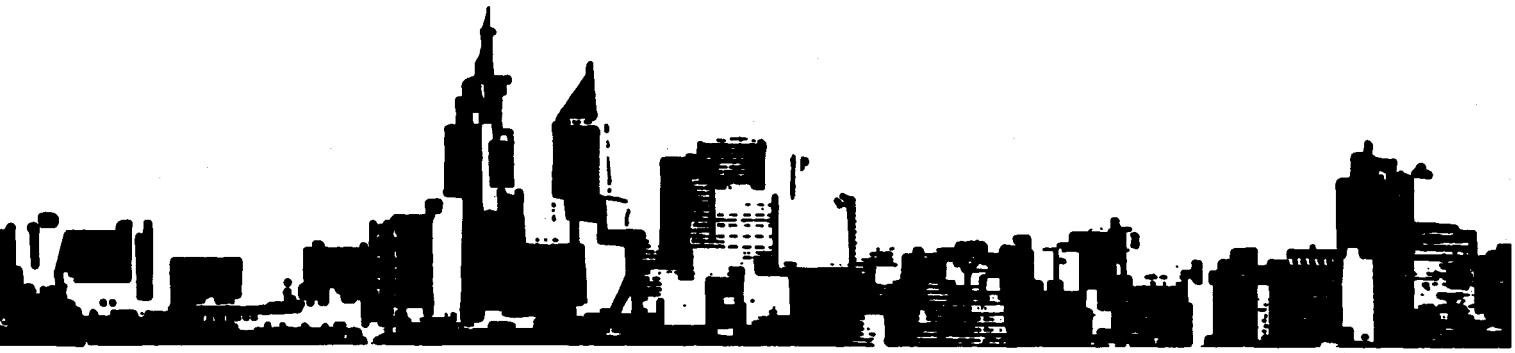
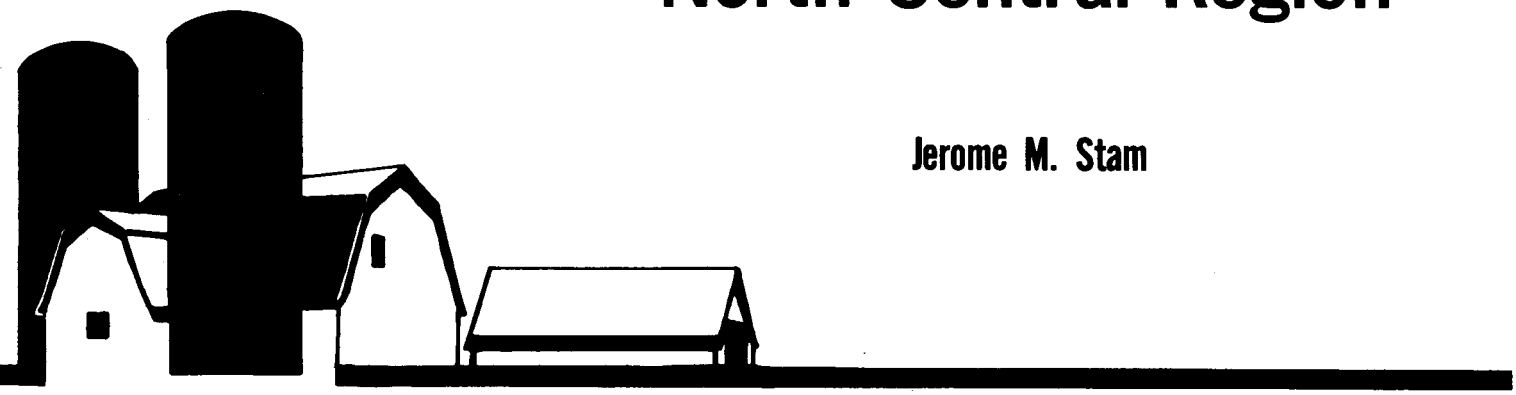
Economic Study Report No. S69-3

July 1969



Farming Opportunities for Rural Farm Youth in the North Central Region



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In cooperation with
Economic Development Division Economic Research Service
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by

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FARMING OPPORTUNITIES FOR RURAL FARM YOUTH IN THE NORTH CENTRAL REGION

Jerome M. Stam*

Perhaps no topic interests people concerned with agriculture as much as the chance young men have to enter farming as an occupation. The continual decline in the number of farms and decrease in farm population since 1920 intensify the interest. This decline numbered 553,000 farms, or 14.9 percent, in the United States between 1959 and 1964. In 1964, the nation had 3,158,000 farms, the lowest total since 1870. Moreover, farm numbers have continued to decline since 1964.

Facing this decline, many efforts have been made to determine male farm youths' opportunities to become farmers. Results have varied widely due to the different estimation techniques and the investigator's particular interest and viewpoint. The assumptions and definitional problems in making such estimates have caused additional difficulties. For example, people with different interests have trouble agreeing on a definition of a farm, an "adequate" farm size, a farm opportunity, projected farm numbers, farm consolidation rates, farmer retirement rates, capital requirements, or off-farm migration rates caused by nonfarm job opportunities. However, these variables are crucial in many farm opportunity studies. Thus it is no surprise that reports of farming opportunities for youth vary widely.

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The purpose of this report is to shed light -- using a simple estimation technique requiring a minimum of assumptions and basic data -- on the question of farm opportunities for youths. Undoubtedly the most straightforward method which fills this requirement is the replacement ratio approach. Replacement ratios for a given period depend on two numbers: (1) the number of young men in the farm population who can be expected to reach the entrance age of the working age group under consideration and survive to the end of a given time period (usually a decade), and (2) the number of men of working age who are expected to die or reach retirement age during the same time period. 1/ These numbers are estimated easily, and the method eliminates estimating such things as rural-farm migration, and farm consolidation rates. For example, the expected number of deaths during the decade and the number still living can be approximated by using the appropriate survival rates, if the number of persons in each age is known for the beginning of the period. Replacement ratios serve as useful indicators of areas of potential over and under-supply of labor, but do not permit an independent evaluation of all the economic trends which affect the demand for and supply of young, potential farm operators. In order to do this other factors also must be considered. Thus, a number of other potential influencing factors not included in the replacement ratio approach employed in this report will be discussed later.

1/ Gladys K. Bowles and Conrad Taeuber, Farm Population, Series Census - AMS (P-27), No. 22, (Washington, D.C., U.S. Government Printing Office 1956) p. 1.

Throughout this report the farm replacement ratios are reported as the chance that a single, individual farm youth has of obtaining a farm. Moreover, the focus is on the 12-state North Central Region, which had 46.0 percent of the nation's commercial farms in 1959 and 46.1 percent in 1964. The years 1959-60 and 1964-65 serve as the beginning points of the two decades which will be considered. 2/

Number of Farms

Both the 1959 and 1964 Censuses of Agriculture define a farm as a place of 10 or more acres where the estimated sales of agricultural products for the year were at least $50. Places of less than 10 acres were counted as farms if the estimated sales of agricultural products for the year were at least $250. 3/

In 1959 and 1964 farms were grouped into two major categories, commercial farms and other farms (i.e., part-time, part-retirement, and abnormal), mainly on the basis of total value of farm products sold. Generally, all farms with a value of sales of $2,500 or more were classified as commercial. Farms with a value of sales of $50 to $2,499 were classified as commercial if the farm operator (1) was under 65 years of age, (2) did not work off the farm 100 or more days

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2/ The replacement ratio technique was used earlier for Michigan farm youths for the decade following 1959-60. See Lester V. Manderscheid, "Farm Careers for Farm Youth," Michigan Farm Economics, No. 244, Michigan State University, (East Lansing: Department of Agricultural Economics, May, 1963), pp 1-2.

3/ Places having less than the $50 or $250 minimum estimated sales also were counted as farms if they could be expected normally to produce agricultural products in sufficient quantity to meet the requirements of the definition. This allows for drouth, floods, and other disasters.

during the year, and (3) the income that he and members of his household received from nonfarm sources was less than the total value of farm products sold. The remaining farms with sales of $50 to $2,499 were included in one of the three groups of other farms.

In both census years, commercial farms were divided into six economic classes based on the total value of all farm products sold, as follows:

Class of farm	Value of farm products sold
I	$40,000 or more
II	$20,000 to $39,999
III	$10,000 to $19,999
IV	$ 5,000 to $ 9,999
V	$ 2,500 to $ 4,999
VI 4/	$50 to $ 2,499

Both censuses categorize each state's farm operators by age and economic class of their farms. Unfortunately, age data by class of farm are not readily

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4/ Provided the farm operator (1) was under 65 years of age, (2) did not work off the farm 100 or more days, and (3) the income that he and members of his household received from nonfarm sources was less than the total value of farm products sold. In 1964 criterion (3) was discontinued resulting in additional farms classified as class VI that year than in 1959. To make the data comparable between 1959 and 1964, the class VI totals for 1964 are reduced throughout this report by the estimated percentage of 1964 class VI farms which had income from other sources greater than the value of farm products sold. See table 17 of the 1964 Census of Agriculture for the actual data.

available for areas smaller in size than a state. [5/] However, it is possible to use the age categories for each state and, by applying the appropriate survival rates, determine the number of farmers in each age category who will not survive 10 years. Thus the number of farms becoming available annually due to death can be estimated.

The mortality rates which are used throughout this report are derived from the 1959-61 life tables published by the United States Public Health Service. [6/] The mortality rates are for white males in the case of each North Central Region state and for total males for the United States. Data on white males are used for each of the North Central States because of the low percentage of nonwhite farm operators. In these states, for example, the highest percentage of nonwhite farm operators in 1959 was 0.9 percent in Missouri and in 1964 1.0 percent in South Dakota.

5/ The Economic Development Division, Economic Research Service, U.S. Department of Agriculture, has obtained from the Bureau of the Census 1959 and 1964 age data by class of farm for the 220 state parts of the 99 U.S. agricultural subregions. However, "... the data are classified partly because they have not been published by the Census Bureau, and partly because certain revisions and corrections made in the state data have not been carried through to the state part tables." (Letter to the author dated March 28, 1968 from Edward J. Smith, Assistant to Director, Economic Development Division). "Since the data in these tables have not been published they are available for administrative use only." (Memorandum to all Economic Development Division personnel dated April 1, 1968 from Edward J. Smith.)

6/ U.S. Department of Health, Education, and Welfare, Life Tables: 1959-61, Public Health Service Publication No. 1252, Volumes 1 and 2, (Washington: U.S. Department of Health, Education, and Welfare, 1964-1966).

Rural Farm Youths

In 1960, the Census of Population defined the rural farm population as those persons living in rural territory on places of 10 or more acres from which sales of farm products amounted to $50 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. This farm definition is essentially the one used by the 1959 and 1964 Censuses of Agriculture, except that it excludes urban farms. Because the Census of Population definition of farm population is based on place of residence it excludes farm operator households who do not live on their farms, and includes nonoperator households living on their farms, so long as they are not merely renting a house for cash.

In 1960, there were 64,998 male rural farm youth aged 10-19 in Minnesota according to the Census of Population. 7/ This means that approximately 6,500 were attaining employable age each year during the following decade. To be strictly correct in replacement ratio analysis, this figure should be adjusted downward by the percentage of 10-19 year old males who do not survive to the end of the decade. However, the mortality rate for 10-19 year old males in the United States was 1.3 percent per decade in 1959-61. This figure is insignificant on an annual average basis and is not considered in the forthcoming analysis. Moreover, it is even lower for white males in North Central Region.

In this report farming opportunities during the next decade, based on data derived from the 1959 Census of Agriculture, and survival rates will be compared

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7/ Table 37 of the 1960 Census of Population, General Social and Economic Characteristics.

with the 1960 Census of Population figures for 10-19 year old rural farm males on an annual basis for the same period. The 1959 Census of Agriculture was taken in October and November 1959 while the Census of Population was taken in April 1960.

Because no population census has been taken since 1960, it was necessary to project the numbers of 1960 10-19 year old rural farm males and then compare with the number of commercial farms in 1964 (the latest Census of Agriculture year). Since the Census of Agriculture was taken in November and December of 1964, the 10-19 year old rural farm male population was projected to April 1965 for each respective North Central Region state in order to make the relationship comparable with 1959-60 situation. 8/

8/ This projection is the only one required in this report and was done in the following manner. Because no census data on farm population after 1960 are available, the estimates are based on figures published jointly by the U.S. Departments of Agriculture and Commerce. See (1) U.S. Department of Commerce and U.S. Department of Agriculture, "Farm Population of the United States: 1965," Current Population Reports, Farm Population, Series Census-ERS, P-27, No. 36, April 1966; (2) U.S. Department of Agriculture, "Farm Population -- Estimates for 1965" ERS-286, April 1966; and (3) U.S. Department of Agriculture, Farm Population: Estimates for 1910-62, ERS-130, October 1963. According to their estimates, the total farm population in April 1965 was 79.1, 83.1, and 77.5 percent of the April 1960 total farm population in the United States, East North Central Region, and West North Central Region, respectively. No estimates are available directly for the 10-19 year old rural farm male age group for the North Central Region. However, for the United States as a whole the April 1965 rural farm male population age 14-19 was estimated to be 83.4 percent of the April 1960 population of this same age group. While this figure is not exactly for the 10-19 age group, it serves as a useful proxy since it represents the important older spectrum of this group. Moreover, it indicates that the rural farm male population age 14-19 has declined somewhat more slowly than that of the total rural U.S. farm population between 1960 and 1965. The comparison is 83.4 percent for the 14-19 year old males compared with 79.1 for the total rural farm population for the United States. The ratio between these two rates (83.4 divided by 79.1) is 105.4 percent. Thus, to estimate more closely the situation in the North Central Region, both the 83.1 and 77.5 percent figures for the respective East North Central and West North Central Regions were multiplied by 105.4 percent. The end result is that rural farm males age 10-19 in April 1965 are estimated to have been 87.7 and 81.7 percent of their respective April 1960 levels in the East North Central and West North Central Regions. These two percentages are used in making all 1965 10-19 year old male rural farm youth projections for the various North Central Region states.

Replacement Ratios

Sufficient data have now been developed on which to base replacement ratios. One of the big problems in farm opportunity analysis traditionally has been in deciding what is meant by an opportunity to farm. Is a farm which grosses $2,500 annually from sales of farm products a real opportunity? A gross farm income of $10,000 or more per year could be defined as an adequate sized farm in 1959. It would have afforded a level of living comparable with that experienced by the nonfarm sector of the economy in that year. In Minnesota 38,042 farms fit into this category in 1959. Table 1 shows the number of Minnesota farmers in each age group grossing at least $10,000 in 1959 and gives information about the likelihood of their death or retirement during the next decade. The only assumption about retirement is that all farm operators age 65 years old and over in 1959 would retire within 10 years. Based on these premises, some 5,165 replacements would be needed in 10 years or 517 per year. Thus approximately one farm boy in 12.6 will have an opportunity to obtain a class III or larger farm in Minnesota during the 10-year period beginning in 1959-60.

Table 1. Opportunity in 1959-60 for a Minnesota male rural farm youth to obtain a class I through III farm during the following 10 years.

Age of operator	Number of operators 1959	Percent not surviving 10 years	Needed replacements
Under 25	681	1.0	7
25-34	7,629	2.0	152
35-44	12,228	5.1	624
45-54	10,064	12.6	1,268
55-64	6,101	29.1	1,775
65 and over	1,339	100.0	1,339
Total needed during next 10 years			5,165
Annual need			517
Number of rural farm males reaching employable age each year			6,500
Proportion with an opportunity to farm			1 in 12.6

If, however, all farmers retire at age 65, the replacement need for the decade would be 9,491 new farmers; for each year 949. In this case, a Minnesota farm boy would have one chance in 6.8 of obtaining a class III or larger farm during the decade. But if this assumption were true, replacement needs would drop significantly in 10 to 20 years from the 949 rate because the disproportionate number of farmers now in the older age group would have retired. Thus this assumption appears to be unrealistic. Moreover, despite Social Security all farmers do not retire at age 65. Instead, the present effect of the Social Security program for farmers is mixed in its influence on retirement plans. When Social Security was extended to farmers for the first time in 1955, many older farmers moved toward early retirement. However, over the years many farmers with large units have not retired at age 65 under the provisions of the Social Security program, because it limits annual earnings from farming operations (including management and wages, but not rental income) to $1,680 until age 72. Thus farmers with small farms tend to retire (or semi-retire) at age 65 under Social Security, and in many cases, farmers with large units, have waited until age 72 to apply for benefits. Younger farmers consolidate many small farms with large units, but the process is delayed often for several years before the large units become available under the present Social Security program structure. This makes the assumption that all farmers retire at age 65 even more unlikely.

Iowa State University suggests that 1½ percent of all farm operators under 55 years of age leave farming annually for reasons other than retirement, i.e. death, health, financial, general dissatisfaction, etc. 9/ A University

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9/ This work was done by Professor Clarence Bundy, Department of Agricultural Education, Iowa State University, Ames.

of Nebraska effort utilized this finding and, in addition, assumed that one-half of all operators aged 55-64 will retire or die within a 10-year period, and that all 65 and over will either retire or die within a 10-year period. 10/ It may be tempting to apply these findings, but they are based on limited survey work in Iowa and do not have general applicability in the North Central Region. Consequently this study uses the more precisely defined replacement ratio method which depends on only survival rates and the modest assumption that all operators aged 65 years and over will leave farming due to death or retirement within 10 years.

Considerable disagreement exists about what constitutes an adequate opportunity to farm. Using the procedure outlined in table 1, table 2 summarizes opportunities to obtain the various classes of farms. Gross calculations based on all farms suggest acceptance of the census definition of a farm for defining an opportunity to farm. Table 2 shows that in the decade following 1959-60 a Minnesota rural farm boy had one chance in 3.1 of obtaining a commercial farm (classes I through VI) but only one chance in 185.7 of obtaining a class I farm.

10/ (a) Douglas G. Genereux, Annual Estimated Replacement Farmer Opportunities in Nebraska, Department of Agricultural Education Departmental Report, University of Nebraska, (Lincoln: Department of Agricultural Education, March, 1967), 10 pp.

(b) Douglas G. Genereux, State Survey of Farmer Replacement Needs, Department of Agricultural Education, University of Nebraska (Lincoln: Department of Agricultural Education, March, 1967), 16 pp.

(c) "Do 17-Year-Old Nebraskans Have a Future in Farming?" Nebraska Farmer Magazine April 1, 1967, pp. 34-35.

Professor Bundy's work at Iowa State University is discussed in these publications.

Table 2. Opportunity in 1959-60 for a Minnesota male rural farm youth to obtain a commercial farm of a given size during the following 10 years.

Economic class	Replacements needed during next 10 years	Cumulated replacement needs	Cumulated opportunities in next 10 years
I	353	353	1 in 185.7
II	1,028	1,381	1 in 47.1
III	3,784	5,165	1 in 12.6
IV	7,565	12,730	1 in 5.1
V	7,692	20,422	1 in 3.2
VI*	764	21,186	1 in 3.1

*See footnote 4.

The replacement ratios for each state in the North Central Region and for the United States can be presented now. 11/ Table 3 shows the cumulated opportunities for each area. A rural farm boy in 1959-60 would have the best chance of obtaining a commercial farm in the following 10 years in Kansas (one in 1.7) and the worst chance in Michigan (one in 3.2). He would have the least opportunity to secure a class I farm in Wisconsin (one in 329.2) and best opportunity in Nebraska (one in 51.2). Although it was more difficult to enter farming in the Upper Lake States of Michigan, Minnesota, and Wisconsin, the analysis revealed few definite area patterns. Much individual variation among states occurred in similar farming areas. Entering farming in the West North Central Region was less difficult than in the East North Central Region. In the North Central Region it was more difficult to obtain a large farm but easier to obtain a small one than in the United States.

11/ A 50 - state United States is used throughout.

Table 3. Opportunity in 1959-60 for a male rural farm youth in the North Central states and the United States to obtain a commercial farm of a given size during the following 10 years.

Area	Economic class of farm					
	I	I-II	I-III	I-IV	I-V	I-VI
	1 in					
East North Central states	137.8	32.5	9.8	4.4	2.7	2.6
Illinois	59.3	14.7	5.1	2.8	2.1	2.0
Indiana	160.1	33.1	9.8	4.5	2.6	2.5
Ohio	169.2	42.3	12.4	5.1	2.9	2.6
Michigan	232.0	51.8	15.9	6.6	3.5	3.2
Wisconsin	329.2	71.9	14.5	5.0	3.1	2.9
West North Central states	88.7	24.5	8.1	3.8	2.5	2.3
Iowa	70.7	18.3	6.5	3.5	2.6	2.5
Kansas	51.8	15.4	5.6	2.7	1.8	1.7
Minnesota	185.7	47.1	12.6	5.1	3.2	3.1
Missouri	118.3	35.6	10.9	4.6	2.4	2.1
Nebraska	51.2	16.0	5.7	3.0	2.2	2.0
North Dakota	176.3	39.5	10.6	4.4	3.0	2.7
South Dakota	107.5	26.9	8.9	4.1	2.7	2.5
North Central states	106.7	27.8	8.8	4.1	2.6	2.4
United States	74.0	24.6	9.6	4.8	3.0	2.7

The 1964-65 replacement ratios are more favorable for each state in the North Central Region and for the United States. Table 4 shows a decline in replacement ratios between 1959-60 and 1964-65 within each comparable area. Possible reasons for this decline will be discussed later. In 1964-65 a rural farm boy still had the best chance in the following 10 years to obtain a commercial farm in Kansas (one in 1.5) and the least chance in Michigan (one in 3.0). The best opportunity for class I farms switched to Illinois (one in 28.6) in 1964-65, but the worst remained in Wisconsin (one in 166.2). In

1964-65, it remained easier to obtain a commercial farm in the western part of the Region than in the eastern part of the Region. In 1964-65 opportunities varied less between the North Central Region and the United States than in 1959-64. The only significant difference in 1964-65 was that it was more difficult to obtain a class I farm in the North Central Region than in the United States.

Although it is more difficult to obtain a farm of a given size in one state (A) than in another (B), this does not mean that it is more difficult to obtain farms of all sizes in state A than in B. There are a number of instances in 1959-60 and 1964-65 shown in Tables 3 and 4 where the odds change or "cross-over" between different size classes in comparing two states.

Table 4. Opportunity in 1964-65 for a male rural farm youth in the North Central states and the United States to obtain a commercial farm of a given size during the following 10 years.

Area	Economic class of farm					
	I	I-II	I-III	I-IV	I-V	I-IV
	1 in					
East North Central states	65.5	17.3	6.6	3.7	2.5	2.4
Illinois	28.6	7.9	3.5	2.3	1.8	1.8
Indiana	69.1	17.6	6.8	3.7	2.5	2.4
Ohio	84.8	22.7	8.3	4.2	2.6	2.5
Michigan	104.2	26.5	10.2	5.2	3.2	3.0
Wisconsin	166.2	37.8	9.5	4.3	2.8	2.7
West North Central states	52.9	15.4	5.9	3.0	2.1	2.0
Iowa	38.1	10.7	4.4	2.7	2.2	2.1
Kansas	36.8	11.9	4.5	2.3	1.5	1.5
Minnesota	113.0	27.7	8.2	4.0	2.7	2.6
Missouri	72.1	22.1	8.0	3.8	2.2	2.0
Nebraska	32.2	11.0	4.5	2.5	1.8	1.8
North Dakota	93.7	21.0	6.2	3.1	2.3	2.3
South Dakota	56.6	16.1	5.5	2.9	2.1	2.0
North Central states	58.4	16.3	6.2	3.3	2.3	2.2
United States	44.4	16.1	7.1	4.0	2.7	2.5

For the 12 North Central States, the replacement ratios varied more for class I farms than for class I through VI farms. In 1959-60, the coefficient of variation, V, for class I farms was 59.0 percent; for all commercial farms, 20.4 percent. In 1964-65 the coefficient of variation was 54.7 percent for class I farms and 20.0 percent for all commercial farms. Thus the amount of variation has decreased slightly for class I farms and almost imperceptibly for all farms between 1959-60 and 1964-65.

Changes in Replacement Ratios

To measure the general decline in replacement ratios between 1959-60 and 1964-65, the following technique was employed. Assumed that the ratio was one in 130 in 1959-60 and one in 70 in 1964-65 for a particular area. This represents a decline of 60 or -46.2 percent (60 divided by 130) in the odds a rural farm boy faces. 12/

Table 5 shows that between 1959-60 and 1964-65 odds improved the most for large farms. The change was relatively more rapid for the large farms in the East North Central Region than in the West North Central Region. This suggests that farm size in the East North Central Region is catching up with that in the West North Central Region. In contrast, odds improved more for small farms in the West North Central Region than in the East North Central Region. The odds for all farm sizes improved more in the North Central Region than in the United States.

12/ Negative numbers to indicate improvement are awkward. Therefore, throughout this section (including table 5), the negative sign is dropped.

Table 5. Percentage improvement between 1959-60 and 1964-65 in the odds of a male rural farm youth in the North Central states and United States obtaining a commercial farm of a given size during the following 10 years.

Area	Economic class of farm					
	I	I-II	I-III	I-IV	I-V	I-VI
	Percentage change					
East North Central states	52.5	46.8	32.7	15.9	7.4	7.7
Illinois	51.4	46.3	31.4	17.9	14.3	10.0
Indiana	56.9	46.8	38.2	18.8	3.8	4.0
Ohio	49.9	46.3	33.1	17.6	10.3	4.8
Michigan	55.1	51.2	35.8	21.2	8.6	6.2
Wisconsin	49.5	47.4	34.5	14.0	9.7	6.9
West North Central states	40.4	37.1	27.2	21.1	16.0	13.0
Iowa	46.1	41.5	32.3	22.9	15.4	16.0
Kansas	29.0	22.7	19.6	14.8	16.7	11.8
Minnesota	39.1	41.2	34.9	21.6	15.6	16.1
Missouri	39.1	37.9	26.6	17.4	8.3	4.8
Nebraska	37.1	31.2	21.1	16.7	18.2	10.0
North Dakota	46.9	46.8	41.5	29.5	23.3	14.8
South Dakota	47.3	40.1	38.2	29.3	22.2	20.0
North Central states	45.3	41.4	29.5	19.5	11.5	8.4
United States	40.0	34.6	26.0	16.7	10.0	7.4

Of individual North Central states, the greatest improvement in odds for all farms between 1959-60 and 1964-65 was in South Dakota (20.0 percent) and the least improvement in Indiana (4.0 percent). Considering only class I farms, the greatest improvement was in Indiana (56.9 percent) and the least in Kansas (29.0 percent). 13/

13/ This technique does not reflect changes in the value of the dollar. A farm grossing $10,000 in 1964 would not have yielded as much real income as one with the same amount of sales in 1959.

Possible Reasons for the Replacement Ratio Decline

The general decline in replacement ratios between 1959-60 and 1964-65 could be explained in a number of ways. The decline indicates that the supply of rural farm boys has dropped more rapidly than has the number of farms coming available.

The average age of farm operators in each area increased between 1959 and 1964. [14/] This continued increase in the average age of farm families is bound to have an effect and tend to lower the percentage of youths in the rural farm population through time. Today's shortage of young rural families results from out-migration. The population remaining on farms contains fewer young people meaning that a smaller proportion of the farm population reaches an employable age annually than did in previous years.

Other things being equal, the fewer farm boys coming of age in 1964-65 than in 1959-60 would tend to decrease the replacement ratios. There may have been factors on the farm operator side also. For example,if the rate of farm consolidation lessened between 1959 and 1964, more farms would have been available subsequently to farm youth than if the consolidation rate had remained high. The pressure to increase farm size during this period may not have been as great as during the boom war periods of the 1940-1955 span. Much of today's new technology is intensive, while a lot of the earlier, machinery-linked agricultural change was extensive in its effects. To prove that farm consolidation and, hence, numbers declined more slowly in the 1960's, the census definition of a farm would need to have remained the same over a considerable period of time. Unfortunately, this has not been the case.

14/ U.S. Department of Commerce, Bureau of the Census, U.S. Census of Agriculture 1964 "Characteristics of Farm Operators and Persons Living on Farms," Volume II, Chapter 5, Table 8, (Washington: U.S. Government Printing Office, 1967), p. 527.

Since the economic class of farm concept is based on the value of farm products sold, it might appear that an upward trend in farm product prices from 1959 to 1964 would have caused much of the decrease in replacement ratios between 1959-60 and 1964-65. However, this was not the case. The United States index of prices received by farmers for all farm products was 240 in 1959 and 237 in 1964 (1910-14 = 100). It was 222 in 1959 and 239 in 1964 for all crops and 256 in 1959 and 236 in 1964 for livestock and livestock products. 15/ Livestock and livestock product sales are more important than crop sales in the North Central Region.

Other Potential Influencing Factors

The replacement ratios represent only the chances a rural farm boy has to obtain a commercial farm of a given size if all other things -- such as capital availability -- are equal. Thus it is important to mention some other factors which, if it were possible or desirable to include them in the analysis, could influence the magnitude of the replacement ratios. This list of influencing factors is not exhaustive, but suggests potential modifications.

The chances that a rural farm boy reaching employable age has to obtain a commercial farm of a given size would improve and, hence, the replacement ratios would lower:

(1) If farm operators younger than retirement age leave farming for non-farm occupations. This would be in addition to the mortality rates considered. Possibilities of accounting for early retirement were discussed in conjunction

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15/ Index numbers are from U.S. Department of Agriculture, Agricultural Statistics, 1967, (Washington: U.S. Government Printing Office, 1967), P. 563.

with the work at Iowa State and Nebraska;

(2) If farmers retired earlier than assumed in this report. This could result from better personal retirement plans or improved Social Security benefits;

(3) If a proportion of the rural farm youths leave the farm sector or migrate before they reach the employable age (20). Many youths leave their rural communities immediately after high school graduation. Even at this age, however, decisions to migrate often are influenced by the poor prospects of obtaining an adequate-size farm; or

(4) If a number of rural farm boys cannot farm for reasons such as poor health or simply do not want to farm for personal reasons. The pool of potential entrants could be reduced by a percentage if the number of farm boys not wanting to farm for personal reasons could be determined. This would improve the chances of obtaining a farm for the remaining rural farm boys.

However, the chances that a rural farm boy reaching employable age has to obtain a commercial farm of a given size would lessen and the replacement ratios increase:

(1) If farmers retire later than was assumed; (This is unlikely.)

(2) If people in other occupations enter farming in substantial numbers. This could be either actual entry or the purchase and holding of farms as an investment. The owner does not live on these investment farms. Rather, the owner rents the land to another person or places it under land retirement programs;

(3) If farms increase in size as a result of consolidation influenced by technological advance. This has been and is occurring. However, since the

consolidation rate varies considerably from area to area and from one time period to another, it is difficult to predict;

(4) If capital requirements to obtain the same size (in terms of value of farm products sold) farm increase over time. The average value of land and buildings per farm in the United States increased from $34,791 in 1959 to $50,646 in 1964 (in 1964 prices). 16/ The continuing farm cost-price squeeze makes it more difficult for the farmer to pay for land that is increasing in price;

(5) If it becomes increasingly difficult to obtain or borrow capital for agricultural purposes. Interest rates paid by farmers have been increasing recently. However, often the real difficulty is not in obtaining credit, per se, but in obtaining enough credit and in possessing the ability to repay considering the cost-price squeeze, and the uncertainty inherent in farming operations; or

(6) If rural nonfarm (or urban) youths want to farm and have the means to do so.

One factor -- the trend in the number of farms in any particular economics class -- produces a somewhat varied effect. In recent years farms have become larger making it less difficult to obtain larger farms and more difficult to obtain smaller farms.

These factors could, with varying degrees of difficulty, be incorporated into the analysis. In most cases, however, data upon which to base the modification are not adequate. Moreover, additional modifications tend to move the analysis away from the traditional replacement ratio approach.

16/ U.S. Department of Commerce, Bureau of the Census, U.S. Census of Agriculture 1964, "Farms and Land in Farms," Volume II, Chapter 1, Table 9, (Washington: U.S. Government Printing Office, 1967), p 22.

Distribution of Opportunities by Economic Class

By working with data on the needed replacements for the following 10 years (as in table 2), the percentage of needed farm replacements by economic class can be calculated for each area (table 6). The most farming opportunities in the decade following 1959-60 were in economic class V. However, opportunities in class IV followed closely.

Opportunities vary considerably among the North Central states, but the distribution of opportunities in the East and West North Central Regions is similar. Fewer opportunities for class I, II, and VI farms existed in the North Central Region than in the United States. Thus, opportunities in the North Central Region were more concentrated among the medium-sized farms.

By 1964-65, the distribution of opportunities had shifted considerably in favor of the larger farms in all areas (table 7). There was considerable variation between states but little variation between the East and West North Central Region distributions. The North Central Region had become more similar to the United States. North Central opportunities were significantly less than United States opportunities only for class I and VI farms. Thus, the North Central Region continued to offer more opportunities to obtain medium-sized farms than the nation as a whole.

An Adequate-Size Farm

Thus far, the analysis has focused on a rural farm boy's opportunity to obtain a commercial farm of a given size during a given decade. Although relative chances of obtaining farms of different sizes and of the same size in different areas were compared, no attempt has been made to define an average "adequate-size" farm and to assess a youth's chances of obtaining this size of farm.

Table 6. Percentage distribution by economic class in 1959-60 of farm replacements needed in the North Central states and United States during the following 10 years.

Area	Economic class of farm						
	I	II	III	IV	V	VI	Total
	Percentage distribution						
East North Central states	1.9	6.0	18.3	31.7	35.4	6.7	100.0
Illinois	3.3	10.0	25.2	30.9	25.7	4.8	100.0
Indiana	1.5	5.9	17.6	30.1	37.6	7.2	100.0
Ohio	1.5	4.7	15.0	30.1	40.5	8.1	100.0
Michigan	1.4	4.7	13.9	28.4	42.5	9.0	100.0
Wisconsin	0.9	3.1	16.1	38.3	36.1	5.4	100.0
West North Central states	2.6	6.9	19.3	32.4	32.2	6.6	100.0
Iowa	3.5	10.0	24.3	33.1	25.2	3.9	100.0
Kansas	3.3	7.7	18.9	32.8	32.9	4.4	100.0
Minnesota	1.7	4.9	17.9	35.7	36.3	3.6	100.0
Missouri	1.8	4.2	13.6	27.3	41.0	12.1	100.0
Nebraska	3.9	8.6	22.5	32.9	24.7	7.2	100.0
North Dakota	1.6	5.3	18.8	35.6	30.1	8.5	100.0
South Dakota	2.3	6.9	18.5	32.4	32.2	7.7	100.0
North Central States	2.3	6.5	18.8	32.0	33.7	6.6	100.0
United States	3.6	7.2	16.9	27.2	32.5	12.6	100.0

There is considerable evidence that in 1959-60 an adequate size of farm was one with annual gross sales of farm products totaling $10,000 or more. [17/] This figure has been growing through time. The upward trend in farm capital requirements and interest rates has been discussed. In addition, the index of all commodities bought by farmers for use in production increased from 266

17/ See James D. Cowhig and Calvin L. Beale, "Vocational Agriculture Enrollment and Farm Employment Opportunities", The Southwestern Social Science Quarterly, (March, 1967), p. 415. They cite a number of references to support this figure.

Table 7. Percentage distribution by economic class in 1964-65 of farm replacements needed in the North Central states and United States during the following 10 years.

Area	Economic class of farm						
	I	II	III	IV	V	VI	Total
	Percentage distribution						
East North Central states	3.7	10.3	22.4	29.5	30.1	3.9	100.0
Illinois	6.3	16.4	28.3	26.2	20.0	2.7	100.0
Indiana	3.4	10.1	21.2	29.0	32.6	3.6	100.0
Ohio	2.9	8.1	19.1	29.3	35.0	5.6	100.0
Michigan	2.9	8.4	18.3	28.3	36.7	5.3	100.0
Wisconsin	1.6	5.6	21.7	35.6	32.1	3.4	100.0
West North Central states	3.9	9.4	21.6	32.4	28.5	4.2	100.0
Iowa	5.6	14.2	29.0	29.2	20.2	1.8	100.0
Kansas	4.1	8.5	20.6	31.9	31.8	3.2	100.0
Minnesota	2.3	7.0	22.2	33.3	30.5	4.8	100.0
Missouri	2.8	6.3	16.0	28.2	37.7	9.0	100.0
Nebraska	5.5	10.5	23.3	31.6	26.3	2.8	100.0
North Dakota	2.4	8.4	25.8	35.8	24.3	3.3	100.0
South Dakota	3.6	9.0	24.1	34.3	26.0	3.1	100.0
North Central states	3.8	9.8	22.0	31.1	29.2	4.1	100.0
United States	5.6	9.9	19.8	26.9	29.3	8.6	100.0

in 1959 to 270 in 1964 (1910 - 14 = 100). During the same period, the parity ratio for farmers declined from 81 to 76 (1910 - 14 = 100). [18] Thus, there is now evidence which indicates that in order to provide a family an adequate level of living consistent with present national standards, a farm must have annual gross sales of $20,000 or more. [19]

18/ All index numbers are from U.S. Department of Agriculture, Agricultural Statistics, op. cit., pp. 563-564.

19/ Radoje Nikolitch, A Comparison of Age Levels of Farmers and Other Self-Employed Persons, U.S. Department of Agriculture, Agricultural Economics Report No. 126, (Washington: U.S. Government Printing Office, November, 1967) p. 3.

Assuming that an adequate-size farm had to gross annually $10,000 in 1959-60 and $15,000 in 1964-65, replacement ratios were derived for the two periods from tables 3 and 4. For 1959-60, the odds of obtaining a farm grossing $10,000 or more annually are given in the class I through III columns of table 3. For 1964-65, the chances of obtaining a farm grossing $15,000 or more annually are approximated by the simple average of the class I and II and class I through III columns of table 4. Table 8 shows the results of this analysis.

Table 8. Opportunity in 1959-60 and 1964-65 for a male rural farm youth to obtain an adequate-size farm in the North Central states and United States during the following 10 years.

Area	Size of farm in gross sales		Percentage change in odds: 1959-60 to 1964-65
	1959-60 $10,000 or more	1964-65 $15,000 or more	
	1 in		Percent
East North Central states	9.8	12.0	22.4
Illinois	5.1	5.7	11.8
Indiana	9.8	12.2	24.5
Ohio	12.4	15.5	25.0
Michigan	15.9	18.4	15.7
Wisconsin	14.5	23.7	63.4
West North Central states	8.1	10.7	32.1
Iowa	6.5	7.6	16.9
Kansas	5.6	8.2	46.4
Minnesota	12.6	18.0	42.9
Missouri	10.9	15.1	38.5
Nebraska	5.7	7.8	36.8
North Dakota	10.6	13.6	28.3
South Dakota	8.9	10.8	21.3
North Central states	8.8	11.3	28.4
United States	9.6	11.6	20.8

It was easier for a farm boy to obtain an adequate-size farm in the West North Central Region than in the East North Central Region in decades following 1959-60 and 1964-65. However, the increase in difficulty between the two time periods was smaller in the East North Central Region than in the West North Central Region. Obtaining an adequate-size farm was easier in the North Central Region than in the United States in both periods, but the North Central Region showed the greater increase in difficulty between the two periods. Among the states it was easiest to obtain an adequate farm in Illinois in both time periods. It was most difficult to obtain an adequate-size farm in Michigan in 1959-60 and Wisconsin in 1964-65. Illinois showed the smallest and Wisconsin the largest increase in difficulty between the two time periods.

Perhaps farming opportunities for farm boys are not encouraging, when one looks only at adequate-size farms. Nevertheless current developments can help young men become established in farming more easily. Table 9 shows one of these factors: the increasing importance of part-time, off-farm employment and earnings in recent years. Absolute percentage varies considerably from state to state, but between 1959 and 1964 in every instance there was positive change with the exception of Missouri and the United States. While part-time, off-farm employment often is an avenue out of farming for the older operator, it can help provide an adequate income for the young farmer's family and can help enlarge the farm operation more quickly. Off-farm earnings are especially important for the young farm operator with small farm sales. In Minnesota, the proportion of farm operators working off the farm 100 days or more in 1964 ranged from 7.0 percent for class I farms to 24.8 percent for class V farms.

Unfortunately, data relating the age of the farm operator to his amount of part-time, off-farm work are not available from the Census of Agriculture.

Summary and Implications

This report evaluates the opportunity in 1959-60 and 1964-65 for a male rural farm youth to obtain a commercial farm of given size in the North Central states and the United States during the decades following each specified date. The replacement ratio technique, utilizing a minimum of assumptions, was used. Replacement ratios, in this case, relate for a given period of time the estimated number of young farm men entering the working-age group annually to the number of working-age farmers expected to die or reach retirement age annually. Data are from the Census of Agriculture and the Census of Population.

Table 9. Percentage of 1959 and 1964 commercial farm operators working 100 days or more off their farms annually, and percentage of commercial farm households reporting off-farm earnings exceeding value of farm products sold, North Central Region and United States.

Area	100 days or more		Off-farm earnings greater	
	1959	1964	1959	1964
	Percent			
East North Central states	17.8	21.3	11.8	13.0
Illinois	12.7	16.1	8.2	8.5
Indiana	21.0	25.0	14.7	16.5
Ohio	20.7	24.1	14.7	15.4
Michigan	24.3	28.1	17.1	18.8
Wisconsin	15.1	17.9	8.1	9.7
West North Central states	10.1	11.7	5.9	6.9
Iowa	8.3	11.6	4.5	5.8
Kansas	15.8	16.5	9.2	10.0
Minnesota	8.4	10.2	5.0	6.2
Missouri	15.1	16.1	10.5	10.3
Nebraska	8.3	8.7	3.6	5.6
North Dakota	6.8	7.7	2.9	4.4
South Dakota	5.6	7.0	3.2	4.3
North Central states	13.3	15.7	8.3	9.5
United States	14.5	16.0	12.5	9.4

The evidence, based on Public Health Service mortality rates and the assumption that all farmers age 65 and over die or retire within ten years, indicates that between 1959-60 and 1964-65 the chances of a male rural farm youth obtaining a farm of a given size measured in total value of farm products sold improved. This change reflects the difference between 1959-60 and 1964-65 in the number of rural farm boys annually reaching an employable age, the distribution of farms by economic class (farm sales), and the age distribution of farmers. However, a male rural farm youth's chances to obtain an adequate-size farm, providing an adequate family income yearly in the decades following 1959-60 and 1964-65 have worsened. In both cases, an adequate-size farm was defined according to the best available evidence, which indicated that farms grossing annually $10,000 or more in 1959-60 and $15,000 or more in 1964-65 met the adequacy requirement.

A number of similarities and differences in the replacement ratios of the East North Central Region, West North Central Region, North Central Region, the United States, and individual North Central Region states are pointed out for both time periods. For the individual states, few ratio trends or patterns by type of farming area were detected. Rather, sharp differences in ratios were recorded in adjacent states in the same type of farming regions.

The replacement ratios presented throughout this study for rural farm males also have implications for rural farm females. Assuming equal birth rates for males and females, and that rural farm males marry as they come of age, the replacement ratios for rural farm boys closely approximates those for rural farm girls, and thus may be used as a proxy for the girls' farm opportunities. Too

often rural farm girls have been ignored in similar analyses and policy statements about farm employment opportunities and off-farm migration.

The replacement ratio technique yields estimates. All ratio or odds figures in this paper should be treated as such. A number of factors which could increase or decrease a particular replacement ratio are presented.

Changes in the replacement ratios between 1959-60 and 1964-65 are analysed. The ratios declined between the two periods, but the greatest change was for the large farms. Thus it became easier to obtain a large farm measured in terms of the value of farm products sold.

There are more opportunities to obtain large farms in the decade following 1964-65 than there were in the 10 years after 1959-60. However, the most opportunities in both periods were in the medium-size farm range. Thus, opportunities for medium-size farms continue but this is changing toward the larger units. A medium-size farm of today will be considered small in the future, if the trend continues.

Replacement ratio analysis estimates, based on death and retirement assumptions about existing farmers, the chances for a male rural farm youth to farm. It does not say anything about his ability to enter the occupation successfully when the opportunity presents itself. In other words, replacement ratio analysis establishes the chance a particular player has to enter the game, but says nothing about the adequacy of his equipment or training when the chance presents itself. Difficult hurdles remain after a male rural farm youth is given a chance to enter farming. He must obtain sufficient capital and credit, which is becoming increasingly difficult. Off-farm work is becoming more important for farm households, especially those with small farms. This can provide a young farmer on a small farm a chance to expand his farm operation. In many cases, the young farmer on a small farm has

the choice of quitting farming, struggling on with a small farm, or increasing off-farm work. Thus the importance of off-farm income sources to young men becoming established in farming should not be minimized.

The focus of this report is on farming opportunities. It says nothing about ooportunities in agricultural industries and occupations for farm youths. Yet the implications of the findings should be clear. Only a fraction of today's farm youths can remain in farming per se. If the remainder wish to capitalize on their farm backgrounds, they should consider entering occupations in related fields. Many agribusiness occupations require considerable training and skill. Rural farm youths should consider their chances to farm and, if they look poor, begin to prepare to enter the agricultural-related complex if they so desire. Preparation is all-important, often requires college training. Many communities must alter traditional school curricula to prepare rural farm youths for nonfarm agricultural jobs. States may have to provide more area vocational-technical schools. Young people learn more quickly and adapt more easily than do older people. As technology and efficiency require fewer and larger farms, the least painful reduction in farm numbers undoubtedly will occur because fewer young families begin farming, rather than by the disruption of older families already engaged in farming. Perhaps replacement ratio analysis demonstrates this better than any other method of illustration.