP curve.

1955-59

The expected salvage value of farm labor exceeded farm income by $1,198 or more during all but one year of this period. This was during the 1958 recession when the gap narrowed to $556 as a result of increased farm income and decreased salvage value.

As would be expected (considering the size and persistence of the difference between farm income and salvage value), both farm population and the farm work force declined by relatively large amounts. Labor requirements declined by an even larger amount, thus setting the stage for further labor force reduction in subsequent periods.

The MPP of labor probably increased during this period. The total machinery and equipment in agriculture increased very little (3 index points) as the labor force decreased by one-eighth. Since product prices were relatively stable the MVP of labor increased during this period.

A comparison of the 1945-49 period with the 1955-59 period shows puzzling contrasts. Both represent periods of

adjustment following wars during which different manpower policies were followed with respect to draft deferments for agricultural workers. During the first period the off-farm movement of farm population and the decrease in size of the farm work force virtually came to a halt. In the latter period off-farm movement was almost as great as during the war period which it followed. Whether the difference can be attributed to different manpower policies is one of the questions considered in Chapter VI.

Rates of entry for farm operators declined substantially over the decade of the 1950's. Withdrawal rates were also higher than during any previous period. These reduced entry rates occurred as farm incomes declined, but while credit was available for entry. Furthermore, the reduced rates occurred during a period of substantial capital gains in agriculture. Also, the period was preceded by a period of large capital gains.

1960-62

The difference between farm income and expected salvage value of farm labor narrowed slightly during this period. Farm income increased $328 as salvage value increased $256. However, the difference remained over $1,000 in 1962.

Although Table III-9 does not show annual changes so that periods of different length are directly comparable,

it is clear that changes in the farm population, farm work force and labor requirements for the 1960-62 period parallel changes in the respective series during the previous 5-year period. In fact it appears that the farm population may decrease by a larger relative amount for the 1960-64 period than it did in the immediately preceding 5-year period.

The MPP of labor probably increased during this period. The machinery and equipment index declined 6 index points (1947-49=100). This fact coupled with the decrease in the farm labor force indicates that the MPP of labor probably increased. If this the case, the MVP of labor increased also as prices were relatively stable throughout the period.

Chapter V

FEDERAL CREDIT PROGRAMS TO ASSIST INDIVIDUAL FARMERS

The analysis in Chapter IV led to the conclusion that the size of the cohort is an important factor in determining the number of persons employed in agriculture. There it was shown that a cohort of farm operators increases in size up to age 35-44 and then slowly declines. Since the size of a cohort remains relatively stable throughout the lifetime of its members once its members reach age 35, the factors which determine the size of the cohort are important in explaining the number of persons employed on farms.

Cohort analysis shows that entry rates for farm operators were smaller than "normal" for persons under 25 years of age during the 1930-40 period. On the other hand entry rates were larger for 25-34 year-olds in the 1930's than during the two preceding decades. Also, withdrawal rates for 35-44 year olds were the lowest of record during this period. Since public credit for farm operation was made available during this period, the question arises: did public credit facilitate entry or retention of persons in agriculture at this time? Was the credit extended or was it particularly acceptable to specific age groups of persons?

In addition, entry rates were "abnormally" large during the 1940's. Can these rates, in part, be attributed to the credit made available to Farm Security Administration clients to assist them in producing food for the war effort?

It is also important to know the aggregate output and income effects of public credit for those operators not receiving credit as well as for those receiving credit.

The general objective of this chapter is to determine the effect of federal credit programs on entry into agriculture and on retention of persons in farm employment. Specifically, two types of credit programs are considered. These are farm ownership loans and farm operating loans extended or insured by the Farmers Home Administration and its predecessor agencies.[1]

Farm ownership and operating loans were singled out from among the total program administered by the FHA because of certain beliefs and hypotheses about their effect on entry into agriculture and on the number of persons employed on farms. Although this is a study of labor, it was considered necessary to include these credit programs as they are oriented primarily toward human resources with credit as a means for accomplishing such desired ends as improved

---

[1]Unless otherwise indicated the term "farm operating loans" is used to include all standard rural rehabilitation loans, production and subsistence loans, adjustment loans and farm operating loans. The common feature of all these loans is that their main purpose was for the purchase of seed, fertilizer, livestock, machinery and equipment or other items of working capital. Loans of this type were not intended for the purchase of real estate.

incomes, levels of living, tenure arrangements, employment opportunities, etc. Except for short-run emergency type programs and other specialized programs, loan programs administered by the FHA and its predecessors have been directed toward serving the credit needs of low-income farm families unable to get credit from regular commercial sources.

The general hypothesis is that extension of public credit to low-income farm operators gets persons involved in programs in which borrowers are further committed to farming and thereby mobility of labor from agriculture is reduced. A premise of this hypothesis is the belief that persons who receive farm operating loans, and to lesser extent those who receive ownership loans, are on the margin of leaving or entering farming. Since presumably borrowers cannot get credit from regular commercial sources, the granting of credit by FHA permits borrowers to enter agriculture or remain on farms. If borrowers remain in farm employment the rate of withdrawal is decreased; if more persons become farm employed as a result of loans, the rate of entry is increased beyond what it would have been in the absence of the programs.

As economic development proceeds with the growth in demand for farm products lagging behind the growth in demand for other products, a program which facilitates entry into farm employment may increase the cost to the individual of occupational adjustments which eventually must be made. Also, facilitating entry into agriculture affects the income

and asset position of farm operators already in agriculture.

The first step in the procedure used to evaluate the general hypothesis includes description of the programs from their initial inception during the 1930's. This description covers the objectives and the magnitude of the program. The magnitude is in terms of the number of persons involved by time period. This is followed by description of who gets involved in the programs and of uses made of loan funds by borrowers.

Analysis is directed toward answering questions about the effects of the program on entry and withdrawal rates for the 1930's, 1940's and 1950's. A time-series, multiple regression analysis is used to determine the association between public credit and the amount of family labor employment on farms. Effects of credit on the productivity of borrowers and on their income and asset position are considered. An estimate of the impact of credit on aggregate output, price and income is presented.

Enabling Legislation and Other Authorization[1]

The policy of extending supervised federal credit to low-income farmers, now administered by the Farmers Home

---

[1]For a discussion of the events leading to federal participation and a more complete chronology of the authorization for federal participation in providing credit to individual families, see Olaf Larson, et al., Ten Years of Rural Rehabilitation in the United States, Bureau of Agricultural Economics, Washington, D.C., 1947, pp. 18-40 and Gladys L. Baker, et. al., Century of Service, U.S. Dept. of Agriculture, ERS, (Washington: U.S. Government Printing Office), 1963, pp. 203-13.

Administration, had its origin under the Federal Emergency Relief Administration which was authorized by the Federal Emergency Relief Act of May 12, 1933. Initially, assistance to farmers consisted of direct relief and employment at civil works projects. In March of 1934 the FERA administrator, Harry L. Hopkins, initiated a program effective April 1, 1934 to replace civil works and direct relief programs as conducted in rural areas with a program of rural rehabilitation.[1]

The program was to provide relief in the form of loans to eligible farmers. The loans which were to be repaid were to be used to purchase seed, livestock, equipment, buildings and land in sufficient quantity for subsistence needs. Also, services of trained specialists in agriculture and home economics were to be provided to aid in formulating plans for subsistence farming, homemaking operations, and in carrying out the plans.[2] The general policy of loans for operating capital coupled with technical supervision has been continued with some modification from March 1934 to date.

The operation of rural rehabilitation under FERA was of short duration as this function was transferred on April 30, 1935 to a newly authorized independent agency to be known as the Resettlement Administration. The Resettlement Administration, established by Executive Order No. 7027 by

---

[1] Larson, et al., p. 29.

[2] Ibid., p. 31.

the President, brought together similar agricultural activities being carried out by different branches of government. One of the functions of the newly formed agency was to continue the loan program as authorized under the Emergency Relief Appropriation Act of 1935.[1]

The Resettlement Administration continued as an independent agency until it was transferred January 1, 1937, to the Department of Agriculture by Executive Order No. 7530.[2] The title of the Administration was again changed September 1, 1937 when the Secretary of Agriculture designated the Farm Security Administration (FSA) as the successor to the Resettlement Administration.[3]

Prior to changing the name to Farm Security Administration, rural rehabilitation received its first direct federal legislative authorization on July 22, 1937 when Congress enacted the Bankhead-Jones Farm Tenant Act. This act linked the problems of farm tenancy and credit. Title II of the Act authorized rehabilitation loans to "individuals who obtain, or who recently obtained, the major portion of their income from farming operations, and who cannot obtain credit on reasonable terms from any federally incorporated lending institution."[4]

---

[1] Ibid., p. 33.

[2] Ibid., p. 35.

[3] Ibid., p. 39.

[4] U.S. Statutes at Large, Vol. L, Part 1, p. 525.

Title I of the Act appropriated funds to be used by the Secretary of Agriculture to provide loans to eligible farmers for the purchase of farms and for necessary repairs to buildings and improvements. Loans were to be repaid over a period of not more than 40 years. Interest on loans was to be charged at the rate of 3 percent per year on the unpaid balance.[1]

The Farm Security Administration provided rural rehabilitation and farm ownership loans to eligible individuals until 1946. An act approved August 14, 1946 entitled the "Farmers Home Administration Act" provided for discontinuance of the FSA which was to be replaced by the Farmers Home Administration (FHA). Although the act called for liquidation of resettlement projects and disposal of farm labor camps (other functions of FSA not considered here) it provided for continuation of loans for farm operation and farm ownership.[2]

Objectives of the Programs

Objectives of the rural rehabilitation program were complex.[3] Initially, the general objective was to enable persons on relief to again become self-supporting. One of the means developed to accomplish this purpose was the rural

---

[1] Ibid., p. 523.

[2] U. S. Statutes at Large, Vol. LX, Part 1, pp. 1062-1080.

[3] See Larson, et al., pp. 41-61 for an entire chapter devoted to a discussion of objectives.

rehabilitation loan to provide working capital for farm operation. At that time, commercialization of agriculture and one-crop farming in particular were looked upon as causes of much of the rural poverty; hence, subsistence farming (where much of the food and clothing were home produced) was promoted as a means of raising the level of living for rural people. The emphasis was on small family-type subsistence farming which would provide additional employment for under-employed family labor available on farms.

As economic conditions improved and levels of living rose, the need for relief in terms of supplying a minimum standard of living decreased. The general objective then became one of assisting low-income families to become self-supporting at an "adequate" level of living.[1]

The rural rehabilitation program which emphasized subsistence farming and was directed toward the low-income segment of agriculture ended on October 31, 1946. Rural rehabilitation loans were replaced by production and subsistence loans under supervision of the newly authorized FHA. The new loans were to assist low-income farmers, who could not get loans elsewhere on reasonable terms, to become commercial farmers.

Hathaway emphasizes three developments which indicate the trend of the program away from subsistence farming and

---

[1] Ibid., et al., p. 45.

toward servicing the needs of commercial farmers who could not get credit from other public or private sources. First, the family living and home planning parts of the program decreased in importance as home management specialists were dropped from county staffs. Second, in two legislative steps, loan limits were increased to $20,000 per single operating loan. And third, the title of production and subsistence loans was changed to "operating loans."[1]

Legislation subsequent to Hathaway's writing raised the ceiling on operating loans to an individual to a new level. On August 8, 1961 the Bankhead-Jones Farm Tenant Act was amended to permit loans up to an outstanding balance of $35,000.[2] Thus, the trend toward servicing commercial agriculture was accentuated.

A recent administrator of the Farmers Home Administration has viewed the objectives of the supervised credit programs in terms of keeping people on farms. Kermit H. Hansen, appearing before the House subcommittee on agricultural appropriations stated:

> We feel that this agency...has the job of helping all the farm families who are eligible and want to stay on farms to stay out there, if they are eligible for our type of credit.[3]

---

[1] Dale E. Hathaway, "The Federal Credit Programs for Individual Farm Development," Federal Credit Agencies, (Englewood Cliffs, N.J.: Prentice-Hall, Inc.), 1963, pp. 323-324.

[2] U. S. Statutes at Large, Vol. LXXV, p. 310.

[3] U.S. Congress, House, Subcommittee on Agriculture of the Committee on Appropriations, Hearings, Department of Agriculture Appropriations for 1960, 86th Congress, 1st Sess., p. 1978.

Thus the objective of farm operating loans has gradually shifted from assisting low-income farm families to become self-supporting to providing credit to anyone who wanted to remain in farming and could not get credit elsewhere.

The principal objective of the tenant-purchase program since its inception has been to enable tenants to acquire ownership of family-sized farms. Operator ownership has been regarded as rehabilitation carried one step further.

Although tenant-purchase or farm ownerships loans were part of the general program of assisting low-income farm families, they differed from farm operating loans in several respects. The Report of the Administrator of the Farm Security Administration states that the main differences are:

> "The idea of making loans for equipment is extended to include the farm itself, as the most important item of equipment needed for security; because the loans are larger, the qualifications for borrowers are more exacting; and since the tenant-purchase borrower has permanent possession of his farm, he can plan long-range improvements which are not possible for the renter who may have to move within a year or two."[1]

The same statements about changing the emphasis from subsistence farming to assisting would-be commercial farmers can be made about ownership loans as was made about operating loans. Loan limits have been raised by successive steps and in 1961 the limit for any single ownership loan was

---

[1]U.S. Farm Security Administration, 1939, p. 15.

increased to $60,000.[1]

Magnitude of the Programs

The magnitude of federal credit programs to aid individual farmers can be measured in terms of the number of dollars loaned or the number of people involved. Since our main interest is in the labor involved we are more interested in the latter measure. Also, data on dollars loaned by program by year are readily available from other sources;[2] data on people involved are not always available from published sources.

Financial assistance to individual farmers has consisted of grants and loans.[3] The number of loans extended far exceeds the number of farm operators assisted as initial loans have been supplemented by subsequent loans to the same individual. Therefore, the number of initial loans is the best indicator of the number of farm operators participating in the program as this measure avoids any duplication.

From 1936 through fiscal 1962 over 2.2 million farm operating initial loans were made to assist individual farm operators (Table V-1). Over 500 thousand loans were made from the beginning of the program through 1939. If all persons who received initial loans from 1936 to 1939 continued

---

[1] U. S. Statutes at Large, Vol. LXXV, p. 308.

[2] See Hathaway, Federal Credit Agencies, pp. 319-384.

[3] The grant program expired with the demise of the Farm Security Administration.

to farm at the time of the 1940 census, they would have represented 8.3 percent of all farm operators. By September 30, 1943, loans had been made to 11.4 percent of all operators reported in the 1940 census.

Table V-1. Initial farm operating loans as a percent of all farm operators at end of the period, United States, for selected periods, 1936-62

Period	Total Initial Loans Made	Total Farm Operators at End of Period	New Loans as a Percent of All Operators
	Number	Thou.	Pct.
1936-39	505,626	6096.8	8.3
1940-44	319,271	5859.2	5.4
1945-49	318,056	5379.2	5.9
1950-54	192,411	4783.0	4.0
1955-59	126,536	3933.5[a]	3.2
1960-62	81,997	---[b]	---
1936-43[c]	695,661	6096.8[d]	11.4
1936-62	2,239,558	---	---

[a]1954 census definition of a farm.

[b]Not available.

[c]Standard rural rehabilitation borrowers cumulative as of September 30, 1943.

[d]Total operators 1940 census.

Source: Loans from Larson, et al., p. 389 and from Reports and Program Analysis Division, Farmers Home Administration. Farm operators from U.S. Census of Agriculture (See Table IV-18).

Over 627 thousand loans were made during the 1940's compared to 319 thousand during the 1950's. For the 1940-44 period, loans were made to 5.4 percent of all farm operators reported in the 1945 census. From 1945 through 1949 loans were made to 5.9 percent of all operators reported in 1950. Although only one-half as many loans were made during the 1950's as were made in the previous decade, the proportion of all farm operators receiving farm operating loans dropped much less than one-half as a consequence of the declining number of farm operators.

A list of initial operating loans by fiscal years shows that loan activity has varied considerably from year-to-year (Appendix Table B-6). The peak loan activity in terms of number of individuals involved occurred in 1936 when over 200 thousand farm operators received loans. In addition to 1936, the number of initial loans made during the year exceeded 75 thousand in 1939 through 1942, 1947 and 1949. After 1951, the number of loans made per year did not exceed 36,000 in any one year. Over this period the number of initial loans was in the range of 21 to 28 thousand per year except for 1954 and 1962 when about 35 thousand loans were made each year.

Operating loans extended to farmers have involved a considerably larger proportion of all farm operators in some states and regions of the country than in others. During the first years of the rural rehabilitation program, 1936 through September 30, 1943, 20 percent or more of all

operators in Florida, New Mexico, Utah, Colorado, and Wyoming received loans.[1] In addition to these states, over 15 percent of all operators in Alabama, Georgia, Arkansas, Louisiana, Nebraska, Oklahoma, Texas, Nevada, and Idaho received loans during the period. Except for Maine, fewer than 10 percent of all operators in Northeastern states received loans.

A more recent study reports that 32 to 57 percent of all credit obtained by farm operators in three irrigation projects in Idaho and Washington was provided by the Farmers Home Administration in 1948 and 1956.[2] On a fourth project, 7 percent of the credit used was provided by FHA. Credit provided by the FHA was used for both operating capital and real estate purchase. It is not possible to determine the proportion of all operators in the respective areas who have been granted credit from the FHA from these data. However, a survey of the Columbia Basin Irrigation Project in 1955 shows that the Farmers Home Administration reported 218 loans compared to 149 for commercial banks and 42 for Production Credit Associations.[3] Furthermore, these three sources provided 72 percent of the credit to farmers in the area in 1956.[4]

---

[1] Larson, et. al., p. 354.

[2] E. R. Franklin, W. U. Fuhriman and B. D. Parrish, Economic Progress and Problems of Columbia Basin Project Settlers, Washington Agricultural Expt. Sta., Bul. 597, July 1959, p. 23.

[3] Ibid., p. 25.

[4] Ibid., p. 21.

It is clear that federal credit extended to individual farm operators has not involved a majority of farm operators at any time. Yet it is equally clear that for certain time periods and in some areas of the country FHA has been an important source of credit for farm operating loans.

Farm ownership loans, first made available in 1938 under authorization of the Bankhead-Jones Farm Tenant Act, have involved far fewer individuals than the farm operating loan program. From inception of the tenant-purchase program through 1963, excluding 1942 and 1943 for which data are not available, over 126 thousand loans in total have been made to individuals for the purchase of family-type farms (Table V-2). This compares to over 2.2 million loans for operating capital as aforementioned.

It is not possible to determine the unduplicated total number of persons involved in both programs from published data. This cannot be done since in many cases persons with ownership loans also have been granted operating loans.

Characteristics and Description of Borrowers

In Chapter IV, it was concluded that occupational mobility is a function of the salvage value of labor which in turn is affected by the age of the person. Thus, knowledge of the age structure of the group of operating loan borrowers is necessary in estimating the effects of the loan program on entry rates and on the expected salvage value of farm labor. Two studies are available which include the age

Table V-2. Farm ownership loans, total, initial and subsequent, extended by the Farm Security Administration and Farmers Home Administration for selected periods, 1938-63, United States

Fiscal Years	Initial Loans	Subsequent Loans	Total
	Number	Number	Number
1938-39	---[a]	---[a]	6,227
1940-44	---[a]	---[a]	20,415[b]
1945-49	20,261	2,420	22,681
1950-54	15,538	4,361	19,899
1955-59	21,350	2,822	24,172
1960-63	30,362	2,640	33,002
1938-63	---	---	126,396

[a]Not available separately.

[b]Does not include 1942 and 1943 as data are not available from published sources.

Note: Initial loans are reported for adequate family farms and other family farms. Under each heading loans are made for farm purchase and development, farm enlargement and development, farm development only and primarily for refinancing. Both direct and insured loans are included.

Source: Unpublished data from Reports and Program Analysis Division, Farmers Home Administration, U. S. Dept. of Agriculture and U. S. Farm Security Administration, Report of the Administrator of the Farm Security Administration, 1938-41.

distribution of borrowers, one of the age distribution of FSA clients, the other of the age distribution of FHA borrowers.

Persons who received standard rural rehabilitation loans during the 1936-39 period were a younger group of persons than all farm operators in 1940 (Table V-3). Sixty percent of all standard loan receivers were under age 45

compared to 41 percent of all farm operators under 45 in 1940. The 1956 study shows that FHA was continuing to service the credit needs of farmers younger than the average farm operator. For both periods, age differences were even more pronounced for age groups under 35. The proportion of borrowers under 35 was almost twice as great as the proportion of all farm operators under 35.

Table V-3. Age distribution of all farm operators and of borrowers from the Farmers Home Administration and its predecessors for selected years, United States

Age of Borrowers	Standard Loan Borrowers 1936 -39	All Farm Operators 1940	Operating Loan Borrowers 1956	All Farm Operators 1954
	Pct.	Pct.	Pct.	Pct.
(1)	(2)	(3)	(4)	(5)
Under 25	8	4	4	2
25-34	25	16	25	13
35-44	27	21	33	23
45-54	24	25	--[a]	25
55-64	13	20	--[a]	20
45-64	37	45	34	45
65 and over	3	14	3	17
Total	100	100	99	100

[a]Not available separately.

Source: Col. 2, Larson, et al., p. 359; Col. 3, U.S. Bureau of the Census, U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subject--Chap. ii, 1962, p. 124; Cols. 4 and 5, Russel W. Bierman and Betty A. Case, "The Farmers Home Administration and its Borrowers," Agricultural Finance Review, U. S. Dept. of Agriculture, Vol. XXI, July 1959, p. 56.

It is not surprising that the age distribution of farmers receiving operating loans shows a higher proportion of persons under age 45 than in the all farm operator group. The program was designed for low-income farmers who were unable to get credit elsewhere on reasonable terms. Since availability of credit is often a function of assets owned and, furthermore, assets owned are a function of age, young farmers were more likely to meet the eligibility requirements established for loans.

Table V-4 shows the number of persons who received initial farm operating loans during a decade as a percent of all farm operators at the end of the decade. For the three periods shown, initial loans made to operators under 25 were equivalent to 18 to 20 percent of all operators under age 25. For the 25-34 age group, the percentage dropped only slightly with about one out of six operators having received an operating loan. This compares to 5 to 8 percent of all operators in the 45-64 age group having received loans.

However, the above figures should be interpreted as an upper limit to the proportion of operators receiving loans. The estimates are based on the assumption that all persons who received loans remained as farm operators at the end of the decade. Actually this overstates the proportion as an undetermined number of persons who received loans did not remain until the end of the decade as farm operators.[1]

---

[1]This point receives further consideration on page 245.

Table V-4. Number of initial farm operating loans during a decade as a percent of total farm operators at end of the decade by age, United States

Age	1936-40	1940-50	1950-60
	Pct.	Pct.	Pct.
Under 25	18.0	20.3	17.6
25-34	15.1	18.5	16.6
35-44	12.1	14.7	11.0
45-54	9.4	---[a]	---[a]
55-64	6.2	---[a]	---[a]
45-64	8.0	9.5	5.1
65 and over	2.2	2.4	1.3
Total	9.6	11.4	7.2

[a]Not available separately.

Source: Appendix Table B-5.

Authorization for lending included the requirement that only persons who obtained or had recently obtained the major portion of their income from farming operations were eligible for credit.[1] There is some evidence to suggest that this requirement was not always rigorously met. Persons who had made the transfer to nonfarm occupations have been granted loans and have re-entered agriculture. Table V-5 shows that the large majority of borrowers have been engaged in farming. Yet for the three periods shown, 14 to 19 percent of all borrowers were not farming at the time of applying for the loan. Also, some of the descriptive examples of assistance to beginning farmers cited in annual

[1]U.S. Statutes at Large, Vol. L, Part 1, p. 525.

reports by the administrator of FHA involve persons who were not operating farms at the time their loans were made.[1]

Table V-5. Tenure status during year before receiving farm operating loan for selected years, United States, 1936-62

Tenure Status	1936-39	1955-57	1960-62
	Pct.	Pct.	Pct.
Not farming[a]	14	17	19
Tenant or sharecropper	51	30	32
Owner or part owner	35	53	49

[a]Includes farm laborers as well as individuals engaged in occupations other than farming.

Note: These data are not strictly comparable between time periods inasmuch as 1936-39 tenure status is applicable to all persons who received operating loans (standard rehabilitation loans) and subsequent data applies to only those borrowers who paid off their loans during the indicated years. Persons who had dropped from the program or were still indebted would not be included as they were for the 1936-39 period.

Source: (1936-39) Larson, et al., p. 357; (1955-57 and 1960-62) U. S. Farmers Home Administration, Family Progress Report for Active Borrowers Who Paid Their Operating Loans in Full, Annual Reports 1955 to 1962.

Uses of Loan Funds

Credit provided for rural rehabilitation loans has been used for the purchase of capital goods, debt settlement and refinancing, current farm operating expenses and family expenses. The distribution of loans by major purpose provides

[1]See for example, U. S. Farmers Home Administration, Report of the Administrator of the Farmers Home Administration, 1952, pp. 6-7, 1953, p. 20.

an indication of the effect of credit on the productivity of labor. In the early years of the program, 1936-39, about 38 percent of rural rehabilitation loan funds were used for the purchase of livestock and poultry, 30 percent for current farm operating expenses, 7 percent for machinery and equipment and 15 percent for debt settlement and refinancing.[1]

The first two groups of inputs are somewhat complementary to labor and thus increase the marginal product of labor. Machinery and equipment decrease the need for labor on a given size farm; hence, it is not surprising that a very small proportion of the loan funds were used for this purpose. The farms were small and non-mechanized methods which used the available labor supply were the rule.

More recent data shows a larger allocation of funds to purchase of machinery and refinancing of chattel debts. Initial operating loans made in 1962 were allocated as follows: purchase of livestock 25 percent, purchase of machinery and equipment 14 percent, refinancing of chattel debts 32 percent, farm operating expense 23 percent, and family living expenses 3 percent.[2] These figures permit a crude estimate of the proportion of inputs which were complementary to labor and which would be expected to increase its

---

[1]Larson, et. al., p. 400.

[2]U. S. Farmers Home Administration, Use of Initial Operating Loans to Borrowers Conducting Adequate Family Operations, 1962 and 1963 Fiscal Years Through June 30, Mimeo.

marginal product. About 48 percent (25 + 23) of the funds were used for this type of input in 1962 compared to 68 percent in the 1936-39 period. Funds used for refinancing which represent a financial transaction would have had no effect on the product of labor. Also, family expenses have no effect on the product of labor since they are consumption expenditures except to the extent that they are devoted to improved diets, education and training or health care.

Initially, farm ownership loans were extended primarily to tenants to acquire ownership of farms. Funds in addition to the purchase price of the farm were available for necessary repairs to buildings and improvements. The following quotation indicates the more recent use of ownership loans:

> In contrast to a few years ago when virtually all the applicants were tenant farmers seeking ownership, the loans made in 1953 went mainly to farm owners for the improvement or enlargement of inadequate units. Of the 2,480 new borrowers, 1,125 needed credit to develop farms they already owned, and 405 received loans to increase the size of their inadequate farms. The farm purchase loans--to families who held title to no land of their own--numbered 950 or only about 38 percent of the new loans approved.[1]

This change in emphasis has relevance for our hypothesis concerning entry rates. It suggests that the ownership program has shifted toward providing greater assistance for individuals already fairly firmly established in agriculture and away from helping those with less tenuous attachments to agriculture.

---

[1]U.S. Farmers Home Administration, Report of the Administrator...., 1953, p. 6.

Some Effects of the Credit Programs

This section consists of an analysis of some of the important effects of the credit programs. There is no suggestion that this is a complete analysis of all the effects of these complex programs. Instead, we are concerned with the effects of loans on (1) the rate of entry and exit of persons from agriculture, (2) the number of people employed in agriculture, (3) the productivity of labor and other inputs of borrowers, and (4) on returns to labor and other inputs for all non-program participants, i.e. on the remainder of agriculture.

Rates of Entry and Exit

In Chapter IV it was concluded that relative labor returns are an important factor in determining both the number of people who enter agriculture and the number of people who remain in agriculture. Since individuals respond to relative income changes, it is hypothesized that farm operating and ownership loans which affect expected and realized farm earnings alter the rate of entry to and exit from farm operatorship.

It is difficult to evaluate this hypothesis with the kinds of data available. We need answers to the following kinds of questions: would all persons who received loans have left agriculture if there had been no loan program? Would they all have remained in agriculture and continued to

earn low incomes? Or more likely, would some have changed occupation and others have stayed? With the kinds of data available, about the best we can do is to estimate the effect under specified assumptions and attempt then to justify the assumptions.

In Table IV-18, estimates of the change in number of farm operators by age-group were presented. The estimates were net percent changes during a decade in the size of a given cohort. Net change was measured after adjusting the cohort by forward census survival rates.[1] Now, if the actual number of operators at the end of the decade is reduced by the number of initial farm operating loans made during a decade, an estimate of the possible effect of loans on entry and exit rates can be derived.[2] The possible effect of the program on entry then isdetermined by dividing the estimated number of non-FHA borrowers by the expected number of farm operators.

The above described estimates provide an upper limit to the effect of loans on entry and withdrawal rates since the method is based on the assumption that all farm operators receiving loans would have left agriculture had loans not been received. From Table V-6 it is possible to compare total rates of change to rates adjusted for the number of loans made.

---

[1] See notes for Table IV-19 for the exact procedure used.

[2] The number of initial operating loans is the best available estimator of the number of operators involved as each operator is counted only once regardless of the number of loans received. Use of the number of initial loans underestimates the number of family farm laborers involved as the typical family contains more than one man-equivalent of labor. See Larson, et. al., p. 358.

Table V-6. Percent change in number of farm operators by age after adjusting for survival rates, total and excluding all persons who received initial farm operating loans during the decade, United States, 1935-60

Age at Beginning of Decade	1936-40		1940-50		1950-60	
	Total	Excluding All Persons Who Received Initial Farm Operating Loans	Total	Excluding All Persons Who Received Initial Farm Operating Loans	Total	Excluding All Persons Who Received Initial Farm Operating Loans
(1)	Pct. (2)	Pct. (3)	Pct. (2)	Pct. (3)	Pct. (2)	Pct. (3)
Under 25	169.1	128.4	260.9	194.1	145.4	104.6
25-34	22.3	7.4	30.8	11.6	1.5	-9.7
35-44	7.6	-2.6	2.5	---[a]	-15.1	---[a]
45-54	-3.4	-9.3	-13.4	---[a]	-22.7	---[a]
55-64	8.2	5.9	-9.1	-11.2	-16.1	-17.2
35-54	2.4	-5.8	-5.5	-14.5	-18.7	-22.9

[a]Not available separately.

Source: Col. 2 from Table IV-19. Col. 3 was calculated as follows: The number of operators in a given age group reported in the U.S. Census of Agriculture at the end of the decade was reduced by the number of initial operating loans made during the decade. Then the expected number in the cohort was subtracted from the adjusted actual number. This difference divided by the expected number then multiplied by 100 yields the percent change in the cohort excluding all persons who received an initial loan during the decade. See notes for Table IV-19 for the method used in calculating the expected number.

In case there is some misunderstanding about the figures in Table V-6, it is worthwhile going over the estimating procedure again, using some specific figures. During the 1940-50 period, the cohort of farm operators under age 25 in 1940 increased 260.9 percent over the expected number for 1950. This means that there was a substantial movement of persons into the given farm operator age-group during this period. Now, if we subtract the number of initial loans from the actual number of operators in the group at the end of the decade, we have estimated what the size of the group at the end of the decade would have been if all persons who received loans had left agriculture. For the 1940-50 period the under 25 cohort would have increased 194.1 percent excluding all loan receivers compared to the 260.9 percent change which did occur.

As expected, a comparison of total percent change in number of farm operators with the reduced percent change in Table V-6 shows greatest differences for the under 25 age-group. This is expected since the loan program favored persons under 35. Furthermore, the cohort is relatively small at this stage. Thus a fairly small change in absolute numbers at this point produces a large percent change. For all three periods, exclusion of all loan receivers reduces decadal changes (or entry rates) by 40 or more percentage points. For the 25-34 age group the differences are less pronounced. Yet, the differences are substantial since the cohort is much larger at this age than in the next lower age group.

As hypothesized, entry rates would have been substantially lower and exit rates higher if all persons receiving loans had left agriculture (assuming of course that they had some place to go). For example, during the 1936-40 period, the 35-54 age group increased 2.4 percent but excluding all persons receiving loans it would have decreased 5.8 percent. For 1940-50 the two figures show a 5.5 percent decrease versus a 14.5 percent decrease for the 35-54 age group. But it cannot be concluded from these data that loans actually increased entry rates or reduced withdrawal rates because the results depend on an assumption which may or may not be valid. Hence, we turn to a statistical approach for determining the impact of loans on farm employment.

Family Labor Employment

Single-equation, multiple regression analysis was used to determine the effect of farm operating loan credit on family labor employment. This is to aid in evaluating the hypothesis that loans of this type increased family labor employment which implies that these loans increased the rate of entry into farm operatorship and/or decreased the rate of withdrawal from agriculture.

Variables found by Heady and Tweeten to be relevant in explaining family labor employment on farms were used in combination with variables which measured the number of persons involved in loan programs. Two general functions with

variations were fitted. The first specified farm employment as a function of the following variables:

$$N = -R + UR + E_{t-1} + L - T$$

A discussion of the variables and the logic involved follows.

N, average annual family labor employed on farms was the dependent variable (measured in thousands). Family labor includes both farm operators and unpaid family members working on farms. Only family labor is included since it is assumed that loans provided to current or potential farm operators affect family labor employment primarily and hired labor indirectly if at all.

An increase in R, relative sector income, was expected to reduce farm employment when other independent variables were taken into account. Specifically, R is defined as the ratio of the average annual wage per employed factory worker to average annual family worker income from farm sources. Farm income is aggregate net farm income from farm sources including government payments and excluding the expense item, payments to hired labor. The aggregate figure was divided by the average annual family labor force to get the income per worker. Although income from nonfarm sources may have some bearing on decisions to remain employed on the farm, the income from farm sources probably is considerably more important. R was entered as an index with 1947-49=100.

Since availability of an industrial job determines whether changes in relative earnings lead to sectoral labor shifts, an interaction term, UR, was included. This is the

product of U, the average proportion of the industrial labor force unemployed during the year, and the index of relative income. For a given relative income, an increase in unemployment was expected to increase farm employment.

E, the equity ratio, measures the financial condition of operators and indicates the past profitability of farm employment. Insofar as liabilities are in terms of a fixed number of dollars and assets are terms of current dollars, the "real" value of which often varies between dates, the equity ratio reflects capital gains and losses. The figure was calculated as the ratio of operator's equity to liabilities for the preceding year. An increase in the ratio was expected to attract workers to farm employment with a lagged effect. Since farm income is not known until late in the calendar year, the decision to remain farm employed or for new persons to enter agriculture probably depends more upon past than current values of this variable.

L represents the number of initial farm operating loans made during the fiscal year measured in thousands. Rather than use the number of dollars loaned, the number of persons receiving loans appears to be preferred since N is in terms of persons. Counting initial loans permits an unduplicated estimate of the number of persons receiving this type loan. If our hypothesis is correct we can expect a regression coefficient for this variable of approximately 1.5 to 1.7 since farm operator families typically consist of about this many workers.[1] Fiscal year data appear to be

[1]Larson, et al., p. 358 reports 20.6 man-month equivalents available per family in 1942.

acceptable without adjustment. This represents a lag of 1/2 year and it probably takes at least this long for the effect of loans to be felt on employment.

The following variables are assumed to influence the amount of family labor employed on farms: the extent of mechanization, individual preferences for farm work and the extent of specialization on farms and between farms and the nonfarm sector. Since these variables are difficult to specify and, furthermore, since they are believed to change fairly systematically with time the last two digits of the calendar year represented by T are included in the function.

As an adjustment factor, N_{t-1}, the lagged value of the dependent variable is included in the function. The coefficient of this variable is expected to indicate the rate of adjustment of employment to changes in the other independent variables.

The only difference in the second specification of the function is that R' is included in the function as an alternative to both R and UR. R' is a variation of the composite variable used in Chapter IV to indicate the expected salvage value of farm labor.[1] Specifically, R' = R(1-5 U) where R is relative income before conversion to an index and U is the proportion of industrial workers unemployed. R' entered the function as an index with 1947-49=100.

Functions were fitted to annual aggregate data for

---

[1]See Chapter IV, p. 137 for a discussion of the composite variable.

the 1920-60 period.[1] The years 1942-45 were omitted from one set of the functions then the same functions were fitted with these years included.

Table V-7 presents the results of alternative specifications of the family labor employment function. The independent variables in equation 5.1 account for 97.9 percent of the variation of farm employment about the mean. All variables have the expected sign and coefficients for all variables except L are significantly different from zero at the 99 percent level. The coefficient of L is significant at about the 78 percent level.

The size of the coefficient of L is within the range of expected values. The interpretation is that the extension of 1,000 initial farm operating loans to farmers increases family labor employment for the given year by 1,580 persons.

Equation 5.2 includes, N_{t-1}, the lagged value of the dependent variable in addition to the independent variables which comprised equation 5.1. Inclusion of this variable increases the multiple correlation coefficient to .99. The

---

[1] Income data are readily available from USDA publications. Long-time unemployment rates are available from U. S. Congress, Joint Economic Committee Staff, Productivity, Prices and Income, 85th Congress, 1st Sess., Joint Committee Print, 1957, p. 87. Loan data were supplied by the Washington office of the Farmers Home Administration and from Larson et al., p. 389. Equity data from 1940 is available from the Agricultural Finance Review, Vol. 22, Sept. 1960, pp. 174-5 and annual issues of the U. S. Dept. of Agriculture, Balance Sheet of Agriculture. For years prior to 1940 the balance sheet was constructed from data available from Raymond W. Goldsmith, A Study of Saving in the United States, Vol. 1, (Princeton, N.J.: Princeton Univ. Press), 1955, pp. 783, 803, 809, 829, 830, 837 and from Agricultural Statistics, 1952, pp. 625, 626, 721, 732.

Table V-7. Family labor employment functions fitted by least squares to annual data 1920-63 omitting 1942-45 with regression coefficient, standard errors in parentheses and related statistics[a,b]

Equation	$\bar{R}^2$	Constant	R	UR	R'	E_{t-1}	L	T	N_{t-1}
5.1	.979	14,220	-11.83 (2.40)	47.89 (5.87)		102.00 (21.87)	1.58 (1.24)	-138.48 (4.30)	
5.2	.994	3,227	-3.32 (1.51)	15.81 (4.45)		41.21 (12.83)	-1.33 (.70)	-35.35 (10.76)	.78 (.08)
5.3	.978	13,694			-6.54 (.74)	114.82 (20.57)	2.52 (1.11)	-139.00 (4.39)	
5.4	.995	3,107			-2.34 (.54)	41.56 (12.34)	-1.29 (.66)	-34.56 (10.22)	.78 (.07)
5.5[c]	.974	13,681			-6.22 (.75)	107.46 (20.51)	2.81 (1.11)	-137.90 (4.52)	

[a]Family labor in thousands of workers.

[b]See text for specification of variables.

[c]1942-45 included.

coefficient of L is significant at the 90 percent level; all others are significant at the 95 percent level. Except for L, all coefficients are reduced by two-thirds to three-fourths as a result of adding the lagged employment variable and all coefficients except L retain their expected signs.

The inclusion of R', the composite variable, in equation 5.3 reduces the proportion of variation in employment "explained" by the independent variables, but only by a small amount. All coefficients are significant at the 95 percent level and coefficients for E and T are similar to those for equation 5.1. The coefficient for L is larger in equation 5.2 and somewhat larger than expected. However, it has the expected sign.

Equation 5.5 has the same specification as 5.3. The former includes 1942-45; the latter omits these years. Inclusion of the war years reduces $\bar{R}^2$ slightly. However, the reduction is not as great as one might expect considering the important events which occurred during this period and which had an effect on family employment. The most noticeable difference between equations 5.3 and 5.5 is the change in the size of the coefficient of L. The increase places the coefficient farther outside the range of the expected value.

The inclusion of the lagged value of the dependent variable in equation 5.4 had the same effect as its inclusion in 5.2; $\bar{R}^2$ was increased, the size of the coefficients was reduced and the sign on L was reversed. All coefficients

except for L are significant at the 95 percent level; the coefficient for L is significant at the 90 percent level.

Although there is some question about the statistical significance of the coefficient for L the reversal of signs may not be inconsistent.[1] The reversal occurs only when the lagged value of the dependent variable is included in the function. The addition of this variable provides a measure of the rate of adjustment of employment to changes in the independent variables. Thus the function can be interpreted as a long-run employment function.[2]

Interpretation of equations 5.2 and 5.4 as long-run employment functions permits the following explanation. New loans increase family labor employment in the short run.

---

[1]Residuals from the farm employment functions were analyzed for serial correlation. The Durbin-Watson d statistic was computed for each equation. Results were as follows:

Equation number	d
5.1	.977
5.2	1.795
5.3	.962
5.4	1.782
5.5	.857

The value of d suggests that the residuals for equations 5.1, 5.3, and 5.5 may be serially correlated. Residuals for equations 5.2 and 5.4 are not serially correlated at the 95 percent probability level. These results raise additional questions about the statistical significance of the regression coefficients, i.e. for equations 5.1, 5.3, and 5.5 inasmuch as the significance tests are not applicable when the assumption of independence of residuals is not met.

[2]The long-run coefficients are obtained by dividing the given coefficients by 1 minus the adjustment coefficient. See Heady and Tweeten, p. 249.

The new loans either encourage persons to enter farm operatorship or they permit persons to remain in agriculture who otherwise would have been forced or attracted out. But the increased competition for land, the increased quantity of inputs and output all lead to fewer, not more, persons employed in agriculture once the aggregate effects of the loan have worked themselves out.

Apparently increased employment is the first step in a capital-labor substitution process. The loan permits the operator to remain on the farm but eventually the increased capital represented by the loan results in a substitution of capital for labor with a reduction in the size of the farm work force.

Productivity of Labor of Borrowers

Progress reports for farm operating loan borrowers who paid off their loans and continued to farm furnish evidence of changes in productivity brought about by participation in the loan programs. Table V-8 summarizes important changes in selected measures of input, output and related factors for firms which received these loans. Likewise, Table V-9 summarizes changes for farm ownership loan borrowers who remained active borrowers and continued to farm five years after receiving the initial loan.

First, consider the changes which occurred for farm operating loan borrowers who paid off their loans during the 1955-58 period. These borrowers on the program an

Table V-8. Selected measures of inputs, output, and related factors for operating loan borrowers for year before loan and for last year reported for persons paying-off their farm operating loans, United States, 1955-62

Item	Average 1955-1958			Average 1959-1962		
	Year Before Loan	Last Year Reported	Change	Year Before Loan	Last Year Reported	Change
	Acres	Acres	Pct.	Acres	Acres	Pct.
Acres operated	194	218	12.4	265	302	14.0
Crop acres	96	112	16.7	136	160	17.6
	Dol.	Dol.	Pct.	Dol.	Dol.	Pct.
Cash farm income	3,268	4,866	48.9	5,018	8,674	72.9
Cash nonfarm income	488	1,024	109.8	560	1,083	93.4
Cash farm operating expenses	1,793	2,999	67.3	3,000	5,382	79.4
Net cash farm income	1,475	1,868	26.6	2,018	3,292	63.1
Net worth	6,880	9,590	39.4	8,820	13,900	57.6
Value productive livestock	1,297	2,292	76.7	1,920	4,236	120.6
Value workstock and equipment	2,194	3,328	51.7	2,888	4,396	52.2
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Index prices received (1910-14=100)	273	237	-13.2	236	240	1.7

Note: Borrowers were on the program an average of 4.2 years for the 1955-58 period and 5.0 years for the 1959-62 period.

Source: U.S. Farmers Home Administration, Family Progress Reports, Annual Reports, 1955-62. Price index from U.S. Department of Agriculture, Agricultural Statistics, 1961, p. 474.

average of 4.2 years, received their initial loans during the 1951-54 period (Table V-8). While on the program, cash farm income increased 49 percent; net worth increased 39 percent. These increases are rather remarkable and raise a serious question in view of a 13 percent decrease over the period in the index of prices received for all farm products. What was responsible for this progress?

The increase in net farm income was substantially less than the increase in cash farm income, 27 percent compared to 49 percent. Thus, the 67 percent increase in cash operating expense was partly responsible for the increased output. On the other hand, the land input increased very little, 12 percent in total and 17 percent for crop acres. The value of productive livestock and the value of workstock and equipment increased about in proportion to the increase in cash farm operating expenses. Cash nonfarm income, presumably from work off the farm, more than doubled over the period.

The same kinds of changes occurred on farms for the 1959-62 period. The most notable differences are in cash farm income and net worth, both of which increased considerably more during this period than during the previous period. Stability of the index of prices received during this period presents a ready explanation for the larger increases in cash farm income and net worth. The larger increases in cash farm operating expenses and the value of productive livestock also contribute to the more rapid progress.

Farm ownership loan borrowers also made substantial progress during their five-year period on the program (Table V-9). Essentially the same differences between the two periods exist for farm ownership loan receivers as was found for operating loan receivers. One noticeable difference is the substantially larger increase between the two periods in cash nonfarm income for ownership borrowers. During the 1955-58 period, nonfarm income was a more important source of income to ownership borrowers when they came into the program than was the case for operating loan borrowers. Starting from a larger base, nonfarm income increased 37 percent for ownership borrowers during the first period compared to 84 percent for the second period. The 84 percent increase more nearly approaches the change made by operating loan receivers during both periods.

Ownership borrowers during both periods made larger gains than operating loan receivers in both cash farm income and cash farm operating expenses. As might be expected, operating loan receivers made greater change in their use of productive livestock and work stock and equipment than was made by ownership loan receivers, except for workstock and equipment used by ownership borrowers during the 1959-62 period.

From Tables V-8 and V-9, it is clear that the total productivity of borrowers increased substantially during the two periods. The effect of the program on the total and marginal product of labor are less clear. However, inferences

Table V-9. Selected measures of inputs, output, and related factors for farm ownership loan borrowers who remained active borrowers and continued to farm five years after the initial loan, United States, 1955-62

Item	Average 1955-1958			Average 1959-1962		
	Year Before Loan	Last Year Reported	Change	Year Before Loan	Last Year Reported	Change
	Acres	Acres	Pct.	Acres	Acres	Pct.
Acres operated	184	204	10.8	238	282	18.3
Crop acres	90	111	22.4	128	155	21.1
	Dol.	Dol.	Pct.	Dol.	Dol.	Pct.
Cash farm income	3,961	6,612	66.9	5,871	11,287	92.2
Cash nonfarm income	979	1,338	36.6	648	1,196	84.5
Cash farm operating expenses	2,030	4,340	113.8	3,438	7,347	113.7
Net cash farm income	1,932	2,272	17.6	2,433	3,940	61.9
Net worth	8,134	11,073	36.1	11,703	18,955	62.0
Value productive livestock	2,555	3,450	35.1	3,041	6,192	103.6
Value workstock and equipment	2,736	3,750	37.1	3,900	6,180	58.4
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Index of prices received (1910-14=100)	273	237	-13.2	236	240	1.7

Source: U.S. Farmers Home Administration, Farm Ownership Family Progress Reports, Annual Reports, 1955-62. Price index from U.S. Department of Agriculture, Agricultural Statistics, 1961, p. 474.

can be made about the effects on labor productivity. The increase in total product was accomplished with a small increase in acres and with declining to steady product prices. Hence, these two sources can be essentially ruled out as an explanation of increased value productivity. Cash farm operating expenses and productive livestock both of which are complementary to labor increased. The only input which could be considered as a substitute for labor is workstock and equipment and this category of inputs, although important, increased less than the complementary inputs. Thus, it seems quite probable that the marginal value product of labor increased on these farms. Furthermore, it would appear that the labor replaced by machinery and equipment found employment off farms as cash nonfarm income increased.

Since a large part of the increase in inputs was complementary to labor, the available quantity of family labor was more fully employed at the end of the period. Other factors undoubtedly contributed to the increased productivity. The technical, planning, and managerial assistance provided by the loan supervisor surely improved the organization of the farm. Also, coming into the program opened up for the borrower new sources of information about the productivity of different inputs as well as about organization. Also, new inputs purchased under the supervision of a technical advisor probably were qualitatively superior to previously used inputs.

Output, Income and Price Effects

In the preceding discussion it was shown that on the average individual borrowers substantially increased their cash farm income during a short period of time. For the 1955-58 period, the average increase for operating loan borrowers was 49 percent and for the 1959-62 period it was 73 percent. Increases in net farm income were smaller as expected, but significant. For the comparable periods net cash farm income increased 27 percent and 63 percent respectively.

Thus there is no question about borrowers who paid off their loans and who continued to farm having improved their income position. But there is a question about the effects of the increased output on price and aggregate farm income. One would expect an increase in aggregate output and a decrease in the product price level as consequences of more inputs and more productive technical knowledge used by borrowers. And it was argued in Chapter II that decreased product prices lead to decreased earnings for capital assets with a tendency for these assets to become trapped when they would have otherwise been earning returns great enough to cover acquisition costs.

In contrast to good data available on income and productivity changes for individual borrowers, data on the aggregate effects of increased credit are apparently nonexistant. Since the question about aggregate effects of

credit seems important, an estimate is attempted. However, as the procedure is crude, it will only give an indication of the effects.

Hendrix, in a study of the progress made by borrowers who received operating loans, estimated the effect of increased credit on net farm income.[1] He found that for each $1,000 increase in credit extended to operators in the North, net cash farm income was increased $260. Comparable increases in the South were $320, in the West $500. These figures do not necessarily represent a return to capital but are a result of the increased credit, planning assistance, technical knowledge, etc., discussed previously, which are associated with credit.

If we assume that the national average increase was about $350 for each $1,000 of credit extended we can get a very rough idea of the increased net output. Using this figure, the total credit made available for operating loans in 1953 was responsible for $45 million of net farm income. As considerably more funds were made available in 1962, operating loan credit accounted for $96 million of net farm income.

To put the increases in farm income in perspective, they are compared to total realized net farm income including government payments. In both cases the increased income

---

[1]William E. Hendrix, Approaches to Income Improvement in Agriculture, Production Research Report No. 33, Agricultural Research Service, USDA, 1959, p. 33.

amounted to less than one percent of the total. For 1953 it was .33 percent and for 1962 it was .77 percent. If these figures come reasonably close to estimating the proportion of net income attributable to credit, it is possible to get an estimate of the effects on price.

The proportion of gross income and, hence, gross product is probably not substantially different from the proportion of net farm income contributed by operating loan credit; thus, we assume no difference. If we further assume that the elasticity of demand for aggregate farm production is in the neighborhood of -.25, we find that in 1953 the output contributed by loan credit may have decreased the price level by 1.3 percent. For 1962, prices may have been decreased by as much as 3.1 percent.

The relatively small percentage changes in price as a result of increased credit (and output) have a magnified effect on net farm income. Net farm income probably decreases at least two percent for each one percent decrease in price. This means that the total net income decrease associated with FHA credit in 1962 may have been slightly in excess of six percent. Furthermore, the decrease could be even greater if the elasticity of demand coefficient is actually -.1 rather than -.25 and this is a real possibility. Our conclusion is that the primary effect of credit is on the persons receiving the loans but that the secondary effect on non-FHA borrowers through changes in the price level are more than insignificant and cannot be overlooked. Also, not

to be overlooked is the lower prices for products at the consumer level.

The availability of credit to persons who could not get credit otherwise has probably had an effect on who remains in agriculture. With the decline in number of farms and the increase in size of farm, those operators with access to ample private credit probably would have acquired more of the land and other inputs than they now hold if the program had not been in existence. If this is the case, average farm income is probably lower than it would have been in the absence of the program because of smaller farms. However, the credit made available to small operators has contributed to their ability to acquire farms and working capital and thus this effect of credit is consistent with the long-time national goal of widespread ownership of family size farms.

Effects of Loans on Mobility - Further Comments

It is clear that borrowers represented by the data in Tables V-8 and 9 made substantial financial progress over a relatively short period of time. However, only about one-half of all persons who have paid off their ownership loans have expressed an intention of remaining on the farm despite the progress made.[1] Presumably, one-half of the operators believed that they could do better elsewhere.

---

[1] U. S. Farmers Home Administration, Annual Report Farm Ownership Borrowers Status of Accounts, 1955-62, Mimeo. Comparable information on operating loan borrowers is not available. This is far the more interesting case since it involves so many more persons but apparently FHA does not obtain this information.

It is interesting to speculate on the question of why only about one-half of the operators remain in farming. Apparently a preference for farming over other occupations existed when borrowers applied for their original loans. It is also possible that lack of alternative employment opportunities at the time the loan was received reinforced the preference for farming. Possible reasons for the departure are that income expectations were not realized or even if they were realized different and preferred alternatives became available at a subsequent date to borrowers which prompted the decision to leave agriculture.

Summary and Conclusions

The federal policy of providing supervised credit to low-income farmers to aid them in farm development began as an anti-depression measure. Gradually, the policy became directed more toward assisting anyone to remain in agriculture who wanted to do so and could not get credit elsewhere. Initially, emphasis was on subsistence farming and maintaining people on the land. This gave way to assisting low-income farmers to become commercial farmers.

From the beginning of the program in 1935 through fiscal 1962, over 2.2 million farm operating loans were made. The total number of loans made was much larger as initial loans were supplemented with subsequent loans as more credit was needed, but the 2.2 million figure indicates the number

of different operator families who received this type of loan assistance. On September 30, 1943 the number of initial loans that had been made was equal to 11.4 percent of all farm operators reported in the 1940 census. In terms of persons involved the program became less important during the 1950's. For the 1955-59 period loans were made to 3.2 percent of all operators reported by the 1959 census.

Throughout the history of the loan program, it has been directed toward the younger-than-average operator. This is the group of farmers most likely to need help in getting established in farming or in improving their income position. But it is also the age group which is most likely to shift to nonfarm work and which has the most to gain from nonfarm employment. It is also the group which stands the better chance of being able to make the shift to nonfarm employment in view of the industrial preference for persons young enough to pay for training programs and retirement benefits.

Thus the group of farm operators which needed help, was the most likely to succeed in developing farms and most likely to pay off a loan, was also the groupmost likely to make a successful transfer to nonfarm employment. Hence,the age-selectivity of the loan programs worked toward retarding rather than facilitating occupational mobility.

Questions were raised about the possible relation between loan activity begun in the 1930's and the large entry rates for the 1930-40 period and the 1940-50 period.

Both were periods with substantial loan activity in terms of the number of individuals involved in comparison to the 1950's.

The number of farm operating loans when related to the number of farm operators by age suggests that the number of persons involved may have had a substantial impact on the rate of entry to agriculture. Regression analysis of farm employment suggests that loans had a significant effect on the number of persons employed on farms, at least in the short run. However, in the long run, loans appear to be associated with a decrease in the number of persons employed on farms. Both results are consistent with what we would expect. Loans apparently get people involved in agriculture but the aggregate effect in the longer-run of increased capital leads to substitution of capital for labor with a smaller amount of labor used in agriculture.

In accord with the regression analysis (short-run specification) and the number of loans made, it appears that the larger amount of credit made available to FSA borrowers during the first years of World War II did contribute to the short-run goal of increased family labor employment and increased output needed for the war effort. About 80 thousand loans were made annually to different individuals for fiscal years 1940-42.

Loan activity was greater than in 1940-42 in terms of individuals involved only during 1936, 1939 and 1947. The large amount of activity in 1936 and 1939 was primarily an anti-depression measure. The large number of loans in

1947 can be explained by enlargement of the program to assist returning veterans who wanted to farm. The large amount of loan activity during the 1940-42 period can be attributed to efforts to meet war food goals.

It is clear that borrowers who paid off their loans and remained on farms made substantial income and net worth gains while on the program. The effects of additional credit on persons who left the program after a short period of time are much less clear. To our knowledge no data are available on financial progress made by persons who did not remain on farms. Also information is not available on why they left farm employment.

Our admittedly crude estimates suggest that the increased inputs in agriculture have had a relatively small impact on price. However, this small impact has a larger impact on aggregate net farm income. The credit extended for operating loans in any one year has probably increased aggregate output less than one percent. The effect on product prices has probably been in the neighborhood of a one to three percent decrease as a result of credit extended during a given year. This decrease is magnified to a two to six percent decrease in net farm income. Also, the cumulative effect of increased inputs, to the extent that inputs have life of more than one year, probably was somewhat greater than the above estimate.

Conflicting evidence makes it difficult to appraise the general hypothesis that ownership and operating loans

reduce mobility. As indicated, the regression analysis suggests that farm employment was increased in the short run as a result of increased loan activity and thus "out-mobility" was reduced. When the farm employment function was specified as a long-run function, loans appeared to reduce out-movement. These results imply that initially loans reduced out-movement, but at some later date the need or pressure for out-movement was greater as a result of the increased credit in agriculture. Furthermore, the plans to remain in farming as expressed by persons paying-off their ownership loans indicate that involvement in the program apparently did not reduce mobility for about one-half of the persons receiving ownership loans. However, for the group leaving agriculture, loans may have postponed the decision by about five years from the time the original loan was made. Postponement of the eventual occupational shift works to the disadvantage of the borrower to the extent that an additional five years of age limits the available types of jobs and nonfarm wages. This probably is a significant factor for persons past 35 years of age when they secured loans.

The analysis suggests that loans have a "trapping" effect. The credit assists persons to get in or to remain in agriculture. The increased credit depresses product prices and this drives others out of agriculture. With the lower product prices, borrowers may remain "trapped" in agriculture.

CHAPTER VI

AGRICULTURAL DRAFT DEFERMENT, MILITARY SERVICE AND EDUCATIONAL PROGRAMS FOR VETERANS, 1940-62

In Chapter IV, cohort analysis showed that entry rates for farm operators under age 35 were substantially larger during the 1940's than during any previous or subsequent 10-year period. During the early 1940's draft deferments were granted to farm workers in larger numbers. During the latter part of the period, a large number of veterans were enrolled in the on-farm training program at public expense.

In addition, cohort analysis indicated that entry rates for farm operators under age 35 were much smaller during the 1950's than during the 1940's. These two periods were periods with different draft deferment policies and different educational programs for veterans.

The above facts raise questions about the effects of draft deferments on getting or keeping young men on farms. Also, were there features about the educational programs which encouraged veterans to enroll in on-farm training in preference to other training? Were differences in the programs for the two decades in part responsible for the lower rates of entry into farm operatorship during the 1950's?

The purpose of this chapter is to investigate the effects on labor use and labor flows to and from the agricultural sector of agricultural draft deferment, military service by males from the farm labor force, and educational programs for veterans. Specific objectives of the chapter are to (1) describe the policies, (2) determine their effects on rates of entry and withdrawal from agriculture and consequently on the size of the farm labor force, (3) determine effects of the policies on acquisition and salvage prices for labor--acquisition in particular, and (4) for the educational programs, in addition to the above objectives, determine their effects on the productivity of labor and on occupational mobility.

There are at least two reasons for including these policies in an analysis of intersectoral labor flows. First, statistical studies of farm employment and migration usually omit years such as 1941-45 when unusual changes occurred.[1] Thus, it would appear that inadequate attention is directed toward changes which involved large numbers of people and may have had long-lasting effects. Furthermore, analysis of these programs is expected to contribute to an explanation of labor flows not accounted for by relative sector earnings, industrial unemployment and proprietors' equities in agriculture. Second, although these programs were of relatively short duration they involved a large number of young men at

---

[1]For an example see Heady and Tweeten, p. 247.

a time in their lives when decisions were crucial with respect to occupational choice and future mobility.

Three general hypotheses are considered. These are: (1) draft deferments tended to get rural males involved in agriculture with the consequence that future occupational mobility was reduced, (2) institutional on-farm training encouraged veterans to return to farming who in the absence of the specific program would have entered the nonfarm labor force, and (3) financial aid for nonfarm training enabled veterans with farm backgrounds who would not have otherwise received additional education to increase their occupational mobility by acquiring more education.

The chapter is organized following the order of events affecting an individual who might have been involved in them. Agricultural deferment is examined first and is followed by analysis of military service for those not receiving deferments. Analysis of educational programs completes the chapter.

Agricultural Draft Deferment

Three important sets of conditions eventually gave rise to a large number of agricultural draft deferments during World War II. First and foremost, during all-out war there was need for a large number of young men for military service. Second, there was need for increased agricultural output in the United States to feed its own military establishment and to feed and clothe a large part

of the world which was engaged in war and unable to feed itself. A third set of conditions involved several factors. All-out war required tremendous production of war materials in addition to food. An increase in production required additional labor which could be secured from farms where a substantial quantity of underemployed labor existed at the beginning of the war. Differences in wage rates provided the incentive for farm labor to shift to the war industries. Tables III-15 shows average hourly wage rates for farm workers of $ .17 per hour compared to $ .66 per hour for employed industrial workers in 1940. At this relative wage large numbers of farm workers were willing to shift to industrial employment when the opportunity arose. And the opportunity did arise as war industries were able to and willing to take industrially unskilled workers to man the assembly lines.

The Selective Service Act of 1940 provided for the deferment from military service of those men employed in industry, agriculture, or other occupations who were found to be necessary to the maintenance of the national health, safety or interest. Wording of the Act left to the President and those designated by him the decisions affecting deferment and induction of agricultural workers.

From April 1, 1940 to October 1, 1942 approximately 630 thousand farm workers were inducted into or enlisted in

the armed services.[1] This loss of laborers from agriculture was small compared to the loss to industrial jobs of over 2.5 million actual or potential farm workers during the same period of time.

As labor shortages became more acute, particularly in certain areas of the country which specialized in dairy, livestock, and poultry products, pressures built up and were exerted in Congress to do something about the loss of workers from agriculture. These pressures led Senator Millard Tydings of Maryland to propose an amendment to the Selective Service Act. The amendment was adopted and is commonly referred to as the Tydings Amendment.

The following quotation illustrates the effect of the amendment adopted November 13, 1942 as interpreted by Selective Service officials:

> Although the Tydings Amendment did little to change the basic procedures and regulations affecting the deferment of farmers, it did much to emphasize the gravity of the agricultural manpower problem which, along with other reports and the stabilization labor program of dairy, livestock, and poultry farmers, had already induced Selective Service to liberalize the deferment of essential farm workers. It marked the turning point where agriculture was rather completely separated from other occupations in matters of classification and in the instructions which were issued by the Director of Selective Service.[2]

---

[1] Selective Service System, Agricultural Deferment, Monograph No. 7 (Washington: Government Printing Office, 1947), p. 50.

[2] Ibid., p. 51.

One of the features of the amendment was to provide for reclassification of a registrant into the class immediately available for service if he were to leave a deferred class without first requesting and receiving permission to do so. The effect of this feature was to freeze deferred workers on the job.

In addition to deferment of essential farm workers, their enlistment was curtailed. About two weeks prior to adoption of the amendment, the Selective Service System had instructed the army and navy that they were to refuse to enlist any man unless he could certify that he was not in one of the deferred classes or that he should not be so classified.[1]

An "objective measure" of the essentiality of a worker to agriculture came into use after November 12, 1942. This measure which came to be known as "war units" was based on animal equivalents as a measure of the labor contribution of the worker. A milk cow was the basic unit. Other livestock was converted to a unit equivalent on the basis of relative labor requirements and the relative essentiality of the different kinds of livestock to the war effort. Other agricultural products were classed as essential or non-essential and a conversion table was provided by the U.S. Department of Agriculture for determination of the number of war units.[2]

---

[1] Ibid., pp. 47, 56.

[2] See Ibid., p. 58 for a copy of the table.

When the war-unit system first went into effect November 12, 1942, eight units were considered as meeting the requirements for deferred classification. The number of units was to be raised to 10 effective February 12, 1943 and to 12 effective May 12, 1943.[1] Before this order went into effect requirements were raised to 16 effective November 30, 1942.[2] However, the new higher limits were to be interpreted as a guide and not as a minimum standard. Application of the standard was to be left to the discretion of local boards.

Apparently some believed that the standard was being enforced too rigidly as a group headed by Senator Bankhead of Alabama persuaded Selective Service officials to more clearly specify the 16 unit formula as an objective rather than a requirement. Boards were granted discretionary power to deviate from this objective to the extent of deferring a producer of only 8 units.[3]

The war unit plan was abandoned April 1, 1944 as military needs became more pressing. For the remainder of the war, deferment qualifications was left to the decision of the local boards. As qualification for deferment was tightened, local boards were required to certify to the irreplaceability of each registrant.[4]

---

[1] Ibid., p. 185.

[2] Ibid., p. 191.

[3] The New York Times, January 16, 1943, p. 6.

[4] Selective Service System, Agricultural Deferment, p. 80.

Deferments Granted, 1941-45

Deferment for farm work was not intended to mean exemption from military service. Classifications were periodically re-examined and deferments were extended if registrants continued to meet the standards and regulations as they were modified in light of changing military requirements for manpower. Since the number of deferments changed from month to month, it is necessary to examine deferments at several periods of time to determine the number of persons involved.

Agricultural deferment of persons 18-37 years of age reached a maximum of over 1.7 million on March 1, 1944 (Table VI-1). Following the peak number, deferments for agriculture remained above 1.5 million until January 1, 1945. On August 1, 1945 just prior to the cessation of war with Japan, 1,265,097 remained in the deferred classification. Table VI-1 shows that deferments for persons 30-37 were reduced little from June 1, 1944 through August 1, 1945. Greater reductions were made in the 26-29 age group but not nearly as large as in the 18-25 age group. The youngest group was decreased by more than one-half during this period.

The number of deferments on August 1, 1945 appears to be the best indicator of the number of persons who were in effect exempted from military service. In general, as the number of deferments decreased the number of farmers and

Table VI-1. Occupational deferments of registrants by age group for the United States, for selected dates December 31, 1942 through August 1, 1945

Date	Agricultural				Nonagricultural			
	Total	Age Groups			Total	Age Groups		
		18-25	26-29	30-37		18-25	26-29	30-37
	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.	Thou.
1942								
Dec. 31	192	---	---	---	1,052	---	---	---
1943								
June 30	1,446	---	---	---	1,264	---	---	---
Dec. 1	1,639	---	---	---	2,194	---	---	---
1944								
March 1	1,722	---	---	---	3,677	---	---	---
June 1	1,637	487	323	827	3,696	139	819	2,739
Dec. 1	1,508	364	304	841	4,258	107	864	3,286
1945								
June 1	1,283	242	249	792	3,406	106	363	2,938
Aug. 1	1,265	238	237	790	3,444	107	318	3,019

Source: Selective Service System, Agricultural Deferment, (Government Printing Office, Washington: 1947), p. 90.

farm laborers inducted into the armed services increased.[1] Since our interest is in the number of persons who remained in agriculture, the August 1 figure is more appropriate than the maximum number receiving deferments.

Occupational deferments were granted to industrial workers, also, but in relatively smaller numbers than in agriculture. There were fewer 18-25 year olds deferred in nonagricultural industries than in agriculture. Slightly more 26-29 year olds were deferred in industry than in agriculture.

Although a comparison which uses two different labor force base dates is not entirely satisfactory Table VI-2 clearly shows the difference between the relative importance of occupational deferments to the two sectors. The difference is most obvious for the 18-25 age group. The number of industrial deferments was equivalent to less than three percent of the employed male labor force of the same ages in 1946. In agriculture the number of deferments for persons 18-25 was equivalent to 14.5 percent of the agricultural labor force of the same age in 1940. Substantial differences also existed for 26-29 year olds on August 1, 1945. For the 30-37 age group deferments were only slightly more common for agricultural occupations than for industrial occupations.

---

[1]The increase was not 1 to 1 however as a relatively high percentage of potential inductees were found mentally or physically unqualified for service. Over 31 percent of the farmers of all races did not meet the physical standards. Corresponding figures for white persons only were 27.8 percent; for negroes the figure was 44.9 percent. See Selective Service System, Agricultural Deferment, p. 255.

Table VI-2. Deferred registrants as a percent of the employed male labor force by age group, July 1, 1944 and August 1, 1945, United States

	Ages 18-37		Ages 18-25		Ages 26-29		Ages 30-37	
	July 1944	Aug. 1945	July 1944	Aug. 1945	July 1944	Aug. 1945	July 1944	Aug. 1945
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Agric.[a]	49.9	33.9	31.9	14.5	52.9	33.3	71.0	58.7
Ind.[b]	31.9	26.8	2.9	2.4	31.7	11.0	55.6	54.9

[a]Agricultural deferments as a percent of the 1940 employed male labor force.

[b]Industrial deferments as a percent of the 1946 employed male labor force.

Source: Selective Service System, Agricultural Deferment, pp. 92, 95.

A comparison of farm deferments by regions shows that the South Central and West North Central regions had considerably smaller proportions of their 1940 labor force of draft age deferred for farm work than other regions (Table VI-3). A comparison of farm deferments to the number of draft age men in the 1940 farm labor force shows that deferments were relatively most important in Middle and South Atlantic states. They were only slightly less important in New England and East North Central states where deferments were equivalent to one of each two persons of comparable age in the 1940 census.

Draft deferments as a proportion of the total number employed in agriculture is another way to compare the importance of deferments by region. This comparison of regions shows a somewhat different picture. Table VI-3

Table VI-3. Agricultural deferments as a percent of total workers on farms June 1, 1944 and as a percent of the 1940 farm labor force of comparable age, August 1, 1945, United States by geographic region

Region	As a Percent of Total Workers on Farms June 1, 1944	As a Percent of the 1940 Farm Labor Force of Comparable Age
(1)	Pct. (2)	Pct. (3)
United States	14.5	33.9
New England	12.4	49.9
Middle Atlantic	18.0	60.5
South Atlantic	11.3	52.1
East North Central	19.1	49.3
East South Central	10.7	31.3
West North Central	22.0	28.3
West South Central	11.5	27.5
Mountain	15.1	39.5
Pacific	12.5	38.5

Source: Col. (2) Walter W. Wilcox, The Farmer in the Second World War, (Ames, Iowa: The Iowa State College Press,) 1947, p. 87. Col. (3) Calculated from Selective Service System Agricultural Deferment, pp. 92-93, 233-238.

shows that deferments as a percent of the total workers on farms were relatively less important in the South Atlantic and South Central states with fewer than 12 percent of all farm employed labor with deferments. This comparison shows the highest proportion of deferments in the West North Central region where family labor comprised over 88 percent of the farm labor force (See Table III-5). Deferred workers

comprised an important segment of the total labor in East North Central and Middle Atlantic States. For the nation, about one in seven persons employed on farms was a deferred worker.

It is important to note that in general deferments were relatively less important in those regions where underemployment had been the most prevalent before the war. It was in the industrial regions of the North and East where it became necessary to rely most heavily on deferments to hold the necessary labor on farms.

Deferments During the Korean Conflict

Agricultural deferments were much less common during the Korean Conflict than during World War II. A survey reported in the April 1952 issue of Selective Service stated that 436,996 persons from rural areas (not necessarily farm operators or farm laborers) had been recruited by the armed forces "without regard to whether they were needed at home or anywhere else."[1] At the time of the survey 276,523 farmers and farm laborers had been selected and inducted by local boards. In addition, about 90,000 persons were in the class deferred for agricultural work.

Deferments during the Korean Conflict did not exceed 100 thousand at any time. They reached a peak in August of

---

[1]Selective Service System, Vol. 2, April 1952 (Washington, D.C.) pp. 1-2.

1952 and steadily declined to 73 thousand by December 1953.[1] When these deferments are compared to deferments for the comparable age group for August 1945 they become more important, however, Deferments during the Korean Conflict applied to 18 1/2 to 26 year olds. On August 1, 1945 there were 238 thousand persons in the 18-25 age group with farm deferments (Table VI-1). Deferments for all ages on this date were 1,265 thousand.

Military Service by Farmers

Although working in agriculture exempted a large number of draft-age men from military service, a substantial number did enter military service. Prior to enactment of the Tydings Amendment, November 13, 1942, 545 thousand farmers were inducted into the army.[2] During the last six months of 1942 inductions varied from 38 to 66 thousand per month. After passage of the amendment, the rate of induction of farmers decreased substantially. From January 1944 to July 1, 1945 inductions varied from 10 to 23 thousand per month. From November 1940 through June 1945, 1,088,124 farmers were inducted into the army. Moreover, these figures do not include 276,197 enlistments in the army and navy as well as inductions into the navy. Thus over 1.3 million farm

---

[1] Ibid., Vol. 1, August 1951, Vol. XII, March 1962,

[2] Selective Service System, Agricultural Deferment, p. 101.

operators and farm laborers entered military service prior to July 1, 1945.

Total enlistments and inductions of farmers represented approximately 41 percent of the male farm labor force of draft age (Table VI-4). A regional comparison shows that the Mountain and Pacific regions had the largest proportion of their draft-age labor force in the armed services. One would expect a large negative correlation between the number of agricultural draft deferments for a region and the number in the military service from that region. A comparison of Tables VI-3 and VI-4 shows some correlation but not as much as one might expect. This is probably due to the fairly narrow range of variation in inductions among regions. Also, regional differences in military acceptance rates of draftees may have contributed to the smaller correlation.[1]

More than one-half of all farmers who served in the military forces were from the three Southern regions (Table VI-4). In addition, large numbers were from the North Central regions. However, as indicated above, the relative contribution to military service of Southern regions was no greater than other regions. In fact, the contribution was less than the U. S. average for the South Atlantic region.

No entirely satisfactory criteria are available for determining where farmers should have been drafted from farms in order to get the most efficient overall use of

---

[1] Supra, p. 260 suggests regional differences.

Table VI-4. Numbers of farmers and farm laborers inducted and enlisted in the army and navy, and as a percent of the male labor force in agriculture in 1940, U.S., by region, June 30, 1945[a]

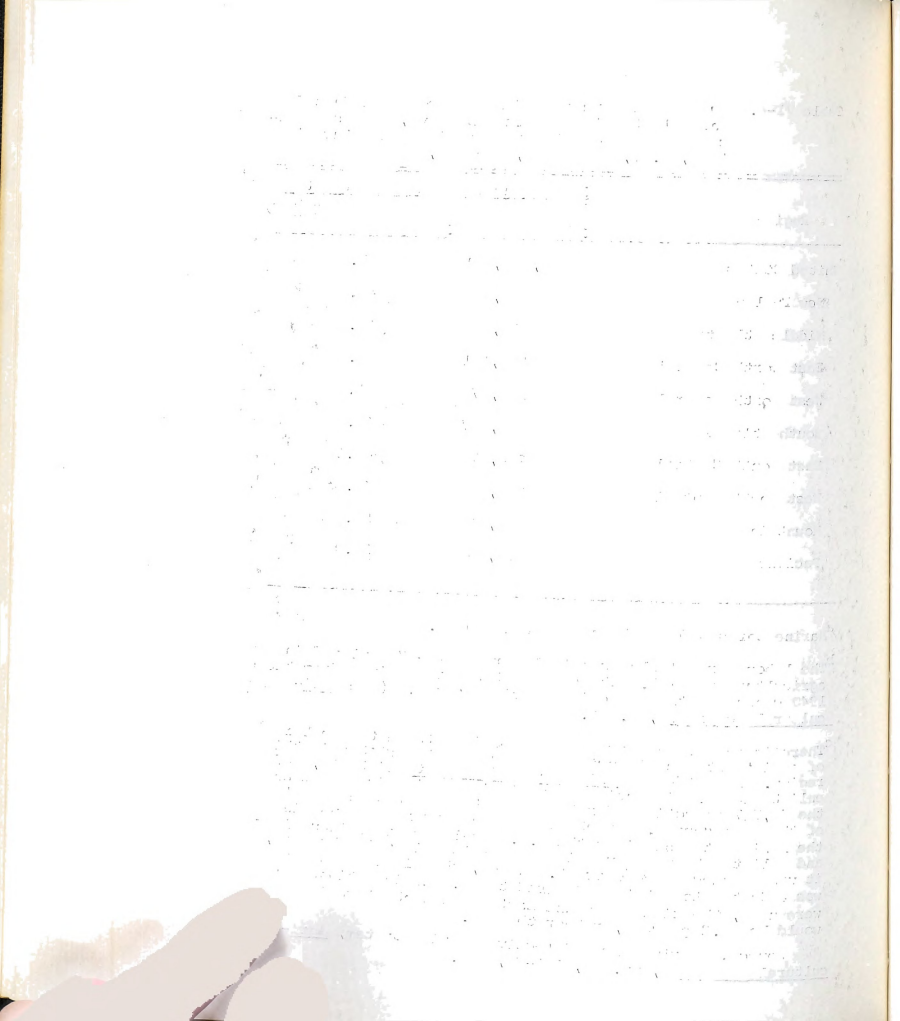
Region	Inductions and Enlistments	
	Total	As a Percent of Male Labor Force[b]
United States	1,364,321	41.5
New England	21,826	44.1
Middle Atlantic	56,238	36.8
East North Central[c]	163,141	36.5
West North Central	246,373	41.8
South Atlantic	224,547	36.6
East South Central	236,774	42.1
West South Central	260,239	44.3
Mountain	79,719	58.4
Pacific	75,464	50.9

[a]Marine Corps and Coast Guard not included.

[b]The labor force includes male labor age 18-37 employed in agriculture in 1940. These estimates were derived from the 1940 census by the Selective Service System. (see Agricultural Deferment, p. 92.)

[c]There is an obvious error in the basic data on the number of enlistments and inductions for one of the states in this region. Page 254 of Agricultural Deferments lists 28, 347 enlistments and inductions for Michigan which is less than the 45,727 inductions for the same state listed on page 100 of the same source. No other apparent error was found in the basic data and since the U.S. total number of inductions and enlistments was found in several locations in the book, it was assumed to be correct. Hence, the Michigan figure was adjusted to get this desired total. If inductions only were used, the figure for the East North Central region would be 40.2 percent, rather than 36.5

Source: Derived from Selective Service System, Agricultural Deferment, pp. 92, 233-38, 254.



manpower. However, size of farm in terms of acres and value of products sold or used on farms serves as an indicator of the labor needed or used on farms. A regional comparison shows that farms were considerably smaller in the South and produced a smaller amount of products per farm than farms in other regions (Table VI-5). Furthermore, Southern farms had more labor available per farm than Northern farms and only slightly less labor than Western farms. East South Central farms were less than one-half as large as the U. S. average and produced less than one-half the value of products per farm compared to the national average. South Atlantic farms were only slightly larger and produced about 70 percent as much as the average farm in the nation with more labor per farm than in any other region.

Changes in Farm Employment, 1940-45

Before one can draw conclusions about the effects of draft deferments and military service by farmers on farm employment, it is necessary to examine more closely total changes in the farm labor forces. The farm population of all ages provides an actual or potential supply of labor to agriculture. From 1940 to 1945 this source of supply of labor to agriculture decreased 16.8 percent (Table VI-6). The largest part of this decrease occurred prior to April 1, 1944. A regional comparison shows that the decline was substantially greater in the West South Central states. In addition, out-migration was heaviest from the South Atlantic,

Table VI-5. Average acreage per farm of all land in farms, average value of all farm products sold or used per farm and average number of persons working per farm reporting, United States, by region, 1940

Region	Average Acreage Per Farm of All Land in Farms	Average Value of All Farm Products Sold or Used Per Farm	Average Number of Family and/or Hired Workers Per Farm Reporting[a]
	Acres	Dol.	Persons
United States	174.0	1,309	1.82
The North	168.6	1,641	1.74
The South	123.1	840	1.87
The West	501.5	2,427	1.92
New England	98.9	1,793	1.87
Middle Atlantic	96.6	1,727	1.95
East North Central	113.0	1,510	1.70
West North Central	251.6	1,716	1.70
South Atlantic	90.8	915	2.07
East South Central	75.3	604	1.75
West South Central	207.9	1,013	1.79
Mountain	821.9	2,168	1.83
Pacific	230.6	2,647	2.00

[a]Reported for last week of March, 1940.

Source: U. S. Bureau of the Census, U. S. Census of Agriculture: 1945, II, General Report, Statistics by Subjects, pp. 73, 298, 589.

East South Central and North Central states. Relative to the size of the regional farm population, out-migration was large for the Mountain states. Relative population out-migration was smallest in New England, Middle Atlantic and East North Central States, states which had long been industrialized and where underemployment on farms had been less prevalent before the war.

Changes in farm employment are more indicative than population data of actual changes which occurred in the amount of labor used on farms. In contrast with the 16.8 percent

Table VI-6. Estimates of farm population January 1, 1940 and 1945, and percent change for period, by regions, United States

Region	Jan. 1 Population 1940	1945	Total Change	Percent Change
	Thou.	Thou.	Pct.	Pct.
United States	30,269	25,190	-5,079	-16.8
New England	617	544	-73	-11.8
Middle Atlantic	1,772	1,578	-194	-10.9
East North Central	4,589	4,033	-556	-12.1
West North Central	4,676	3,989	-687	-14.7
South Atlantic	6,025	5,067	-958	-15.9
East South Central	5,238	4,251	-987	-18.8
West South Central	5,008	3,750	-1,258	-25.1
Mountain	1,102	891	-211	-19.1
Pacific	1,242	1,087	-155	-12.5

Source: Selective Service System, Agricultural Deferment, p. 339.

decline in the farm population, total farm employment decreased only five percent from the 1935-39 December average to December 1, 1945. Family worker labor decreased three percent as hired labor decreased 11 percent which indicates the importance of family labor as a substitute for unavailable hired labor.

The above figures show that despite the drafting of workers from farms and the exodus of persons from the farm population, the farm labor force decreased only a small amount. This was accomplished partly, as suggested above, by increased participation of farm wives and farm children

in the work force. Also, programs for the importation of laborers from Mexico and other countries were initiated and eventually contributed significantly to the total labor input. Although these programs added materially to the total labor supply, they are considered outside the range of this study.[1]

Table VI-7 shows substantially different rates of change in labor use between regions. Differences are less apparent for total farm employment than for its components. Total employment dropped most in South Atlantic states. It increased by 4 or 5 percent in Middle Atlantic and Pacific states. The greatest differences among regions are shown for hired workers as regions show contrasting trends. The hired labor input increased substantially in West South Central and Pacific states and slightly in Middle Atlantic states. Hired labor use decreased 25 to 30 percent in North Central and South Atlantic states.

There appears to be no entirely satisfactory way of determining the effect of draft deferments and military service on rates of entry and withdrawal from agriculture. However, farm operator data by age provide some insight into the changes which occurred. Age-data of this type were introduced and explained in Chapter IV and Table IV-19. For convenience Table IV-19 is included in this chapter as Table VI-8 with one new decade added, 1945-55. The data are

---

[1] For a history of the emergency programs see Wayne D. Rasmussen, A History of the Emergency Farm Labor Supply Program, 1943-47, U.S. Dept. of Agriculture Monograph, No.13, 1951.

Table VI-7. Farm employment December 1, 1944 and December 1, 1945 as a percent of average 1935-39 December employment, United States, by regions

Region	Total Farm Employment			Family Workers			Hired Workers		
	Dec. Average 1935-39	Dec. 1, 1944	Dec. 1, 1945	Dec. Average 1935-39	Dec. 1, 1944	Dec. 1, 1945	Dec. Average 1935-39	Dec. 1, 1944	Dec. 1, 1945
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
United States	100	96	95	100	98	97	100	90	89
New England	100	93	93	100	99	99	100	79	79
Middle Atlantic	100	101	104	100	100	103	100	104	106
East North Central	100	95	94	100	101	101	100	74	70
West North Central	100	96	96	100	100	101	100	77	75
South Atlantic	100	90	88	100	96	93	100	73	73
East South Central	100	97	93	100	97	95	100	94	81
West South Central	100	97	98	100	93	91	100	109	120
Mountain	100	98	96	100	103	102	100	87	81
Pacific	100	107	105	100	97	96	100	124	128

Source: Selective Service System, Agricultural Deferment, p. 353.

limited by the fact that no age distribution of farm operators is available from the 1935 census of agriculture. Thus, change in number of operators for the 1935-45 period are not available. Also, the 10-year intervals used for the age distribution do not permit calculation of changes for the 1940-45 period. However, overlapping periods, 1940-50 and 1945-55 permit some useful inferences.

Table VI-8. Net percent change in number of farm operators by age after adjusting for survival rates by 10-year periods, 1910-1959, including 1945-55, United States

Age at Beginning of Decade	1910-20	1920-30	1930-40	1940-50	1945-55	1950-59
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Under 25	261.4	189.8	169.1	260.9	320.6	145.4
25-34	22.2	12.5	22.3	30.8	30.0	1.5
35-44	3.5	.4	7.6	2.5	-9.4	-15.1
45-54	-11.9	-9.5	-3.4	-13.4	-24.3	-22.7
55-64	-8.1	-1.5	8.2	-9.1	-12.0	-16.1

Source: Table IV-19 except for 1945-55. Estimates for 1945-55 were developed using the same procedure and the same sources of data as noted in Table IV-19 with one exception. Census data do not permit derivation of forward census survival rates for other than decennial census dates. Hence, survival rates used for 1955 were the average of the 1950 and 1960 rates.

Table VI-8 is difficult to interpret especially for the 1940-50 period. With the aid of additional evidence in Table VI-9, a plausible interpretation appears possible. An understanding of the differences between the two tables is

essential for the interpretation. Whereas Table VI-8 shows the percent change in size of a given cohort during a decade, Table VI-9 shows the average annual percent change in size of a given age group from the beginning to the end of the specified period. An example from Table VI-9 illustrates what is being measured. As persons moved into and out of the 25-34 year age bracket from 1910 to 1920, the size of the group decreased an average of .48 percent annually. This means that the rate of withdrawal from all causes exceeded the rate of entry for the specific age group.

Table VI-9. Average annual percent change in number of farm operators by age for selected periods, 1910-1960, United States

Age	1910-20	1920-30	1930-40	1940-45	1945-50	1950-55	1955-60
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Under 25	-.76	-.10	-3.66	-7.70	3.34	-9.38	-6.02
25-34	-.48	-1.96	-.87	-2.78	-.24	-5.02	-6.40
35-44	.20	-.65	-1.31	.62	-1.22	-2.30	-4.64
45-54	.44	.07	-.14	-.40	-3.10	-.96	-2.26
55-64	.59	.94	.87	-.20	-2.00	-1.84	-2.44
65 and over	.61	1.84	2.36	-.12	-1.54	0	-2.80
Total	.14	-.25	-.31	-.78	-1.64	-2.22	-3.56

Source: Basic data from U. S. Census of Agriculture (See Table IV-18). See Table IV-19 for adjustments made for operators not reporting age.

Although there is the possibility of assuming causality when only association exists, changes in the rate of entry for certain age groups during the 1940-45 periods should be indicative of the effects of draft deferments on the rate of entry. Unfortunately, from an analytical standpoint, there appears to be no "normal" rate of entry over the 50 years included in Table VI-8 but two figures for 1940-50 do stand out. The percentage change for persons under 25 is larger than for either of the two previous decades. For the 25-34 year group the figure is higher than for any other period. Both of these groups involved draft age men. However, the large change in number of operators under 25 for the 1945-55 period indicates that the change in that group came after 1945, not before. Evidence is less clear from this table for the 25-34 year group. However, there is the suggestion that the increase for 25-34 year olds occurred prior to 1945.

Table VI-9 brings the picture into somewhat better focus. The number of farm operators under 25 was reduced more during the 1940-45 and 1950-55 periods than during any other period. And both were war periods when Selective Service was deferring 18-37 year olds to work in agriculture. On the other hand, farmers 18-25 years of age in particular were inducted into the armed forces in large numbers. Thus for the youngest age group it appears that despite deferments the rate of entry was less than during prior periods.

The effect of deferments on the size of the 25-34 year group is similar to that on the younger group.

Deferments do not appear to have offset military service especially for the 1950-55 period when deferments were numerically less important.

The size of the 35-44 year group increased during the 1940-45 period, the first time this had occurred since the 1910-20 war period with its draft policies. Since persons in this group were between ages 30 and 40 in 1940 and since a large proportion of the 30-37 age group of operators received draft deferments it appears that deferments increased the size of this group. It appears more certain that draft deferments increased the rate of entry when it is noted that the long-run trend has been toward fewer farm operators in this age group. Thus a slowing of that decrease would have been sufficient evidence of an increase in the rate of entry. Furthermore, the trend regained its direction and accelerated following the 1940-45 period.

Two interesting figures appear in Table VI-9 for the 1945-50 period. World War II veterans returned from the service during the first part of the period. The under-25 age group increased 25,000 or 16.7 percent during the period but many veterans would have been too old to be counted in this group of operators. This follows from the fact that persons in this group were under 20 in 1945. During the 1945-50 period the 25-34 group decreased 10 thousand or .24 percent annually. This was the smallest decrease both absolute and percentage wise of any period for 25-34 year olds. The smaller rate cannot be attributed to veterans

returning from military service unless one can argue that involvement in military service encouraged persons to enter farming who would not have otherwise done so. This may have been true in some cases and is discussed further under the section on educational programs for veterans.[1]

To recapitulate, there is small doubt that draft deferments for farmers kept more persons in agriculture than would have been the case in the absence of occupational deferments. This is especially true for persons under age 37. The more difficult question is whether deferments encouraged or permitted more persons under 37 to enter agriculture than would have done so otherwise. We have found some evidence that draft deferments may have maintained or increased the rate of entry particularly for draft-age persons between ages 30 and 37. For younger persons in the aggregate, deferments appear to have had less effect.

How Draft Deferment Reduced Mobility

An agricultural deferment was intended as a device for postponing military service until such time as a replacement could be found for a farm worker. Actually, many deferments turned out to be exemptions from military service as indicated by a survey reported in Selective Service.[2] The survey of persons in the deferred class found that 30 percent

---

[1] Supra, pp. 297, 307.

[2] Selective Service System, Vol. 4, May 1954, (Washington, D.C.).

of the deferments had been retained for three years or more. Nineteen percent had been deferred for two to three years, and 27 percent had been so classified for one to two years. In total, 76 percent of the deferments covered in the survey were for more than one year.

Selective Service control over certain age groups had an important effect on which age groups left the farm and which did not as nonfarm wages increased and jobs became plentiful. Selective Service had virtually no control of persons over age 45 and Table VI-8 shows that farm operators in this category left the farm at an accelerated rate in comparison to previous periods. As a result of this outmigration of labor, the Tydings Amendment provided for a halt to the flow from agriculture of draft-age men with deferments or potential deferments. The amendment provided for immediate reclassification into the available class (available for induction) for any person leaving agriculture without first receiving approval of the local draft board. The following quotation indicates the intended effect of the threat of induction:

> ...the threat of induction...was to keep or freeze workers on farm jobs where agricultural wages were so low that there remained no accompanying economic factor to offer an additional inducement to remain on the farm. The higher wages of industry continued to attract many farmers who by reason of age, sex, or physical disqualifications were not affected by the Tydings Amendment. This movement of workers from the farms could mean only one thing: to make up for the accumulative and continuing loss, the young men liable to the draft must be retained on farms.[1]

---

[1] Selective Service System, Agricultural Deferment, p.52.

The above can be interpreted to mean that the effective acquisition cost of labor to the farm sector was lowered or made unimportant in decisions to remain on the farm by Selective Service policies. Noneconomic factors dictated the decision. On this basis it can be argued that at a given relative wage in the two sectors more labor entered the farm sector than would have entered without manpower directives.

Additional factors such as change in relative income favorable to farmers, capital gains, credit programs and the effect of war psychology on price and income expectations in agriculture no doubt influenced persons to enter farming. And once persons got into agriculture during the 1940-45 period, these economic factors favored them remaining in agriculture, provided they were on a large enough farm and producing enough to secure the advantage of rising prices.

Table VI-10 illustrates the changes in farm income and value of agricultural assets which occurred during the 1940-45 period. Part of the gains were only monetary gains but the constant dollar figures make it clear that all the gains were not offset by inflation. From 1940 through 1943, farm income in terms of total (national) income, income per worker, and income per family farm worker increased by as much as 48 percent and not less than 33 percent from one year to the succeeding year. In deflated dollars the range was from 19 percent to 40 percent. Income per employed person increased at a greater rate than total income as a result of the declining number of persons employed.

Table VI-10. Farm income--total, per worker, and per family worker--and value of agricultural assets each in current and constant dollars, 1940-45, United States

Item	1940	1941	1942	1943	1944	1945
	Dol.	Dol.	Dol.	Dol.	Dol.	Dol.
Farm income[a]						
Total						
current dol., mil.	5,318	7,402	10,456	13,902	14,419	15,149
constant dol., mil.	5,427	7,117	8,713	10,375	10,154	10,236
Per worker[b]						
current dol.	484	694	995	1,331	1,411	1,515
constant dol.	494	667	829	993	994	1,024
Per family worker[c]						
current dol.	517	767	1,110	1,483	1,529	1,630
constant dol.	528	738	925	1,107	1,077	1,101
Value of agr. assets						
current dol., bil.	53.0	55.1	62.5	73.3	83.8	93.1
constant dol., bil.	54.1	53.0	52.1	54.7	59.0	62.9
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Index of prices paid for family living, (1935-39=100)	98	104	120	134	142	148

Change from Previous Year

	Pct.	Pct.	Pct.	Pct.	Pct.
Farm income					
Total					
current dol., mil.	39.2	41.3	33.0	3.7	5.1
constant dol., mil.	31.1	22.4	19.1	- 2.1	.8
Per worker					
current dol.	43.4	43.4	33.8	6.0	7.4
constant dol.	35.0	24.3	19.8	.1	3.0
Per family worker					
current dol.	48.4	44.7	33.6	3.1	6.6
constant dol.	39.8	25.3	19.7	- 2.7	2.2
Value of agr. assets					
current dol., bil.	4.0	13.4	17.3	14.3	11.1
constant dol., bil.	- 2.0	- 1.7	5.0	7.9	6.6

[a] Farm sources only.

[b] Includes total workers. Income includes payments to hired workers.

[c] Includes only family workers. Income excludes wages paid to hired workers.

Source: Farm income from U. S. Department of Agriculture, ERS, Farm Income Situation, July, 1963, p. 41. Agricultural assets from U. S. Department of Agriculture, Agricultural Finance Review, Vol. XXII, September, 1960, pp. 174-75. Price index from U. S. Department of Agriculture, Agricultural Statistics, 1962, p. 560.

The increase in value of agricultural assets lagged behind rising incomes. Prior to 1943 the increase was a monetary gain offset by rising prices. After that date the value of agricultural assets gained in real terms at from 5 to 8 percent per year. This rise in value of assets probably encouraged and enabled persons to remain in agriculture since rising asset values increase the credit base and "staying" ability of persons already in agriculture.

An additional noneconomic factor--a sense of moral obligation--which is really impossible to appraise may have reduced occupational mobility following a draft deferment and the end of the war. On the part of some individuals, there was a feeling of moral obligation to remain on the farm after having been exempted from military service. To leave the farm sector after a deferment would suggest to some that the deferment was really a way of avoiding military service.

Other factors which are more readily documented, without doubt, reduced mobility of the persons who had remained in agriculture. Immediately following the war there was a decrease from the peak in 1943 in the number of persons employed in nonagricultural establishments.[1] This meant a decrease in the number of jobs available particularly for industrially unskilled workers at a time when millions of men were being released from military service. And those

---

[1] Economic Report of the President, 1963, p. 201.

who were released had first preferences for return to jobs which they had left. In addition, veterans had aid for training and education which presumably fitted them for civilian jobs.

Educational Programs for Veterans

This section presents a partial analysis of educational programs for veterans of World War II and the Korean Conflict. Specifically, interest is in the effect of these programs on pre-service farmers and farm laborers. The analysis is concerned with (1) the differences in the programs for the two periods, (2) the effects of the programs on getting persons re-involved in agriculture, (3) effects of the programs on the productivity of labor involved, and (4) effects of education on the occupational mobility of farm labor.

World War II

The World War II program is analyzed first. The analysis of the program for Korean veterans, although less complete because of lack of data, concentrates on the differences between the programs for the two periods.

General Enabling Legislation and Training Made Available

The basic provisions for the education and training of veterans of World War II were contained in Title II of the Servicemen's Readjustment Act of 1944, commonly called

the G I Bill of Rights.[1] The law specified who was eligible for education and training, the period of education based on the number of days in service, and the period of time during which programs of study must be undertaken. Tuition payments not in excess of $500 per year except in specified cases were made directly to the school attended. In addition to tuition payments, subsistence allowances were authorized for veterans in training. Full-time institutional students without dependents received $50 per month or $75 per month with one or more dependents.[2] Those taking part-time institutional courses received proportionate rates.

From a reading of the enabling legislation and discussions of educational programs, two points stand out with respect to choice of education for the veterans and, hence, occupational mobility. Essentially, there were no limits placed upon the veteran as to the type of education he could receive, except that certain recreational and avocational courses were excluded. Of course, an implicit limitation was contained in the provision that for a person to continue to be eligible for benefits he must continue to do satisfactory work throughout the period according to regularly prescribed standards of the institution.[3] The second point

---

[1] U. S. Statutes at Large, Vol. LVIII, Part 1, pp. 284-301.

[2] Subsistence allowances were raised by subsequent amendments. See Table VI-11.

[3] U. S. Statutes at Large, Vol. LVIII, Part 1, pp. 284-301.

is that an effort was made to provide educational guidance to all veterans taking training. Guidance centers in addition to those in regional Veterans' Administration offices were set up in universities and colleges. Veterans could go to these centers for counsel and advice on educational matters and on the choice of an occupation. But no mention was made of guidance centers specifically for persons enrolling in farm training. As they were not provided, it is highly doubtful that many persons enrolled in farm training availed themselves of counsel which could be secured only at regional centers or at colleges and universities. Furthermore, it is quite unlikely that the schools with which the farm trainee was associated advised him against taking farm training or against entering agriculture despite historically unfavorable relative incomes in agriculture and the excess supply of labor to agriculture. On the contrary, teachers and supervisors urged veterans to enroll in the program and did a certain amount of recruiting for the program. Thus, veterans entering farm training probably received inadequate advice and perhaps misinformation on choice of occupation.

Institutional On-Farm Training

Special legislation--Probably the most important change in the training program as authorized under the original G I Bill from the standpoint of persons taking farm training followed passage of Public Law 377, Eightieth

Congress on August 6, 1947. The original bill had made no distinction between farm training and other on-the-job training. Administration of the training had been left to the Veterans' Administration. And on August 27, 1946 the VA had in effect reduced institutional on-farm training for self-employed veterans from a full-time to a part-time course with corresponding reduction in tuition and subsistence allowances. Protests by veterans and veterans organization over the reduction led to Congressional committee hearings and passage of P.L. 377.[1] The effect of this law was to establish institutional on-farm training as a specialized program. A full-time course was defined as organized group instruction of at least 200 hours per year. The full-time status provided for a return to payment of the full tuition and monthly subsistence allowance.

Public Law 377 established the minimum criteria for agricultural training. To qualify for full-time training, the veteran was required to own or have under his control a farm, to attend organized classes, and to receive on-farm training at least twice per month by his instructor. The law further specified that:

> Such farm shall be of a size and character which (1) together with the group instruction part of the course, will occupy the full-time of the veteran, (2) will permit instruction in all

---

[1] Chief of Investigations of the General Accounting Office, General Accounting Office Report of Survey - Veterans Education and Training Program, Printed for use of the Committee on Veterans Affairs, 82d Cong., 1st Sess. House Committee Print No. 160, 1951, p. 159 (Hereafter cited as GAO Report, Print No. 160).

> aspects of the management of a farm of the type for which the veteran is being trained, and (3) if the veteran intends to continue operating such farm at the close of his course, will assure him of a satisfactory income under normal conditions.[1]

As specified in the law, farm training consisted of two parts, classroom instruction and on-farm training. Public Law 377 stated that a course of instruction to be approved had to consist of organized group instruction in agricultural and related subjects of at least 200 hours per year (and of at least 8 hours per month). The law further specified that the self-employed veteran was to receive not less than 100 hours of individual instruction, not less than 50 hours of which were to be on the farm with at least two visits by the instructor to the trainee's farm each month. If the farm trainee was the employee of another, he was to receive on the employer's farm not less than 50 hours of individual instruction per year with at least one visit by the instructor to the farm each month. In addition, the employer was to agree to instruct the trainee in various aspects of farm management in accordance with a training schedule developed for the veteran by his instructor.

Public Law 377 further specified the general objectives and content of the course of instruction. Course instruction and supervised work experience was to increase the proficiency of the trainee in planning, producing, marketing, farm mechanics, conservation of resources, food

---

[1] U.S. Statutes at Large, Vol. LXI, Part 1, pp. 791-93.

conservatio

ing of farm

directed to

the trainee

Th

in additio

received a

Initially

no depende

law increa

P

condition

establish

ance coul

However,

receivin

earnings

of the t

in train

sistence

the loc

evidenc

which

from va

conservation, farm financing, farm management and the keeping of farm and home accounts. Thus, the training was directed toward increasing both the technical knowledge of the trainee and his organizational and managerial ability.

The subsistence allowance--as previously mentioned in addition to the educational assistance, the veteran received a subsistence allowance while enrolled in the program. Initially the monthly allowance was $50 for the veteran with no dependents (Table VI-11). Successive amendments to the law increased the base allowance to $75 per month.

Payment of the maximum subsistence allowance was conditional upon farm earnings of the individual. The rate established in 1946 specified that earnings plus the allowance could not exceed $175 per month for the single veteran. However, this ceiling did not prevent most trainees from receiving the maximum subsistence allowance as reported earnings were small. On June 30, 1950, ninety-five percent of the trainees were self-employed and 87 percent of those in training on May 31, 1949 were drawing the maximum subsistence allowance.[1]

Qualifying for training--In order to be approved by the local committee for training, the veteran was to show evidence that he owned or controlled an adequate-sized farm which would provide him with a reasonable income. Evidence from various sources indicates that veterans received this

---

[1]GAO Report, Print No. 160, p. 28.

Table VI-11. Monthly education and training subsistence rates for institutional on-farm training for World War II and Korean veterans

Program and Law	Single Veteran	Veteran and One Dependent	Veteran and Two or More Dependents
	Dol.	Dol.	Dol.
World War II program			
Public Law 346, June 22, 1944, all courses	50	75	75
Public Law 268, Dec. 28, 1945, all courses	65	90	90
Public Law 679, Aug. 8, 1946, all courses	65	90	90
Ceiling on subsistence plus earnings	175	200	200
Public Law 411, Feb. 14, 1948			
Full-time institutional courses	75	105	120
Ceiling on subsistence plus earnings	175	200	200
Public Law 512, May 4, 1948			
On-farm	65	90	90
Ceiling on subsistence plus earnings	210	270	290
Korean Conflict program			
Institutional on-farm[a]	95	110	130

[a]Subject to periodic reduction subsequent to the initial 12 months of training. An amount of $30 per month for tuition and fees is exempt from reduction.

Source: U.S. Congress, House, Committee on Veterans' Affairs, Benefit Levels in Veterans' Programs, by the President's Commission on Veterans' Pensions, Staff Report No. 5, House Committee Print No. 243, 84th Cong., 2d Sess., 1956, p. 10.

type of training while working inadequate farm units or did not otherwise meet the requirements.

A General Accounting Office investigation of institutional on-farm training found laxity on the part of local officials in screening applicants. For example, one case is

cited where the chairman of a veterans' advisory committee in a far Western state admitted that all applications for training were approved by his committee as a matter of course.[1]

Participation in the program by World War II veterans with small, inadequate farms was brought out in Congressional hearings on proposed bills to provide education and training to Korean veterans. During these hearings a question was raised about the resources available to the veteran at the time he started in the course. The supervisor of agricultural education in the state of Mississippi indicated two important sources of funds for veterans getting started farming. Though he emphasized loans from the Farmers Home Administration and other lending agencies, the subsistence allowance received greater emphasis. He stated, "We have required in our state that in order for the veteran to qualify and remain in training, he would have to invest at least the amount of his subsistence into improving his farm, his livestock, his machinery, the building, or buying land."[2]

The House Select Committee to evaluate educational programs for veterans concluded with respect to institutional on-farm training that "many local officials were lax in allowing veterans to enroll when the veterans' farming program

---

[1] Ibid., p. 163.

[2] U. S. Congress, House, Committee on Veterans' Affairs, Hearings, Education and Training and Other Benefits for Veterans Service on or After June 27, 1950, 82d Cong., 2d Sess., 1952, p. 1672.

was inadequate to provide full-time employment and a reasonable income."[1]

The educational levels attained by farm veterans prior to military service indicate that a high proportion of farm veterans could not immediately qualify for professional or college level education if they had so desired. One study which surveyed only farm veterans reports that the typical veteran taking farm training had completed from 9 to 10 years of school.[2] Perhaps more revealing is the fact that 48 percent of the trainees had completed only 8 grades or less. On the other hand, about 25 percent of the trainees had completed 12 or more years of schooling.

Only about 25 percent of the veterans had received vocational agricultural instruction in high school with only 11 percent having received more than two years of such training.[3] This small proportion is not surprising in view of the proportion of all farm veterans who completed high school. This amount of vocational education clearly indicated a need for additional training for the veteran who chose to return to farming. On the other hand, the presence of

---

[1]U.S. Congress, House, House Report No. 1375, p. 4.

[2]Committee on Research in the Education of Farm Veterans, Education of Veterans in Farming, American Vocational Association, Inc., Res. Bul. No. 5, Washington, D.C., 1952, pp. 7, 49.

[3]Ibid., p. 50.

former vocational agricultural students in the training program indicates a lack of rigorous compliance with the eligibility requirements. Except for certain refresher courses, veterans were not authorized to enroll in courses which essentially repeated previous training.

The conclusion is that the education level attained by veterans previous to military service placed rather effective limits on the kind of training appealing to farm veterans.

Magnitude of the program--One would expect that farm reared persons were the persons most likely to enroll in on-farm training. This was found to be true in a national survey of World War II veterans made in 1950. Results of the survey of veterans who took the training and continued to farm show that 93 percent of the veterans were farm reared.[1]

Since most of those taking training were farm reared, it is interesting to compare the number taking this type of training to the number of veterans with farm backgrounds. Seven hundred thousand nondisabled veterans of World War II took institutional on-farm training under P. L. 346 (Table VI-12). This represented over one-half of all farmers and farm laborers who entered the armed services.[2] When all persons who took this type training are included, the percentage is somewhat greater (nearer 57 percent) as

---

[1] Ibid., p. 7.

[2] It has been estimated that about three-fourths of all those veterans who returned to the farm took on-farm training. See U.S. Congress, House, House Select Committee to Investigate Educational, Training and Loan Guaranty Programs Under G I Bill, 82d Cong., 2d Sess., House Report No. 1375, 1952, p. 92.

the above figure does not include 74 thousand veterans who were receiving service connected disability compensation and who were enrolled in the program under Public Law 16.

Table VI-12. Veterans of World War II who entered institutional on-farm training under P. L. 346, cumulative through fall of 1955, total and as a percent of all farmers and farm laborers who were inducted into or enlisted in the army or navy, United States, by region

Region	Number of Veterans Who Entered Institutional On-Farm Training	Enrollees as a Percent of All Farmers and Farm Laborers Who Entered the Army or Navy
	Thou.	Pct.
United States	698[ab]	51.2
New England	7	32.1
Middle Atlantic	25	44.5
East North Central	93	57.0
West North Central	110	44.6
South Atlantic	139	61.9
East South Central	129	54.5
West South Central	124	47.7
Mountain	32	40.2
Pacific	24	31.8

[a]The distribution fails to account for 15 thousand who entered training or about 2 percent of the total.

[b]This total does not include 74,000 W.W.II veterans receiving service connected disability compensation who were enrolled in the program.

Source: Calculated from Table VI-4 , and U.S. Congress, House, Committee on Veterans' Affairs, Veterans' Benefits Administered by Departments and Agencies of the Federal Government, pp. 312-13.

A regional distribution of those taking training shows that enrollments were largest in North Central, South Atlantic and South Central states. (Table VI-12). Perhaps a more meaningful figure for comparison is enrollments as a percent of veterans with farm backgrounds. Almost two out of three veterans with farm backgrounds in South Atlantic states were enrolled in the program. Likewise, more than one out of two were enrolled in the East North Central and East South Central regions. This type of training attracted a smaller proportion of veterans in the New England and Pacific regions.

One might expect a relationship between the proportion of farm veterans taking farm training and the opportunities for farming in a given region. One rather crude indicator of the opportunity or profitability of agriculture is the value of products sold or used per farm. Using this figure as an indicator of opportunities, Table VI-13 shows quite clearly that a higher proportion of veterans took farm training in those regions where opportunities were poorest. Furthermore, where production per farm was greatest, a smaller proportion of veterans were enrolled in the program. Thus, it appears that factors other than opportunities for farming must have been more important in the decision to take farm training.

Some effects of the training--Very little organized information is available on the effects of the training on the productivity of the farm labor involved. Presumably labor productivity was increased by a significant amount.

Table VI-13. Institutional on-farm training enrollees as a percent of all farmers and farm laborers inducted or enlisted in the army or navy during W W II and the average value of all farm products sold or used per farm, 1940 and 1945

Region	Enrollees as a Percent of All Farmers and Farm Laborers Who Entered the Army or Navy	Average Value of All Farm Products Sold or Used Per Farm	
		1940	1945
	Pct.	Dol.	Dol.
United States	51.2	1,309	3,148
New England	32.1	1,793	3,248
Middle Atlantic	44.5	1,727	3,472
East North Central	57.0	1,510	3,437
West North Central	44.6	1,716	4,380
South Atlantic	61.9	915	2,053
East South Central	54.5	604	1,477
West South Central	47.7	1,013	2,420
Mountain	40.2	2,168	5,450
Pacific	31.8	2,647	7,552

Source: Table VI-12 and U. S. Census of Agriculture: 1945, II, General Report, p. 589.

This increased productivity was the result of numerous factors.

As indicated above the training stressed the technical knowledge of agriculture along with planning and management training to enable the trainee to use the new knowledge. Also emphasis was placed on acquainting the veteran with the various institutions serving agriculture with production, marketing, and conservation information and financial assistance. The following quotation indicates the contribution to the training from sources outside the school:

> An unusual amount of cooperation was secured from agricultural organizations and agricultural education agencies outside the schools. Time was usually set aside for instruction furnished by other agencies. A major purpose of the program was to prepare veterans to use wisely the agencies that have been set up for the benefit of farmers.[1]

Examples are available of improved practices being put into use as a result of improved technical knowledge. The state supervisor of education in Mississippi cited the case of increased corn yields in his state. He claimed that in his state the long-time average yield of corn had been 15 bushels per acre. But as a result of a 5-point program which included adequate fertilizer nutrients, knowledge about placement of fertilizer and other technical information, yields were increased to 100 bushels per acre. Yields of over 100 bushels per acre were obtained by over 5,000 students, the

---

[1] Committee on Research in the Education of Farm Veterans, Education of Veterans in Farming, p. 11.

majority of whom were veterans.[1] Although this is probably an unusual example it indicates the possible impact of newly acquired knowledge.

The national study of veterans and their farm training shows yields for major crops for 1949 and 1950.[2] Presumably, the change in yields is associated with improved practices put to use as a result of the training. Yields of some crops in some regions increased 20 to 30 percent for the second year. Other crops in other regions, however, showed a decrease. Different changes in different regions are not surprising in view of the influence of weather conditions on yields and the length of the period studied.

Perhaps more reliable information on the results of improved practices are shown by efficiency factors associated with livestock production since it is less affected by weather influences. In almost all cases and in almost all regions there were measurable positive changes from 1943 to 1950 in the rate of gain for baby beef, steers, hogs, lambs, broilers and turkeys.[3]

The above two paragraphs cannot be considered as conclusive evidence that training promoted improved practices and that the productivity of labor was increased. However, this

---

[1] Committee on Veterans' Affairs, Hearings, Education and Training..., pp. 1650-51.

[2] Committee on Research in Education of Farm Veterans, Education of Veterans in Farming, Appendix Table V.

[3] Ibid., Appendix Table VII.

evidence in addition to the logical connection between new knowledge and supervision of practice supplied by trained instructors strongly suggest that the training increased the productivity of labor involved.

One of the important questions raised about on-farm training is whether it encouraged a substantial number of farm veterans to return to the farm rather than seek alternative employment as their term of military service ended. This is an important question since we are concerned with the forces which move persons to enter or remain employed in agriculture. It is a particularly important question when one considers that there were 1.3 million veterans with farm backgrounds.

As stated above, Table VI-9 shows that the number of farm operators 25-34 years of age decreased by only a very small amount from 1945 to 1950. Furthermore, the decrease was the smallest for any time period shown for 25-34 year olds. The implication is that availability of the training program with the subsistence allowance encouraged farm veterans to return to and remain on the farm at least for the duration of the training. The following statements support this argument.

Previously, it was shown that the training program was most important in Southern states in terms of the number enrolled and as a percent of veterans with farm backgrounds. Historically, per capita incomes in the South have been less than incomes in other regions of the nation. Since subsistence allowances were uniform throughout the nation one

would expect the program to have been more attractive in the South than in other regions.

The way in which the training was conducted provided an additional incentive for entering the program. Although the training was classified as full-time training after passage of P. L. 377, only a minimum of 200 hours yearly were required for participation in the program. The balance of the veterans' time could be spent productively employed on his farm earning other income. There is evidence that the ceiling on the subsistence allowance plus farm earnings kept few veterans from receiving the maximum monthly allowances.

The importance of the subsistence allowance is illustrated by the GAO report. There it was stated that:

> Many veterans admitted that the prime incentive for entering and continuing institutional on-farm training was the subsistence allowance. Although many were interested in the courses of instruction, some stated that they attended classes only to keep from being dropped from the subsistence roles. It was evident and many veterans stated, that they used their subsistence allowances to purchase farms, tractors, trucks, combines, and other farm equipment...rather than for current living expenses as apparently contemplated under the statues.[1]

The importance of the subsistence allowance is also illustrated by the proportion of farmers who took training in comparison to other occupational groups. A special survey of veterans made by the Bureau of the Census which classifies

---

[1]Print No. 160, p. 180.

veterans by occupation shows that a greater proportion of farmers than any other group (51.0 percent) took training. For most other occupational groups, 30 to 45 percent of the veterans used training benefits.[1]

Sam Coile of the Veterans Administration appearing before a congressional committee investigating educational programs expressed this point of view with respect to subsistence allowances:

> I think that certainly there are instances now where, because of the economic status of a veteran or even a community, the amount of subsistence can become a very strong incentive for the pursuit of a course of study by some veterans.[2]

The important point with respect to institutional on-farm training is that to be eligible for the allowance it was necessary for the veterans to be or become engaged in farming. Thus there is the strong presumption that a fairly large number of veterans did remain in agriculture in order to gain the additional income while remaining essentially fully employed.

The subsistence allowance was not the only incentive operating at the time which may have encouraged veterans to return to the farm. Previously it was shown that farm

---

[1]U. S. Congress, House, Committee on Veterans' Affairs, Readjustment Benefits, General Survey and Appraisal, Report on Veterans' Benefits in the United States by President's Commission on Veterans' Pensions, Staff Report 9, Pt. A, House Committee Print 289, 84th Cong., 2d Sess., 1956, p.80.

[2]Committee on Veterans' Affairs, Hearings, Education and Training..., p. 1313.

incomes were very favorable relative to the salvage value of labor during the 1945-50 period, particularly for 1946 and 1947 (See Figure IV-4). Any inclination which the veteran had toward returning to the farm was probably reinforced by his estimate of expected farm earnings. Both the favorable farm earnings of the previous 5-year period and the subsistence allowance no doubt were important for income expectations formulated during this period. And these expectations were almost certain to materialize as a result of the guaranteed minimum income from the subsistence allowance. Hence it is not surprising that about three-fourths of all farm veterans returned to the farm.

Participation in farm training prohibited what has sometimes been referred to as the initial step in movement from the farm. Off-farm work was not encouraged. In fact for World War II veterans, there is evidence that nonfarm work was in violation of the law.[1]

Apparently these regulations were to assure that the veteran had intentions of becoming a full-time farmer or that he was taking training that he would continue to use. If the restrictions were strictly adhered to they no doubt kept some veterans from taking part-time nonfarm work, at least while engaged in training.

---

[1] A. P. Fatherree representing the American Vocational Association during congressional hearings commented that if a veteran reported any income from any source other than from the farm, his training was automatically interrupted. (The membership of the AVA had responsibility for giving on-farm training) See Committee on Veterans' Affairs, Hearings, Education and Training..., p. 1664.

Other Training Programs

The farm veteran was not restricted to institutional on-farm training. He was free to choose any kind of training where he could get accepted by an approved training institution or establishment. This included institutions of higher learning, business schools, elementary and secondary schools, profit and nonprofit vocational schools and nonfarm on-job training.

More veterans of World War II attended schools below the college level than any other type of school (Table VI-14). Institutions of higher learning were next in importance with on-farm training least important for all veterans. For all veterans, on-the-job training exclusive of farm training attracted 9.1 percent of all veterans.

Table VI-14. Veterans who entered training as a percent of all veterans in civil life by type of training for World War II and Korean veterans, cumulative through Fall of 1955

Type of Training	World War II Veterans	Korean Veterans
	Pct.	Pct.
Total entered training	50.6	37.9
Institutions of higher learning	14.3	19.0
Schools below college level	22.7	12.9
Institutional-on-the-farm	4.5	1.7
On-the-job training	9.1	4.3

Source: U. S. Congress, House, Committee on Veterans' Affairs, Veterans' Benefits Administered by Department and Agencies of the Federal Government, pp. 312-15.

The above figures are for all veterans and our interest is in the usage of educational benefits by farm veterans. Published data on type of training by pre-service occupation appear to be nonexistent. Yet an estimate can be pieced together from several sources of data collected for other purposes if we combine enrollments for both World War II and Korean veterans since separate data are not available.

Tabulations from a special survey of veterans made by the Bureau of the Census in October of 1955 show that there were 752 thousand non-disabled veterans who had used any educational benefits and had been classified as farmers and farm managers or farm laborers and foremen prior to their entry into service.[1] Table VI-11 shows that 698 thousand non-disabled World War II veterans had enrolled in on-farm training. In addition to this number 53 thousand Korean veterans had enrolled in similar training making a total of 751 thousand nondisabled veterans who had enrolled in on-farm training by the time of the survey.[2] Furthermore, it has been estimated that 93 percent of all on-farm trainees had been farm reared. This means that for the two periods only about 53 thousand farm veterans had enrolled in other than farm training.

---

[1]U. S. Congress, House, Committee on Veterans' Affairs, Readjustment Benefits, pp. 208-10.

[2]U. S. Congress House, Committee on Veterans' Affairs, Veterans' Benefits Administered by Departments and Agencies of Federal Government, Digests of Laws and Basic Statistics, Report on Veterans' Benefits in the United States by President's Commission on Veterans' Pensions, Staff Report 2, House Committee Print 262, 84th Cong. 2d Sess., 1956, pp. 314-15.

It is possible that the above procedure underestimates the number of farm veterans enrolled in other-than farm training. The estimate does not account for those veterans who dropped from on-farm training and may have reenrolled in some other type training. No estimate of this is available. In any case it appears that nonfarm training in the aggregate was unimportant for farm veterans. Using the above estimate of 53 thousand only about 3.9 percent of all farm veterans used nonfarm training. About 7.0 percent of all farm veterans who used any training used nonfarm training.

However, these low percentages are not without explanation. Only about 25 percent of all farm veterans were educationally equipped to enroll in training above the high school level. On the immediate economic side, favorable relative income and the subsistence allowance provided an incentive to enter farm training. Thus, it is not surprising that few farm veterans entered nonfarm training and that the large majority of them chose on-farm training.

It appears that the hypothesis concerning nonfarm training has small relevance for farm veterans. No doubt certain individuals were able to acquire the type of education required to increase occupational mobility as a result of having been a veteran. Furthermore, some of these veterans probably would have received no more education than they had prior to entering the service if it had not been

for the educational benefits. The lack of relevance for the hypothesis appears from the fact that such a small number of farm veterans availed themselves of the type of education which would enhance occupational mobility.

The Korean Conflict

General Enabling Legislation

Since the G I Bill did not provide for benefits for veterans of the Korean Conflict, the Veterans Readjustment Act of 1952 was enacted to meet the need. Three features of the Act of 1952 made education and training substantially different from that under the G I Bill. First, the duration of education and training was limited to one and one-half times the period of active service with a limit of 36 months.[1] Second, no tuition payments were made directly to schools; instead, subsistence allowances were increased to permit the veteran to pay a part of his own costs. And, third, the section of the act dealing with on-the-job training specified that the subsistence allowance for persons taking institutional on-farm training was to be periodically reduced as the training progressed.[2]

Institutional On-Farm Training

The subsistence allowance--As indicated above the subsistence allowance for on-farm training was to be

---

[1]The G I Bill provided for one year plus the length of service, not to exceed four years.

[2]U. S. Statutes at Large, Vol. LXVI, pp. 663-91.

periodically reduced as the training progressed. Thiswas to account for the increased self-sufficiency expected of the veteran as he progressed through the training period. The periodic reduction was a part of the initial authorization and was to apply from the initial enrollment in the program. As a result of considerable discontent and agitation on the part of the veterans' groups and farm training officials, the law was amended to postpone the quarterly reduction in the allowance until twelve months training had been completed.

The quarterly decrease in the subsistence payment was in contrast to the payment formula under the original G I Bill which applied to World War II veterans. Under that program the level of subsistence was maintained throughout the period of eligible training.

Qualifying for training--Data are not available on the adequacy of farms for providing full-time employment and adequate incomes for operators enrolled in the program. Neither is data available on the pre-service educational attainment of farm veterans. However, two factors lead one to believe that Korean veterans were educationally better prepared and thus could make a wider choice among educational opportunities than was made by World War II veterans. First educational levels had been rising. Probably a more important reason is the fact that Korean veterans were on the average considerably younger than veterans of World War II. This was a result of lower (18 1/2-26 years) draft ages

for Korean veterans than for veterans of World War II. More recent schooling, more years completed prior to service, and less tenuous attachments to a pre-service occupation are all reasons which contributed to a wider choice of educational programs for Korean veterans.

Magnitude of the program--By the fall of 1955, fifty-three thousand Korean veterans had enrolled in on-farm training under P. L. 550. It is not known exactly what percent of farm veterans this represents as data are not available on farmers serving in the armed forces during the Korean Conflict. However, it is clear that a smaller proportion of farm veterans of the Korean Conflict than World War II farm veterans enrolled in farm training. This is obvious from two facts. First, fewer agricultural draft deferments were granted in the 18-26 age group during the Korean Conflict compared to World War II. This means that a larger proportion of this age group had veterans status and thus were eligible for training. Second, only 1.7 percent of the Korean veterans enrolled in farm training under P. L. 550 compared to 4.5 percent of World War II veterans under P. L. 346 (Table VI-14). Thus, a larger proportion of veterans were pre-service farmers but a smaller percent took farm training.

Other Training Programs

The range of programs available to World War II veterans, was also available to Korean veterans. Although the data on Korean veterans are incomplete since all eligible

veterans had not had opportunity to take advantage of training at the time of the report it is clear that Korean veterans showed preference for higher education. The proportion of Korean veterans preferring on-job training and school below the college level was considerably smaller than the proportion of World War II veterans preferring this training.

Conclusions Concerning Different Impacts of the World War II and Korean Training Programs

Although the analysis is incomplete because of lack of data it is clear that there were differences in the educational programs for the two periods. Veterans of World War II who took on-farm training received a full-time subsistence allowance for part-time training. Nonfarm trainees received equivalent subsistence allowances. However, veterans of the Korean Conflict received smaller allowances when taking farm training in contrast to other training. This was a result of the quarterly reduction in allowances.

Veterans of the Korean Conflict had more pre-service education than veterans of World War II. Consequently, Korean veterans had a wider choice of educational benefits from which to choose.

Farming was less attractive as an occupation in the 1950's than in the 1940's. Consequently, a smaller proportion of Korean veterans took farm training. A larger proportion availed themselves of nonfarm training.

Conclusions

The full effects of national war-time manpower policy on labor use in agriculture and on the occupational mobility of farmers are not clear. Yet, hopefully this chapter has provided some insight into the impact of these policies.

Cohort analysis shows entry rates above "normal" for the 1940's for persons under age 35. Analysis in this chapter shows that most of the increase in the number of farm operators came after the end of the war. Therefore, it does not appear to be possible to attribute the increased rates to draft deferments except possibly for persons in the 35-44 year bracket.

It does appear that the increased rates of entry after 1945 can in part be attributed to the on-farm training program. Other factors such as high absolute prices contributed to the increased entry rate. However, the following points support the view that on-farm training contributed to the return of farm veterans to agriculture: (1) variations in importance of the program by region, (2) the value of sales per farm by region, (3) the importance of the subsistence allowance, and (4) reports of various investigating committees.

Allocation of workers to agriculture by noneconomic criteria (the war unit system for deferment) in a semi-controlled economy had the effect of reducing the acquisition price of labor to agriculture. Although farm incomes during 1940-45 were substantially greater than in previous periods

they lagged behind nonfarm incomes. Farm incomes and the MVP of labor were held down by price controls on farm products. The need for draft deferments to supply labor to agriculture is sufficient evidence that economic factors (particularly relative income) were not sufficiently strong to hold labor in agriculture. As a result other means were required to keep labor on farms thereby holding the acquisition price of labor below what its level would have been in an economy without price ceilings, wage controls and manpower directives.

The farm operator who remained on the farm with a draft deferment experienced rising income and he acquired assets while his counterpart was engaged in military service. His counterpart, as a result of legislative action, acquired rights which developed into assets. He acquired the right to job preference upon his return to civilian life, the right to certain loans and the right to education and training at public expense.

Job preference probably had small significance for the veteran who wished to return to the farm particularly if he had been self-employed prior to entering service. Job preference probably worked against the farm veteran who wanted to enter nonfarm work on his return from service as the preference system consisted of rights of re-employment at the pre-service job. This feature also undoubtedly worked against nonveterans in agriculture who wanted to transfer to nonfarm jobs at the close of the war.

Education and training benefits provided an opportunity for veterans to secure additional training and formal education at public expense. These benefits enabled the veteran to acquire additional training for his pre-service occupation or for education to enhance occupational mobility. Far more farm veterans chose the first alternative in preference to occupational mobility.

With due respect for the individual veterans' job preference and his right to take the training of his choice, it appears that many mistakes in choice of job training were made particularly in view of subsequent price and income developments in agriculture. These mistakes appear to have resulted from lack of occupational guidance and information and from the general lack of knowledge of the movements of farm and nonfarm incomes. Furthermore, it is difficult to believe that many veterans could have correctly foreseen the declining need for labor in agriculture, the overproduction at acceptable prices and the depressed farm incomes of the 1950's.

Although data are insufficient for firm conclusions, it is the opinion of the author that training taken by Korean veterans did considerably more to enhance occupational mobility for farm veterans than training taken by farm veterans of World War II. Furthermore, the training taken by the large majority of World War II veterans with farm backgrounds may have even retarded occupational mobility as persons became tied to an occupation and to farm assets.

This last argument has been expressed as follows by Guy H. Birdsall, Assistant Administrator for Legislation, Veterans' Administration, in an appearance before the House Committee on Veterans' Affairs, February 7, 1952:

> It cannot be doubted that this program has played a major role in keeping farm veterans on the farm, thereby checking to some extent the historic trend of migration from farm to city.[1]

One aspect of national manpower policy which is difficult to gauge except in a general way yet which without doubt has had an impact on the rate of entry into agriculture since the Korean Conflict is the "threat" of military service faced by most farm youth. No doubt the "threat" has encouraged enlisting and volunteering for the draft. On the other hand, farm boys have been drafted into peace-time service. This breaking-away from home surroundings and the resulting acquaintanceship with nonfarm life has probably had some influence on occupational choice and has probably decreased the rate of entry into agriculture.

---

[1] Committee on Veterans' Affairs, Hearings, Education and Training..., p. 1243.

CHAPTER VII

SUMMARY AND CONCLUSIONS

The general objective of this thesis was to describe and analyze the flow of labor resources between the farm and nonfarm sectors of the nation for the 1917-62 period. Additional objectives were to examine specific governmental policies as to their effects on labor flows. The specific policies examined were federal credit to aid individual farm development and national manpower policy and related educational programs since 1940.

Chapter II consists of an exposition of the theoretical model and its application to labor. Acquisition costs and salvage values on an annual basis were defined for both hired and operator labor for 20-25 and 40-45 year olds for the industry, the firm and the enterprise.

Between sectors, acquisition cost computations for hired labor are based on the nonfarm wage rate for hired labor. Acquisition cost computations for operator labor are based on the nonfarm wage rate, i.e., the largest available nonfarm wage appropriately adjusted upward for transfer costs. (See p. 53 for definitions for other levels.)

For the agriculture sector, the salvage value of both hired and operator labor is based on the highest net wage which a person employed in the farm sector could get in the nonfarm sector in available jobs.

Acquisition costs and salvage values for a specific age and skill class of labor differ at a point in time. This is a consequence of transfer costs, differences in available jobs, employment uncertainty, etc. When the total labor force is considered, additional factors contribute to the spread between acquisition costs and salvage values. Acquisition costs apply to new or potential entrants. The characteristics of new entrants (particularly operators class) consisting largely of young farm males are important in acquisition cost calculations. Salvage values apply to workers currently in agriculture. Age, experience, education, and skill are important factors in computations. Thus, one set of characteristics determines salvage value for labor on farms while the other set determines acquisition costs for labor from the nonfarm sector or for new entrants from the rural population.

Despite numerous series, there appears to be no entirely satisfactory measure of the number of persons who depend upon agriculture for the major portion of their living or of the labor input in agriculture. With this limitation in mind three different measures, farm population, the farm labor force, and labor requirements were used as indicators.

Since 1920 the farm population decreased 17.7 million persons; the farm labor force decreased 6.7 million persons; and labor requirements fell by 14.9 billion man-hours. These changes occurred as farm output almost doubled. A comparison of two periods of equal length, 1920-39 and 1940-59, shows that most of the decrease has occurred since 1940

as illustrated by the following figures: for the first period, the farm population decreased 3.5 percent, the labor force 15.6 percent and labor requirements 13.8 percent. For the second period the decreases were 45.7 percent, 33.1 percent and 49.7 percent respectively.

Despite unfavorable relative incomes for farmers throughout most of the 1917-62 period, an analysis of labor flows by 5-year periods shows contrasting movements during different periods. In the short run (5-year periods), the flow of labor from the farm has not been continuous nor have movements as measured by the three series been of comparable magnitude.

To utilize the theory presented in Chapter II, a time-series believed to represent the expected salvage value of farm labor was constructed. The series was developed from the average annual wage per employed factory worker and the industrial unemployment rate. Intersectoral labor flows expected on the basis of movements in the constructed series were found to be quite consistent with labor flows which did occur.

Regression analysis which utilized a variation of the expected salvage value series indicated that the series was a significant and useful variable in "explaining" family labor employment on farms. Thus, the salvage value concept is helpful in explaining intersectoral labor flows. The concept appears to be useful in understanding the current economic organization of agriculture, especially the tendency

for labor to remain in agriculture, despite low returns.

A comparison of the expected salvage series with information from other sources suggests that the series is indicative of changes in the level of salvage value but that the series probably overestimates the absolute level of salvage value. If this is the case, the series probably represents a sort of upper limit to expected salvage value and is applicable to younger (under 35), better educated farm workers. Other studies, OASI data in particular, suggest that the salvage value of the labor services of older workers may be as much as 30 to 40 percent below this upper limit.

The expected salvage value series as derived was also believed to be fairly representative of the acquisition cost of farm operators and workers. This follows from the fact that the majority of workers enter agriculture before age 35. Further, there is small difference between acquisition costs and salvage value for labor at the time of entry into agriculture.

Asset fixity theory which utilizes the relationships between acquisition costs, marginal value products and salvage values for inputs was found to imply the kinds of adjustments in labor use which have occurred over the past 45 years. The amount of labor used on farms has declined least on the larger (as measured by value of products sold), better managed farms where the marginal value product of labor is large relative to other farms and it has declined most on smaller farms particularly those with less than $2,500 of

sales. Farm operator labor has decreased least in the upper economic classes of farms. Off-farm work by operators in this group has been less important and has increased less than for operators in the lower economic classes. Also, hired labor has decreased less on the larger farms.

The analysis of labor movements, by age-groups, shows that the decline in number of farm operators has involved operators of all ages. However, it appears that adjustment to rising wage rates has involved reduced entry rates more than increased withdrawal rates. It appears that more operators or potential operators under 35 than over 35 have made the shift from farming to other occupations. Younger operators have more alternatives to choose from as they may have both higher on-farm and higher potential off-farm labor earnings than older workers have. Older workers may have low earnings on the farm but their potential off-farm earnings (salvage value) is less and thus they remain on farms. They become "trapped" on farms because the marginal value product of their labor is greater than their salvage value off the farm.

It should be pointed out that older workers may have low farm earnings not necessarily because of age and physical impairment but because of inadequate size of farms, other limited capital resources and inadequate education and managerial ability. The latter two factors may contribute to low salvage value. Also important are the discriminatory hiring practices for older workers which are practiced by

industrial firms. These practices determine the types of nonfarm jobs and consequently wages available to older workers.

Information about the salvage value of farm labor is helpful in explaining why labor remains on farms despite low earnings. However, it does not explain the continued overcommitment of labor to agriculture. Very limited knowledge about product price expectations held by farmers indicates that they tend to overestimate prices more frequently than they underestimate them. This leads to overestimation of expected farm incomes and to mistakes of overcommitment of labor to agriculture.

To gain certain additional but limited information on institutional factors affecting entry into agriculture as well as withdrawal, Chapter V was directed toward analysis of certain federal credit programs while Chapter VI consists of an analysis of national manpower policies specifically influencing agriculture.

The major objective of Chapter V was to determine the effect of federally provided credit for farm operation and ownership on entry into agriculture and on retaining persons in farm employment. Although persons involved in loan programs represent a relatively small proportion of all farm operators, the policy of dealing mostly with younger operators makes it possible for this type credit to have a fairly significant effect on entry rates provided all persons receiving loans remain employed on the farm. The major conclusion of this section was (1) that loans for farm operation

probably increased family labor employment in the short run but (2) that in the long run, loans of this type probably had only a small effect on farm employment. Although the program appears to have an effect on which farmers remain in agriculture, in the long run, federally supervised credit probably contributed to the decline in number of persons employed on farms.

Since the passage of the Selective Service Act of 1940, national manpower policy and veterans' benefit programs appear to have had a significant impact on farm employment. Agricultural draft deferments during World War II determined which farm youth remained on farms but they did not maintain entry rates for farm operators under 35 years of age. The data for 1940-45 shows a larger decline in the number of operators under age 35 than during previous periods. Since the effect of the Tydings Amendment was to "freeze" agricultural workers on jobs, apparently a major part of the decrease occurred prior to passage of the Amendment. Thus, the Amendment served to halt a further decline which would probably have occurred. Also, there is some indication that deferment policies for 30-37 year old farm males actually increased entry rates during the 1940-45 period for persons in that age group.

Agricultural draft deferments during the Korean Conflict were less important as a source of labor to agriculture during the early 1950's than draft deferments were during World War II. This was a result of less severe farm labor

shortages and of less liberal draft deferment policies during the Korean Conflict.

Following World War II, more than one-half of all veterans of that war with farm backgrounds enrolled in some type of educational program provided under authorization of the "G I Bill of Rights." Of the total number of nondisabled veterans with farm backgrounds over 51 percent enrolled in institutional on-farm training. This is in sharp contrast to only about four percent of the group enrolled in other-than farm training. Relatively favorable farm earnings, the subsistence allowance received while in training which could be received in addition to farm income, and inadequate educational background for higher education appear to be the factors which account for the farm veterans preference for farm training following World War II.

Changes which occurred during and after the Korean Conflict provided additional evidence that the above factors were important in influencing veterans to enroll in on-farm training in preference to other training. As Korean veterans returned from service and took advantage of educational benefits, farm incomes were less favorable, also subsistence allowances were less favorable for farm training compared to other types of training inasmuch as allowances were periodically reduced as the training progressed. In addition, Korean veterans were younger and better prepared as a group to enroll in institutions of higher learning than were veterans of World War II.

Our general conclusion is that the type of training taken by the majority of veterans of World War II with farm backgrounds probably hindered or at least did not facilitate occupational mobility. However, the type of training taken by Korean veterans with farm backgrounds probably had the opposite effect. In any case the operation of the training program following World War II appears to have encouraged veterans who had been in the farm labor force prior to military service to return to and remain on the farm, at least for the duration of the training period.

Although supporting evidence is admittedly fragmentary, we have reached the following incomplete conclusions as to how the programs examined contributed to the overcommitment of labor to agriculture in the period under study.

It is clear that relative income is an important factor in the decision to remain employed in agriculture. It follows that expected relative income is an important factor in the decision to enter farming. Available data on expected product prices appear to suggest that farmers overestimate product prices and thus overestimate expected incomes in agriculture. Then occupational choices based on overestimated farm income turn out to be mistakes of overcommitment of labor to agriculture.

Changes occurring in the general economy aggravate and reinforce the mistakes of overcommitment. Even if farmers correctly estimate both farm and nonfarm incomes when they

are evaluating relative incomes prior to occupational choice it is doubtful that they can foresee the trend in incomes that results from economic development. With the relative decline in demand for farm products one can expect farm incomes to decline relative to incomes in other occupations unless adjustments in resource use occur at precisely the right pace, however, it is doubtful that the average farmer can forsee this.

Thus decisions as to the appropriate amount of labor to commit to agriculture in the aggregate depend upon either perfect foresight of the trends in farm and nonfarm incomes or the ability to adjust once incorrect decisions have been made. Perfect foresight appears unlikely and our findings emphasize some of the difficulties of adjusting resource use.

High absolute prices during certain periods, overestimated expected product prices, manpower policies and subsequent educational programs, and federal credit policies all appear to have had some part in getting persons into agriculture. In addition to these factors the competitive structure of agriculture with essentially unrestricted entry probably has contributed to the overcommitment.

There are few if any other occupations easier to enter than agriculture. The excess of births over deaths within the farm sector provides a readily available supply of new entrants. The attraction of self-employment along with no formal education or skill requirements contributes to the ease of entry. Capital requirements also are not

large for small-scale farm operation. However, operation of a farm which provides an adequate income by modern standards is another story. Education, managerial skill and capital requirements are substantial. Yet, these requirements appear not to deter persons from entering farming who possess inadequate amounts of any or all of the requirements.

The labor flows to and from the farm sector observed since 1917 do not support the hypothesis sometimes put forth that farm operators are not responsive to pecuniary benefits and that it is their attachment to nonpecuniary rewards which explains the overcommitment of labor to agriculture. No doubt non-monetary returns are important considerations for many farm operators but the timing and variation in magnitude of the out-movements from agriculture clearly indicate that labor flows respond to relative income changes. When labor is disaggregated and relevant relative earnings are considered for each subclass of labor, i.e., when acquisition costs and attainable salvage values are considered, observed behavior appears more rational from a pecuniary viewpoint.

We have not been entirely successful in explaining the overcommitment of labor to agriculture during certain periods. Neither has the analysis entirely accounted for the greatly increased withdrawal rates during the 1950's. High entry rates may in part be explained by the availability of high school vocational agricultural training in rural areas and the relative unavailability of industrial

vocational training in rural school systems. Availability of vocational training appears to warrant study as to its effects on entry rates.

For the 1950's an analysis of the effects of Social Security coverage for self-employed persons would improve our understanding of increased withdrawal rates. Also, the effects of Public Law 78 under which Mexican nationals have been imported for labor on U. S. farms are not clear.

APPENDIX A

Appendix A is a description and critical analysis of sources of time-series estimates of labor used in agriculture. Seven different series which are designed to estimate farm operator labor, unpaid family labor, hired labor, and labor requirements are included.

Sources of Time-Series Estimates of Labor Used in Agriculture

National historical data are available on labor used in agriculture from at least seven sources. These sources provide different estimates, some for presumably the same components of the labor force. These estimates vary because of different definitions and concepts used in determing who is included in the farm work force. Estimates also differ as a result of the methods used in collecting data. The purpose of this appendix is to describe each series of data so that it is clear who is included, what is measured and how basic data are obtained.

Description and Brief Analysis

Bureau of the Census, Census of Population

The decennial census of population conducted by the Bureau of the Census provides estimates of the farm population for census years, only. Data are collected from households which are classified as urban or rural households depending upon location of the place of residence. For the 1960 census the urban population consisted of all persons living in:

(1) places of 2,500 inhabitants or more incorporated as cities, boroughs, villages and towns (except towns in New England, New York and Wisconsin);

(2) The densely settled urban fringe, whether incorporated or unincorporated, of urbanized areas;

(3) towns in New England and townships in New Jersey and Pennsylvania which contain no incorporated municipalities as subdivisions and have either 25,000 inhabitants or more or a population of 2,500 to 25,000 and a density of 1,500 persons or more per square mile;

(4) counties in states other than the New England states, New Jersey, and Pennsylvania that have no incorporated municipalities within their boundaries and have a density of 1,500 persons or more per square mile; and

(5) unincorporated places of 2,500 inhabitants or more.[1]

The population not classified as urban consists of the rural population which is further subdivided as rural farm and rural-nonfarm populations. The rural-farm population consists of persons living in rural territory on places of 10 or more acres from which sales of farm products amounted to $50.00 or more in 1959 or on places of less than 10 acres from which sales of farm products amounted to $250 or more in 1959.[2] If value of sales was at least the amount specified for that size of place the household was reported as living on a farm. Rural households not meeting the above requirements were classified as rural-nonfarm. Persons living in households who paid rent for the house but their rent did not include any land used for farming were classified as rural-nonfarm.

Essentially the procedure for determining the farm population in 1960 was to first determine whether the household

---

[1] U. S. Bureau of the Census, U. S. Census of Population: 1960, General Social and Economic Characteristics, United States Summary, Final Report PC(1)-1C, p. vii.

[2] Ibid.

was located on a piece of land or place which met the requirements to be called a farm. After establishing that the household was located on a farm all members in the household were counted in the farm population irrespective of occupation or attachment to work in agriculture. However, the above procedure was more restrictive than was applied for the 1950 census. For the 1950 census farm-nonfarm residence was determined by the respondent's answer to the question, "Is this house on a farm (or ranch)?" However, the 1950 instructions to the enumerators specified that "persons on farms who paid cash rent for their house and yard only were to be classified as nonfarm.[1]

Application of the more restrictive criteria for determining the rural-farm population in 1960 led to substantial reductions in the farm population. Comparisons have been made of data collected by the Current Population Survey using both the old and new definitions of the farm population. These data show that the change in definition resulted in a net reduction of 4.2 million persons on farms or about 21 percent of the farm population under the old definition.[2]

The procedure for determining the farm population in the Census of 1940 and in the Census of 1930 was practically

---

[1] Ibid., p. viii.

[2] U. S. Bureau of the Census and U. S. Department of Agriculture, AMS, Farm Population: Effect of Definition Changes on Size and Composition of the Rural-Farm Population: April 1960 and 1959, Series Census-AMS (P-27), No. 28, April, 1961, p. 2.

the same as for the 1950 Census.[1] As in 1950 the decision as to whether the household was on a farm was mainly the responsibility of the householder. For the census of 1920 which is generally considered as the beginning of the series of census data on farm population the decision for classifying the household was left to the judgment of the enumerator with no explicit criteria specified.[2]

Current annual estimates of the farm population which supplement decennial estimates are available since 1940. Recent estimates of the farm population have depended upon data collected by the Current Population Survey (CPS) conducted by the Bureau of the Census. The CPS collects data on a probability sampling basis which utilizes a rotating sample with trained interviewers. Data are collected through interviews with 35,000 households in 330 primary areas of the nation.

The Bureau of the Census utilizes the same procedures for both the CPS and the decennial census in determining who is to be included in the farm population with one exception. The CPS enumerates unmarried persons attending college away from home as residents of their parents homes. The decennial population census enumerates such persons as residents of the communities where they are attending college.[3]

---

[1] U. S. Bureau of the Census, Farm Population, 1880-1950, by Leon E. Truesdell, Tech. Paper No. 3, (Washington, D.C.), 1960, p. 4.

[2] Ibid., p. 2.

[3] Vera J. Banks, Calvin L. Beale and Gladys K. Bowles, Farm Population Estimates for 1910-62, U.S. Dept. of Agriculture, ERS, p. 10.

Thus, the CPS classifies a larger number of college-age persons as farm residents than would be classified under decennial census procedures.

To recapitulate, estimates of the farm population which have been developed by the Bureau of the Census are available from the decennial census. Since 1940 annual estimates are available from the Current Population Survey. Data is collected from households which are included in the farm population if the household meets certain specifications. Persons residing in included households are counted in the farm population irrespective of their occupation or participation in the work force.

Statistical Reporting Service, Farm Employment Series

This series consists of estimates of annual average employment on farms from 1910 to date and monthly estimates from 1940 to date for the U. S. and for the nine major geographical divisions of the country. Separate estimates are available for family workers and hired workers. Although not reported separately family workers consist of farm operators and family members other than operators.

The Statistical Reporting Service (SRS) uses the following criteria to determine who is engaged in farm employment.[1] A farm operator is counted as employed in the farm work force if he spends one hour or more during the

---

[1]Taken from U.S. Department of Agriculture, Major Statistical Series of the U.S. Department of Agriculture, Vol. 7, Farm Population, Employment and Levels of Living, Ag. Hbk. No. 118, 1957, p. 8.

survey week at farm work or chores or in the transaction of farm business. Unpaid family workers are members of the operator's family who did 15 or more hours of farm work or chores during the survey week. Hired workers include all persons working one or more hours for pay during the survey week. Further specification is required to classify certain family members working for pay and for sharecroppers.

If a member of the operator's family receives wages he is counted as a hired worker or if he works part-time as an unpaid family worker and part-time as a hired worker he is counted as a hired worker. Sharecroppers are considered family workers when working their own plots but hired workers when working off their plots.

The Statistical Reporting Service of the U. S. Department of Agriculture collects the data which are used to construct the farm employment series. About 15,000 to 20,000 mailed questionnaires are returned every month from a sample of farmers who serve as voluntary crop reporters. Farmers report the number of workers employed on their farms during the survey week.

Essentially, the method used for estimating employment has two parts. The data which are collected from the voluntary crop reporters are used to determine average employment per farm by class of workers. Then, average employment per farm is applied to an estimate of the number of farms to determine total farm employment.[1]

[1] For more detail on the method see Ibid., pp. 10-11.

The Statistical Reporting Service recognizes that data which it collects are subject to bias because the mailing list is not a cross sectional sample of all farms. Also, more progressive farmers who presumably employ more labor tend to respond more frequently than do operators of smaller farms.[1] Therefore, the data received from farmers are adjusted to account for the bias. However, the SRS does not make clear in published material how the adjustments are determined.

It is obvious in evaluating this series that the estimates of farm employment are far from an exact measure of labor used in agriculture. Data which are collected from establishments (farms) permits an undetermined amount of double counting of workers. If a hired worker is employed on two or more farms during the survey week he would be counted two or more times. Both part-time and full-time workers are enumerated without distinction as long as they meet the minimum specifications. Because of the concepts involved it is erroneous to conclude that workers included in this series depend on agricultural employment for all or even a major part of their income.

The SRS series could be characterized as providing an estimate of the number of jobs which were filled during the survey week. But these jobs are enumerated without regard to the numbers of different workers filling the positions or the amount of time each worker contributed.

---

[1] Ibid.

Despite deficiencies which have been discussed the SRS series does count workers missed by other series. The series enumerates an undetermined number of migrant workers who would be unaccounted for in the household survey conducted by the Bureau of the Census. Also, the SRS series includes workers regardless of age where the Bureau of the Census series does not include workers under 14 years old. Furthermore, for historical work, the SRS series is the only continuous annual series from 1910 whereas other series were begun about 1940 or later.

U. S. Census of Agriculture

The most detailed farm labor data and associated characteristics of farms and farm organizations are available from the U. S. Census of Agriculture. With some variation with respect to type of data, the data are available at 5-year intervals from 1935 to 1959.

Data on farm labor relate to the number of workers during a specific week. In some cases the week was specified as the week proceeding the enumeration. In other cases the specified week has been a selected week which did not vary as the enumeration proceeded. Due to the seasonality of farm work, variation of the week for which the enumeration was made means that data from one census are not fully comparable to data from another census.

The labor data published by the Census of Agriculture are collected from and apply to establishments or farms in

contrast to household data. In collecting the data the procedure is to establish that the farm meets the specifications to be counted as a farm, assign one operator to the farm, and enumerate additional laborers if the minimum specifications are met.

The definition of a farm has undergone several changes since detailed labor data have been collected from farms.[1] The most recent change was to make the concept of the farm population more comparable between the agricultural and population censuses. The definition used for the 1960 Census of Population coincided with the definition used for the 1959 Census of Agriculture with one exception. For the Census of Agriculture places were included as farms which did not meet the minimum estimated sales requirement if they could normally be expected to produce agricultural products in quantity to meet the requirements.[2] The exception applied particularly to farms affected by crop failure or other unusual circumstances.

Information on farm labor is reported separately for operator, unpaid members of the operator's family, and hired labor for the 1945 Census and subsequent Censuses. For the Census of 1935 and 1940 information was reported separately for only family workers and hired workers.[3]

---

[1] U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Intro. xxvii.

[2] Ibid., p. xxvi.

[3] U. S. Bureau of the Census, U. S. Census of Agriculture: 1954, II, General Report, Statistics by Subjects, Chap. iv, p. 233.

For the 1959 Census of Agriculture operators of farms were enumerated as working if they did one or more hours of farm work during the specified week. Members of the operators family who worked as unpaid laborers were included if they worked 15 or more hours during the specified week. Apparently there was no minimum specification for hired workers. All were classified as regular or seasonal workers on the basis of whether they worked more or less than 150 days during the year.

Information on hired labor is far more detailed and comprehensive than data on operator and family labor for the 1950, 1954 and 1959 censuses. Data for hired labor are presented on wage rates and hours worked by basis of payment. Data consists of numbers of workers in each category, the wage rate and average number of hours worked.

An evaluation of the Census of Agriculture data on agricultural labor includes several points the first of which is obvious. Data are available for only every fifth year and as stated previously, variation in the week for which the data are collected results in data which are not fully comparable from one census to the next. Because of the seasonality of farm work there is considerable fluctuation in the number of persons in the farm work force. Within the farm work force seasonal fluctuation is greater for hired labor than for unpaid family labor. Both classes fluctuate

more than operator labor.[1]

As in the SRS series criteria for deciding who shall be counted in the farm work force does not apply equally to all workers. However, the Agricultural Census in contrast to the SRS series does provide detailed information on the amount of labor contributed by hired laborers, at least for those who were working during the week specified for the enumeration.

Since these data are establishment data double counting of workers is possible for hired workers who were employed on two or more farms during the survey week. It is also not inconceivable for operator and unpaid family labor to be counted more than once when working off the home farm for pay during the survey week.

Monthly Report on the Labor Force (MRLF)

Monthly data on farm employment have been collected in the Current Population Survey conducted by the Bureau of the Census. These data are available monthly and in an annual summary from 1940 to date. The probability sampling method, which is used to collect labor force as well as population data has been described above.[2]

Prior to July 1, 1959 the employment results of the CPS were published in the Monthly Report on the Labor Force

---

[1]U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subject, Chap. iv, pp. 229-30.

[2]Supra, p. 327.

issued by the Bureau of the Census. Since that date interpretation and publication of the data have been the responsibility of the Bureau of Labor Statistics. The BLS publishes the data in the monthly issues of Employment and Earnings.

For the MRLF series workers are classified according to industry and occupation. A worker is included in the industry and occupation in which he works the most hours during the survey week. Thus, a worker is counted only once. Workers under 14 years of age are not counted in the regular survey.

To be included in the labor force a person is counted as employed if he worked for pay at all. An unpaid worker is counted as employed if he worked 15 hours or more during the survey week.

In the MRLF series the farm labor force is classified as comprising two major occupational groups. These consist of (1) farmers and farm managers, and (2) farm laborers and foremen. Within the agricultural industry workers are classified as: (1) wage and salary workers, (2) self-employed workers, and (3) unpaid family workers.

In interpreting the differences in estimates of the farm work force given in the MRLF and the SRS series it is necessary to consider the following points: (1) the CPS is on a sound probability sampling basis and trained, supervised persons conduct the interviews in contrast to SRS estimates based on mailed-in information from voluntary crop reporters,

(2) family workers under 14 are included in the SRS series if they work 15 or more hours during the survey week where they are not included by the CPS, (3) workers are counted only once in the CPS whereas they may be counted more than once in the SRS series, and (4) the CPS household survey omits migratory workers not maintaining a household at the time of the survey.

Johnson and Nottenburg have made a critical analysis of the SRS and MRLF estimates of farm employment.[1] In evaluating the SRS series they state that "the definition of farm employment used and the method of obtaining the data used in the BAE series makes it impossible to derive an estimate that is satisfactory for the most frequent uses of farm employment estimates."[2] However, they believe that the MRLF estimates are more useful. They state that "the MRLF estimates...the number of people dependent upon agriculture for their major activity. This, we believe, is an estimate useful for many policy and research purposes."[3]

To this point four different sources of time-series estimates of labor used in agriculture have been described

---

[1]The currently designated SRS series has been previously labeled as the Agricultural Marketing Service (AMS) series and the Bureau of Agricultural Economics (BAE) series.

[2]D. Gale Johnson and Marilyn Corn Nottenburg, "A Critical Analysis of Farm Employment Estimates," Journal of the American Statistical Association, xlvi, June 1951, p.204.

[3]Ibid., pp. 204-5.

and compared. These series are the major sources of data on a national basis for all classes of workers. The three remaining series are more specialized as to workers included, what they measure, or areas covered in the U. S.

Hired Farm Work Force (HFWF)

In all but two years since 1945 the Bureau of the Census through the Current Population Survey has collected detailed data for the Economic Research Service of the Department of Agriculture on the hired farm work force. The data are reported along with some analysis in an annual economic report by the ERS.

The information on the hired farm work force is collected on a special schedule which is a part of the monthly Current Population Survey. For 1962 the data on the HFWF were collected as a part of the December 1962 CPS.

Here it is not necessary to describe the method by which the data are collected since the data are collected on a schedule which is an extension of the CPS. If the response to a question in the regular monthly survey indicated participation in farm work for wages, information was collected on the special schedule on hired farm wage work.

Data which are collected refer to all persons 14 years of age and over who reported any farm wage work during the calendar year and who were in the civilian noninstitutional population during the survey week. Data is obtained on the number, characteristics, employment, and earnings of persons who did farm wage work at any time during the year.

As a measure of the total labor input by hired workers this series has two notable omissions. Workers under 14 years of age are omitted, and there is some evidence that this group makes a fairly substantial contribution to the total labor input in agriculture. As a part of the 1961 survey of the HFWF a special set of questions was included to determine the importance of this omission. It was found that 364,000 persons 10 to 13 years of age did wage work during 1961.[1] Within this group of children 257,000 persons worked less than 25 days during the year at farm wage work while 107,000 reported more than 25 days of farm wage work in 1961.

The second group of omitted workers consists of foreign nationals who have returned to their native country at the time of the survey. Migratory workers are included in the survey if they are at their households in this country during the survey. However, the survey is taken near the end of the calendar year when use of hired labor is at or near a minimum. Thus, many foreign nationals have returned to their native country.

Bureau of Employment Security Series (BES)

The Bureau of Employment Security of the U. S. Department of Labor has collected and published data on seasonal hired agricultural labor since 1953. This series

---

[1] Samuel Baum, Reed E. Friend, and Robert R. Stansberry, Jr., The Hired Farm Work Force of 1961, p. 20.

published in Farm Labor Market Developments covers only a short time and is more specialized than other series.

Information on seasonal hired farm workers is received by the BES semi-monthly from 272 agricultural reporting areas throughout the country.[1] Reports contain estimates of seasonal hired employment by crop activity and origin of workers. Employment estimates relate to the last normal working day of each report period.

Estimates in the BES series do not cover all seasonal hired farm workers or all of the U. S. Reports are received only from those areas where seasonal hired labor is relatively important. A report for an area is required for the first through the last semi-monthly period if any of the following criteria are met:

(1) 500 or more seasonal hired farm workers are employed,

(2) a shortage of 100 or more seasonal farm workers exist,

(3) a surplus of 100 or more seasonal farm workers available for other area exists, or

(4) foreign workers legally admitted to the United States for temporary farm work are employed.[2]

---

[1] U. S. Bureau of Employment Security, Farm Labor Market Developments, January 1963, p. 34.

[2] Ibid.

The BES defines seasonal hired workers as those who are hired or assigned to work on any one farm or establishment for less than a continuous 150 day period in the course of a year.

The procedure used by the Michigan State Employment Service is an example of how the BES estimates of seasonal farm employment are made. These estimates are not obtained from formal periodic sampling of employers or workers but are built up from numerous sources of information.[1] State estimates of in-season employment are developed from these sources of information and from reports made by Farm Placement Specialists in each assigned sub-area of an agricultural reporting area.

From this list of sources of information it would appear that current estimates of seasonal employment are based on employment during the previous year, but are modified by changes observed by placement specialists in the

---

[1] F. M. Mitchell, Chief, Employment Service Division (Michigan) reported in a letter dated March 10, 1964 that the following sources of information were used in making estimates:

Previous Years In-Season Farm Labor Reports
Special Surveys affecting mechanization, labor turnover, unit labor requirements, etc.
The Census of Agriculture
Michigan Agricultural Statistics
USDA Statistical Reporting Service Reports
Beet and Pickle Industry Reports
Employer Record Files
Job Orders placed during the past season
Observation Analysis of Penetration of Placement Services
Applicant Registrations
Migratory Labor Employment Records
County Agricultural Agents
Horticultural Society Offices

area and by special surveys taken at various times. Factors which affect the estimates are observed changes in the supply of agricultural labor and changes in demand for workers due to changes in mechanization, weather, and crop conditions.

No statistical measure such as the standard deviation is available in appraising the reliability of BES estimates of seasonal farm employment. In using this series the extent of coverage of the U. S. and the procedures used for making the estimates should be kept in mind.

From the data reported in the BES series it is possible to get a rough estimate of the total man-months of labor supplied to agriculture by seasonal hired workers. It is also possible to estimate the man-months of labor by crop activity. Although wage rates are reported, it is not possible to determine the annual earnings of seasonal workers from these data since workers move into and out of the agricultural work force from one month to the next. It is necessary to rely on estimates made by the Economic Research Service of the USDA and reported in the HFWF reports discussed in the section above for estimates of annual earnings per person.

Man-Hours of Labor Used for Farm-Work Series

The final series to be discussed here is not an estimate of the number of persons employed in farm work. It is an annual estimate of the number of man-hours required to produce aggregate farm output. Thus, it is not an observed

measure of the total labor input in agriculture but an aggregate developed from observed data. This series is available by geographic division from 1919 to date and for the U. S. from 1910 to date.

Construction of the series of man-hours required or used consists of two basic steps. The first step consists of determining representative labor requirements for individual farm enterprises per acre of crops and per head or per unit of production of livestock. The second step consists of multiplying the per unit labor requirements by the appropriate number of units of production. The units of production are the official estimates of acres and numbers reported by the Agricultural Estimates Division of the Statistical Reporting Service. For determining man-hours required for crops, work requirements are determined for pre-harvest and harvest activities. Hours for pre-harvest work are applied to acres planted; hours for harvest work to acres harvested, only. After man-hours are determined for each enterprise, these subtotals are summed over all enterprises to get the aggregate labor requirements.[1]

It should be recognized that this series is not a measure of workers on farms. It is an estimate of the amount of labor required under "average" circumstances to produce the total agricultural output.

---

[1]For more detail see U. S. Department of Agriculture, Major Statistical Series of the U. S. Department of Agriculture, Vol. 2, Agricultural Production and Efficiency, Ag. Hbk. No. 118, 1957, p. 14.

Further Analysis and Comparison of Time-series Estimates

The SRS, MRLF and labor requirements series are all available on an annual basis from 1940 to date. Figure A-1 shows that these three series have roughly parallel movements over time. For the 1940-62 period the simple correlation between the SRS and the MRLF estimates of the total agricultural labor force was .95. A comparison of these two series with the labor requirements series shows that the labor requirements series had slightly higher correlation (.99) with the MRLF series than with the SRS series (.96).

A linear regression with time as the independent variable and total workers as the dependent variable estimates the average annual trend in number of workers in agriculture. Table A-1 summarizes the results of trends in the different series. For the period 1940-62 both the SRS and MRLF series show approximately the same trend. Each series shows that the total agricultural labor force decreased about 200,000 workers per year. Comparison of the 1940-62 trend with the longer-term 1917-62 trend shows that the number of agricultural workers has decreased at a more rapid rate during the more recent period. Using the SRS series the 1917-62 trend shows an annual decline of 154,574 workers compared to an annual decline of 199,771 workers for the 1940-42 period.

The total labor requirements series was converted to a full-time worker equivalent basis with 2,500 hours considered as full-time annual employment for a worker. The trend in

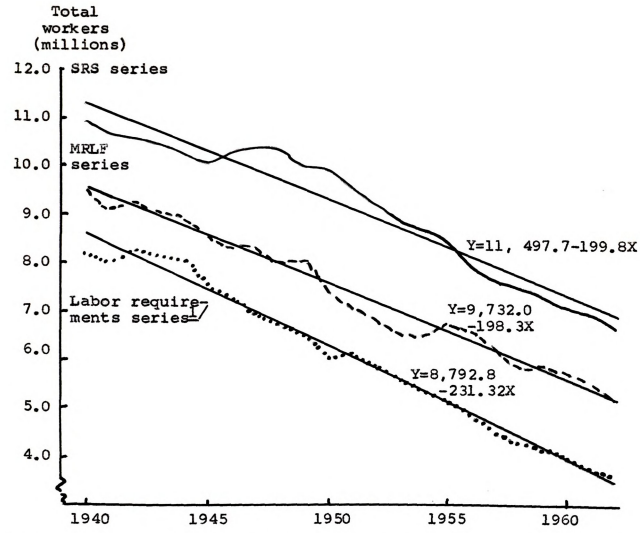


Figure A-1. Comparison of total annual average farm employment estimates, Statistical Reporting Service series, monthly report on labor force series and labor requirements series converted to full-time worker equivalent, United States, 1940-62

1/ Labor requirement series converted to full-time worker equivalent on basis of 2,500 man hours per year per worker.

labor requirements when converted to annual full-time worker equivalents shows a greater annual average reduction

Table A-1. Comparison of trends in annual average farm employment estimates using linear regression for specified estimates and time periods, United States

Dependent Variable	Inter-cept	Annual Trend	Simple Correlation	Years Included
	Units	Units		
Total workers SRS series	14,576,119	-154,574	-.969	1917-62
Total workers SRS series	11,497,727	-199,771	-.969	1940-62
Total workers MRLF series	9,731,988	-198,282	-.990	1940-62
Total workers Full-time equivalent, labor requirement series	8,792,825	-231,321	-.994	1940-62

(231,321) than is shown by the MRLF series (198,282). This difference is consistent with increased multiple job holding by agricultural workers. Also, the decline in number of days worked per year by hired workers is consistent with the more rapid decline in labor requirements than in number of workers employed.

Estimates of trends in the size of the farm work force shown in Table A-1 cast doubt on one of the conclusions reached by Johnson and Nottenburg with respect to the inadequacies of the SRS series. They concluded that the SRS series is not an adequate estimator even of the trend in

number of workers in the farm work force.[1] However, they believe that a satisfactory estimate can be determined from the MRLF series. Table A-1 shows for both series similar estimates of trend in the size of the agricultural work force. The SRS series shows for 1940-62 a decline of 199,771 workers annually compared to 198,282 workers for the MRLF series.

The SRS series has consistently provided larger estimates for the total agricultural labor force than are provided by the MRLF estimates. Table A-2 shows the percent by which the SRS estimates exceed the MRLF estimates by years for total and for hired workers. Over the 1940-62 period annual SRS estimates have averaged 24.5 percent greater than MRLF estimates of the total agricultural labor force. For hired workers estimates have been somewhat closer with SRS estimates exceeding MRLF estimates by 21.2 percent.

However, the range of the differences between the two estimates has been greater for the hired worker series than for the total worker series. The MRLF estimate of hired workers ranged from 1.4 percent below the SRS estimate to 43.3 percent above the SRS estimate. For the hired worker series a sharp change in the difference between the two estimates follows the 1954 revision of the CPS sampling area which provides the data for the MRLF estimates.[2] This abrupt

---

[1] Johnson and Nottenburg, p. 204.

[2] U. S. Bureau of the Census, Current Population Reports, Series P-23, No. 5, 1958, p. 4.

Table A-2. Annual averages of total and hired agricultural workers for the U. S. as estimated by the Statistical Reporting Service and Current Population Survey with percentage differences between the two estimates, 1940-62

Year	Total Workers			Hired Workers		
	SRS Estimate	CPS Estimate	Excess of SRS over CPS	SRS Estimate	CPS Estimate	Excess of SRS over CPS
	Thou.	Thou.	Pct.	Thou.	Thou.	Pct.
1940	10,979	9,540	15.1	2,679	2,480	8.0
1941	10,669	9,100	17.2	2,652	2,230	18.9
1942	10,504	9,250	13.6	2,555	2,590	- 1.4
1943	10,446	9,080	15.0	2,436	2,250	8.3
1944	10,219	8,950	14.2	2,231	2,000	11.6
1945	10,000	8,580	16.6	2,119	1,760	20.4
1946	10,295	8,320	23.7	2,189	1,670	31.1
1947	10,382	8,266	25.6	2,267	1,677	35.2
1948	10,363	7,973	30.0	2,337	1,746	33.8
1949	9,964	8,026	24.1	2,252	1,845	22.1
1950	9,926	7,507	32.2	2,329	1,733	34.4
1951	9,546	7,054	35.3	2,236	1,647	35.8
1952	9,149	6,805	34.4	2,144	1,526	40.5
1953	8,864	6,562	35.0	2,089	1,467	42.4
1954	8,651	6,504	33.0	2,081	1,452	43.3
1955	8,381	6,730	24.5	2,036	1,700	19.8
1956	7,852	6,585	19.2	1,952	1,692	15.4
1957	7,600	6,222	22.1	1,940	1,687	15.0
1958	7,503	5,844	28.4	1,982	1,671	18.6
1959	7,342	5,836	25.8	1,952	1,689	15.6
1960	7,057	5,723	23.3	1,885	1,866	1.0
1961	6,919	5,463	26.7	1,890	1,733	9.1
1962	6,700	5,190	29.1	1,827	1,666	9.7

Source: U. S. Department of Agriculture, SRS, Farm Employment, Stat. Bul. No. 334, p. 7. U. S. Department of Agriculture, ERS, Farm Cost Situation, Nov., 1963, p. 11; U. S. Bureau of the Census, Annual Reports on the Labor Force, 1940-1958; U. S. Bureau of Labor Statistics, Employment and Earnings, Annual Supplement Issues, 1961, 1963.

shift upward in the MRLF estimates during a long-time down-trend would suggest that the CPS had been underestimating the number of workers in the hired farm work force prior to 1955.

Series Used and Reasons for Choice

In comparing labor earnings for individuals in the farm and nonfarm sectors different series are used but the SRS series and the farm population series are the two major sources of data. Despite its deficiencies it is necessary to use the SRS series since it is the only one available which provides annual estimates of the farm work force for the entire time period under study. Also, annual per capita farm income data are available which utilize the SRS estimates of the farm work force.

Availability of income data on a farm-nonfarm population basis is the major reason for using population data as a proxy for labor force data. Both current and historical, personal and family income data are available for the farm and nonfarm population. Income data of this nature is average earnings, not marginal earnings. Income is from all factors of production owned by the individual or family and thus represents more than labor income. But it is necessary and helpful to use these data because of the lack of alternative data. Very little data are available on marginal earnings to labor particularly on a national basis.

APPENDIX B

Supplementary tables for Chapters IV and V

Table B-1. Man-hours per acre and per unit of production for designated crops, United States, 1915-62

Crop	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.
Corn for grain										
per acre	34.2	32.7	30.3	28.2	28.1	25.5	19.2	13.3	9.9	7.3
per 100 bu.	132	122	115	123	108	79	53	34	20	12
Wheat										
per acre	13.6	12.4	10.5	9.4	8.8	7.5	5.7	4.6	3.8	2.9
per 100 bu.	98	90	74	70	67	44	34	27	17	12
Rice										
per acre	51.7	46.9	37.2	33.0	31.8	28.6	20.6	14.5	13.2	12.6
per 100 bu.	133	119	87	70	64	63	44	27	19	16
Potatoes										
per acre	73.8	75.2	73.1	67.9	69.7	68.5	68.5	63.1	53.1	48.9
per ton	26	23	21	21	20	17	12	8	6	5
Cotton										
per acre	105	96	96	97	99	99	83	66	66	49
per bale	299	296	268	252	209	182	146	108	74	52
Tobacco										
per acre	353	353	370	370	415	442	460	464	475	486
per 100 lbs.	44	46	48	47	47	43	39	36	31	27
Peanuts										
per acre	68.0	66.8	67.1	65.6	66.4	58.6	44.4	36.4	27.6	22.4
per 100 lbs.	9.2	9.8	9.2	9.8	9.0	8.4	6.5	4.1	2.6	1.7

Source: Robert C. McElroy, Reuben W. Hecht, and Earle E. Gavett, Labor Used to Produce Field Crops, U.S. Dept. of Agriculture, ERS, Stat. Bul., No. 346, May 1964, pp. 5-6.

Table B-2. Man-hours per unit of livestock and per unit of production, United States, 1915-62

Kind of Livestock and Item	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-49	1950-54	1955-59	1960-62
	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.
Milk cows										
Man-hours per cow	141	142	145	145	148	142	129	121	109	96
Man-hours per cwt. of milk	3.7	3.6	3.3	3.4	3.4	3.1	2.6	2.2	1.7	1.3
Cattle and calves										
Man-hours per cwt. of beef produced[a, b]	4.5	4.5	4.3	4.3	4.2	4.0	4.0	3.6	3.2	2.9
Hogs										
Man-hours per cwt. produced[b]	3.6	3.5	3.3	3.2	3.2	3.0	3.0	2.7	2.4	2.2
Chickens-broilers										
Man-hours per 100 birds	...	...	...	...	24.6	22.7	15.6	7.5	4.2	3.3
Man-hours per cwt. produced[b]	...	...	...	...	8.5	7.7	5.1	2.4	1.3	1.0
Turkeys										
Man-hours per cwt. produced[b]	31.1	30.0	28.5	26.7	23.7	19.6	13.1	6.8	4.4	3.0

[a] Production includes beef produced as a by-product of the milk cow enterprise.

[b] Liveweight production.

Source: Reuben W. Hecht, Labor Used to Produce Livestock, Estimates by States, 1959, U. S. Dept. of Agriculture, ERS, Stat. Bul. No. 336, Sept. 1963, p. 3.

Table B-3. Value of assets in agriculture at beginning of year, total change in asset position of agriculture during year due to price change and percent change in asset position during year, United States, 1917-59

Year	Value of Assets at Beginning of Year	Total Change in Asset Position of Agriculture	Pct. Change in Asset Position of Agriculture	Year	Value of Assets at Beginning of Year	Total Change in Asset Position of Agriculture	Pct. Change in Asset Position of Agriculture
	Bil. Dol.	Mil. Dol.	Pct.		Bil. Dol.	Mil. Dol.	Pct.
1917	---	7,669.5	---	1939	44.1	-703.5	-1.6
1918	---	5,755.6	---	1940	44.6	1,090.6	2.4
1919	72.3	10,921.3	15.1	1941	46.4	547.2	1.2
1920	84.4	-10,513.3	-12.5	1942	52.4	6,511.1	12.4
1921	76.2	-10,376.8	-13.6	1943	41.2	6,560.9	10.7
1922	64.9	-287.4	-.4	1944	69.3	5,618.9	8.1
1923	64.1	-1,309.7	-2.0	1945	76.6	5,336.7	7.0
1924	61.9	149.1	.2	1946	82.2	11,729.2	14.3
1925	61.0	-91.8	-.2	1947	92.6	12,342.5	13.3
1926	60.9	-1,998.7	-3.3	1948	103.0	1,654.9	1.6
1927	59.1	238.5	.4	1949	109.0	-4,158.1	-3.8
1928	59.7	416.5	.7	1950	108.8	16,189.8	14.9
1929	60.8	-726.5	-1.2	1951	124.8	13,197.4	10.6
1930	60.8	-7,443.9	-12.2	1952	139.5	-5,627.6	-4.0
1931	54.4	-9,748.8	-17.9	1953	136.0	-5,829.1	-4.3
1932	45.5	-8,450.7	-18.6	1954	131.9	2,380.2	1.8
1933	37.4	1,978.0	5.3	1955	135.8	2,235.5	1.6
1934	39.1	2,449.2	6.3	1956	138.2	8,543.4	6.2
1935	40.5	1,423.7	3.5	1957	146.0	11,013.6	7.5
1936	43.5	1,875.2	4.3	1958	155.0	14,611.3	9.4
1937	44.7	1,201.4	2.7	1959	170.2	407.0	.2
1938	44.9	1,626.2	-3.6				

Source: Value of assets, 1919-39, calculated from U.S. Department of Agriculture, Agricultural Statistics, 1952, p. 625 and Raymond W. Goldsmith, A Study of Saving in the United States, Vol. I, (Princeton, N.J.: Princeton University Press), 1955, pp. 803, 809. Assets since 1940 from U.S. Department of Agriculture, Agricultural Finance Review, XX, Sept. 1960, pp. 174-75. Change in asset position from Glenn L. Johnson, An Evaluation of U.S. Agricultural Policies and Programs, p. 14. **Changes in asset values were calculated by Johnson, modified by by Hathaway and brought up to date by Willard Sparks.**

Table B-4. Net income originating in agriculture, total change in asset position of agriculture, government payments, and total, current dollars, United States, 1917-59

Year	Net Income Originating in Agriculture	Total Change in Asset Position of Agriculture	Government Payments	Total
	Mil. Dol.	Mil. Dol.	Mil. Dol.	Mil. Dol.
1917	10,534	7,670	0	18,204
1918	11,400	5,756	0	17,156
1919	11,904	10,921	0	22,825
1920	10,626	-10,513	0	113
1921	5,449	-10,377	0	-4,928
1922	6,474	-287	0	6,187
1923	7,388	-1,310	0	6,078
1924	7,232	149	0	7,381
1925	9,047	-92	0	8,955
1926	8,260	-1,999	0	6,261
1927	8,094	239	0	8,333
1928	8,342	417	0	8,759
1929	8,510	-726	0	7,784
1930	6,322	-7,444	0	-1,122
1931	4,949	-9,749	0	-4,800
1932	3,288	-8,451	0	-5,163
1933	3,820	1,978	113	5,911
1934	4,306	2,449	397	7,152
1935	6,821	1,424	498	8,743
1936	5,947	1,875	242	8,064
1937	7,757	1,201	283	9,241
1938	6,022	-1,626	377	4,773
1939	6,161	-704	661	6,118
1940	6,340	1,091	626	8,057
1941	8,753	5,470	472	14,695
1942	12,717	6,511	563	19,791
1943	15,139	6,561	563	22,263
1944	15,282	5,619	687	21,588
1945	15,995	5,337	659	21,991
1946	19,416	11,729	683	31,828
1947	20,034	12,342	277	32,653
1948	22,425	1,655	227	24,307
1949	17,141	-4,158	162	13,145
1950	18,175	16,190	249	34,614
1951	20,793	13,197	250	34,240
1952	19,879	-5,628	239	14,490
1953	17,632	-5,829	186	11,989
1954	16,939	2,380	224	19,543
1955	15,965	2,235	200	18,400
1956	15,905	8,543	485	24,933
1957	16,081	11,014	891	27,986
1958	18,131	14,611	988	34,164
1959	15,871	407	618	17,365

Source: U. S. Department of Agriculture, ERS, Farm Income Situation, July, 1961, pp. 35-36. Glenn L. Johnson, An Evaluation of U.S. Agricultural Policies and Programs, p. 14.

Table B-5. Age distribution of borrowers, number of borrowers by age by decade, total farm operators at end of decade and initial farm operating loans as a percent of total operators by decade, United States

Age	Age Distribution of Borrowers	Number of Borrowers	Total Farm Operators	Borrowers as Pct. of Total Operators
	Pct.	Units	Thou.	Pct.
		1936-40		
Under 25	7.5	43,890	243.8	18.0
25-34	25.6	149,810	991.8	15.1
35-44	27.1	158,588	1306.8	12.1
45-54	24.0	140,447	1491.4	9.4
55-64	12.6	73,735	1197.8	6.2
45-64	36.6	214,182	2689.2	8.0
65 and over	3.2	18,726	865.3	2.2
TOTAL	100.0	585,195	6096.8	9.6
		1940-50		
Under 25	5.8	35,448	174.6	20.3
25-34	25.4	156,230	843.9	18.5
35-44	30.2	185,658	1265.8	14.7
45-64[a]	35.5	217,911	2300.8	9.5
65 and over	3.1	19,106	794.1	2.4
TOTAL	100.0	614,354	5379.2	11.4
		1950-60		
Under 25	4.0	11,456	65.2[b]	17.6
25-34	25.3	71,601	430.5	16.6
35-44	33.3	94,514	861.4	11.0
45-64[a]	34.3	97,378	1893.0	5.1
65 and over	3.0	8,592	683.4	1.3
TOTAL	100.0	283,541	3933.5	7.2

[a]Age distribution not available for the two age classes separately.

[b]Operators adjusted to 1950 census definition of a farm.

Source: Age distributions: 1936-40, Larson et al., p. 359; 1951-59, Bierman and Case, p. 56, the distribution applies to persons receiving operating loans from the Farmers Home Administration; 1941-50, No age distribution is available for this decade. The distribution used is a simple average of the distribution of the other two periods. Number of borrowers: Totals from Larson et al., p. 389 and Reports and Program Analysis Division, Farmers Home Admin. distributed among age classes according to given age distribution. Total farm operators, U.S. Census of Agr.

Table B-6. Farm operating loans by fiscal year, United States, 1935-63

Fiscal Year	Initial Loans		Supplemental Loans	Total Loans
	Number	Thou. Dol.	Thou. Dol.	Thou. Dol.
1935	73,821	17,722	2,399	20,121
1936	201,015	48,257	6,533	54,790
1937	55,135	26,833	29,472	56,305
1938	62,687	37,142	29,432	66,574
1939	112,968	71,040	41,196	122,236
1940	79,569	48,683	44,704	93,387
1941	82,755	54,472	50,823	105,295
1942	78,832	49,730	66,715	116,445
1943	52,392	36,887	57,371	94,258
1944	25,723	25,845	45,763	71,608
1945	26,771	29,331	43,158	72,489
1946	41,023	54,525	44,655	99,180
1947	109,608	62,633	39,872	102,505
1948	63,079	37,578	27,203	64,780
1949	77,575	65,522	27,673	93,195
1950	56,596	64,346	31,831	96,178
1951	47,757	67,400	39,235	106,635
1952	27,165	72,494	51,464	123,957
1953	25,602	79,613	50,159	129,771
1954	35,291	97,372	50,151	147,523
1955	25,481	77,912	55,703	133,615
1956	27,016	81,593	65,490	147,083
1957	28,358	101,239	82,019	183,259
1958	23,256	89,072	88,376	177,448
1959	22,425	88,967	99,430	188,396
1960	21,190	98,919	99,357	198,276
1961	26,374	124,487	108,838	233,325
1962	34,433	143,368	131,955	275,324
1963	23,806	150,029	150,438	300,467

Source: Larson, et al., 1935-43. Data for 1944-62 was furnished by Reports and Program Analysis Division, Farmers Home Administration, U. S. Dept. of Agriculture.

BIBLIOGRAPHY

Books, Theses and Monographs

Baker, Gladys L. et al. Century of Service, U. S. Dept. of Agriculture, ERS, Washington: U. S. Government Printing Office, 1963.

Bishop, C. E., "Economic Aspects of Changes in Farm Labor Force," Chap. 4, Labor Mobility and Population in Agriculture, Ames, Iowa: Iowa State University Press, 1961.

Boyne, David H., Changes in the Real Wealth Position of Owners of Agricultural Assets, 1940-1960. Unpublished Ph. D. thesis, University of Chicago, 1962.

Cochrane, Willard W. Farm Prices, Myth and Reality, Minneapolis, Minn.: University of Minnesota Press, 1958.

Edwards, Clark. Resource Fixity, Credit Availability and Agricultural Organization. Unpublished Ph.D. thesis, Michigan State University, 1958.

Goldsmith, Raymond W. A Study of Savings in the United States, Vol. I, Princeton, N.J.: Princeton Univ. Press, 1955.

Hathaway, Dale E. Government and Agriculture, New York: The MacMillan Company, 1963.

_____. "The Federal Credit Programs for Individual Farm Development," Federal Credit Agencies, Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963.

Heady, Earl O., Agricultural Policy Under Economic Development, Ames, Iowa: Iowa State University Press, 1962.

_____. Tweeten, Luther G. Resource Demand and Structure of the Agricultural Industry, Ames, Iowa: Iowa State University Press, 1963.

Johnson, D. Gale. "Labor Mobility and Agricultural Adjustment," Agricultural Adjustment Problems in a Growing Economy, Ed. by E. O. Heady, et al., Ames, Iowa: Iowa State University Press, 1958.

Johnson, Glenn L. "Supply Function - Some Facts and Notions," Agricultural Adjustment Problems in a Growing Economy, Ames, Iowa: Iowa State University Press, 1956.

Larson, Olaf et al. Ten Years of Rural Rehabilitation in the United States, Bureau of Agricultural Economics, Washington, D.C., 1947.

Lee, E. S. et al. Population Redistribution and Economic Growth - United States, 1870-1950, prepared under supervision of Simon Kuznets and D. S. Thomas, Philadelphia, Pa.: The American Philosophical Society, 1957.

Leftwich, Richard H. The Price System and Resource Allocation, New York: Holt, Rinehart and Winston, 1955.

Lerohl, M. Ph.D. thesis in progress, Michigan State University, 1964.

Perkins, Brian B. The Mobility of Labor Between the Farm and Nonfarm Sector. Unpublished Ph.D. thesis, Michigan State University, 1964.

Rasmussen, Wayne D. A History of the Emergency Farm Labor Supply Program, 1943-47, U. S. Dept. of Agriculture Monograph, No. 13, 1951.

Sjo, John B. Technology: Its Effect on the Wheat Industry, Unpublished Ph.D. thesis, Michigan State University, 1960.

Wilcox, Walter W. The Farmer in the Second World War, Ames, Iowa: The Iowa State College Press, 1947.

Periodicals and Articles

Bierman, Russel W. and Case, Betty A. "The Farmers Home Administration and its Borrowers," Agricultural Finance Review, U. S. Dept. of Agriculture, XXI, (July 1959), pp. 40-67.

Clawson, Marion. "Aging Farmers and Agricultural Policy," Journal of Farm Economics, XLV, (Feb. 1963), pp. 13-30.

Johnson, D. Gale and Nottenburg, Marilyn Corn. "A Critical Analysis of Farm Employment Estimates," Journal of the American Statistical Association, XLVI, (June 1951), pp. 191-205.

Johnson, Glenn L. "The State of Agricultural Supply Analysis," Journal of Farm Economics, XLII, (May 1960), pp. 435-452.

Kanel, Don. "Age Components of Decrease in Number of Farmers, North Central States, 1890-1954," Journal of Farm Economics, XLIII, (May 1961), pp. 247-263.

Lange, Oscar. "A Note on Innovations," Review of Economic Statistics, XXV, (Feb. 1943), pp. 19-25.

The New York Times, January 16, 1943.

Waldo, Arley Dean. The Off-Farm Employment of Farm Operators in the United States, Unpublished Ph. D. thesis, Michigan State University, 1962.

Public Documents

Chief of Investigations of the General Accounting Office, General Accounting Office Report of Survey--Veterans Education and Training Program, printed for use of the Committee on Veterans' Affairs, 82d Congress, 1st Sess., House Committee Print No. 160, 1951.

Economic Report of the President, Washington: U. S. Government Printing Office, 1963.

U. S. Bureau of Employment Security, Farm Labor Market Developments, Jan. 1961, Jan. 1963.

U. S. Bureau of Labor Statistics, Employment and Earnings, Annual Supplement Issues, 1959, 1960, 1961, 1963.

U. S. Bureau of the Census. Annual Reports on the Labor Force, 1940-1958.

_____. Current Population Reports, Series P-23, No. 5, 1958.

_____. Farm Population, 1880-1950, by Leon E. Truesdell, Tech. Paper No. 3, Washington, D. C., 1960.

_____. Fifteenth Census of the United States: 1930, Agriculture, IV, General Report, Statistics by Subjects.

U. S. Bureau of the Census. Fourteenth Census of the United States: 1920, Agriculture, V, General Report and Analytical Tables.

_____. Sixteenth Census of the United States: 1940, Agriculture, III, General Report, Statistics by Subjects.

_____. U. S. Census of Agriculture: 1945, II, General Report, Statistics by Subjects.

_____. U. S. Census of Agriculture: 1954, II, General Report, Statistics by Subjects, Chap. iv.

_____. U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Introduction.

_____. U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chap. ii.

_____. U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chap. iv.

_____. U. S. Census of Agriculture: 1959, II, General Report, Statistics by Subjects, Chap. xi.

_____. U. S. Census of Population: 1960, General Social and Economic Characteristics, United States Summary, Final Report, PC(1)-1C.

_____. U. S. Census of Population, 1960, PC(1)1D U. S. Summary.

_____. U. S. Department of Agriculture, AMS, Farm Population: Effect of Definition Changes on Size and Composition of the Rural-Farm Population: April 1960 and 1959, Series Census AMS (P-27), No. 28, April 1961.

U. S. Congress, House, House Select Committee to Investigate Education, Training and Loan Guaranty Programs Under G. I. Bill, 82d Cong., 2d Sess., House Report No. 1375, 1952.

U. S. Congress, House, Committee on Veterans' Affairs; Benefit Levels in Veterans' Programs, by the President's Commission on Veterans' Pensions, Staff Report No. 5, House Committee Print 243, 84th Cong., 2d Sess., 1956.

_____. Hearings, Education and Training and Other Benefits for Veterans Serving on or After June 27, 1950, 82d Cong., 2d Sess., 1962.

U. S. Congress, House, Committee on Veterans' Affairs. Laws Granting Education and Training and Other Benefits to Veterans, House Committee Print No. 308, Aug. 5, 82d Cong., 2d Sess., August 5, 1952.

_____. Readjustment Benefits, General Survey and Appraisal, Report on Veterans' Benefits in the United States by President's Commission on Veterans' Pensions, Staff Report 9, Pt. A, House Committee Print 289, 84th Cong., 2d Sess., 1956.

_____. Veterans' Benefits Administered by Departments and Agencies of Federal Government, Digest of Laws and Basic Statistics, Report on Veterans' Benefits in the United States by President's Commission on Veterans' Pensions, Staff Report 2, House Committee Print 262, 84th Cong. 2d Sess., 1956.

U. S. Congress, House, Subcommittee on Agriculture of the Committee on Appropriations, Hearings, Department of Agriculture Appropriations for 1960, 86th Cong., 1st Sess.

U. S. Congress, Joint Economic Committee Staff. Productivity, Prices and Income, 85th Cong., 1st Sess., Joint Committee Print, 1957.

U. S. Department of Agriculture, Advance Report on the Hired Farm Working Force of 1962, ERS-141, 1963.

_____. Agricultural Statistics, 1952.

_____. Agricultural Statistics, 1961.

_____. Agricultural Statistics, 1962.

_____. Farm Costs and Returns, Ag. Info. Bul. No. 230, Revised June 1961, June 1963.

_____. ARS, Agricultural Finance Review, Vol. XXII, Sept. 1960.

_____. ARS, Balance Sheet of Agriculture, Annual Issues, 1960-62.

_____. ERS, Changes in Farm Production and Efficiency, 1963, Stat. Bul. No. 233, July 1963.

_____. ERS, Farm Cost Situation, Nov. 1962.

_____. ERS, Farm Income Situation, July 1963.

_____. ERS, Farm Cost Situation, Nov. 1963.

U. S. Department of Agriculture, ERS, Farm Population - Estimates for 1963, ERS-177, July 1964.

_____. SRS, Agricultural Prices, Sept. 15, 1962.

_____. SRS, Agricultural Prices, Jan. 1963.

_____. SRS, Farm Employment, Stat. Bul. No. 334, no date.

_____. Major Statistical Series of the U. S. Department of Agriculture, Vol. I; Agricultural Prices and Parity, Agricultural Handbook No. 118, 1957.

_____. Major Statistical Series of the U. S. Department of Agriculture, Vol. 2, Agricultural Production and Efficiency, Ag. Hbk. No. 118, 1957.

_____. Major Statistical Series of the U. S. Department of Agriculture, Vol. 7, Farm Population, Employment and Levels of Living, Ag. Hbk. No. 118, 1957.

U. S. Farm Security Administration, Report of the Administrator of the Farm Security Administration, 1938-1941.

U. S. Farmers Home Administration, Family Progress Report for Active Borrowers Who Paid Their Operating Loan in Full, Annual Reports, 1955-1962.

_____. Farm Ownership Family Progress Reports, Annual Reports, 1955-1962.

_____. Report of the Administrator of the Farmers Home Administration, 1952, 1953.

U. S. Office of Business Economics, U. S. Dept. of Commerce, Business Statistics, 1932 Annual Supplement, 1938 Annual Supplement, 1957 ed., 1963 ed.

U. S. Statutes at Large, Vol. L, Part 1.

U. S. Statutes at Large, Vol. LVIII, Part 1.

U. S. Statutes at Large, Vol. LX, Part 1.

U. S. Statutes at Large, Vol. LXI, Part 1.

U. S. Statutes at Large, Vol. LXVI.

U. S. Statutes at Large, Vol. LXXV.

Selective Service System, Agricultural Deferment, Monograph No. 7, Washington: Government Printing Office, 1947.

Selective Service System, Selective Service, Vol. 2, April 1952, Washington, D.C.

_____. Selective Service, Vol. 4, May 1954, Washington, D.C.

Veterans Administration, V. A. Regulations Transmittal Sheet, No.84, Aug. 4, 1952, Washington, D.C.

Research Bulletins

Committee on Research in the Education of Farm Veterans, Education of Veterans in Farming, American Vocational Association, Inc., Res. Bul. No. 5 (Washington, D.C.), 1952.

Franklin, E. R., Fuhriman, Will and Parrish, B. D. Economic Progress and Problems of Columbia Basin Project Settlers, Washington Agricultural Expt. Sta. Bul. 597, July 1959.

Hendrix, William E. Approaches to Income Improvement in Agriculture, Production Research Report No. 33, Agricultural Research Service, U.S.D.A., 1959.

Johnson, Glenn L., Hardin, Lowell S. Economics of Forage Evaluation, Sta. Bul. No. 623, Lafayette, Ind., Agr. Expt. Sta., April 1955.

Loomis, Ralph A. and Barton, Glen F. Productivity of Agriculture, U. S. Dept. of Agriculture, ARS Tech. Bul. No. 1238, Washington: U. S. Government Printing Office, 1961.

Schnittker, John A. and Owens, Gerald P. Farm to City Migration: Perspective and Problems, Ag. Ec. Report No. 84, Kansas Ag. Expt. Sta. 1959.

Statistical Bulletins and Reports

Banks, Vera J., Beale, Calvin L. and Bowles, Gladys K. Farm Population Estimates for 1910-62, U. S. Dept. of Agriculture, ERS-130, Oct. 1963.

Baum, Samuel, Friend, Reed E. and Stansberry, Robert R., Jr. The Hired Farm Work Force of 1961, U. S. Dept. of Agriculture, ERS, 1963.

Bowles, Gladys K., and Taeuber, Conrad. "Rural-Farm Males Entering and Leaving Working Ages, 1940-50 and 1950-60," Farm Population, U.S. Dept. of Agriculture, AMS, and U.S. Bureau of the Census, Series Census-AMS (P-27), No. 22, Aug. 1956.

Cowhig, James D. Education, Skill Level, and Earnings of the Hired Farm Working Force of 1961, U. S. Dept. of Agriculture, Ag. Ec. Report, No. 26, 1963.

Friend, Reed E. and Stanberry, Robert R., Jr. The Hired Farm Working Force of 1960, U. S. Dept. of Agriculture, ERS, Ag. Info. Bul. 266, July 1962.

Goodsell, Wylie D. and Jenkins, Isabel. Costs and Returns on Commercial Farms, Long-Term Study, 1930-57, U.S. Dept. of Agriculture, Stat. Bul. 297, 1961.

Hecht, Reuben W. Labor Used to Produce Livestock, Estimates by States, 1959, U. S. Dept. of Agriculture, ERS, Stat. Bul. No. 336, Sept. 1963.

McElroy, Robert C., Hecht, Reuben W. and Gavett, Earle E. Labor Used to Produce Field Crops, U. S. Dept. of Agriculture, ERS, Stat. Bul. No. 346, May 1964.

Miller, Herman P. Trends in the Income of Families and Persons in the United States: 1947-1960, U. S. Bureau of the Census Tech. Paper No. 8, 1963.

Unpublished Sources

Johnson, Glenn L. An Evaluation of U.S. Agricultural Policies and Programs, 1956 to 1960, unpublished paper for Committee for Economic Development, 1961.

Johnson, Glenn L. Project statement submitted to Resources for the Future.

Mitchell, F. M. Chief Employment Service Division (Michigan), Letter dated March 10, 1964.

Reports and Program Analysis Division. Farmers Home Administration, U. S. Dept. of Agriculture. Unpublished data.

U. S. Farmers Home Administration, Annual Report Farm Ownership Borrowers Status of Accounts, 1955-1962. Mimeo.

U. S. Farmers Home Administration, Use of Initial Operating Loans to Borrowers Conducting Adequate Family Farming Operations, 1962 and 1963 Fiscal Years Through June 30. Mimeo.


MICHIGAN STATE UNIVERSITY LIBRARIES
3 1293 03062 3213