12-1-1960

Factors Affecting the Occupational Migration of Labor from Agriculture

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New Haven, Connecticut

COWLES FOUNDATION DISCUSSION PAPER NO. 103

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December 13, 1960

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Introduction

Occupational migration from agriculture is defined as the net migration of labor from employment in agriculture to employment in any nonfarm occupation. The more familiar concept of a change from a farm to a nonfarm place of residence is referred to here as residential migration from agriculture.

Occupational migration, though frequently accompanied by residential migration, by no means requires it. Indeed, in most parts of the United States a substantial reduction in the level of agricultural employment has occurred without a proportionate decrease in the size of the rural farm labor force.** The process of urban decentralization -- the high propensity of Americans to commute -- contributes to exactly that kind of occupational migration from agriculture which does not require that the migrant leave a farm residence. A reduction in farm employment without a corresponding decrease in the labor force or population living on farms is increasingly the rule rather than the exception.

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* I have had help in this work from a variety of sources. I am enormously indebted to Harold W. Watts for repeated assistance and instruction in the use of I.B.M. computing equipment. The basic 650 program used was written and made available by George M. Furnival. I am also grateful for the critical comments of Mark W. Leiserson on an earlier version of this paper. Key Whan Kim and Seong Yawng Park were research assistants.

** The rural farm labor force is defined by the Bureau of the Census as the labor force living on farms, not as the labor force working on farms.

Occupational Migration

Although economic factors may influence the direction and extent of both occupational and residential (geographic) migration, this paper is concerned only with the former, and is primarily an empirical analysis of the effect of age upon the response of occupational migration to those factors generally considered influential in this context. In part this work is a consequence of rather disappointing results obtained from attempts to explain regional variation in the rates of migration from agriculture on any basis other than age.* While it is true that rapid rates of migration from agriculture have occurred in those areas where agricultural incomes are low, notably of course in the southeastern states, the relationship between income and migration within those areas has not been systematic.

* For an unsuccessful attempt, see my "Occupational Migration from Agriculture, 1940-1950," unpublished Ph.D. dissertation, Department of Economics, The University of Chicago, 1956.

On the other hand, studies of rural-urban migration have repeatedly shown that migration rates tend to be disproportionately high in the younger working-age groups, suggesting, as has been verified, a relationship between the age structure of the farm population and the rate of migration which may be expected from that population. A number of other variables would normally be expected to influence that rate. The actual demonstration of such influence, however, may be difficult if the impact of these variables depends in turn upon the age of the workers in question. A given differential in income, for example, may be a major factor to a young man basing an occupational choice on a future of close to forty years, but at the same time be unimportant to an older

worker close to retirement. Under these circumstances an empirical association between a measure of income and a migration rate for all age groups taken together will be less apparent and less easily isolated (or more readily interpreted as an age effect) than would be the case if the behavior of individual age groups were observed and analyzed independently.* This paper

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* This, of course, does not follow if the exact form of the interaction with age can be specified in advance. It is because an accurate specification is highly unlikely, and indeed has never really been examined empirically, that disaggregation is favored.

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presents a comparison of the results obtained with this latter approach with those obtained when migration is considered for all working-age groups as a whole.

The pattern of migratory behavior anticipated can be summarized rather simply. It is expected that the rate of occupational migration from agriculture will be more rapid, other things being equal, the greater the labor income or wage differential between agriculture and nonfarm employment.** Factors or

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** A higher nonfarm than farm level of labor income is assumed.

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variables in this category of "other things" include the age structure of the farm labor force, distance from the farm area to the relevant nonfarm labor markets, racial characteristics of the farm workers, the degree to which these workers are self-employed farm operators rather than hired farm employees, and the knowledge of these persons regarding opportunities for nonfarm employment. Usually it is argued that the rate of migration from agriculture, given the migratory flow is to be in this direction, will be more rapid the lower the

"age" of the farm labor force, the shorter the geographic distance to the nonfarm jobs sought, the larger the nonwhite proportion of the farm population, the lower the percentage of self-employed farm operators in the work force employed in agriculture, and the more exposed the farm area to urban practices, customs, and experiences.*

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* This is not intended as a detailed or definitive theory of migration. It serves only as an introduction to the empirical analysis which follows. For a related and more self-sufficient discussion, see D. Gale Johnson, "The Functioning of the Labor Market," Journal of Farm Economics, Vol. 33, February, 1951.

The pattern of migration of Negro farm workers during the post World War II period is perhaps not what would have been expected. While available evidence clearly points to lower than average nonfarm earnings for Negroes in the south (the only region where nonwhite employment in agriculture is significant) existing data show that the rate of migration of nonwhites from agriculture has in most instances exceeded that of similarly situated whites.** The difference is

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** See C. E. Bishop, Underemployment of Labor in Agriculture, Southeastern United States, Ph.D. dissertation, The University of Chicago, 1952. See also U. S. Department of Agriculture and U. S. Department of Commerce, Farms and Farm People, Washington, 1953.

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not easily reconciled by appeal to differences in the earnings of whites and nonwhites in southern agriculture.** The simpliest explanation, which has not been overlooked, is that whites and nonwhites differ in their evaluations of the relative advantages and disadvantages of available farm and nonfarm occupations. This paper considers the migration of white farm workers only. The basis for excluding data for nonwhites is the general conclusion that at present

both attitudes and alternatives may differ between whites and nonwhites and that the two are therefore best considered separately.

With the exception of the racial factor, the suggested relationships are little more than simple extensions of the argument that anything which tends to increase the cost of changing jobs (or to reduce the return therefrom) will tend to lower the rate of change of jobs within any given area, and vice versa. In most cases supporting logic is not hard to develop. Employers with justification from a purely private viewpoint are concerned with the rate at which new workers acquire special skills, with the expected accident and illness rates and other characteristics of these new employees. Older workers tend to adjust less quickly to new surroundings, and rates of absence due to accident and illness tend, with appropriate correction, to be associated with worker age.* Older workers therefore are apt to spend longer

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* For a detailed discussion of this and other points related to hiring practices, see Arthur M. and Janet N. Ross, "Employment Problems of Older Workers," Special Committee on Unemployment Problems, United States Senate, Studies in Unemployment, Washington, 1960, pp. 97-120. See also Lloyd G. Reynolds, The Structure of Labor Markets. New York: Harper, 1951, p. 159.

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seeking equivalent employment in any given labor market than are their younger competitors. The longer a farm migrant must look in finding new nonfarm employment, the greater the cost to him of the occupational move, and the fewer moves, therefore, to be expected. This cost on the average probably also rises with age for other reasons as well. If a residential as well as an occupational change is required, workers in the middle age categories are, in general, those who must move families in addition to themselves. Both reasons may imply negative association with the age factor, though the implied association is not necessarily linear.

Similarly the further the distance to the appropriate nonfarm labor market the greater will be the cost of commuting (or the cost of moving), the more difficult, and therefore more costly, the process of acquiring the information needed for such a move, and all in all the more complex the process of occupational migration. Again a negative association with migration is suggested -- the further the new jobs, the lower the expected rate of migration from agriculture. In corresponding fashion it may be argued that the cost of abandoning agricultural work is apt to be less for an individual who acts as a hired farm worker than for one who either owns or rents, but in any case operates, a farm unit.

What is added by this paper to this fairly conventional statement is the assertion that the degree and even the nature of the response of migration rates to these "other things" is not independent of the age factor itself. Relatively simple theory based upon a maximization of money returns from an occupational choice suggests that such is the case for those variables which most obviously fit this cost-return schema.* In addition, there may be reason

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* I am thinking of the cumulative discounted lifetime income differential between two occupations. It is of course true that all factors, assuming given tastes, can be forced into this mould. It is, however, the distinction between differences in tastes and differences in the cost or returns of an occupational move to which the text refers at this point.

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to expect a difference in the evaluation of external factors between the younger and older age groups. A large nearby city may be an attraction to a young farm worker, yet an older colleague may be deterred by the sheer size of the urban element itself. This argument is perhaps not as intuitively appealing as the earlier one which sums advantages and disadvantages,

appropriately discounted, over the work span of the individual, producing different answers for workers of different ages. But once the decision to proceed independently with the different age groups is made, there is some reason to expect that differing patterns among age classes may be reconciled only by appeal to the possibility of systematic differences in the tastes of different age groups.

The Data

This work is based on migration data very kindly supplied by Mrs. Gladys K. Bowles of the United States Department of Agriculture.* These relate to

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* See Gladys K. Bowles, "Farm Population: Net Migration From the Rural Farm Population, 1940-1959," U. S. Department of Agriculture, Statistical Bulletin 176, Washington, June, 1956. Corresponding unpublished data for state economic areas were made available by Mrs. Bowles.

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what has earlier been termed residential migration rather than occupational migration, and were provided by Mrs. Bowles for state economic areas, by sex and color for five-year age groups for the decade 1940-1950. These migration rates were developed from data of the Census of Population for 1940 and 1950. Migration from the farm population is therein defined as the absolute difference between the 1940 farm population expected to survive the ten year period and the actual farm population of the area in question in 1950. If N_{40} is the 1940 farm population of a given area, S the Census survival rate applicable to that area, and if N_{50} is the observed farm population in the same area in 1950, then M, the absolute migration from the farm population, is

defined as*

$$M = S.N_{40} - N_{50}$$

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* The Census survival rate is an empirical measure (corrected for misreporting of ages) of the proportion of given age classes surviving the inter-Censal years. See Gladys K. Bowles, op. cit., p. 171.

When expressed as a migration rate, M', the base is the population expected to survive, or

$$M' = \frac{S.N_{40} - N_{50}}{S.N_{40}}$$

Though it is hoped that later work can make use of data for both white and nonwhite persons, the present paper considers the migration of only white male farm persons between the ages of 15 and 64 in 1940.**

** Individuals aged 15 in 1940 will, of course, be 25 in 1950. Although trivial, this dimension in the specification of ages is apt to be confusing. Hereafter in this paper, all ages, unless otherwise noted, are measured as of 1940.

These data relate, as noted, to farm to nonfarm migration in a residential, rather than occupational, sense. For the areas considered, however, they are a close, though not ideal, approximation of occupational migration rates from the farm labor force. Ideally, age distributions for the employed male farm labor force in 1940 and 1950 would be compared to determine rates of occupational migration from agriculture by narrow age classes. Though the basic information necessary for such an operation was collected by Census enumerators in both 1940 and 1950, age distributions by occupational classes were published only for aggregates too broad to permit the satisfactory

application of cross-sectional techniques. Recourse to special tabulation is impossible since the relevant data for 1940 have been destroyed. This is the case for all classes of occupational data, not just agriculture.*

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* This paper was initially conceived as one which would investigate in similar fashion changes in the age composition of a variety of occupational categories including a cross-section of urban centers as well as the agricultural analysis here presented. Age distributions for a cross-section of narrow occupational classes are just not available for any period before 1950. With the processing of the 1960 Census, however, it should be possible to construct such information for the 1950-1960 decade. This point is further developed towards the end of this paper.

The following procedure was followed to permit the application of Mrs. Bowles' data. Of the 361 non-metropolitan state economic areas in the country, all were set aside in which the employment of rural farm persons in nonfarm occupations exceeded fifteen per cent of the total employed rural farm labor force in 1940. The basis for this selection was Item 64 of Table A of Donald J. Bogue's publication "State Economic Areas."** From the 89 state economic

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** See Donald J. Bogue, "State Economic Areas," Washington: Government Printing Office, 1951. Item 64 is based on the employment of both male and female persons and is shown only for the non-agricultural tabulation of state economic areas (i.e., all state economic areas having a letter suffix are combined -- a single item is shown for Oklahoma Area 8 instead of separate entries for Oklahoma Area 8a and 8b). Where the combined area (e.g., Oklahoma 8) met the "rurality" requirement both underlying areas were included (e.g., Oklahoma 8a and 8b). See Bogue, op. cit.

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areas remaining, seventy were selected. These are identified by Table 1. In each the percentage of nonfarm employment of all employed male farm persons was less than fifteen per cent in 1950.*** This is the sample on which the analysis

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*** This statistic is not published for state economic areas. Selection of the seventy state economic areas was based on county data from the 1950 Census

of Population. It was originally intended that all seventy-five state economic areas meeting these criteria would be included in the sample on which this analysis is based. In the first machine checking of these data, data were incomplete or in error and not easily corrected for five areas: Georgia 7a, North Carolina 8, Oklahoma 7b, Montana 3a, and Montana 3b. On the assumption that these deficiencies were random, and to meet computing deadlines, the initial calculations were completed for the seventy areas remaining. Later work was also based on the same seventy areas to retain comparability.

Table 1

Selected Sample of State Economic Areas

Wisconsin	2a	Nebraska	3b
"	2b	"	4
"	3	"	5
Minnesota	1	"	6
"	3	Kansas	1
"	4	"	2a
"	5	"	2b
"	7	"	3b
"	8	"	4
Iowa	1a	North Carolina	6
"	2a	South Carolina	6
"	3a	"	7
"	3b	Georgia	8
"	4	Kentucky	4
"	5	"	6
Missouri	2a	Tennessee	1
"	3	Alabama	2
"	9b	Mississippi	1
North Dakota	1	"	2
"	2a	"	5
"	2b	Arkansas	7a
"	3a	"	7b
"	3b	"	8a
"	3c	"	8b
"	4	Louisiana	2
South Dakota	1	"	3
"	2a	Oklahoma	1
"	2b	"	4
"	3a	Texas	3
"	3b	"	5
"	4a	"	10
"	4b	Montana	2a
Nebraska	1	"	2b
"	2	Wyoming	2b
"	3a	Colorado	4

reported below is based. It is, of course, not random in any sense. It is, however, a reasonably large group of areas, each of which is sufficiently rural to insure that the employed rural farm male labor is largely employed in agriculture. A move from the rural farm population should, therefore, generally imply a move from agricultural employment and vice versa. Though not perfect, this sample is a group of areas where some impression of the behavior of occupational migrants of different ages can be gained. Such data are more difficult to come by than might at first be anticipated.

The Analysis

The regression coefficients reported in Tables 2, 3, and 4 were derived from regression equations with constant terms with each observation receiving unit weight. The analysis is cross-sectional with seventy observations. Each observation is based on one of the seventy state economic areas.

In each equation fitted the dependent variable is a rate of migration from the farm population during the 1940-1950 decade. The particular age class of the farm population considered in the estimation of that migration rate is indicated. A comparison is shown of the varied response of migration rates for the ten five-year age classes between 15 and 64, and for the fifty-year age group, 15 to 64.*

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* Rates for the 15-64 age class were estimated from migration data for five-year age classes provided by Mrs. Bowles. Estimates of both the rate of migration and the number of migrants for each five-year class were available. From these the base population was estimated, permitting in turn the estimation of migration rates for aggregates of five-year age classes.

With a few exceptions, each set of independent variables selected was used for the fitting of eleven separate regression equations -- one for each

of the eleven age classes for which migration rates were available. In other words, migration rates for the ten five-year age classes, and for the one fifty-year age class, were considered independently but were fitted to the same groups of independent variables.

In all, thirteen independent variables were considered. These are defined below and are identified in the tables by the letters which precede them here.

P The 1940 population in thousands of the city with a population in 1940 of more than 100,000 nearest the state economic area in question.

D The distance in miles along a straight line joining the approximate geographic center of the state economic area to the center of that nearest city (as in P above).

C The number of cities of population 25,000 or more (1940) located within a circle of radius D above about the center of the state economic area.

These three variables attempt to measure the "distance" to nonfarm jobs for the farm labor force in question. The first is simply the distance in miles to the nearest major (arbitrarily defined) nonfarm labor market. The second is, of course, a measure of the absolute size of that market. The third is related to the density of the nonfarm labor market in the intervening area. The three relate not only to the cost of a physical move from the farm area, but also to the exposure of the farm area in question to information regarding nonfarm opportunities and customs.

H The ratio, multiplied by 100, of the number of hired farm workers to the number of farmers and farm managers in the state economic area

in question in 1940.* This is a measure of the degree to which farm workers in the area are self-employed -- a factor cited frequently in studies of rural-urban migration.

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* Farmers, farm managers, and hired farm workers are defined as by the 1940 Census of Population. Calculation of this variable (H) which includes both male and female workers, was also based on Table A of Bogue, op. cit. When state economic areas are divided for agricultural tabulations (e.g., Oklahoma 7a and 7b) Bogue's percentage for the combined area (Oklahoma 7) was taken to be applicable to both or all parts (e.g., both 7a and 7b).

RR The 1940-1950 state economic area replacement rate for white rural farm males aged 25 to 64. The logic underlying the use of this variable is discussed later in this paper. The variable is defined here for convenience only. Though these replacement rates were computed from data supplied by Mrs. Bowles, the concept is that of Conrad Taeuber's 1944 paper, "Replacement Rates of Rural Farm Males Aged 25-69 Years,"**and may be expressed as

$$RR = 100 + 100\left[\frac{N_{15-24} - N_{55-64} - M_{15-54}}{N_{25-64}}\right]$$

where

RR = the rural farm replacement rate

N = the number of rural farm males in 1940

M = the expected mortality over the 1940-1950 decade

The subscripts indicate the age classes included in each case.

** Conrad Taeuber, "Replacement Rates of Rural Farm Males Aged 25-69 Years, by Counties, 1940-1950." Washington: U. S. Department of Agriculture, Bureau of Agricultural Economics, 1944 (Mimeographed).

LR The labor force growth rate, 1940-1950, where

$$LR = 100 + 100\left[\frac{N_{15-24} - M_{15-54} - N_{55-64} - E_{25-54}}{N_{25-64}}\right]$$

N is the 1940 number of white farm male persons, M is the expected mortality of white farm male persons during the ten year period, E the absolute number of migrants from agriculture as earlier defined. The subscripts indicate for each component the ages included (e.g., N_{15-24} is the number of white farm male persons aged fifteen to twenty-four inclusive in 1940).

This variable, a labor force growth rate which takes account of out-migration in the upper age groups, shows the relative pressure arising from indivisibilities in the farm labor market. If this variable is 100, it implies that over the ten year period the number of surviving youths aged 15-24 in 1940 will exactly equal the total departures from age group 25-64 resulting from deaths, increasing age, and migration from the farm population. If, for example, the first occupational choice of every farm youth, all things considered, were farming, and if farm youths always had first choice of vacancies, and if for some reason the number of jobs in agriculture were necessarily constant, this labor force replacement rate would be a major factor determining the rate of off-the-farm migration in the 15-24 (1940) year age group over the ten year period. This is not the kind of behavior economists like to suggest in the analysis of free labor markets, yet there is sufficient attention paid to the notion that farm youth is forced off the farm ("father had five sons and only one could stay on the farm") to make the introduction of this variable interesting. Notice that this "indivisibility" argument, for that is what it is, implies that, other things being equal, the higher the labor force replacement rate, the higher the expected rate of migration from agriculture. Such

implications are further discussed in the light of empirical findings which follow.

LL The 1940 farm operator family level of living index.* This index is a proxy for the income of farm families. It is based on four variables: the percentage of farms with automobiles, the percentage of farms with electricity, the percentage of farms with telephones, and the average value of farm products sold, per farm reporting, in the year preceding the last Census enumeration.**

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* U. S. Department of Agriculture, Bureau of Agricultural Economics, "Farm Operator Family Level of Living Indexes," Washington, May, 1952.

** The use of this index series as a measure of farm income is common, perhaps because of the difficulty of accurately estimating farm income for small areas. See, for example, Sheridan J. Maitland and Dorothy Anne Fisher, "Area Variations in the Wages of Agricultural Labor," U. S. Department of Agriculture, Technical Bulletin 1177, Washington, March, 1958. See also Donald J. Bogue, "Components of Population Change, 1940-1950." Miami: Scripps Foundation, 1957.

The introduction of this variable, as in the case of the farm income variables to follow, presumes that the level of farm income (or the level of the farm operator family level of living index) is a satisfactory inverse measure in this context of the income differential between agricultural and nonagricultural employments. The basis for this assertion is the realization that regional variation in nonfarm labor incomes is small when compared to that of nonfarm income, and therefore that the degree of error introduced by

the use of farm income to measure the differential between farm and nonfarm incomes is apt in turn to be small.*

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* Some support for this may be found in Morton Zeman, "A Quantitative Analysis of White-Nonwhite Income Differentials in the United States," unpublished Ph.D. dissertation, The University of Chicago, September, 1955. D. Gale Johnson, op. cit. also includes some discussion of this point. Zeman's work illustrates the difficulty of making inter-regional comparisons of the opportunity labor incomes of farm workers.

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dLL The percentage increase in the farm operator family level of living index between 1940 and 1950. If dLL is this percentage increase then

$$dLL = 100 \left[\frac{LL_{50} - LL_{40}}{LL_{40}} \right]$$

LL_{40} is the F.O.F.L.L. index in 1940 and LL_{50} the corresponding index for 1950.

Y Farm income per worker, 1939.**

** This variable and the two which follow are substitutes for the preceding pair. They are not used simultaneously in the analysis, but treated as alternative measures of the 1940 level of farm income and change in farm income during the 1940-1950 decade.

This series was developed for state economic areas from county data published in the 1940 Census of Agriculture. The basic farm income series available by counties is the Census of Agriculture reports of the total value of farm products sold, traded, and consumed on the farm. Estimates of government transfer payments to farmers were added to this Census series, and those specified farm

expenditures listed by the Census of Agriculture (excluding expenditures for hired labor) were deducted. The resulting figure for the state economic area was divided by an estimate of farm employment in that area to provide this measure of farm income per worker.*

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* In more detail

$$Y = \frac{1}{N_{40}} \left[VFPS + T + GTP - SFE \right]$$

N_{40} is a measure of farm employment in 1940 for the state economic area in question. Estimates of farm employment by counties are available from both the 1940 Census of Agriculture and the 1940 Census of Population. For several reasons, but mostly because of double counting of hired farm workers implicit in the enumeration of farm establishments underlying the Census of Agriculture, those estimates of the Census of Population are to be preferred. (See D. Gale Johnson and M. C. Nottenburg, "A Critical Analysis of Farm Employment Estimates, Journal of the American Statistical Association, Vol. 46, 1951, pp. 191-205.) Estimates of farm employment were obtained by state economic areas for 1940 by summing the appropriate county data from the Census of Population, counting a female as the equivalent of one-half a male, or full time, farm worker. This figure was corrected for the seasonal influence of the March enumeration with the aid of monthly farm employment data released in mimeographed form in Paul R. Walrabenstein's "Revision of Bureau of Agricultural Economics Farm Employment Series," Washington, U. S. Department of Agriculture, Bureau of Agricultural Economics, April 29, 1953.

VFPS + T is the sum of the relevant county totals of the value of farm products sold and traded in 1939, obtained from County Table XVII of Volume II of the 1940 Census of Agriculture.

GTP is an estimate of the total value of government transfer payments to farmers made as a consequence of farm operations. The value of such transfers is shown only for states or larger areas in "Cash Receipts and Value of Home Consumption, by states, 1924-1951," Washington, B.A.E., 1952. Each state total was allocated to state economic areas according to the value of farm products sold. In this instance, the average yearly value of government transfer payments for 1938, 1939, and 1940 was used instead of the total for 1939 alone.

SFE is the total of those specified farm expenditures, excluding expenditures for hired farm labor, listed for 1939 by County Table X of Volume I of the 1940 Census of Agriculture. Six such classes are listed: (1) food for domestic animals and poultry, (2) implements and machinery, (3) gasoline, distillate, kerosine, and oil, (4) building materials, (5) commercial fertilizer, and (6) liming materials.

This procedure is clearly neither consistent nor complete. Among other things, the list of farm production expenses is at the same time lacking and overly inclusive; data for gross farm income for 1939 are combined with employment estimates for 1940; one man is rather arbitrarily treated as the equivalent of two women in obtaining aggregate employment estimates; more consistency with regard to the pattern of agricultural production among regions of the county is implicitly assumed than can be justified; and perhaps most important, the 1939-1940 period is taken as representative of income levels at the beginning of the 1940-1950 decade in spite of the well known tendency for farm incomes in given areas to vary, sometimes substantially, from year to year. The imaginative reader should not have far to look for additional shortcomings. The procedure followed can be supported only in the light of the inadequacies of feasible alternatives. It is possible to do better for states. Existing data sources for counties make it very difficult to do much better on a state economic area basis. It is on this account that alternative measures of income are included in the over-all analysis.

For an interesting discussion of the problems which arise even at the state level, see D. Gale Johnson, "The Allocation of Agricultural Income," Journal of Farm Economics, Vol. 30, 1948.

W The arithmetic mean of the composite agricultural wage in 1939 and 1940 for the state containing the state economic area in question. This mean was calculated from unpublished data obtained from the Farm Income Branch of the Agricultural Research Service.*

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* See U. S. Department of Agriculture, Technical Bulletin 1177, Washington: U. S. Department of Agriculture, March, 1958. The composite agricultural wage is a weighted average of all forms of wages paid to hired farm workers (i.e., monthly, weekly, etc.).

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dY(s-a) The absolute difference in 1940 between farm income per worker for the containing state and the corresponding figure for the state economic area in question.**

** Farm income per worker defined as in variable Y above.

This variable, coupled with the preceding wage variable (W), was introduced to correct with state wage data the regional bias in the preceding measure of farm income per worker occurring because of incomplete information regarding farm production expenses. The state composite wage probably shows more accurately than this measure of farm income per worker (Y) the true labor income position of the state in question. These wage data are not, unfortunately, directly available by counties or by state economic area for the years considered. On the other hand, the incomplete specification of farm production expenses, though important when totally different agricultures are compared, may be less of a drawback when this farm income series is employed only to indicate the relation of farm income in the state economic area to that in containing state. This is the case when variables W and dY(s-a) are used jointly in the same multiple regression equation. This correction is, needless to say, less than perfect.

dW The ratio, multiplied by 10^3 of the 1950 state economic area composite farm wage rate to the 1939-1940 state composite wage rate defined (W) above.* In 1948, the United States Department of Agriculture changed from reporting composite farm wage rates on a monthly basis to an hourly basis. No correction was possible. The factor of 10^3 simply reduces the number of leading zeros in this variable. This variable, which is an alternate form of variable dLL, is designed for use in conjunction with variables dY(s-a) and W.

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* U. S. Department of Agriculture, Technical Bulletin 1177, op. cit.

NW A color correction factor defined as

$$NW = \frac{n}{(n+w)} \cdot (Yw - Yn)$$

where n is the 1940 number of nonwhite farm males aged 15-64, w is the 1940 number of white farm males aged 15-64, Yw is the state median wage and salary income of rural farm white families without other income, and Yn is the corresponding figure for nonwhite rural farm families. These medians were estimated from the Types of Families Reports of the Sixteenth Census of Population. The rationale for this correction factor is evident if the observed mean income in any area is thought of as the weighted average

$$\frac{n}{(n+w)} \cdot Yn + \frac{w}{(n+w)} \cdot Yw$$

If the mean level of white income is expressed as

$$\frac{n}{(n+w)} \cdot Yw + \frac{w}{(n+w)} \cdot Yw$$

then the differences between the two (a measure of the extent of the error introduced by using average income to estimate white income) is the correction factor cited

$$\frac{n}{(n+w)} \cdot Yw - \frac{n}{(n+w)} \cdot Yn$$

The use of medians is inappropriate, but only median income data are available by color for rural farm families in 1939, and then only by states. The correction was introduced because the migration of only white farm workers was considered while the income and wage variables are necessarily based on incomes for the entire farm sector.

Some Findings

Table 2 summarizes results obtained from regression equations fitted to several sets of common (among age groups) sets of independent variables built largely about the 1940 farm operator family level of living index (variable LL).* This table should not be difficult to read once the alphabetic coding

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* Regression coefficients presented in this paper were obtained with the aid of an IBM 650 data processing machine, and may be considered checked for accuracy. The computed standard errors and coefficients of determination were, however, calculated by hand and, at this time, have been spot checked only. Though every effort has been made to avoid errors, a few may, on this account, remain. As is argued in the text, it is the pattern of these findings which is striking. This pattern is accurately presented.

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of the independent variables is understood. The upper left hand cell of the table shows, for example, that when rates of migration from agriculture for rural farm white males aged 15-64 in 1940 are regressed on the 1940 farm operator family level of living index for the group of seventy state economic areas earlier described, the regression coefficient of the migration rate on the level of living index is -.055. The asterisk indicates that this index is more than 1.96 times its computed standard error, and the squared simple correlation coefficient is .14.** Similarly, the box second from the left in

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** Constant terms were included but their coefficients are not shown here.

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the top row indicates that when the migration rate for white farm males aged 15-19 (instead of 15-64) is regressed on the same independent variable, the regression coefficient jumps to -.121, and is again more than 1.96 times its computed standard error. The squared correlation coefficient becomes .28.

Table 2

Regression Coefficients: Migration Rates by Age on Selected Independent Variables

Independent Variables	Age Group 15-64	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
REGRESSION I:											
LL	-.055*	-.121*	-.094*	-.074*	-.048*	-.041*	-.024	-.013	.028	.139*	.137*
R^2	.14	.28	.28	.18	.09	.06	.01	--	.01	.19	.17
REGRESSION II:											
LL	-.053	-.129*	-.103*	.068*	-.066*	-.039	-.014	.021	.048	.172*	.130*
dLL	.002	-.006	-.007	.004	-.014	.001	.007	.027	.016	.026	-.005
R^2	.14	.28	.28	.18	.09	.06	.02	.02	.15	.20	.17
REGRESSION III:											
LL	-.074*	-.117*	-.096*	-.094*	-.069*	-.074*	-.050	-.040	.008	.073	.078
NW	-.071	.017	-.007	-.077	-.082	-.129*	-.101	-.108	-.076	-.258*	-.229*
R^2	.17	.28	.28	.19	.11	.11	.05	.03	.16	.27	.22
REGRESSION IV:											
LL	-.071*	-.124*	-.105*	-.088*	-.087*	-.072	-.040	-.006	.029	.107	.072
dLL	.002	-.006	-.007	.005	-.014	.002	.007	.027	.016	.027	-.005
NW	-.071	.018	-.007	.077	-.082	-.129	-.101	-.109	-.077	-.258*	-.229
R^2	.17	.28	.28	.19	.12	.12	.06	.04	.02	.27	.22

Table 2 (Cont'd.)

Independent Variables	15-64	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
REGRESSION V:											
H	.048	-.122*	.009	.006	.085*	.073	.103*	.144*	.115*	.040	.065
LL	-.069*	-.128*	-.095	-.088*	-.061*	-.067*	-.040	-.027	.019	.077	.084
NW	-.007	.027	-.008	-.081	-.088	-.134	-.109	-.119	-.085	-.261*	-.234
R^2	.19	.35	.28	.22	.18	.16	.14	.14	.20	.27	.23
REGRESSION VI:											
D	.013*	-.017*	--	.001	.014	.017*	.018*	.030*	.042*	.047*	.059*
H	.051	-.126*	.009*	.056	.088*	.076*	.107*	.151*	.125*	.051	.079
LL	-.066	-.132*	-.095*	-.088*	-.059*	-.063*	-.036	-.021	.028	.087*	.097*
NW	-.062	.011	-.007	-.080	-.076	-.118*	-.092	-.091	.047	-.217*	-.179*
R^2	.27	.40	.28	.22	.25	.25	.26	.33	.42	.49	.55
REGRESSION VII:											
H	.046	-.124*	.007	.055	.080*	.070	.103*	.147*	.117	.038	.057
LL	-.044	-.153*	-.102*	-.058	-.051	-.025	.006	.050	.071	.180*	.141*
dLL	.005	-.014	-.006	.008	-.008	.006	.014	.036	.024	.028	-.002
R^2	.17	.35	.28	.20	.15	.10	.11	.13	.20	.21	.18

Table 2 (Cont'd.)

Independent Variables	15-64	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
REGRESSION VIII:											
D	.015*	-.019*	--	-.002	-.014	.019*	.021*	.035*	.046*	.053*	.064
H	.052	-.132*	.007	.056	.086	.078*	.111*	.162*	.136*	.060	.084
LL	-.029	-.172*	-.102*	-.055	-.036	-.005	.027	.085*	.117*	.233*	.205*
dLL	.016	-.030	-.007	.010	.003	.021	.031	.064	.060	.071	.049
R^2	.26	.42	.27	.20	.23	.22	.25	.37	.36	.48	.54
REGRESSION IX:											
Y	-.002	-.011*	-.006*	-.003	-.001	-.001	.001	.002	.006	.012*	.014*
R^2	.04	.35	.17	.05	.01	.00	.00	.02	.01	.23	.28
REGRESSION X:											
D	.015*	-.012	-.004	-.003	.015*	.019*	.019*	.030*	.039*	.043*	.055*
H	.074*	-.057	-.056	.087*	.105*	.089*	.111*	.146	.101*	.003	.001
Y	-.003*	-.010	-.006	-.003	-.002	-.002	--	--	.005	.010	.012
R	.20	.39	.20	.12	.19	.19	.22	.31	.36	.42	.55
REGRESSION XI:											
P	-.033	-.041	-.007	-.026	-.045	-.057*	-.041	--	-.020	-.032	-.010
D	.020*	-.007	.008	.010	.021*	.025*	.024	.032*	.041*	.043*	-.058*
C	-.358	-.318	-.504	-.676*	-.443*	-.391	-.361	-.223	-.085	-.126	-.353
H	.087*	-.046	.077	.114*	.120*	.102*	.123*	.155	.103	.020	-.014
Y	-.003*	-.011*	-.007*	-.004	-.003	-.003	-.001	.001	.005*	.010*	.001*
R^2	.26	.41	.26	.23	.28	.27	.28	.32	.36	.42	.56

Table 3

Regression Coefficients: Migration Rates

by Age on Selected Independent Variables

Independent Variables		Age Group 15-19	Age Group 20-24
REGRESSION I:	LF	-.253	-.279*
	LL	-.148*	-.124
	R^2	.31	.34
REGRESSION II:	D	-.024*	-.005
	H	-.121*	.013*
	LF	-.436*	-.345*
	LL	-.160*	-.118*
	NW	.077	.045
	R^2	.47	.35
REGRESSION III:	P	.019	.033
	D	-.030	-.005
	C	.311	-.179
	H	-.137	.021
	LF	-.502*	-.342*
	LL	-.212	-.116
	dLL	-.027	-.004
	NW	.045	.075
	R^2	.50	.37
REGRESSION IV:	P	-.023	.009
	D	-.011	.006
	C	-.369	-.612*
	H	-.046	.073*
	LF	-.287	-.191
	Y	-.010*	-.006*
	NW	.154*	.152*
	R^2	.46	.32
REGRESSION V:	P	.045	.047
	D	-.008	.009
	C	-.184	-.515*
	H	-.084	.045
	LF	-.416*	-.260
	W	-.748*	-.395
	dY(s-a)	.005	.001
	NW	.057	.107
	dW	.020	.014
	R^2	.52	.34

* An asterisk indicates that the coefficient shown differs from zero by more than 1.96 times its computed standard error.

Table 4

Regression Coefficients: Migration Rates by Age on Selected Independent Variables

Independent Variables	Age Group										
	15-64	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
REGRESSION I:											
RR	.246*	-.132	.122	.177	.175	.106	.312*	.543*	.717*	.471*	.445*
LL	-.020	-.140*	-.077	-.049	-.023	-.026	.021	.066	.130*	.207*	.200*
R^2	.22	.29	.29	.20	.12	.07	.12	.18	.23	.26	.22
REGRESSION II:											
D	.014*	-.018*	.001	.001	.014*	.017*	.019*	.032*	.044*	.049*	.061*
H	.023	-.120*	-.005	.039	.071	.064	.076*	.095*	.046	-.015	.018
RR	.279*	-.058	.134	.176	.165	.122	.317*	.565*	.790*	.664*	.614*
LL	-.035	-.138*	-.081*	-.069*	-.040	-.050	-.001	.042	.115*	.160*	.165*
NW	-.09	.015	-.019	-.095	-.090	-.129*	-.119*	-.139*	-.113	-.273*	-.230*
R^2	.36	.41	.29	.24	.27	.27	.34	.49	.55	.60	.64

Table 4 (Cont'd.)

Independent Variables	15-64	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
REGRESSION III:											
P	-.026	-.001	.016	-.013	-.040	-.054	-.046	-.014	-.050	-.023	-.065
D	.019*	-.019*	.004	.008	.019*	.022*	.026	.039*	.054	.056*	.073*
C	-.33	-.008	-.489	-.650*	-.387	-.179	-.375	-.369	-.553	-.336	-.776*
H	.032	-.129*	.007	.058	.078*	.070	.089*	.119*	.069	.008	.043
RR	.314*	-.028	.190	.243	.221	.140	.350*	.562	.828*	.656*	.685*
LL	-.009	-.171*	-.070	-.031	-.023	-.017	.045	.116*	.186*	.237*	.241*
dLL	.0074	-.029	-.011	.004	.003	.018	.021	.046	.034	.050	.029
NW	-.045	.013	.048	-.010	-.045	-.122	-.074	-.087	-.043	-.227*	-.134
R^2	.40	.42	.34	.32	.38	.33	.41	.54	.61	.63	.69
REGRESSION IV:											
RR	.305*	.040	.256*	.297*	.259*	.192	.316*	.486*	.573*	.156	.203
Y	--	-.010*	-.004*	-.001	.001	--	.003	.006*	.011*	.013*	.015*
R^2	.21	.35	.25	.31	.11	.06	.14	.22	.30	.24	.29

Table 4 (Cont'd.)

Independent Variables	15-64	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
REGRESSION V:											
P	-.032	-.032	.002	-.021	-.045	-.063*	-.045	-.005	-.023	.009	.026
D	-.020*	-.006	.009	-.011	.021*	.024*	.024	.032*	.041*	.040*	.056*
C	-.383*	-.469	-.680*	-.770*	-.449*	-.306	-.301	-.157	-.057	.276	-.072
H	.040	-.066	.035	.070	.088*	.080*	.081*	.088*	.010	-.063	-.034
RR	.329*	.081	.231	.285*	.231*	.195	.328	.519*	.681*	.474*	.459*
Y	-.002	-.009*	-.004*	-.002	-.002	-.002	--	.002	.007*	.009*	.011*
NW	-.044	.087	.076	.009	.039	-.094	-.102	-.142*	.146*	-.360*	-.276*
R^2	.41	.44	.35	.32	.33	.32	.39	.49	.56	.57	.65

* An asterisk indicates that the coefficient shown differs from zero by more than 1.96 times its computed standard error.

The table is designed to be read across rather than up and down. The various regressions are listed in order of the number of independent variables included. At the outset, it should be clear that the regression analysis is intended as a descriptive rather than an analytic device in any single instance. Regression coefficients are used here, as are the t-tests and correlation coefficients, simply as a convenient and familiar short hand to concisely describe the nature of many empirical associations. The significance of these findings is not to be judged by the number of asterisks which can be found in this table, but rather by the distribution of asterisks throughout the table, and by the pattern exhibited by the observed values of the regression coefficients themselves.

This point can be illustrated by the first two rows of Table 2. Here results obtained by considering a single migration rate for the aggregate 15-64 age group are compared to those resulting when the ten five-year age classes therein contained are considered separately. It is not surprising to find that the "fifty-year" coefficient appears to show a kind of average of the ten less aggregative coefficients. But what is striking is that with one exception the regression coefficient on LL for the five year age classes increases with age. It is not only striking but also surprising to see positive coefficients for the upper age classes. The tendency for the coefficients to be directly related to age is consistent with the argument that a given income differential between two occupations is a more important factor to a younger than to an older worker. But this argument does not suggest that a higher than average level of farm income, while discouraging the farm migration at the younger age level, should turn about and be responsible for more rapid than average migration within the older age categories. This is, however, what row one of Table 2 implies.

It is perhaps some consolation that the positive association is small except in the two most senior age classes, and when the 1950 ages of persons 55-64 in 1940 are considered it is apparent that a substantial element of retirement is involved. It is the wealthy not the poor from agriculture who can seek in retirement the comforts of urban facilities or the climates of more attractive locations. It is interesting that the tendency for retirement to be a superior good is so clearly present in even these crude statistics.

This pattern continues throughout the analysis. The introduction of variable dLL, the percentage increase in the farm operator level of living index over the decade in question, appears neither to add nor detract from the foregoing.* Similar results follow the introduction of the color correc-

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* This is consistent with the result of an earlier though quite different analysis of mine. There I argued that the pattern of regional income variation in agriculture, which is striking, was not significantly (in an economic, not a statistical, sense) altered during the 1940-1950 period -- that the relevant income variable appears to be the basic level of income at the beginning of this period. See Charles H. Berry, op. cit.

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tion factor, variable NW, in the third regression shown by Table 2. Note that the negative sign expected (when the color correction factor is large, the observed measure of income understates more heavily the true level of income of white workers, hence a lower rate of out-migration is anticipated) is generally, though not always, observed. Over-all, here and elsewhere in the tables, improvement in fit resulting from the use of this color correction is disappointing.

These remarks are not inconsistent with the coefficients of Regression IV. Here the two added variables are jointly introduced. Although little insight

seems to be gained at this level from these two factors, it should be noted that the regular pattern of change in the coefficients among the age groups is again present. The fifty-year class once more shows what appears to be "average" behavior.

On the other hand, variable H, the ratio (as a percentage) of the number of hired farm workers to the number of farmers and farm managers is more interesting. Again some association between the nature of the response to this factor and the age of the group considered is implied. In addition, there is, especially within the younger age groups, a marked tendency for closeness of fit, as measured by the multiple R^2, to improve. While the temptation to see too much in these individual coefficients must be resisted, it should be noted that for the youngest age class (15-19), the coefficient on variable (H) is negative, implying that the more heavily the labor force in the area is weighted with hired as opposed to self-employed farm workers the lower the rate of off-the-farm migration observed. In no other age group is this the case, and indeed until age group 55-59 is reached there is a tendency for this coefficient to increase quite regularly with the age of the labor force.

It is perhaps only intriguing to speculate that this tendency for the coefficient of this labor force factor to be negative at the very bottom age groups may be explained by arguing that the ready availability of hired farm work in the neighborhood acts as a deterrent to city-ward migration on the part of the very young who probably still live at home -- while quite the opposite is true for older persons, where self-employment here seems a deterrent to migration. This tendency for marked differences both in the direction, sensitivity and fit, between the age classes must be taken more seriously as the pattern re-appears with regularity.

This is again evident in Regression VI when variable D, the distance in miles to the nearest city of one hundred thousand or more persons, is added. Once more the only negative coefficient on the new variable appears for the 15-19 age group. In this case, however, this is the only instance in which the coefficient corresponds to what the earlier argument with respect to motivation implies. The shorter the distance to the nearest major city the more exposed the rural area to the city, the more readily farm youth moves to nonfarm employment. This, however, appears to be true only for workers who succumb as youths to the lure of a nonfarm labor market. Otherwise the reverse is the general rule. This is perhaps due to a quirk of the data on which this analysis is based. These data count a migrant only if a physical move from a farm residence is made. In spite of an effort to select areas in which a city-ward occupational move would require such a residential move, some divergence, though hopefully a minor one, between the two undoubtedly remains. On this account it may be that in areas close to large urban centers, established heads of farm households who make the occupational move find it possible to avoid the residential move, whereas this is not a feasible alternative for more distant colleagues. If it were possible to isolate the association between purely occupational moves and this distance factor, a negative relationship might be obtained. With the methodology of this paper, however, the negative coefficients in Table 2 for the youngest or younger age groups may reflect only that a geographic move is less costly for younger unmarried individuals.

Consider, on the other hand, the coefficients of this regression for the 15-64 age class. The ability of aggregates to be misleading becomes evident. Coefficients obtained in this case (Regression VI) for the ten five-year age

groups suggest that at younger age levels a dominant if not the dominant factor underlying occupational choice is farm income.* Further, it is suggested

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* Farm income is measured by the 1940 farm operator family level of living index.

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that a negative association between the migration rate from agriculture and the distance to the nearest major city can be anticipated at these, the most mobile, ages. One might almost go so far as to argue that within the youngest age group migratory decisions, as measured by these data, appear to fit a rational economic model of the labor market. Yet, when migration rates for the entire fifty-year age group are examined, relative incomes have lost their impact -- distance becomes the major force, and the association is positive, not negative. The truth of the matter seems to be that mixing together motives both of retirement and of employment, and employing data for which accuracy varies with age, produces results that not only are unreliable in themselves but which lean towards conclusions opposite to, or at least contradictory with, those produced by a less aggregative approach.

Regressions VII and VIII are variations of those presented earlier in the table and are generally similar in their implications. The last three regressions of Table 2 are built about independent variable Y, farm income per worker in 1939. This variable is an alternative to LL as a measure of the initial or base level of farm income. The framework of the coefficients is consistent with those outlined earlier. It seems, at least superficially, that of the two (Y and LL) the farm operator family level of living index is the more satisfactory explanatory variable. Once again, however, the purpose of this paper is a comparison of the behavior of persons of different ages and

not, at this time, an evaluation of the relative merits of alternative measures of farm income. In general, the two behave in similar fashion. With respect to variables D and H the break here between the behavior of older and younger persons is less abrupt, though quite as clear over-all.

Variables P, the size of the nearest major city, and C, the number of "neighboring smaller cities, are introduced for the first time in Regression XI. Almost no improvement in fit follows the addition of these two variables. Indeed, in each instance the signs, which are negative, are opposite to those expected. It is possible to rationalize this in at least one case by the same type of logic applied in the case of the positive coefficient obtained for the distance variable D. In view of the negligible association observed, however, this scarcely seems appropriate. The more interesting feature is the sharp rise of both the regression and correlation coefficients between the 15-64 and 15-19 age groups when Regressions IX and X are fitted. The aggregation effect outlined earlier is more apparent here than elsewhere.

Table 3 contains the coefficients obtained with five different explanatory equations each containing variable LR, the labor force replacement rate. If the pressure of an increasing farm population on limited employment opportunities in agriculture is an important factor underlying off-the-farm migration, a positive coefficient on LR would be expected. This would imply a positive association between the surplus of potential farm employees (over the existing level of employment in agriculture) and the number of off-the-farm migrants.* The coefficients on variable LR in Table 2 are in every case

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* As earlier argued, this variable is logically appropriate only for the two youngest age groups.

negative, lending little support for the theory that a substantial part of the regional variation in the rate of the farm migration may be directly explained by the push of a growing labor force against a fixed level of farm employment.

On the other hand, these coefficients, while negative, do result in some substantial improvement in the fit of these regression equations. Superficially, it may perhaps be supposed that the negative significant coefficients imply that the same factors contributing to a rapid rate of off-the-farm migration among older persons also contribute to a high rate among the two younger age groups.* Another way of putting this is that the negative coefficients

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* The number of older migrants from agriculture enters negatively into the construction of LR.

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suggest that if the same equations but with LR deleted (as in Table 2 for example) were fitted to all ten age groups, there would be positive associations among the residuals of the ten equations. Some spot checking shows this indeed to be true. At least one implication is that additional explanatory factors not considered by these regressions exist -- variables to which all age groups react in similar fashion.**

** Note that Regression V of Table 2 includes the alternative income variables W, dY(s-a), and dW. The pattern here is not different. Some fair degree of association with the 1939 state level of farm wages (W) appears -- dY(s-a), a state to state economic area correction factor, and variable dW, the growth in the area wage over the original state wage during the ten year period, are less important. This is consistent with Table 2.

Table 4 shows the effect of substituting a more conventional rural farm male replacement rate (RR) for the rather controversial labor force replacement

rate (LR).* Since expected mortality is a function of the age distribu-

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* The difference between RR and LR is only that the number of migrants of age 25-54 (E_{25-54}) are subtracted from the numerator in the construction of the latter. In terms defined earlier

$$RR = 100 + 100\left[\frac{N_{15-24} - N_{55-64} - M_{15-54}}{N_{25-64}}\right]$$

$$LR = 100 + 100\left[\frac{N_{15-24} - N_{55-64} - M_{15-54} - E_{25-54}}{N_{25-64}}\right]$$

---

tion of the base population, the replacement rate (RR) may be considered a measure of the age distribution of the potential farm labor force in the area considered.

Table 4 is intended to do two things. On the one hand, it shows for the two younger age groups, 15-19 and 20-24, the effect of eliminating the tie to the migration pattern in the older age groups implicit in the use of variable LR. For the younger of the two groups (15-19) the coefficient on the replacement rate is negative as in the case of the analogous variable (LR). Its size, however, is substantially reduced. This coefficient is positive for the 20-24 age group. For the remaining age categories, when comparison is made with the corresponding coefficients of Table 2, it seems generally evident that virtually no improvement in fit results from the addition of the replacement rate. This is not contrary to what would be expected. The relative size of the potential increment to the farm labor force ought neither to induce nor to deter the out-migration of established farm persons.

On the other hand, it is interesting to compare, in Table 4, the results of the extreme left hand age column, the 15-64 groups, with the more responsive

younger five year age classes. For the 15-64 aggregation, the replacement rate variable displays an asterisk and the expected positive sign in every instance. The income variable, variable LL or Y as the case may be, in no instance shows an asterisk, and in terms of the response shown by the two neighboring age columns is consistently low. In one case a rounded coefficient of zero is entered. Given the pattern of the component age categories, this is not surprising. An almost complete reverse of this situation is shown by the 15-19 and even by the 20-24 age groups. The contradiction is striking evidence of the tendency for migration rates computed by wide age categories to disguise and even to hide a response to economic factors which are important but which may readily be overlooked or dismissed unless the age factor is carefully examined.

Table 4, as in the two preceding tables of coefficients, also contains its share of puzzles, especially at the upper age levels. It should be remembered that the retirement element is present. With the construction of the replacement rate, however, it would be surprising indeed if high positive correlations for the oldest age classes did not appear. The tendency of coefficients on variable C (the number of nearby smaller cities) to be negative and significant in the middle age groups, is first evident in Regression XI of Table 2, is again present. Perhaps this, as well as other contradictions which can be found or imagined with little effort, ought to be left for reconciliation to the reader's ingenuity. It is, however, perfectly true that when more than a few, and perhaps a very few, of these variables are introduced simultaneously, the resulting multicolinearity makes any serious attempt at careful interpretation of individual results tenuous to say the least. It is on this account that more use has been made of variables D, H, LL, and Y,

with the introduction of the more special variables RR and LL, than would be expected given the long list of explanatory variables initially presented. These variables (D, H, LL, Y, LR, and RR) have somewhat arbitrarily been considered the more "basic" ones in this endeavour.

The results presented here are not a selection from a much larger group, but include almost all regressions fitted in a first attempt to show the age effect in occupational migration from agriculture. Rather than select from these results, all have been reprinted here to allow the reader to look for evidence which may be relevant to interpretations this paper has not considered.

Concluding Remarks

This paper is concerned with the effect of distance, self-employment, farm income, and the pressure of an increasing farm labor force, upon the farm to nonfarm occupational migration of white farm male persons of different ages during the 1940-1950 decade. Each age class was considered separately. In general, results for the younger age classes appear to fit the conventional mould. Migration rates are higher the nearer a large neighboring city and the lower the prevailing level of farm incomes, however measured. The ready availability of farm employment acts as a deterrent to off-the-farm migration by the youngest class of farm persons, though the opposite effect, presumably reflecting the impact of self-employment, is evident for older age groups. There is no evidence in these findings that the pressure of a rapidly increasing farm labor force tends to encourage a disproportionately high rate of off-the-farm migration in the younger classes.

This pattern is not found throughout all ages considered. At the upper age levels low farm income is associated with a lower than average rate of city-ward migration. The influence of retirement is probably responsible.

Similarly, older workers, and indeed those of intermediate ages appear to be discouraged, whereas younger workers were encouraged, by the size of a nearby nonfarm labor market -- the larger the city the lower the rate of migration. And again, at both intermediate and older age levels, the further away that city the more, rather than less, rapid the out-migration from agricultural employment. This last is perhaps a consequence of the disadvantages of purely rural retirement, and possibly of the lack of part-time nonfarm employment in farm areas far removed from urban centers. In the latter case, this argument could readily be tested were better occupational data available.

The degree of explanation obtained for the middle age groups is far less than that for either extreme. Multiple correlation coefficients were high, for this type of work, for both the youngest and the oldest groups. Not only is closeness of fit much lower for the intermediate or middle groups, but the plausibility of the explanation also seems, for the most part, rather poor. Income levels cease to be significant, or take on positive coefficients at younger age levels than would be thought appropriate. A disproportionate emphasis on the self-employment variable appears. The rather consistent significance of a positive coefficient on distance is probably, as noted, due to shortcomings of the raw data upon which the analysis is based. Summing up, these results suggest some success in the explanation of moves by the two most mobile groups -- the younger noncommitted and the older groups where urban retirement appears to be a major goal. Variation in rates of off-the-farm migration by farm workers of intermediate age groups fits these models less well.

The findings do, however, very strongly support the contention that, in an analysis of this sort, the behavior of individuals of different ages ought not to be lumped together. The assertion that individuals of different ages

may be assumed to react similarly to common incentives is contradicted. When migration rates are computed for the broad age group 15-64, and when these rates are in turn regressed on the various sets of independent or explanatory variables, not only is the degree of explanation sharply reduced, but the tendency of the effect of age to predominate becomes clearly apparent. Coefficients obtained for the individual age groups do provide insights to the impact of several plausible variables in the determination of occupational migration from agriculture. But when the age breakdown is abandoned, not only is this insight lost, but the likelihood of rejecting the argument that, for example, farm income is a significant variable in this context in favor of the over-riding influence of age is substantially increased. It is reasonable for a variety of causes to argue that workers of different ages will respond in different ways to varying incentives or deterrents to migration. Without a more detailed understanding of this interaction, it is not reasonable to proceed without separate consideration of individual and narrow age classes. This is the major theme of this paper.

A number of criticisms can easily be applied. The ten year period considered is far from ideal. A decade is too long a period for this type of analysis, and a decade which did not contain World War II would certainly be preferable.* A more recent period would perhaps be more interesting and certainly more topical.

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* A shorter period would permit an analysis similar to that of this paper without raising to the same degree the question of whether the rate of migration has not, for example, as much determined the level of farm wages as vice versa. This issue of identification is in large part ignored with the implicit assumption that the rate of migration during these ten years was, in terms of the effect of other factors, of minor importance in the determination of farm wages or income. Put differently, this assumption argues that whatever influence the rate of migration from agriculture did have upon the regional

distribution of farm wages was small in terms of the initial and final disequilibria observed. This assertion is to some extent supported by the lack of a measurable net association between the rate of migration and the change in farm income during the decade. The argument could be made more comfortably if based on a period considerably shorter than ten years.

Secondly, it must be conceded that such occupational data as are available for agriculture are highly suspect. In large part this can be attributed to the difficulty of closely defining the farm industry. This is in no small way a consequence not only of the varied activities which agriculture encompasses, but also of the prevalence of part-time and non-commercial operations which border on all of what can be called commercial agriculture.* Even the

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* The fact that even commercial farming includes many quite different types of activity, ranging for example from Connecticut or Arkansas broiler production, through the small grain production of the Great Plains all the way to the citrus fruit production in California, is another clear drawback of the cross-section on which this study is based. The hired hand in the plain states may be more akin to the urban truck driver than to hired farm labor in the southeast.

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very excellent migration analysis of Mrs. Bowles is at best a limited compromise when forced into the context of this study of age and occupational migration. It is ironic that the best approximation of a measure of occupational migration by age is possible for that industry, agriculture, where, of all major occupational classes, the least satisfactory empirical definition of the occupation itself, of the level of employment, and even of the terms of employment, are available. In many ways it is a pity that this analysis could not, for example, have had the advantage of just a few of the refinements of measurement which are a feature of urban as opposed to rural labor markets.

At the same time, however, the regression coefficients here reported are not without impact. While it may be easy to question the validity or meaning

of any single result, the entire pattern of findings is highly suggestive. The fact that the industrial base is agriculture is far from irrelevant. For a long time it has been commonplace to find references to the immobility of farm labor as the clear explanation for what has come to be called under-employment of farm labor, the chronic low level of income which has affected many agricultural areas of the southeastern states. While on the one hand such a statement must be tautologically valid, it is also true that the pattern of response or mobility implied by Tables 2, 3, and 4 is surely not inconsistent with a rational form of migration. Indeed it may be argued that the crudity of this methodology implies not that these results ought to be discounted but rather that they should be considered to imply that even more striking evidence of the role of age in the process of occupational change might be forthcoming with more suitable data and with the application of a better planned analysis. Perhaps these findings ought not to be thought to bear as much on our knowledge of the city-ward migration of farm persons as upon the justification for a greater use of those micro-data which the Census of Population can provide.

With new data from the 1960 Census, with existing data from the 1950 Census, and with increased access to data processing equipment, it should prove feasible to extract cross-sectional age distributions for both 1950 and 1960 for a variety of occupational classes. Given this information, it would not be difficult to construct accurate measures of occupational migration during this more recent decade for each occupation class included, and, hopefully, to make use of an age-specific analysis similar to this one. In addition, there would perhaps be the advantage of more rigidly defined occupations, improved or more accurate wage information, a more accurate definition of the terms of

alternative employments, and finally of the extension of this kind of analysis not only beyond agriculture but also into the more recent decade. Very little is known of the process of occupational selection or migration. Occupational age distributions by municipalities or narrow regions for two points in time, when combined with other labor market information readily available, would permit a more than satisfactory first step to be taken. These data are for the first time available in a form which would make such work feasible. It is to be hoped that the opportunity for a further analysis of the behavior of narrow age classes by occupation will not be overlooked.

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