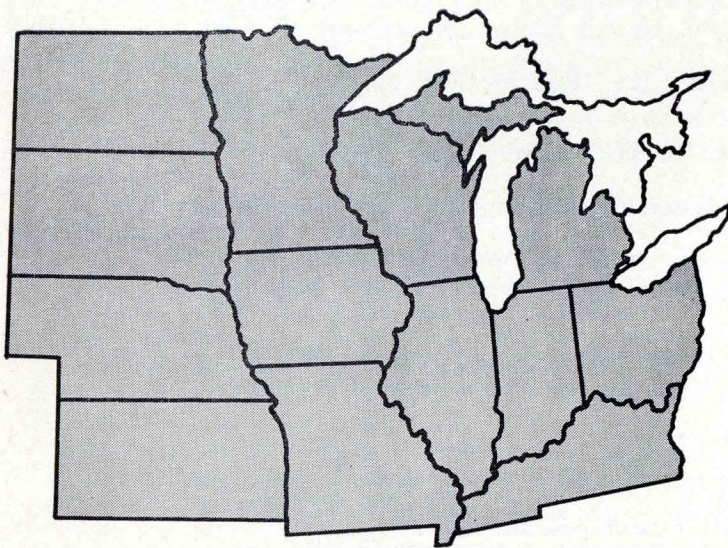NORTH

CENTRAL

REGIONAL

PUBLICATION

NO. 56

Population Change and Net Migration in the North Central States, 1940-50

by Paul J. Jehlik and Ray E. Wakeley

Agricultural Experiment Stations of

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Kansas	North Dakota
Kentucky	Ohio
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Wisconsin

and United States Department of Agriculture cooperating

IOWA AGRICULTURAL EXPERIMENT STATION

IOWA STATE COLLEGE   **AMES, IOWA**

RESEARCH BULLETIN 430

JULY 1955

NORTH CENTRAL REGIONAL COMMITTEE
FOR
RESEARCH ON POPULATION DYNAMICS AND RELATED RURAL SOCIAL AND ECONOMIC PROBLEMS IN THE NORTH CENTRAL REGION

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This bulletin was accepted for publication in January 1955. The list of names above represents the committee makeup at the time of acceptance.

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[c]Member of the Executive Committee and senior author of Hagood, Margaret Jarman and Sharp, Emmit F. Rural-urban migration in Wisconsin, 1940-1950. Wis. Agr. Exp. Sta. Res. Bul. 176. The basic plan of that bulletin was adopted as the pattern for the preparation of data by the states for their own reports and for this regional report.
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FOREWORD

Major population changes and the redistribution of population through migration are extremely important for everyone interested in the relationships of changing population to the agricultural, industrial, institutional and community life of the people.

Motivations for migration and changes in residence of our population have roots in an integrated web of social, psychological and economic factors that "push" people out of one area and "pull" them into another. Accompanying any movement of people, is a transplanting and an amalgamation of such factors as economic wealth, social values, ideas about local government, modes of speech and architecture, community organization, religion and education.

Any redistribution of population creates problems of community adjustment, social organization, land use, agricultural production and farm policy. Service, institutional and utility burdens rise in areas whose populations are increasing. Retrenchments and reorganization become necessary in areas of decreasing population.

This study is an attempt to deal with population change, especially net migration, and its relationship to population growth and to selected agricultural and industrial factors. The objectives, outline and procedures for this study were developed by the North Central Regional Committee for Research on Population Dynamics and Related Rural Social and Economic Problems in cooperation with the Farm Population and Rural Life Branch, Agricultural Marketing Service, United States Department of Agriculture.

This publication will be of value to agricultural, business, educational and governmental leaders; to public and private agencies and to many persons concerned with population change. It will be useful in planning the development of our physical, social and economic resources.

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in the North Central Region and
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Problems

ACKNOWLEDGEMENTS

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SUMMARY

This study is a description and analysis of significant population changes and of the components of population change in the North Central states, including Kentucky, 1940-50. Projections of the future population to 1975 are also included.

The economic subregion, a relatively homogeneous area sometimes cutting across state lines, is used as the most appropriate area for analysis. The 44 subregions wholly or partly in the North Central states represent combinations of 48 metropolitan and 125 nonmetropolitan state economic areas, which are combinations of 1,094 counties in the 13 states.

The North Central states have had a history of continuous population growth. Population increased more than sixfold over the 6,386,000 persons in 1850 to 47,405,568 in 1950. In 1850, 91 percent of the population was rural; in 1950, only 42 percent. These percentages are according to the 1940 census definitions of urban and rural population which were used throughout this study.

Between 1940 and 1950 a total of 9,667,884 births and 4,617,218 deaths occurred to the population of the region, resulting in a natural increase of nearly 12 percent. Net migration, however, removed 651,425 persons leaving a net increase in population of 4,399,241, or 10 percent over that of 1940.

Urban population increased by 3,076,200, or 13 percent, the rural by 1,323,041, or 7 percent. Population in the metropolitan state economic areas, those containing cities or urbanized areas of 100,000 or more population, increased 18 percent. The urban population in such areas increased 13 percent while the rural population increased 50 percent. Population in the nonmetropolitan state economic areas increased 3 percent; the urban population increased 12 percent while a loss of 1 percent took place in the rural population.[1]

In the total population of the region, natural increase (excess of births over deaths) played a more important role in the distribution of population between 1940 and 1950 than did migration. Migration, however, played a more important role than natural increase in the redistribution of the total population in the nonmetropolitan areas and in the redistribution of the rural populations within both the metropolitan and nonmetropolitan areas. Conversely, natural increase played a more important role in the distribution of the total population in the metropolitan areas and in the distribution of the urban population within both the metropolitan and the nonmetropolitan areas.

The crude birth rate for the region increased during the decade from 17.6 per 1,000 population in 1940 to 23.7 by 1950.

Although the observed crude rural birth rate was higher than the urban rate at the beginning of the decade, the reverse was true at the end of the decade. The urban birth rate increased from 17.2 to 24.5 while the rural birth rate rose from 18.3 to 22.7. Both urban and rural increases were greater in the metropolitan than in the nonmetropolitan areas. In a study completed by the National Office of Vital Statistics, it was found that 9.4 percent of the rural births that occurred January-March 1950 were misreported as urban, and 5.9 percent of the births reported as urban were in fact rural.[2] This suggests that in many subregions the urban-rural switch in birth rate differential might be restored to its traditional direction. Even though misreporting of residence has been substantiated by that study, it is still true that urban birth rates have risen more proportionally than the rural rates.

In 1940, those subregions having low levels of living among farm families generally had the highest birth rates. In 1950, high rural birth rates were associated with high levels of living.

The death rate declined from 10.7 per 1,000 population in 1940 to 9.9 in 1950. The urban rate declined from 11.2 to 10.6 and the rural from 10.1 to 9.1. Rural rates declined most in the metropolitan areas while the urban rates declined most in the nonmetropolitan areas.

Thirty-three of the 44 subregions lost total population through migration; 18 of the subregions lost urban population and 38 subregions lost rural population.

Net migration added 199,532 persons to the urban population while it removed 850,957 persons from the rural population. The difference represents net out-migration from the region. In the metropolitan areas, migration added 142,833 persons to the urban population and 1,052,329 to the rural, thus greatly increasing suburbanization in the rural areas surrounding metropolitan centers. In the nonmetropolitan areas, migration added only 56,699 persons to the urban population, while it removed 1,903,286 from the rural population.

Concurrent with the marked redistribution in population in the North Central states during the decade, was an 11-percent decline in number of farms, a 101-percent increase in tractors, a 22-percent decline in amount spent for hired farm labor (adjusted for change in wage rates), a 26-percent increase in total value of farm products sold (adjusted for price change) and a 44-percent increase in the index of farm operator family level of living.

Employed workers in all industries increased 24 percent. Workers employed in agriculture, however, declined 12 percent while those in manufacturing increased 44 percent and those in all other industries increased 29 percent. Decreases in hired workers in agriculture occurred in all but two subregions, while increases in workers in

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[1] Metropolitan and nonmetropolitan state economic areas in subsequent discussion are referred to as metropolitan or nonmetropolitan areas.

[2] Births by race and geographic subdivision, United States, 1950. National Office of Vital Statistics, Vital Statistics—Special Reports. Vol. 37, No. 21. 1954.

manufacturing and in all other industries occurred in every subregion.

Increase in job opportunities in nonagricultural industries was an important factor affecting rural-urban migration as well as migration into rural areas that were close enough to places of employment so that workers could commute daily. Subregions having the larger proportions of their employed workers engaged in manufacturing tended to have smaller decreases or to have actual increases in population through migration.

The population prospect for the North Central states is one of continued growth and continued redistribution of population similar to the 1940-50 decade. Under the assumption of peacetime conditions, redistribution of population through migration may be expected to take place at a lower rate than between 1940 and 1950. The population of the North Central states may be expected to be about 53,800,000 in 1960 and 61,100,000 in 1975. For the subregions, rather wide variations in population change may be expected. All of the subregions containing metropolitan areas, and 9 of the 24 not containing metropolitan areas, are expected to show consistent increases in population. The most rapid growth is expected to continue near metropolitan centers, with a considerable increase in both urban and rural population in such areas.

Population Change and Net Migration in the North Central States, 1940-50[3]

BY PAUL J. JEHLIK AND RAY E. WAKELEY

MIGRATION AS A DYNAMIC SOCIAL FACT

The past decade brought about a marked population redistribution in the North Central states. The question of what is happening to the population in any area has important implications for everyone interested in the changes as they relate to the agricultural, industrial, institutional and community life of the people. Migration represents more than a movement of people. It includes a transplanting of personal attachments, wealth, social values, ideas of local and other government, community organization, education, religion, modes and means of communication, and economic production.

The motives leading to migration are many and complex. They are not well known or understood. Whatever they are, they must be considered in terms of the sources from which they arise, the goals sought and the socio-economic factors operating in both place of origin and place of destination prior to and at the time of migration.

Some persons move just to be on the move or for other personal reasons that are little related to the socio-economic factors that "push" people out of one area or "pull" them into another.

A considerable volume of internal migration in the United States during the 19th and the early part of the 20th centuries consisted of movement of people from east to west and from rural to urban areas.[4] Present day migration streams are multi-directional and complex, consisting of specialized movements. For example, they include movements from one rural area to another, which may be farm to farm, farm to village, village to farm, village to village, from rural to urban and from urban to rural, from urban to urban, and from areas of declining agricultural and industrial employment to those of expanding social and economic opportunity. Much population movement consists of short distance moves mostly within the same socio-economic area.[5]

[3]Includes the states of Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin.

[4]For the 1940 census, urban population included all persons living in incorporated places of 2,500 population or more. All figures of urban population in this study are based on that definition.

[5]The term migration as used in this study is a net term that refers to the difference between out-migration and in-migration for a given area between 1940 and 1950 and for a specified population group.

EMERGING PROBLEMS AND NEEDED INFORMATION

During the decade 1940-50, the North Central Region was unique among the major areas of the United States in generally maintaining a balance between its agricultural and industrial activity. In arithmetic effect the region retained most of its natural population increase, consisting of the excess of births over deaths. While the total population increased by more than 10 percent during the decade, the net change in total population due to exchange of migrants with other major regions was small.

The North Central Region accomplished its relative population and resource balance by considerable redistribution of population, much of which was between such areas as the Cut-Over, the Ozarks, the Appalachian and the Great Plains, which produce manpower beyond their replacement needs, and the large ever-expanding industrial areas which need to recruit manpower. In an intermediate position are the commercialized agriculture areas which produce manpower more than sufficient for their own replacement needs but which must constantly compete with industry to retain manpower needed in farming.

Most of the competition for manpower is between industry and agriculture rather than between the states of the region. The competition is also among broad, relatively homogeneous subregions which transcend state lines. Competition for manpower created by opportunities for increased productive employment constitutes one of the major *pull* stimuli for population movement between subregions. The relatively high rate of natural population increase and excess labor force characteristic of the economically less productive areas is the major *push* stimulus. The influence of these two sets of stimuli contributes markedly to the constant population change. This in turn contributes to major social and economic problems.

Many of the problems are ones of adjustment and accommodation. In areas which gain substantially in population, service agencies, institutional facilities and utilities become overburdened. Problems related to community organization and neighborhood adjustments become acute. Problems of land use, taxation, agricultural programs and production policies are created. Family levels of living frequently are subject to readjustment.

In areas characterized by population losses, retrenchment instead of expansion becomes necessary. Changes in population composition, in both gaining and losing areas, whether due to differences in fertility or migration or both, affect problems of youth, of the aged and of the labor force. Thus, many social and economic problems need to be studied for a better understanding of their character. Basic to this is the recognition that the natural and social resources and topography of a region play an important part in the lives of the people who inhabit it.

OBJECTIVES OF THE STUDY

This study includes many important kinds of population information for the region:[6] (1) a review of population growth in the region 1850 to 1950; (2) population change by economic subregions, 1940 to 1950; (3) an analysis of births, deaths and natural increase during the last decade; (4) net change in population due to migration in the last decade; (5) an examination of rural-urban migration in the metropolitan and nonmetropolitan areas 1940 to 1950; (6) an analysis of the relationship between certain agricultural and industrial factors and net migration; and (7) projections of probable future population.

METHOD AND PROCEDURE

Population census data do not provide information on the number of migrants for the decade. Therefore, it was necessary to compute the number of migrants from the total population at the beginning and at the end of the decade after births and deaths had been taken into account. This is commonly referred to as the residual method and may be indicated in the following formula: $M = I - E = P_2 - P_1 - (B-D)$, where M = net migration, I = the number of in-migrants, E = the number of out-migrants, P_2 = the 1950 population, P_1 = the 1940 population, B = the number of births and D = the number of deaths.

Compilation of data by the states for their own research reports and for that of the regional unit in general included:

(1) compiling of 1940 and 1950 urban and rural population data (the urban and rural classification of areas in the 1940 census was used for both 1940 and 1950).[7] This included retaining as rural any incorporations to urban areas that occurred between 1940 and 1950 and retaining as urban any retrocessions from urban areas that occurred during the same period;

(2) estimating of births for April through December 1940 and January through March 1950 to conform to census dates. Since there is little seasonal variation in deaths, death data for the period January 1940 through December 1949 were used;

(3) computing figures for rural population by subtracting the urban from totals and, in general, obtaining a certain population simply by subtracting known parts from known totals;

(4) reallocating births from place of occurrence to place of residence;

(5) using data on student populations in the county of parental homes as enumerated in the 1940 census and, in 1950, in the county in which the institution of higher learning was located;

(6) retaining institutional populations in the county in which the institution was located as enumerated in the 1950 census;

(7) adjusting birth data for under-registration; and

(8) adjusting, for relationship purposes, data such as farm income and farm wages for 1949 to 1939 price and wage levels.

As a result of making adjustments, data presented in this report in many cases do not agree with those in the published census reports but do make possible more exact comparisons between 1940 and 1950.[8] Any deviations from the foregoing procedures are appropriately noted in the text and in the tables.

SOME RESULTS OF METHODS USED

Computation of migration data through use of the residual method has resulted in new types of information heretofore not developed for areas within all the states in the North Central Region on any large scale. Births and deaths for each year of the decade for both rural and urban population groups were computed from special tabulations of unpublished data supplied by the National Office of Vital Statistics.[9] Adjustment for under-registration made possible reliable estimates of births. Thus, for the first time, accurate estimates of natural increase and of net migration for total, rural and urban, metropolitan and nonmetropolitan population groups have been provided. Information on selected agricultural and industrial variables has been related to migration. Analysis of the above types of information was carried out by the individual states for total, rural and urban residence categories within metropolitan and nonmetropolitan economic areas. In this unit of study, the analysis was carried out in similar manner but within economic subregions and for the North Central states as a whole.

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[6]For a complete discussion of the organization of the regional project in population dynamics in the North Central Region see Wakeley, Ray E. and Jehlik, Paul J. Regional research in population dynamics. Rural Sociology. 18:166-169. June, 1953.

[7]Except where noted, the urban-rural definition of population and classification of urban and rural centers for 1940 were used throughout the decade for vital statistics and for the 1950 population enumeration. This made possible comparisons of data between the beginning and ending of the decade. The new urban-rural definition of population used for the first time in the 1950 census classified as urban the densely settled incorporated and unincorporated urban fringe around cities of 50,000 or more and unincorporated places of 2,500 or more

outside of any urban fringe. The remaining population was classified as rural. The 1950 definition had the effect of classifying as urban population groups that would have been classified as rural according to the 1940 definition.

[8]For a more detailed discussion of the foregoing procedures, see Appendix C.

[9]Though these data are not included in this report, they may be obtained from the participating states.
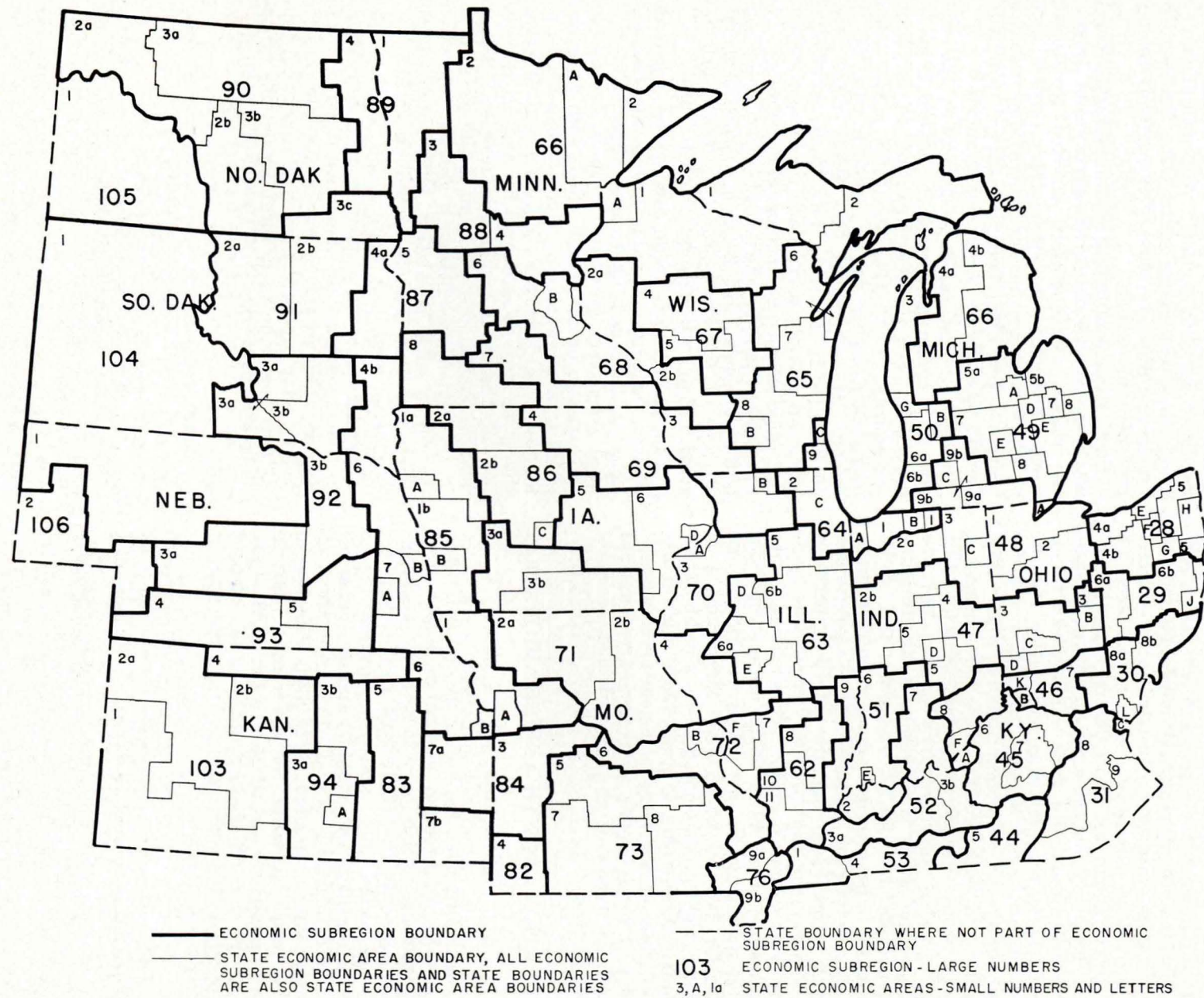
Fig. 1. Economic areas and economic subregions, North Central states.

Legend:

— ECONOMIC SUBREGION BOUNDARY

— STATE ECONOMIC AREA BOUNDARY, ALL ECONOMIC SUBREGION BOUNDARIES AND STATE BOUNDARIES ARE ALSO STATE ECONOMIC AREA BOUNDARIES

--- STATE BOUNDARY WHERE NOT PART OF ECONOMIC SUBREGION BOUNDARY

103 ECONOMIC SUBREGION - LARGE NUMBERS

3, A, 1a STATE ECONOMIC AREAS - SMALL NUMBERS AND LETTERS

THE NORTH CENTRAL REGION AND ITS ECONOMIC SUBREGIONS AS A FRAME OF REFERENCE

Migration of population is not only an intra-area but an inter-area phenomenon. Therefore, it logically becomes the concern of regional groupings of states. Measurement of migration and the analysis of the interplay of related factors in and among various subregions covering an area as large as the combined North Central states is important because it indicates the directions of population changes and the factors related to them. This consideration permits generalization regarding the relationships between migration and selected social and economic factors within the framework of homogeneous economic subregions.

Many states include within their boundaries areas of widely varying characteristics, and the boundaries of areas with similar characteristics often overlap state lines. Therefore, it is more meaningful to have analyses done on an area basis, such as a subregion, because both the geographic universe under study and the interplay between the components of change usually cross state lines.

The North Central states are subdivided into 173 economic areas, 48 of which are metropolitan and 125 nonmetropolitan.[10] These in turn combine into all or parts of 44 economic subregions (see fig. 1).[11] Each of the subregions is a combination of similar state economic areas and the latter are combinations of relatively homogeneous counties.[12] Twenty of the economic subregions are composed of both metropolitan and nonmetropolitan state economic areas.

POPULATION GROWTH AND NET MIGRATION

POPULATION CHANGE

Students of population are aware of the tendency for shifts in direction of population movement and settlement to take place in response to changing social, economic and technological conditions. They are aware that internal migration (1) is essential for both social stability and social change; (2) creates dislocations and adjustment problems in the process of change; and (3) is selective in nature which accounts for differences between those who migrate and those who stay. They are also aware that differences among areas such as subregions are due in part to the time and pattern of early settlement.

Migration was the dominant factor in early population growth of the region. The first permanent settlements in the Ohio Valley were well under way before 1800. Settlement in the western part of the region took place much later, after the middle of the 19th century. Not until after 1870 could the Great Plains states—the Dakotas, Nebraska and Kansas—boast of two or more inhabitants per square mile.

Early streams of migration were directed largely westward toward the fertile agricultural areas of the region. Others were directed toward the newly developing commercial trade centers, some of which later became our present day industrial centers. By 1900, the patterns of population density had become fairly well established.

After the first rapid settlement of the land, streams of migration began to change from the prevailing east to west direction to increasing movements from rural to urban areas, again originating earlier in the eastern part of the region. More recently, the former rapid urban growth has been giving way to an accelerating suburban growth, particularly in areas surrounding large urban and metropolitan centers. This constantly changing shift in the direction of population movements results in numerous identifiable streams of migration—rural to urban, urban to rural, urban to urban, and rural to rural.

The pattern of urban and rural population growth varied considerably among the 13 states. Between 1850 and 1900, more than half of the total population growth of Illinois, Indiana and Ohio was in urban areas. Ohio, with 81 percent of its total growth occurring in urban areas, was highest. In Michigan, Missouri and Wisconsin the urban growth accounted for slightly less than half of the total population increase. The remaining states, most of them in the western half of the region, experienced a greater proportional growth in rural population, with Minnesota and North and South Dakota leading (table 2).

Between 1900 and 1950, states which showed large gains in urban population in the period 1850 to 1900 continued to show such gains. Iowa, Kansas, Missouri and Nebraska had gains in urban population in excess of their total population gains. At the same time their rural populations dropped to levels below those of 1900. For example, in

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[10]Bogue, Donald J. State economic areas: a description of the procedure used in making a functional grouping of the counties in the United States. U. S. Bureau of the Census. U. S. Govt. Print. Off., Washington, D. C. 1951.

[11]Bogue, Donald J. and Beale, Calvin L. Economic subregions of the United States. Series Census—BAE No. 19. U. S. Bureau of the Census and Bureau of Agricultural Economics, U. S. Department of Agriculture, Washington, D. C. June 1953.
Fifteen of the 44 subregions extend beyond the boundaries of the 13 states included in this study. Data and interpretation presented in this analysis pertain only to those parts of the subregions within the boundaries of the North Central states. Broken lines along the boundaries of the 13 states (fig. 1) indicate places where subregions extend outside area of study.

[12]See Appendix B for a more complete description of economic subregions.

TABLE 1. POPULATION IN THE NORTH CENTRAL STATES, RURAL AND URBAN, 1850, 1900 AND 1950.

Year	Total		Urban		Rural	
	Number	Percent	Number	Percent	Number	Percent
1850	6,386,000	100.0	573,217	9.0	5,812,783	91.0
1900	28,480,178	100.0	10,632,980	37.3	17,847,198	62.7
1950*	47,405,568	100.0	27,434,443	57.9	19,971,125	42.1
1950†	47,405,568	100.0	29,575,002	62.4	17,830,566	37.6

*According to 1940 definition and classification of urban and rural population.

†According to 1950 definition and classification of urban and rural population.

TABLE 2. PERCENTAGE URBAN POPULATION CHANGE WAS OF TOTAL POPULATION CHANGE, NORTH CENTRAL STATES, 1850-1900, 1900-1950, 1940-1950.*

Year	Total	Ill.	Ind.	Iowa	Kan.	Ky.	Mich.	Minn.	Mo.	Neb.	N. D.	Ohio	S. D.	Wis.
1850-1900	45.5	64.3	53.5	27.6	23.4†	33.8	45.6	13.4	43.2	22.2†	6.5‡	80.7	8.7	43.2
1900-1950	90.3	99.5	91.2	167.4	132.0	65.0	79.6	82.0	124.7	136.5	33.8	83.9	69.8	81.9
1940-1950§	77.7	83.1	52.9	168.9	143.4	137.5	57.7	114.3	132.1	954.7	—**	54.3	593.8	77.0

*Including Kentucky.
†Period covered, 1860-1900.
‡Period covered, 1870-1900.
§The 1950 population is classified according to the 1940 definition of urban and rural population.
**North Dakota had a loss of 22,299 in total population and a gain of 32,894 in urban population.

Iowa during the 50-year period the total population increased 389,220. The urban population increased 651,680 while the rural population had 262,460 fewer persons than in 1900. In these four states it is apparent that the rural areas were overpopulated in relation to the technological developments that were to occur in agriculture by 1950. During the 50-year period, North Dakota showed the smallest proportional gain in urban population although the state's total population nearly doubled.

The World War II decade, 1940-50, and its accompanying prosperity was associated with further urbanization of the population of the region. However, in Illinois, Indiana, Michigan, Ohio and Wisconsin, the urban population growth was at a lower rate that it had been for the entire 1900-1950 period. All of these states have large urban populations, are heavily industrialized and have showed substantial growth in their rural populations through suburbanization. In the remaining states, the ratio of urban to total growth continued at a high level, but these states also had increases in the rural-nonfarm population.

Throughout the region the rural areas, and more specifically the rural farm population, provided much of the population that entered the migration streams to bring about the marked residential and occupational shifts in population.

POPULATION CHANGE BY ECONOMIC SUBREGIONS, 1940-50

Rates of population growth in the region were computed on the basis of the newly delineated economic subregions and, within these subregions, for metropolitan and nonmetropolitan state economic areas and for rural and urban classification of residents.

Analysis of population change by subregions shows that, in general, the subregions that gained most in population were already populous and relatively highly urbanized. The less populous subregions gained little or actually lost in population.

Population increased between 1940 and 1950 by 4,399,241, or 10 percent, in the combined 13-state region. Urban population increased by 3,076,200 (13 percent) and the rural population by 1,323,041 (7 percent). These data are on the basis of the 1940 definitions and classification of urban and

rural population.[13] Total population in metropolitan areas increased 18 percent. Urban population in these areas increased 13 percent while the rural population increased 50 percent. Population in the nonmetropolitan areas increased 3 percent; the urban population increased 12 percent while a loss of 1 percent was sustained in the rural population.

In contrast with the general similarity in urban population growth in the metropolitan and nonmetropolitan areas, the rural population increased sharply in the rural parts of the already heavily populated metropolitan areas. This growth does not, however, reflect an increase in the agricultural population.[14] Much of the increase in rural population took place in suburban unincorporated areas or incorporated centers of under

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[13]For further explanation of slight differences between these data and those computed from the 1940 and 1950 Census of Population, see footnotes * and †, table 3.

[14]A part of the "urban fringe" around the larger cities that was defined and included as "urban" in the 1950 census reports is included with the "rural" in this bulletin to compare it directly with the 1940 classification of urban and rural.

TABLE 3. CHANGE IN TOTAL, URBAN AND RURAL POPULATION WITH CLASSIFICATION BY METROPOLITAN AND NONMETROPOLITAN AREAS, NORTH CENTRAL STATES, 1940-50.

Area	1940 population	1950 population	Change, 1940-50 Number	Change, 1940-50 Percent
Total	43,006,327*	47,405,568	4,399,241	10.2
Urban	24,358,243*	27,434,443†	3,076,200	12.6
Rural	18,648,084*	19,971,125†	1,323,041	7.1
Metropolitan	19,701,344	23,302,201	3,600,857	18.3
Urban	16,775,285	18,922,688	2,147,403	12.8
Rural	2,926,059	4,379,513	1,453,454	49.7
Nonmetropolitan	23,304,983	24,103,367	798,384	3.4
Urban	7,582,958	8,511,755	928,797	12.2
Rural	15,722,025	15,591,612	—130,413	—0.8

*In four states, Kentucky, Michigan, Minnesota and North Dakota, the 1940 Census data were adjusted to include in the total and urban populations, 17,368 out-of-state college students residing in the state at the time of the census. Other adjustments, including allocation of college students with rural parental residence to urban areas and accounting for annexations, retrocessions, incorporations and disincorporations, resulted in reducing the rural population for the region from the 1940 Census figures by 54,065 and increasing the urban population by a similar number. The 1940 Census figures show: total population 42,988,959; urban 24,286,810; and rural 18,-702,149. Urban increases and rural decreases were as follows: Kentucky, 12,330 and —8,212; Michigan, 45,791 and —36,789; Minnesota, 9,137 and —5,514; and North Dakota, 4,175 and —3,550, respectively.
†According to 1940 definitions and classification of urban and rural population. The 1950 Census figures according to 1940 definition, but not classification of urban and rural population, show urban population 27,986,456, and rural 19,419,112. The difference between these data and those shown in the table is due to classifying as urban in 1950 only those centers so classified in 1940 and classifying as rural all centers and populations so classified in 1940.

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2,500 population. Some took place in the open country hinterlands.

Census data show that the rural farm population declined from 10,516,588 to 8,416,541 persons, or by 20 percent.[15] The range for the 13 states was from a 15-percent loss in Iowa to a 27-percent loss in Kansas.

States in the East North Central Division, (not including Kentucky), generally considered as a highly urbanized and industrialized area, lost 20 percent in farm population in the 10-year period. The West North Central Division likewise lost 20 percent.[16]

The changes in definition of the farm population in the 1940 and 1950 censuses are believed to account for not more than one-third of the reported total decrease in rural-farm population. While the total decrease in farm population was 20 percent, the reduction in number of farms was 11 percent—suggesting that many members of farm families left the farm without a corresponding decrease in number of farms occurring. The new definition of farm residence also eliminated many of the "extra" dwelling units (and households) on farms.

[15]U. S. Bureau of the Census. U. S. Census of Population: 1950. Vol. II. Characteristics of the population, part 1. U. S. Summary, Chapter B. Washington, D. C. 1952. Table 58.

[16]States in the East North Central Division are: Ohio, Indiana, Illinois, Michigan and Wisconsin. In the West North Central Division they are: Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas.

A small part of the apparent decrease in farm population and gain in rural nonfarm population is due to a change in definition, whereby in 1950 persons are excluded from the farm population and included in the nonfarm population if they live in a house on a farm which they rent for cash without any farm land. Also, occupants of tourist camps and institutions located on farms were excluded from the count of farm population in 1950.

The rural nonfarm population increased from 8,185,561 to 11,002,571 persons, or 34 percent. The range was from a gain of 3 percent in South Dakota to 67 percent in Michigan. The East North Central Division and Kentucky gained 44 percent while the less urbanized and industrialized West North Central Division gained 16 percent.

Net losses in total population were sustained in 19 of the 44 subregions ranging from 0.3 to 9 percent of the 1940 population. Of the 20 subregions containing one or more metropolitan economic areas, only two suffered losses, each 2 percent. These were Subregion 30, the Central Alleghany Plateau in southeast Ohio, and Subregion 66, the Great Lakes Cutover. Both are characterized by considerable subsistence farming. On the other hand, 17 of the 24 subregions containing no metropolitan areas had losses in total population ranging from 0.3 to 9 percent. Figure 2 shows that most of the subregions suffering losses in population were located in the cutover and south of the Ohio or west of the Mississippi rivers.

Fig. 2. Net change in total population, economic subregions, 1940-50.

SEE FIG. I FOR KEY TO BOUNDARY LINES

PERCENT GAIN

20 & OVER

10 - 19

0 - 9

PERCENT LOSS

0 - 9

Fig. 3. Net change in urban population, economic subregions, 1940-50.

SEE FIG. I FOR KEY TO BOUNDARY LINES

PERCENT GAIN

20 & OVER

10 - 19

0 - 9

PERCENT LOSS

0 - 9

10 - 19

20 & OVER

Fig. 4. Net change in rural population, economic subregions, 1940-50.

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In contrast, only two economic subregions, 30, the Central Alleghany Plateau in southeast Ohio, and 62, Southern Illinois, lost in urban population (0.2 and 1.1 percent, respectively), while 27 subregions showed losses in rural population ranging from 0.3 to 14 percent. Table 4 presents the economic subregions by gains and losses in population classified by whether or not they contain metropolitan and nonmetropolitan economic areas and by rural and urban populations.

Coefficients of contingency were computed from table 4 for total, urban and rural populations with respect to the presence or absence of metropolitan areas in the subregions. The coefficients were 0.52 for total population, 0.16 for urban and 0.61 for rural population. The relatively high coefficients shown for total and rural population is supporting evidence that the presence of metropolitan economic areas within economic subregions was an important "pull" factor in increasing the population in both urban and rural areas. The absence of such areas tended to have an opposite effect, particularly for the rural population.

Absolute and percentage changes between 1940 and 1950 for total, urban and rural populations by subregions are given in tables 5, 6 and 7. In these and succeeding tables, subregions containing metropolitan areas are identified by an asterisk (*).

BIRTHS, DEATHS AND NATURAL INCREASE, 1940-50

Population change is the result of additions to the population through births and in-migration and subtractions through deaths and out-migration. Births, deaths and migration are affected, in part, by the composition of the population and the social and economic conditions that precede the period under study as well as conditions that prevail throughout the period. If there were no in- or out-migration, natural increase or the difference between births and deaths, would be a complete measure of population change.[17]

CHANGES IN THE BIRTH RATE

During the 1940 to 1950 decade, a marked increase occurred in the birth rate in the North Central states. The total number and rates reached their peak in 1947. At the end of the decade (1949) the rate was slightly more than one-third higher than 10 years earlier, 23.7 births per 1,000 population compared to 17.6 in 1940 (table 8). As in the past, births during the decade were more than sufficient to replace the total population lost through deaths.

Traditionally, crude birth rates of the rural

[17]Data on births and deaths that occurred during the decade were obtained from the National Office of Vital Statistics. Estimates of births and deaths, 1940-45, according to rural and urban residence were made by special formula furnished by Dr. Henry Shryock, Jr., of the U. S. Bureau of the Census and Dr. Margaret Jarman Hagood of the U. S. Agricultural Marketing Service. Birth data corrected for under-registration cover the period April 1, 1940 to April 1, 1950. Death data cover the calendar years 1940 through 1949. For further discussion of methods of compilation of data and of analysis, see Appendix C.

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population have been higher than rates for the urban population but, during the decade, the observed relationship was reversed. In 1940 the rural rate was 18.3 compared to 17.2 for the urban

TABLE 4. NET CHANGE IN TOTAL, URBAN AND RURAL POPULATION NORTH CENTRAL STATES, FOR ECONOMIC SUBREGIONS WITH AND WITHOUT METROPOLITAN ECONOMIC AREAS, 1940-50.

Population and type of economic subregion	Economic subregions by population change, 1940-50		
	Total	Gain	Loss
Total population	44	25	19
Economic subregions with metropolitan areas	20	18	2
Economic subregions without metropolitan areas	24	7	17
Urban population	44	43	1
Economic subregions with metropolitan areas	20	19	1
Economic subregions without metropolitan areas	24	24	0
Rural population	44	19	25
Economic subregions with metropolitan areas	20	17	3
Economic subregions without metropolitan areas	24	2	22

TABLE 5. CHANGE IN TOTAL POPULATION, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940-50.

Subregion	1940 Population	1950 Population	Change, 1940-50	
			Number	Percent
Total	43,006,327	47,405,568	4,399,241	10.2
28*	2,834,472	3,325,814	491,342	17.3
29*	628,058	641,005	12,947	2.1
30*	441,388	432,958	—8,430	—1.9
31	772,293	745,067	—27,226	—3.5
44	208,170	193,608	—14,562	—7.0
45	512,336	530,777	18,441	3.6
46*	1,533,596	1,797,195	263,599	17.2
47*	2,673,718	3,208,159	534,441	20.0
48*	1,529,404	1,731,319	201,915	13.2
49*	4,008,024	4,956,598	948,574	23.7
50*	656,383	786,621	130,238	19.8
51*	761,103	791,876	30,773	4.0
52	501,512	514,530	13,018	2.6
53	321,437	320,396	—1,041	—0.3
62	487,429	448,498	—38,931	—8.0
63*	1,202,894	1,321,923	119,029	9.9
64*	6,128,430	7,025,414	896,984	14.6
65*	1,114,376	1,272,460	158,084	14.2
66*	1,233,326	1,209,248	—24,078	—2.0
67	365,080	379,304	14,224	3.9
68*	1,694,953	1,896,822	201,869	11.9
69*	1,083,611	1,165,696	82,085	7.6
70*	1,156,709	1,240,059	83,350	7.2
71	1,087,888	1,016,825	—71,063	—6.5
72*	1,805,114	2,051,294	246,180	13.6
73	530,420	507,966	—22,454	—4.2
76	252,412	256,960	4,548	1.8
82	171,676	166,665	—5,011	—2.9
83	400,287	386,369	—13,918	—3.5
84	350,464	318,851	—31,613	—9.0
85*	2,496,249	2,665,750	169,501	6.8
86*	768,059	807,980	39,921	5.2
87	277,183	275,961	—1,222	—0.4
88	273,906	262,521	—11,385	—4.2
89	291,058	292,317	1,259	0.4
90	352,216	335,948	—16,268	—4.6
91	199,972	196,143	—3,829	—1.9
92	408,927	395,782	—13,145	—3.2
93	338,298	309,907	—28,391	—8.4
94*	419,952	487,556	67,604	16.1
103	316,365	332,017	15,652	4.9
104	222,706	214,793	—7,913	—3.6
105	103,143	95,682	—7,461	—7.2
106	91,330	92,934	1,604	1.8

*Subregions containing one or more metropolitan state economic areas.

TABLE 6. CHANGE IN POPULATION OF AREAS URBAN IN 1940, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940-50.

Subregion	1940 Population	1950 Population†	Change, 1940-50	
			Number	Percent
Total	24,358,243	27,434,443	3,076,200	12.6
28*	2,251,861	2,527,422	275,561	12.2
29*	274,199	280,217	6,018	2.2
30*	159,482	159,131	—351	—0.2
31	57,230	57,470	240	0.4
44	6,125	7,097	972	15.9
45	144,423	151,889	7,466	5.2
46*	1,092,041	1,212,659	120,618	11.0
47*	1,648,492	1,914,190	265,698	16.1
48*	646,548	734,272	87,724	13.6
49*	3,062,651	3,634,437	571,786	18.7
50*	346,595	378,314	31,719	9.2
51*	325,731	374,499	48,768	15.0
52	80,987	93,811	12,824	15.8
53	92,168	97,797	5,629	6.1
62	180,418	178,494	—1,924	—1.1
63*	606,376	679,271	72,895	12.0
64*	5,597,477	6,165,916	568,439	10.2
65*	543,262	626,208	82,946	15.3
66*	498,068	505,420	7,352	1.5
67	113,687	128,705	15,018	13.2
68*	1,079,063	1,206,815	127,752	11.8
69*	407,003	479,127	72,124	17.7
70*	571,911	648,498	76,587	13.4
71	317,859	342,492	24,633	7.7
72*	1,269,761	1,399,907	130,146	10.2
73	100,090	114,697	14,607	14.6
76	48,694	63,949	15,255	31.3
82	68,531	71,532	3,001	4.4
83	175,049	191,176	16,127	9.2
84	90,814	93,069	2,255	2.5
85*	1,415,702	1,592,710	177,008	12.5
86*	315,364	360,115	44,751	14.2
87	45,693	54,873	9,180	20.1
88	40,578	47,519	6,941	17.1
89	88,647	107,813	19,166	21.6
90	59,712	72,025	12,313	20.6
91	39,369	48,432	9,063	23.0
92	79,421	93,919	14,498	18.3
93	54,315	64,700	10,385	19.1
94*	222,371	287,846	65,475	29.4
103	60,344	87,049	26,705	44.3
104	39,349	51,235	11,886	30.2
105	12,821	14,767	1,946	15.2
106	27,961	32,959	4,998	17.9

*Subregions containing one or more metropolitan state economic areas.

†According to 1940 definition and classification of urban population.

TABLE 7. CHANGE IN POPULATION OF AREAS RURAL IN 1940, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940-50.

Subregion	1940 Population	1950 Population†	Change, 1940-50	
			Number	Percent
Total	18,648,084	19,971,125	1,323,041	7.1
28*	582,611	798,392	215,781	37.0
29*	353,859	360,788	6,929	2.0
30*	281,906	273,827	—8,079	—2.9
31	715,063	687,597	—27,466	—3.8
44	202,045	186,511	—15,534	—7.7
45	367,913	378,888	10,975	3.0
46*	441,555	584,536	142,981	32.4
47*	1,025,226	1,293,969	268,743	26.2
48*	882,856	997,047	114,191	12.9
49*	945,373	1,322,161	376,788	39.9
50*	309,788	408,307	98,519	31.8
51*	435,372	417,377	—17,995	—4.1
52	420,525	420,719	194	**
53	229,269	222,599	—6,670	—2.9
62	307,011	270,004	—37,007	—12.1
63*	596,518	642,652	46,134	7.7
64*	530,953	859,498	328,545	61.9
65*	571,114	646,252	75,138	13.2
66*	735,258	703,828	—31,430	—4.3
67	251,393	250,599	—794	—0.3
68*	615,890	690,007	74,117	12.0
69*	676,608	686,569	9,961	1.5
70*	584,798	591,561	6,763	1.2
71	770,029	674,333	—95,696	—12.4
72*	535,353	651,387	116,034	21.7
73	430,330	393,269	—37,061	—8.6
76	203,718	193,011	—10,707	—5.3
82	103,145	95,133	—8,012	—7.8
83	225,238	195,193	—30,045	—13.3
84	259,650	225,782	—33,868	—13.0
85*	1,080,547	1,073,040	—7,507	—0.7
86*	452,695	447,865	—4,830	—1.1
87	231,490	221,088	—10,402	—4.5
88	233,328	215,002	—18,326	—7.9
89	202,411	184,504	—17,907	—8.8
90	292,504	263,923	—28,581	—9.8
91	160,603	147,711	—12,892	—8.0
92	329,506	301,863	—27,643	—8.4
93	283,983	245,207	—38,776	—13.7
94*	197,581	199,710	2,129	1.1
103	256,021	244,968	—11,053	—4.3
104	183,357	163,558	—19,799	—10.8
105	90,322	80,915	—9,407	—10.4
106	63,369	59,975	—3,394	—5.4

*Subregions containing one or more metropolitan state economic areas.

**Less than 0.05 percent.

†According to 1940 definition and classification of rural population.

population. In 1949 the rural rate was 22.7 and the urban 24.5. The urban excess in 1949 probably can be explained by the misallocation of births by residence of mother (see footnote 2).

Factors that appear associated with the rise in birth rates during the 1940's include the delayed marriages accumulated from the depression of the 1930's and from World War II, lower age at marriage, increase in family size and increase in disposable income.

Increase in birth rate was greatest in the highly urbanized areas. The urban rate in the metropolitan areas increased from 16.4 to 24.5 while the urban rate in the nonmetropolitan areas increased from 18.8 to 24.7. Closely associated with increases in birth rates in the highly urbanized areas were those in the rural parts of the metropolitan areas. In those areas the rural rate increased from 15.9 to 21.4, an increase of 5.5 points, compared to the increase in the nonmetropolitan areas of from 18.7 to 23.0, an increase of

4.3 points. Thus, by 1949 the urban birth rates outside of the largest cities and highly urbanized areas were higher than those of the small towns and the open country (table 9).

Assuming there had been no misallocation of births by residence of mother, the higher urban than rural crude birth rates in 1949 probably would not hold if both rates were standardized to allow for the differences in the age-sex composition of the urban and rural populations. Even so, the marked change in the rural-urban differential cannot be accounted for by differences in age-sex composition alone. The levels of both the urban and rural crude birth rates during the decade were substantially above those required for population replacement on a long-term basis.

Although birth rates increased in all subregions of the North Central states, substantial differences in the rates of increase were noted. While the rates by subregions in 1949 were different from those in 1940, a moderately high positive re-

lationship (r = +0.74) was shown between the 2 years. The Cutover, Ozarks, Appalachians and the western portions of the Great Plains states ranked high among the subregions in 1940 birth rates and, in general, showed the least increase during the decade. Other subregions generally began the decade with lower rates and showed the largest increases over the 10-year period.

Among the subregions, a moderately positive relationship (r = + 0.55) was found between increases in birth rates in the total population and the proportion of urban population in 1940 (table 10). The tendency of the subregions to be distributed from practically no increase in crude birth rate and a low percent urban population to a high increase in birth rate and high urbanization shows this relationship. The increase in birth rate in the urban population was more closely related to the degree of urbanization than was the increase in birth rate in the rural population (r = 0.41 and 0.35, respectively). Apparently, factors related to

TABLE 8. BIRTH RATES FOR ECONOMIC SUBREGIONS, 1940 AND 1949 BY URBAN AND RURAL RESIDENCE, NORTH CENTRAL STATES.

| Subregion | Births per 1,000 population | | | | | |
| | 1940 | | | 1949† | | |
	Total	Urban	Rural	Total	Urban	Rural
Total	17.6	17.2	18.3	23.7	24.5	22.7
28*	15.8	15.7	16.2	23.7	24.6	21.0
29*	17.0	17.8	16.4	22.5	23.9	21.3
30*	18.9	18.4	19.2	22.9	23.8	22.4
31	29.7	27.0	29.9	31.2	29.2	31.2
44	25.3	35.9	24.9	25.9	38.0	25.5
45	19.2	21.2	18.4	23.2	24.7	22.6
46*	17.0	17.0	17.0	24.2	26.0	20.5
47*	17.6	18.4	16.2	24.4	27.0	20.5
48*	17.8	18.2	17.6	24.1	25.2	23.3
49*	18.4	17.8	20.1	25.4	25.9	23.9
50*	19.1	19.1	19.1	25.5	27.5	23.6
51*	17.9	19.0	17.1	22.2	24.7	20.0
52	21.0	21.1	21.0	23.2	24.5	22.9
53	18.8	19.8	18.4	22.2	25.0	20.9
62	19.1	21.0	18.0	19.3	20.7	18.3
63*	17.1	19.3	14.9	22.3	22.9	21.6
64*	15.2	15.4	13.5	22.4	22.7	20.4
65*	17.5	17.2	17.7	24.4	24.3	24.5
66*	19.6	18.3	20.5	23.3	24.6	22.4
67	19.5	19.0	19.7	25.0	25.7	24.6
68*	17.8	16.9	19.4	25.4	24.9	26.2
69*	18.2	19.0	17.8	24.4	24.2	24.6
70*	17.2	17.4	17.1	23.2	23.7	22.7
71	16.3	16.6	16.2	19.5	20.9	18.8
72*	15.6	16.0	14.9	22.5	23.5	20.3
73	18.6	19.6	18.4	21.1	23.5	20.4
76	22.1	22.9	22.0	27.8	28.1	27.7
82	17.5	18.6	16.8	19.9	21.5	18.6
83	15.9	15.3	16.3	20.9	24.6	17.3
84	14.8	15.7	14.5	18.0	20.2	17.1
85*	16.0	16.6	15.2	23.1	24.1	21.6
86*	19.5	19.4	19.6	25.3	26.8	24.1
87	20.3	28.3	18.7	25.2	26.8	24.8
88	20.4	22.9	19.9	23.8	26.7	23.2
89	24.5	29.2	22.4	26.6	29.9	24.6
90	26.5	28.8	26.1	27.2	29.8	26.5
91	19.2	20.7	18.9	26.1	27.8	25.5
92	17.6	18.0	17.6	25.0	27.1	24.4
93	15.0	16.8	14.6	21.6	25.7	20.6
94*	17.0	17.9	15.9	23.7	28.1	17.4
103	17.3	18.4	17.1	26.5	30.0	25.2
104	20.0	22.3	19.5	26.4	30.5	25.1
105	27.7	27.7	27.8	29.5	33.9	28.7
106	22.1	23.4	21.5	28.4	33.2	25.8

*Subregions containing one or more metropolitan state economic areas.

†According to 1940 definition and classification of urban and rural population.

TABLE 9. BIRTH RATES IN THE NORTH CENTRAL STATES BY URBAN AND RURAL RESIDENCE FOR METROPOLITAN AND NONMETROPOLITAN ECONOMIC AREAS, 1940 AND 1949.

| Area | Births per 1,000 population | | | | | |
| | 1940 | | | 1949 | | |
	Total	Urban	Rural	Total	Urban	Rural
Total	17.6	17.2	18.3	23.7	24.5	22.7
Metropolitan	16.3	16.4	15.9	23.9	24.5	21.4
Nonmetropolitan	18.8	18.8	18.7	23.6	24.7	23.0

increases in birth rates during the 1940 decade did not have an equal effect on rural and urban increases. Only a small positive relationship (r = +0.39) was found when the increase in urban birth rates was correlated with the increase in rural rates.

Another set of factors was used to determine the relationship of birth rates in the rural population to the prosperity among farmers during the decade. This set was the Bureau of Agricultural Economics farm operator family level of living indexes for 1940 and 1950 which were used to indicate the average level of living among farmers in each of the subregions.[18]

A moderately negative relationship (r = —0.57) between the 1940 rural birth rate and the 1940 level of living of farm operator families was disclosed. This is in line with many previous studies that indicate a negative relationship exists be-

[18]Hagood, Margaret Jarman. Farm operator family level-of-living indexes for counties of the United States, 1930, 1940, 1945 and 1950. Bur. Agr. Econ. U. S. Dept. Agr., (mimeo) 1952. The indexes are based on four items: (1) percentage of farms with electricity; (2) percentage of farms with telephones; (3) percentage of farms with automobiles; and (4) average value of products sold or traded in the year preceding the census (adjusted for changes in purchasing power of the farmer's dollar).

TABLE 10. INCREASE IN CRUDE BIRTH RATE, 1940-49, IN RELATION TO PERCENTAGE OF THE POPULATION THAT WAS URBAN IN 1940, 44 ECONOMIC SUBREGIONS, NORTH CENTRAL STATES.†

| Increase in crude birth rate | Percent urban, 1940 | | | | | | | | | |
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Total population										
9-10	—	1	—	—	—	—	—	—	—	—
7-8	—	2	1	—	1	2	2	4	—	1
5-6	—	3	—	3	4	3	—	—	—	—
3-4	—	1	4	1	2	—	—	—	—	—
1-2	2	4	—	1	1	—	—	—	—	—
—1-0	—	—	—	1	—	—	—	—	—	—
Urban population										
11-12	—	1	—	—	—	—	—	—	—	—
9-10	—	2	—	1	1	1	1	2	—	—
7-8	1	1	1	1	3	2	1	2	—	1
5-6	—	2	1	2	3	1	—	—	—	—
3-4	—	3	2	1	1	1	—	—	—	—
1-2	1	1	—	1	—	—	—	—	—	—
—1-0	—	1	—	1	—	—	—	—	—	—
Rural population										
9-10	—	—	—	—	—	—	—	—	—	1
7-8	—	2	1	—	2	1	1	—	—	—
5-6	—	4	—	1	2	2	—	2	—	—
3-4	—	1	3	2	2	1	1	2	—	—
1-2	2	3	1	1	2	1	—	—	—	—
—1-0	—	1	—	1	—	—	—	—	—	—

†Coefficient of correlation: total, 0.55; urban, 0.41; rural, 0.35.
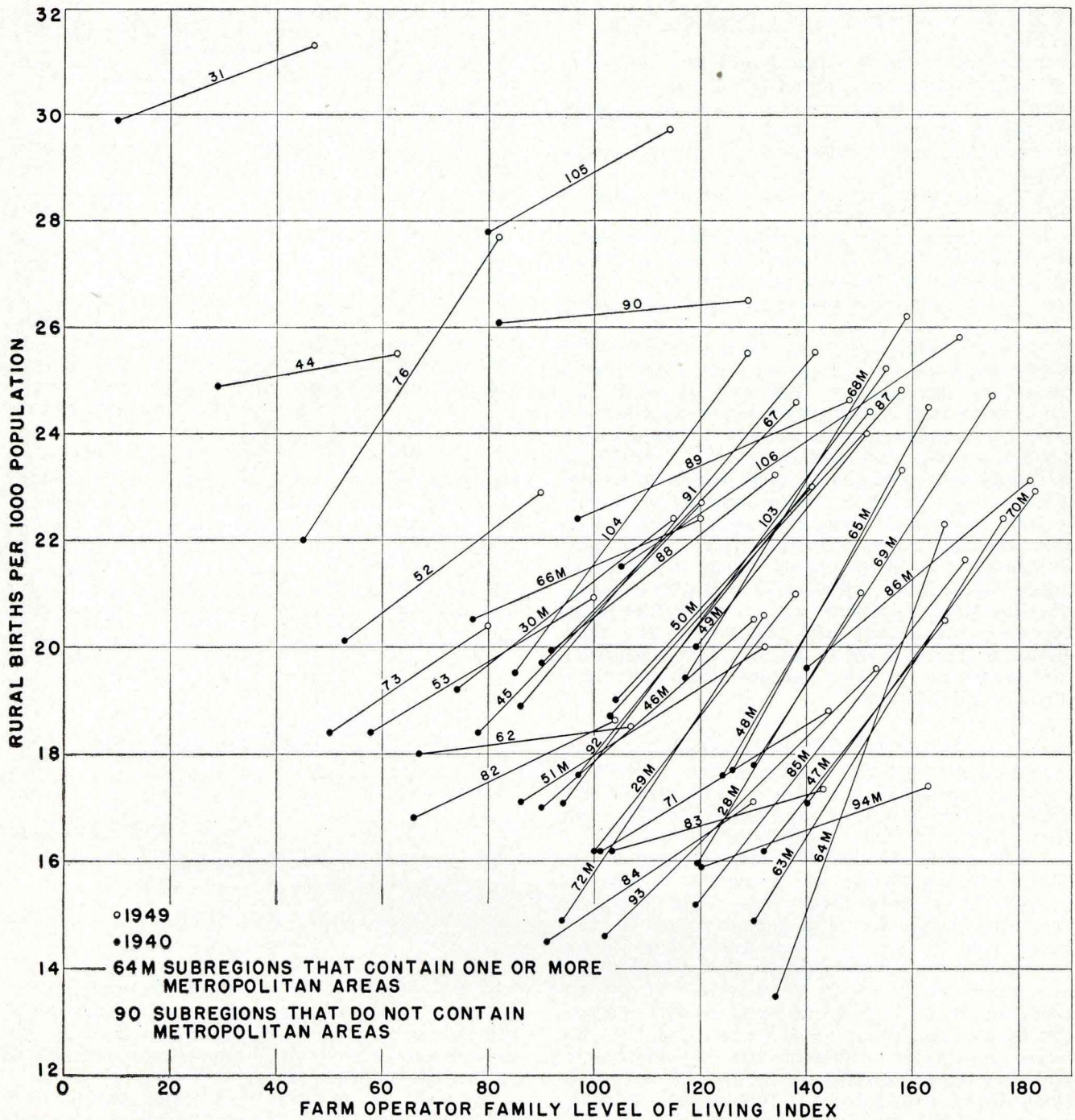
Fig. 5. Increase in rural birth rate, 1940-49, in relation to increase in farm operator family level of living index, 1940-50, economic subregions.

tween level of living and birth rate. In this study, data for 1940 show that areas of low level of living among farm operator families generally showed a high birth rate while those with a high level of living had a low birth rate. By 1950 the closeness of the relationship had changed appreciably though still showing a negative correlation (r = —0.17). By 1950 birth rates in the various subregions in the North Central states were more nearly equal, apart from differences in levels of living. Whereas birth rates increased

in every subregion during the decade, the greatest gains occurred in areas with the higher levels of living. It is noteworthy that subregions 31 and 44, both areas of low levels of living in eastern and southeastern Kentucky and subregions 89, 90 and 105 in northwestern Minnesota and North Dakota all reported birth rates in 1940 in excess of the 1949 average of 23.7 per 1,000 population for the North Central states. Birth rates in these five subregions were maintained at very high levels throughout the decade and even increased

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as the farm operator family level of living increased.

In general, farm operator family level of living and urbanization were found to be negatively associated (r = —0.25). Some of the areas were exceptions in that they had a high degree of urbanization and a high level of living among farmers. Too, there were areas that had a rise in birth rate greater than expected on the basis of the degree of urbanization.

The average decrease in rural-urban birth rate differential between 1940 and 1949 was indicated earlier; however, the subregions differed in the amount and direction of change that took place. This change was measured by computing a "second-order" difference. For each subregion the difference between the urban and rural birth rates was obtained for 1940 and for 1949, the difference was given a positive sign when the rural exceeded the urban birth rate and a negative sign when the urban exceeded the rural. In 1940, 32 of the 44 subregions had higher urban than rural birth rates. By 1949, there were 39 such subregions. To complete the analysis, the 1949 difference was then subtracted from the 1940 difference. The result was a measure of change in the rural-urban birth rate differential over the decade. Practically no association (r = —0.12) was found between this change and changes in the farm operator family level of living, thus suggesting the importance of other factors which influenced fertility differentials.

CHANGES IN THE DEATH RATE

In contrast with the birth rate, the crude death rate in the North Central states changed but little, moving downward slightly during the decade from 10.7 per 1,000 population in 1940 to 9.9 in 1949 (table 11). Since data on age-specific death rates were not yet available, it was not possible to compute death rates which would reveal more adequately the improvements in mortality over the decade. It is known that in the 13 states the number of persons over 65 years of age increased by nearly 29 percent. If the expectation of life had not changed over the decade, the crude rate would have increased due to the larger proportion of persons in the very young and very old age groups, both of which have relatively high death rates. It follows then that the small overall reduction in the crude death rate implies a larger reduction in the rate standardized for age.

The reduction in overall crude death rate was due to reductions in the urban and rural rates of 0.6 and 1.0 deaths per 1,000 population, respectively. Eleven subregions showed small increases in death rates; seven had increases in rural areas only; and four in both urban and rural areas. These 11 subregions were predominantly rural with no large urban centers.

In general, the reductions in crude rural and urban death rates occurred in those subregions characterized by in-migration. This reduction

TABLE 11. DEATH RATES FOR ECONOMIC SUBREGIONS, 1940 AND 1949, BY URBAN AND RURAL RESIDENCE, NORTH CENTRAL STATES.

Subregion	*Deaths per 1,000 population					
	1940			1949†		
	Total	Urban	Rural	Total	Urban	Rural
Total	10.7	11.2	10.1	9.9	10.6	9.1
28*	10.4	10.0	11.7	9.5	10.0	8.1
29*	11.7	12.2	11.4	11.1	12.0	10.3
30*	12.0	13.1	11.3	10.5	11.2	10.1
31	7.8	11.4	7.5	7.5	9.7	7.3
44	8.7	15.2	8.5	8.1	11.8	8.0
45	11.9	18.0	9.6	10.6	13.7	9.4
46*	12.7	12.9	12.1	10.8	12.1	8.3
47*	12.4	12.7	11.9	10.2	11.3	8.6
48*	12.2	12.5	11.9	10.5	11.4	9.8
49*	9.4	9.2	10.1	8.7	8.9	8.0
50*	11.2	11.0	11.5	9.8	10.5	9.1
51*	12.0	13.6	10.7	11.3	12.3	10.3
52	10.8	13.6	10.3	9.6	10.7	9.3
53	12.1	14.6	11.1	11.0	13.8	9.8
62	11.7	12.2	11.4	11.2	12.7	10.3
63*	11.8	12.2	11.4	10.4	11.5	9.2
64*	10.5	10.4	11.3	10.1	10.5	6.8
65*	10.3	10.7	10.0	9.4	10.0	8.9
66*	10.4	10.5	10.3	10.7	11.0	10.6
67	9.5	9.8	9.3	9.3	9.7	9.0
68*	9.8	9.9	9.5	9.4	9.8	8.8
69*	10.5	11.8	9.7	9.9	10.6	9.4
70*	11.5	13.1	9.9	10.6	11.3	9.8
71	12.2	15.0	11.0	12.4	13.2	12.0
72*	11.3	12.0	9.9	10.4	11.5	8.1
73	10.4	12.8	9.9	10.5	11.7	10.1
76	9.8	13.5	9.0	9.5	10.7	9.1
82	12.2	14.3	10.7	11.3	12.7	10.3
83	11.1	11.9	10.4	10.9	12.0	9.9
84	12.9	15.0	12.1	12.7	14.5	11.9
85*	10.7	12.1	8.9	10.0	10.9	8.6
86*	9.1	11.3	7.6	9.2	10.3	8.2
87	8.6	11.5	8.0	9.0	10.4	8.2
88	9.8	14.9	8.9	9.7	9.7	9.6
89	8.8	9.6	8.5	8.8	8.8	8.8
90	8.3	10.5	7.8	8.5	11.0	7.9
91	8.4	10.1	8.0	8.8	9.5	8.5
92	9.0	11.9	8.4	9.7	11.5	9.1
93	10.0	11.3	8.1	10.8	11.7	8.6
94*	9.9	10.5	9.1	9.4	10.0	8.5
103	8.4	8.7	8.4	8.2	8.6	8.0
104	9.0	10.9	8.6	9.0	9.4	8.8
105	7.3	10.7	6.8	7.9	9.9	7.6
106	7.9	9.4	7.2	8.5	10.0	7.7

*Subregions containing one or more metropolitan state economic areas.

†According to 1940 definition and classification of urban and rural population.

was due primarily to the heavy in-migration of persons in the younger age group. Conversely, the subregions that lost population through migration showed very little improvement or showed an increase in death rates.

It would be expected that out-migration from the rural areas of the North Central states would consist principally of young adults in the productive age groups and few older people. Thus, any large movement out of an area would result in higher crude death rates among the residents who remained in the area. The rates presented reflect the incidence of mortality on residents of the subregions. It should not be inferred, without other forms of evidence, that there has been a deterioration in general health conditions in areas of out-migration or that there has been improvement in the areas of in-migration.

One of the more important causes of the differences among the rates shown in table 11 is the

age composition of the population. Another factor is the increasingly large proportion of rural deaths that occur in urban hospitals and the consequently greater opportunities for errors of residence allocation for fringe dwellers. The marked reduction in the crude rural death rate in subregions 28, 46, 47 and 64 in northeast Ohio, southwest Ohio, southeast Indiana and the Chicago Environs areas, respectively, suggests a substantial change in the age structure of the rural population. As is shown in the section on migration, there was a heavy migration into the rural areas of these subregions. While rural death rates were lower than urban rates in practically all parts of the region, inspection of rates in table 12 shows that they were much lower in the combined metropolitan than in the nonmetropolitan areas. In general, this relation holds for total, urban and rural rates both in 1940 and 1949.

NATURAL INCREASE IN POPULATION

The influence of the rate and amount of natural increase, i.e., excess of births over deaths, is an important consideration in any analysis of the redistribution of population. During the 1940-50 decade, births exceeded deaths by 109 percent in the 13 North Central states. That is approximately 2.1 births for each death. The observed natural increase would have led to a gain of 5,050,666 persons (table 13). This would have

TABLE 12. DEATH RATES FOR METROPOLITAN AND NONMETROPOLITAN ECONOMIC AREAS, 1940 AND 1949, BY URBAN AND RURAL RESIDENCE, NORTH CENTRAL STATES.

Area	Deaths per 1,000 population					
	1940			1949		
	Total	Urban	Rural	Total	Urban	Rural
Total	10.7	11.2	10.1	9.9	10.6	9.1
Metropolitan	10.4	10.5	9.9	9.6	10.3	7.1
Nonmetropolitan	10.9	12.5	10.1	10.2	11.3	9.6

meant an 11.7-percent increase in population in the region over 1940. All of the subregions showed a natural increase during the decade (fig. 6). The percentage increase ranged from just over 4 percent in Subregion 84, the Kansas-Missouri Corn Belt Border, to nearly 26 percent in Subregion 31 in southeast Kentucky.

The highest rates of natural increase in total population were in subregions 31 and 44 in eastern and southeastern Kentucky and in Subregion 76 in the Missouri Bootheel. The next highest rates were in subregions 90, 105 and 106 in North Dakota and western Nebraska. The lowest rates were in subregions 71 and 84 in southern Iowa, northern Missouri, west central Illinois and in the Kansas-Missouri Corn Belt Border. In general, rates below the average for the region were concentrated in a belt extending from eastern and
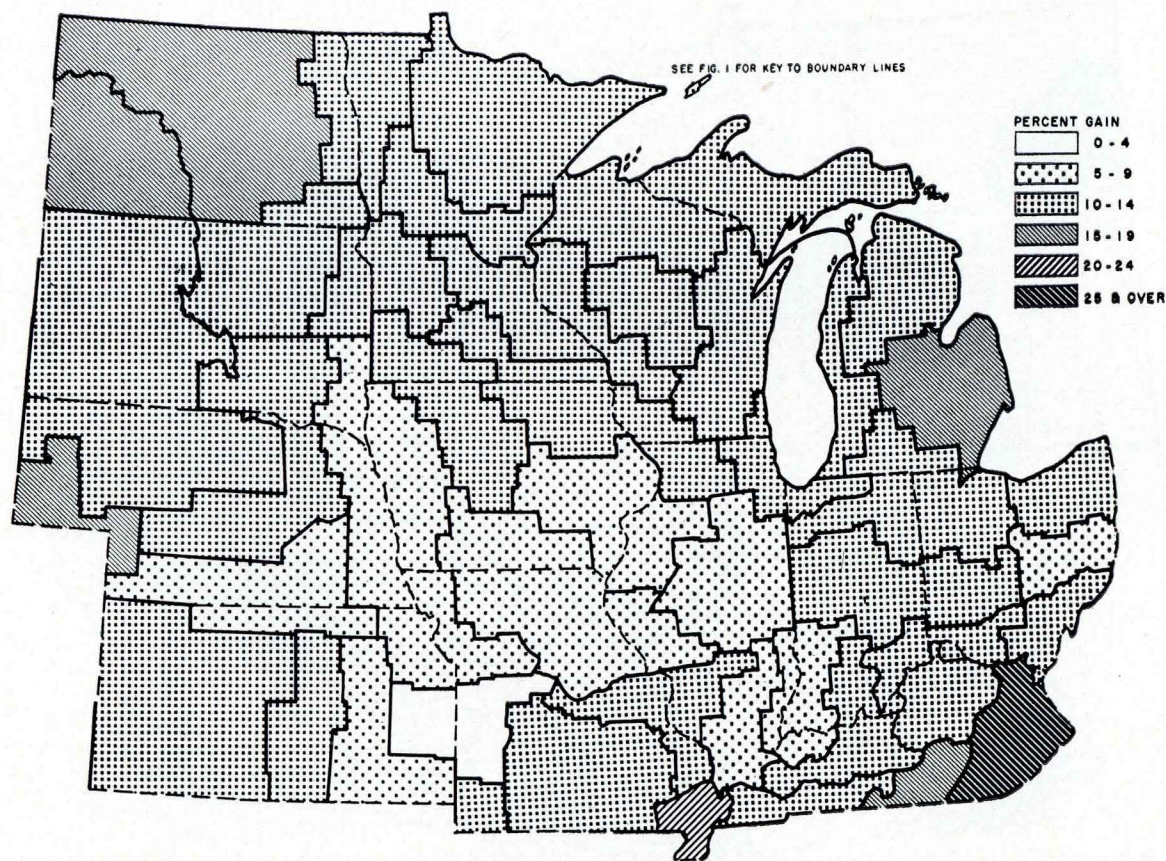
Fig. 6. Natural increase, 1940-50, as percent of 1940 population, economic subregions.

southern Nebraska and eastern and northern Kansas, through northern Missouri, southern Iowa and the central part of Illinois.

Natural increase and migration in combination play varying roles in net population change. In the following section, the role of migration in adding to population above that of natural increase or in reducing population will be discussed.

POPULATION CHANGE THROUGH MIGRATION, 1940-50

The 1940-50 decade was a period of change. There was a continuation of the shift from depression to prosperity, the prosecution of World War II, and the postwar economic adjustment. During the decade, widespread migrations occurred as workers and their families responded to the sharp increase in employment and the many alternative employment opportunities. The demands of the war period brought on expansion and readjustment in the structure of the nation's industrial facilities. Along with industrial redistribution and expansion, agriculture likewise adapted itself to production at full capacity. This adaptation was accomplished through rapid postwar mechanization, through production of improved varieties of farm products, seeds and livestock, and through increased efficiencies in farm management and operation. Increased agricultural production was accompanied by a decline in hired and family labor on farms.

TABLE 13. RELATIONSHIP OF NATURAL INCREASE AND NET MIGRATION TO URBAN, RURAL, METROPOLITAN AND NONMETROPOLITAN POPULATION CHANGE, NORTH CENTRAL STATES, 1940-50.

Area	Natural increase	Percent of 1940 population	Natural increase plus net migration	
			Total	Percent of natural increase
Total	5,050,666	11.7	4,399,241	87.1
Urban†	2,876,668	11.8	3,076,200	107.0
Rural†	2,173,998	11.7	1,323,041	60.9
Metropolitan	2,405,695	12.2	3,600,857	149.7
Urban	2,004,570	11.9	2,147,403	107.1
Rural	401,125	13.7	1,453,454	362.3
Nonmetropolitan	2,644,971	11.3	798,384	30.2
Urban	872,098	11.5	928,797	106.5
Rural	1,772,873	11.3	—130,413	—7.4

†According to 1940 definition and classification of urban and rural population.

The relatively well established patterns of population distribution of the pre-war period were altered drastically. The social effects of the changes in the social structure and in community relationships were not small. New social frontiers came into being. Some areas were greatly de-populated; others expanded populationwise. In both instances, institutional, service facility, community relationship, land use, tax base and many other adjustments had to come about. While our concern is with the redistribution of the population
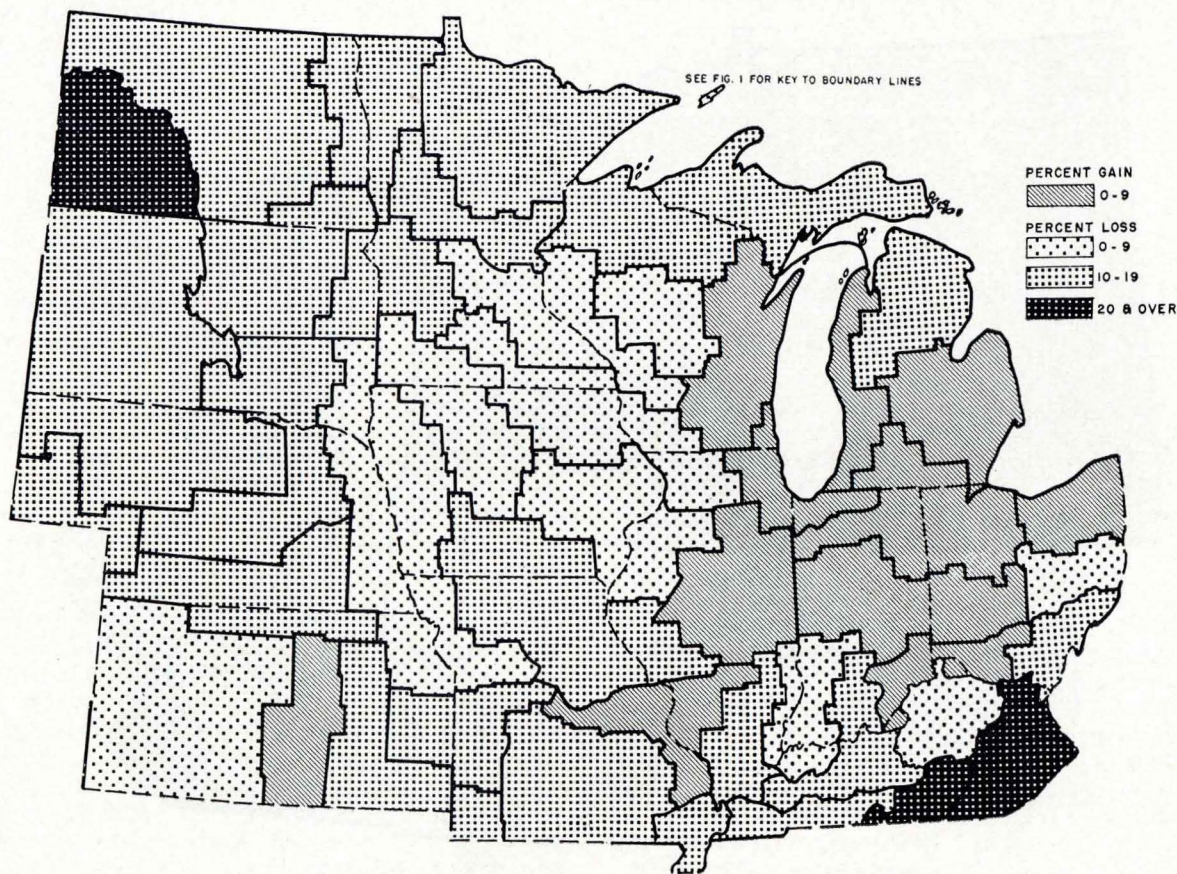
Fig. 7. Net change in population due to migration, economic subregions, 1940-50.

SEE FIG. I FOR KEY TO BOUNDARY LINES

PERCENT GAIN
20 & OVER
10 - 19
0 - 9
PERCENT LOSS
0 - 9
10 - 19
20 & OVER
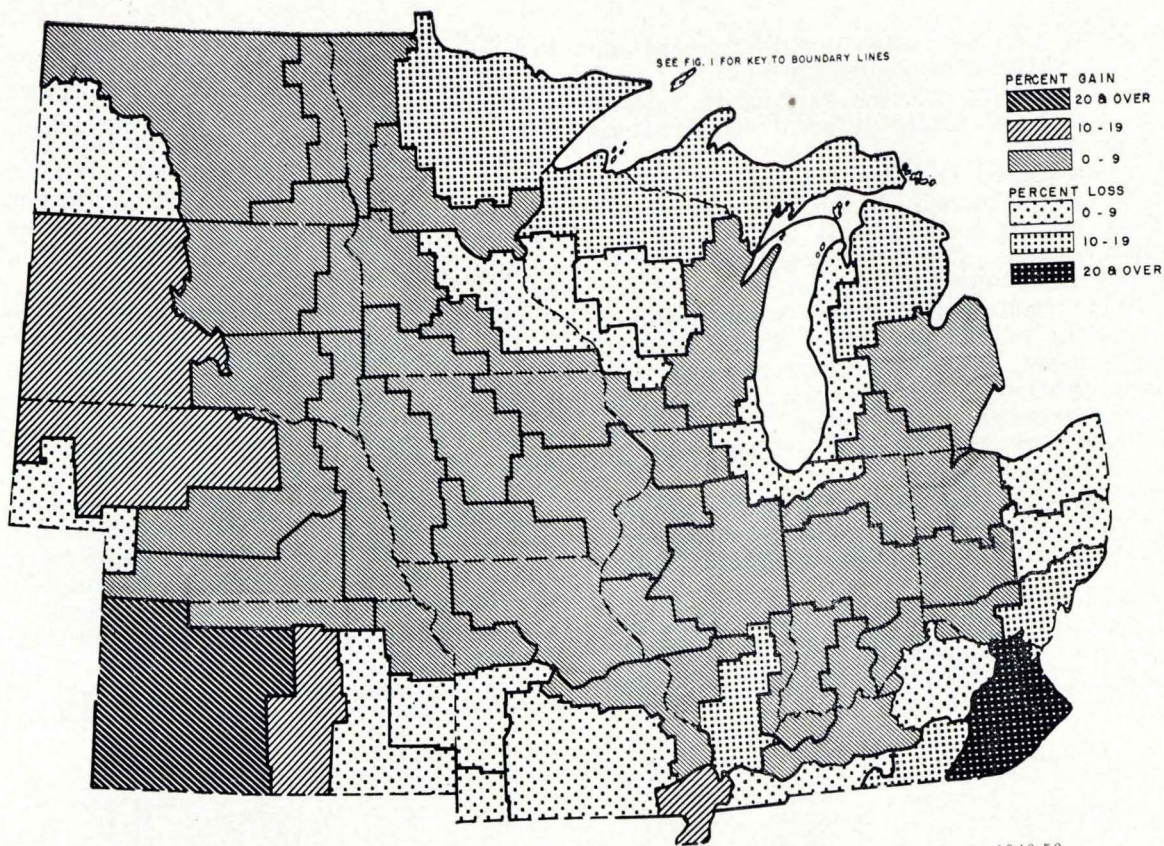
Fig. 8. Net change in urban population due to migration, economic subregions, 1940-50.

SEE FIG. I FOR KEY TO BOUNDARY LINES

PERCENT GAIN
20 & OVER
10 - 19
0 - 9
PERCENT LOSS
0 - 9
10 - 19
20 & OVER
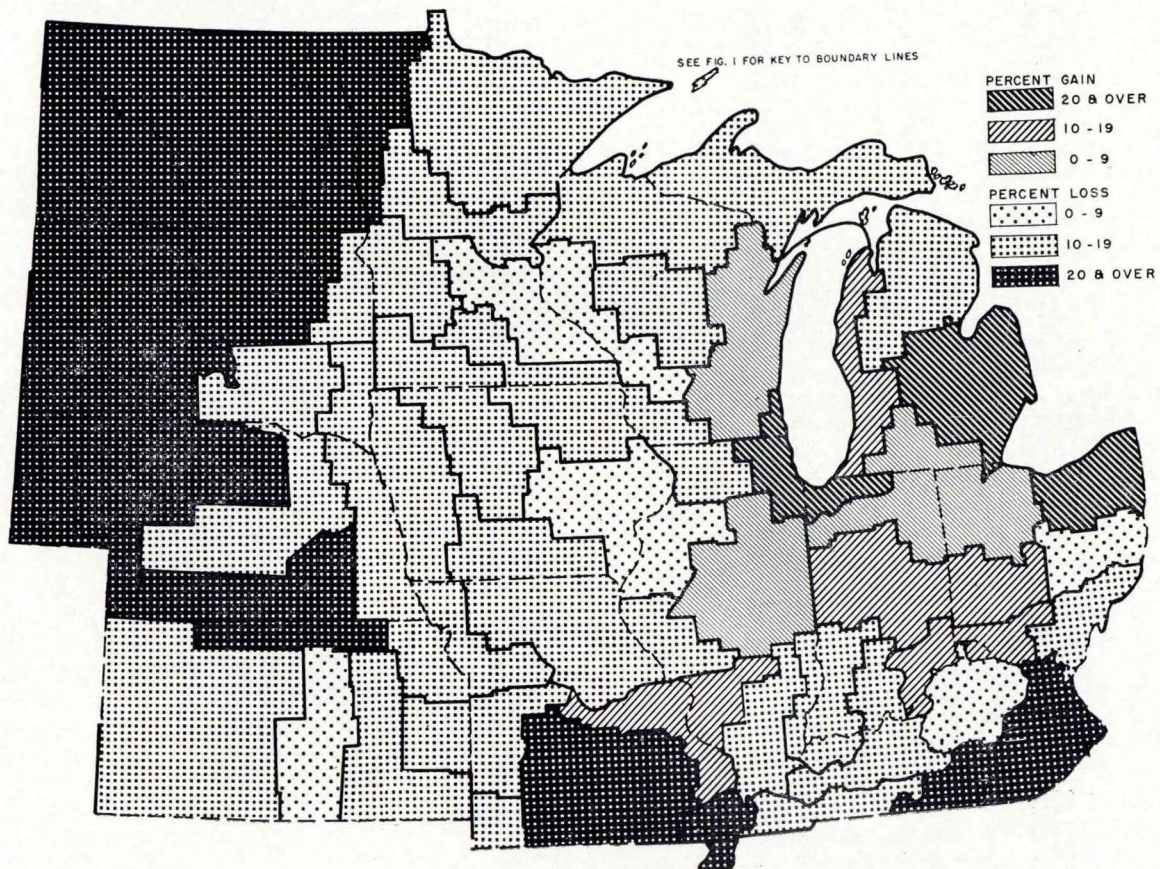
Fig. 9. Net change in rural population due to migration, economic subregions, 1940-50.

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in the North Central states during the 1940-50 decade, that shifting in population must be recognized as an ongoing process varying in rate at different times and under different combinations of circumstances.

The method used in measuring net migration was to add natural increase to the 1940 enumerated population and to compare this figure with the 1950 enumeration. The difference gives a figure termed net change due to migration.[19]

The North Central states as a whole retained the equivalent of 87 percent of their reported natural increase. Thirteen percent was lost through migration. The retention, or loss, was not uniform throughout the region. The national trend toward urbanization was evident even in the more rural subregions.

The urban population retained all of its natural increase of 2,876,668 persons, or the equivalent of about 12 percent of the 1940 population (tables

[19] As used in this study, net change due to migration includes those changes that occurred in rural and urban populations, in the metropolitan and nonmetropolitan areas, in the economic subregions and in the North Central states. Lack of adequate vital statistics data did not permit the computation of net migration for the rural farm and rural nonfarm populations by the same methods.

13 and 17). In-migration added 199,532 persons or nearly 1 percent of the 1940 population. In the rural population, only 1,323,041 or the equivalent of 61 percent of the natural increase of 2,173,998 persons was retained. The remainder, 850,957, was lost through out-migration. Thus, the rural natural increase retained was the equivalent of only 7 percent of the 1940 population.

Metropolitan areas as a whole not only retained their natural increase of 2,405,695 but also added 1,195,162 residents through migration. Nonmetropolitan areas lost 1,846,587 persons through out-migration or 69.8 percent of their natural increase of 2,644,971 persons. Thus, the nonmetropolitan areas had more out- than in-migrants. It is quite clear that on the whole, in the urban and rural areas of the region, natural increase played a more important role in distributing population than did migration. In the rural portions of metropolitan areas, however, more persons were added through migration than through natural increase. In the rural portions of the nonmetropolitan areas a loss of population was sustained, for out-migration was greater than natural increase (table 13).

All economic subregions, except Subregion 94,

TABLE 14. BIRTHS, DEATHS AND NET MIGRATION, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940-50.

Subregion	Population April 1, 1940	Births April 1940 to April 1950	Deaths April 1940 to April 1950	Net migration April 1940 to April 1950	Population April 1, 1950
Total	43,006,327	9,667,884	4,617,218	—651,425	47,405,568
28*	2,834,472	658,165	307,299	140,476	3,325,814
29*	628,058	128,111	71,540	—43,624	641,005
30*	441,388	96,639	47,930	—57,139	432,958
31	772,293	253,040	54,382	—225,884	745,067
44	208,170	55,762	16,021	—54,303	193,608
45	512,336	115,557	58,488	—38,628	530,777
46*	1,533,596	366,538	196,316	93,377	1,797,195
47*	2,673,718	652,803	329,918	211,556	3,208,159
48*	1,529,404	355,332	182,393	28,976	1,731,319
49*	4,008,024	1,018,957	404,054	333,671	4,956,598
50*	656,383	165,224	74,175	39,189	786,621
51*	761,103	162,447	87,563	—44,111	791,876
52	501,512	116,559	49,210	—54,331	514,530
53	321,437	69,099	36,371	—33,769	320,396
62	487,429	90,148	52,299	—76,780	448,498
63*	1,202,894	246,380	139,972	12,621	1,321,923
64*	6,128,430	1,299,743	672,895	270,136	7,025,414
65*	1,114,376	253,427	116,481	21,138	1,272,460
66*	1,233,326	263,788	127,140	—160,726	1,209,248
67	365,080	81,862	33,735	—33,903	379,304
68*	1,694,953	388,525	169,125	—17,531	1,896,822
69*	1,083,611	238,591	114,209	—42,297	1,165,696
70*	1,156,709	243,600	130,950	—29,257	1,240,059
71	1,087,888	188,380	125,943	—133,500	1,016,825
72*	1,805,114	391,120	209,621	64,681	2,051,294
73	530,420	114,032	51,057	—85,429	507,966
76	252,412	77,031	22,264	—50,219	256,960
82	171,676	37,410	20,061	—22,360	166,665
83	400,287	74,739	41,893	—46,764	386,369
84	350,464	57,369	42,320	—46,662	318,851
85*	2,496,249	515,753	268,569	—77,683	2,665,750
86*	768,059	170,427	69,992	—60,514	807,980
87	277,183	62,299	23,773	—39,748	275,961
88	273,906	57,773	26,325	—42,833	262,521
89	291,058	66,053	25,117	—39,677	292,317
90	352,216	82,177	28,357	—70,088	335,948
91	199,972	43,557	16,570	—30,816	196,143
92	408,927	84,014	36,346	—60,813	395,782
93	338,298	59,189	33,218	—54,362	309,907
94*	419,952	99,730	42,474	10,348	487,556
103	316,365	69,077	27,264	—26,161	332,017
104	222,706	49,784	19,067	—38,630	214,793
105	103,143	25,334	7,321	—25,474	95,682
106	91,330	22,339	7,157	—13,578	92,934

* Subregions containing one or more metropolitan state economic areas.

TABLE 15. BIRTHS, DEATHS AND NET MIGRATION FOR URBAN POPULATION, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940-50.

Subregion	Population April 1, 1940	Births April 1940 to April 1950	Deaths April 1940 to April 1950	Net migration April 1940 to April 1950	Population April 1, 1950†
Total	24,358,243	5,701,685	2,825,017	199,532	27,434,443
28*	2,251,861	524,336	242,165	—6,610	2,527,422
29*	274,199	60,946	34,196	—20,732	280,217
30*	159,482	36,582	19,884	—17,049	159,131
31	57,230	20,252	5,792	—14,220	57,470
44	6,125	2,588	864	—752	7,097
45	144,423	36,928	23,424	—6,038	151,889
46*	1,092,041	254,869	143,483	9,232	1,212,659
47*	1,648,492	436,182	213,518	43,034	1,914,190
48*	646,548	163,519	83,303	7,508	734,272
49*	3,062,651	773,560	307,760	105,986	3,634,437
50*	346,595	89,188	39,245	—18,224	378,314
51*	325,731	82,392	44,409	10,785	374,499
52	80,987	22,113	9,713	424	93,811
53	92.168	21,440	12,838	—2,973	97,797
62	180,418	38,034	21,555	—18,403	178,494
63*	606,376	134,030	72,699	11,564	679,271
64*	5,597,477	1,181,363	612,731	—193	6,165,916
65*	543,262	126,920	60,467	16,493	626,208
66*	498,068	114,415	54,703	—52,360	505,420
67	113,687	27,653	11,727	—908	128,705
68*	1,079,063	249,494	113,411	—8,331	1,206,815
69*	407,003	95,870	50,329	26,583	479,127
70*	571,911	127,906	74,554	23,235	648,498
71	317,859	63,447	47,148	8,334	342,492
72*	1,269,761	284,384	155,701	1,463	1,399,907
73	100,090	25,816	12,596	1,387	114,697
76	48,694	16,135	6,419	5,539	63.949
82	68,531	16,260	9,847	—3,412	71,532
83	175,049	40,497	22,544	—1,826	191,176
84	90,814	17,660	13,855	—1,550	93,069
85*	1,415,702	320,077	176,274	33,205	1,592,710
86*	315,364	77,015	35,775	3,511	360,115
87	45,693	14,097	5,688	771	54,873
88	40,578	10,694	6,924	3,171	47,519
89	88,647	25,098	9,319	3,387	107,813
90	59,712	16,437	6,523	2,399	72,025
91	39,369	10,399	4,168	2,832	48,432
92	79,421	20,097	9,815	4,216	93,919
93	54,315	13,867	6,880	3,398	64,700
94*	222,371	66,955	26,523	25,043	287,846
103	60,344	19,020	7,312	14,997	87,049
104	39,349	11,169	4,653	5,370	51,235
105	12,821	3,790	1,391	—453	14,767
106	27,961	8,191	2,892	—301	32,959

* Subregions containing one or more metropolitan state economic areas.
† According to 1940 definition and classification of urban population.

the Wichita Prairie area in central Kansas, that had net rural population losses due to migration also had net migration losses in total population (table 18). The subregions that experienced net rural population losses through migration had a total net loss of 1,867,246 of this type. Conversely, all the subregions, except Subregion 94, that had gains in total population through migration also had gains in their rural population through migration. A high relationship (r = +0.88) was found between the percent of population that was urban and gains in total population through migration.

In 11 subregions the rate of loss in total population through migration was in excess of 15 percent (table 18).[20] These subregions were located in eastern and southeastern Kentucky, in the Ozark Plateau and Mississippi River Delta area, the Minnesota Forest Margin area, central and western North Dakota, in northeast and western South Dakota and the Kansas-Nebraska border

area. In the rural population of each of these 11 subregions, losses were even greater while in the urban population the losses were lower, and seven of the subregions actually showed gains in population. The greatest loss in total population through migration sustained by any subregion containing a metropolitan area was 13 percent. In no such subregion was the rural loss in excess of 15 percent or the urban loss in excess of 11 percent.

In general, the greatest losses occurred in a broad belt diagonally across the northwestern portion of the North Central states, in the Cutover and along the southern border of the region. Gains through migration occurred mainly in the east central industrialized portion of the region.

The effect of the presence of metropolitan areas within a subregion has been pointed out. The metropolitan areas gained a total of 1,195,162 persons through migration or the equivalent of 6 percent of their 1940 population. The urban population in these areas gained 142,833, or only 1 percent, and the rural 1,052,329, or 36 percent (table

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[20] Subregions 31, 44, 62, 73, 76, 88, 90, 91, 93, 104 and 105.

TABLE 16. BIRTHS, DEATHS AND NET MIGRATION, RURAL POPULATION, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940-50.

Subregion	Population April 1, 1940	Births April 1940 to April 1950	Deaths April 1940 to April 1950	Net migration April 1940 to April 1950	Population April 1, 1950†
Total	18,648,084	3,966,199	1,792,201	—850,957	19,971,125
28*	582,611	133,829	65,134	147,086	798,392
29*	353,859	67,165	37,344	—22,892	360,788
30*	281,906	60,057	28,046	—40,090	273,827
31	715,063	232,788	48,590	—211,664	687,597
44	202,045	53,174	15,157	—53,551	186,511
45	367,913	78,629	35,064	—32,590	378,888
46*	441,555	111,669	52,833	84,145	584,536
47*	1,025,226	216,621	116,400	168,522	1,293,969
48*	882,856	191,813	99,090	21,468	997,047
49*	945,373	245,397	96,294	227,685	1,322,161
50*	309,788	76,036	34,930	57,413	408,307
51*	435,372	80,055	43,154	—54,896	417,377
52	420,525	94,446	39,497	—54,755	420,719
53	229,269	47,659	23,533	—30,796	222,599
62	307,011	52,114	30,744	—58,377	270,004
63*	596,518	112,350	67,273	1,057	642,652
64*	530,953	118,380	60,164	270,329	859,498
65*	571,114	126,507	56,014	4,645	646,252
66*	735,258	149,373	72,437	—108,366	703,828
67	251,393	54,209	22,008	—32,995	250,599
68*	615,890	139,031	55,714	—9,200	690,007
69*	676,608	142,721	63,880	—68,880	686,569
70*	584,798	115,694	56,439	—52,492	591,561
71	770,029	124,933	78,795	—141,834	674,333
72*	535,353	106,736	53,920	63,218	651,387
73	430,330	88,216	38,461	—86,816	393,269
76	203,718	60,896	15,845	—55,758	193,011
82	103,145	21,150	10,214	—18,948	95,133
83	225,238	34,242	19,349	—44,938	195,193
84	259,650	39,709	28,465	—45,112	225,782
85*	1,080,547	195,676	92,295	—110,888	1,073,040
86*	452,695	93,412	34,217	—64,025	447,865
87	231,490	48,202	18,085	—40,519	221,088
88	233,328	47,079	19,401	—46,004	215,002
89	202,411	40,955	15,798	—43,064	184,504
90	292,504	65,740	21,834	—72,487	263,923
91	160,603	33,158	12,402	—33,648	147,711
92	329,506	63,917	26,531	—65,029	301,863
93	283,983	45,322	26,338	—57,760	245,207
94*	197,581	32,775	15,951	—14,695	199,710
103	256,021	50,057	19,952	—41,158	244,968
104	183,357	38,615	14,414	—44,000	163,558
105	90,322	21,544	5,930	—25,021	80,915
106	63,369	14,148	4,265	—13,277	59,975

* Subregions containing one or more metropolitan state economic areas.
† According to 1940 definition and classification of rural population.

TABLE 17. BIRTHS, DEATHS AND NET MIGRATION IN THE URBAN AND RURAL POPULATION, METROPOLITAN AND NONMETROPOLITAN ECONOMIC AREAS, NORTH CENTRAL STATES, 1940-50.

Area	Population April 1, 1940	Births April 1940 to April 1950‡	Deaths April 1940 to April 1950	Net migration April 1940 to April 1950	Population April 1950†
Total	43,006,327	9,667,884	4,617,218	—651,425	47,405,568
Urban†	24,358,243	5,701,685	2,825,017	199,532	27,434,443
Rural‡	18,648,084	3,966,199	1,792,201	—850,957	19,971,125
Metropolitan	19,701,344	4,569,420	2,163,725	1,195,162	23,302,201
Urban	16,775,285	3,867,949	1,863,379	142,833	18,922,688
Rural	2,926,059	701,471	300,346	1,052,329	4,379,513
Nonmetropolitan	23,304,983	5,098,464	2,453,493	—1,846,587	24,103,367
Urban	7,582,958	1,833,736	961,638	56,699	8,511,755
Rural	15,722,025	3,264,728	1,491,855	—1,903,286	15,591,612

†According to 1940 definition and classification of urban and rural population.
‡Adjusted for under-registration of births.

19). This clearly indicates the high rate and large volume of nonfarm population growth in the unincorporated areas near metropolitan centers. It also indicates the preference of increasing numbers of families and persons to live in such rural or suburban rather than urban areas. At no other time in the history of the region has this suburban and rural infiltration been so pronounced. Nor is there evidence that any marked reversal in this trend is likely to occur.

The suburban and rural infiltration trend was not uniform for all metropolitan areas. Of the 48 metropolitan areas in the North Central states, 40 gained population in their rural areas through migration and eight lost. With regard to their urban population, 21 gained and 27 lost. In the

TABLE 18. NET MIGRATION FOR THE TOTAL, URBAN AND RURAL POPULATION BY ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940-50.

Subregion	Total		Urban†		Rural†	
	Number	Percent 1940 population	Number	Percent 1940 population	Number	Percent 1940 population
Total	—651,425	—1.5	199,532	0.8	—850,957	—4.6
28*	140,476	4.9	—6,610	—0.3	147,086	25.2
29*	—43,624	—6.9	—20,732	—7.6	—22,892	—6.5
30*	—57,139	—12.9	—17,049	—10.7	—40,090	—14.2
31	—225,884	—29.2	—14,220	—24.8	—211,664	—29.6
44	—54,303	—26.1	—752	—12.3	—53,551	—26.5
45	—38,628	—7.5	—6,038	—4.2	—32,590	—8.9
46*	93,377	6.1	9,232	0.8	84,145	19.1
47*	211,556	7.9	43,034	2.6	168,522	16.4
48*	28,976	1.9	7,508	1.2	21,468	2.4
49*	333,671	8.3	105,986	3.5	227,685	24.1
50*	39,189	6.0	—18,224	—5.3	57,413	18.5
51*	—44,111	—5.8	10,785	3.3	—54,896	—12.6
52	—54,331	—10.8	424	0.5	—54,755	—13.0
53	—33,769	—10.5	—2,973	—3.2	—30,796	—13.4
62	—76,780	—15.8	—18,403	—10.2	—58,377	—19.0
63*	12,621	1.0	11,564	1.9	1,057	0.2
64*	270,136	4.4	—193	**	270,329	50.9
65*	21,138	1.9	16,493	3.0	4,645	0.8
66*	—160,726	—13.0	—52,360	—10.5	—108,366	—14.7
67	—33,903	—9.3	—908	—0.8	—32,995	—13.1
68*	—17,531	—1.0	—8,331	—0.8	—9,200	—1.5
69*	—42,297	—3.9	26,583	6.5	—68,880	—10.2
70*	—29,257	—2.5	23,235	4.1	—52,492	—9.0
71	—133,500	—12.3	8,334	2.6	—141,834	—18.4
72*	64,681	3.6	1,463	0.1	63,218	11.8
73	—85,429	—16.1	1,387	1.4	—86,816	—20.2
76	—50,219	—19.9	5,539	11.4	—55,758	—27.4
82	—22,360	—13.0	—3,412	—5.0	—18,948	—18.4
83	—46,764	—11.7	—1,826	—1.0	—44,938	—20.0
84	—46,662	—13.3	—1,550	—1.7	—45,112	—17.4
85*	—77,683	—3.1	33,205	2.3	—110,888	—10.3
86*	—60,514	—7.9	3,511	1.1	—64,025	—14.1
87	—39,748	—14.3	771	1.7	—40,519	—17.5
88	—42,833	—15.6	3,171	7.8	—46,004	—19.7
89	—39,677	—13.6	3,387	3.8	—43,064	—21.3
90	—70,088	—19.9	2,399	4.0	—72,487	—24.8
91	—30,816	—15.4	2,832	7.2	—33,648	—21.0
92	—60,813	—14.9	4,216	5.3	—65,029	—19.7
93	—54,362	—16.1	3,398	6.3	—57,760	—20.3
94*	10,348	2.5	25,043	11.3	—14,695	—7.4
103	—26,161	—8.3	14,997	24.9	—41,158	—16.1
104	—38,630	—17.3	5,370	13.6	—44,000	—24.0
105	—25,474	—24.7	—453	—3.5	—25,021	—27.7
106	—13,578	—14.9	—301	—1.1	—13,277	—21.0

* Subregions containing one or more metropolitan state economic areas.
** Less than 0.05 percent.
† According to 1940 definition and classification of rural and urban population.

TABLE 19. NET MIGRATION FOR THE TOTAL, URBAN AND RURAL POPULATION BY METROPOLITAN AND NON-METROPOLITAN AREAS, 1940-50.

Area	Total		Urban†		Rural†	
	Number	Percent 1940 population	Number	Percent 1940 population	Number	Percent 1940 population
Total	—651,425	—1.5	199,532	0.8	—850,957	—4.6
Metropolitan	1,195,162	6.1	142,833	0.8	1,052,329	36.0
Nonmetropolitan	—1,846,587	—7.9	56,699	0.8	—1,903,286	—12.1

† According to 1940 definition and classification of rural and urban population.

rural population the percentages ranged from a 19-percent loss in the Sioux City, Iowa, Metropolitan Area to an 85-percent gain in the Hamilton, Ohio, Metropolitan Area. A large proportion of the rural growth in the metropolitan areas was concentrated in the Great Lakes industrial areas. It was also here that a large proportion of the loss in urban population through migration in the metropolitan areas occurred.

Net migration data do not indicate whether the streams of migration have been direct rural-to-suburban movements, rural-to-urban movements accompanied by urban-suburban and rural dispersion, or exchange of population with other states and areas. In any case, all of the streams undoubtedly exist. Information is not available on whether the migrants moved long or short distances. Further study is needed to trace the direction and volume of the various streams as well as distance traveled by the migrants. Assuming that a migrant is not replaced in the area which he left, his leaving will show up as a net loss. However, if he replaces a resident in the area of destination then no net change is

shown in the population of that area. It is only if his arrival represents an addition to the population of the area of destination that an increase in population is noted.

Rural population growth in the metropolitan areas does not represent a corresponding expansion in farm population. The reverse is the case. Between 1940 and 1950, the number of farms, and hence roughly the same number of farm households, in the metropolitan areas declined 17 percent. In the nonmetropolitan areas, the decline was 10 percent. The data suggest an increase in "commuters" rather than in farmers residing in rural areas. They reflect an increasing heterogeneity in the occupational composition of the unincorporated population in contrast to the former homogeneity of the predominantly farming population.

Assuming the farm population will continue to decline and the rural nonfarm population to increase outside of incorporated areas, particularly near larger metropolitan centers, many areas of the region will assume mixed rural-urban characteristics. This is of increasing interest and concern to students of rural society and to all who work with rural people. This is so because new types of social relationships and interactions between and among rural farm and rural nonfarm residents emerge as such people become integrated into the social structure and share in the social organization and leadership of the rural areas. The modifications occurring in relationships, both rural and urban, which will continue to occur in the years immediately ahead likewise will be of importance.

Although little is known about the characteristics of those who migrate and those who do not, the matter of age selectivity has been quite well established. In general, migrants from rural areas are predominantly in the 18 to 35 age group. As a result, areas losing population through migration tend to maintain a residuum of persons in the older age groups; in turn this is reflected in lowered fertility and increased death rates. The loss of many persons in the 18-35 year age group in the areas of heavy out-migration will be even more noticeable because of the small number of persons born during the depression who will reach age 18 during the next few years.

More precise effects on losing and gaining areas may be ascertained when information on education, occupation, income, fertility, family size and other characteristics of migrants and non-migrants is analyzed on a comparative basis.

EXPLORATION OF FACTORS ASSOCIATED WITH NET MIGRATION

Gains and losses in both rural and urban populations are, in a large part, due (1) to demographic factors operating within those populations and (2) to factors operating within agriculture and industry.

It has been shown that such demographic factors

as natural increase and migration have not operated uniformly throughout the North Central states. While increased births show up as increasing population, they do so immediately only as increasing numbers of consumption units, not as production units. The influence of births on the number of production units occurs 15 or more years after birth when such persons enter the labor force. Thus, it is the size of the labor force, its increase and decrease which becomes important in influencing redistribution of population.

The rural population, and more specifically the rural labor force, is affected by agricultural and industrial factors, and the urban population is affected by both urban and rural factors, one of which acts as a pull and the other as a push factor in rural-urban migration.

Agricultural Factors

The development of a highly mechanized commercial agriculture throughout most of the North Central states has served to create, in most areas, a potential oversupply of labor on farms. This potential oversupply has acted as one of the "push" factors in migration from farms. Out-migration therefore indicates a continuing attempt to make necessary adjustments between population, labor force, agricultural resources and the demand for agricultural products.

On the other hand, the increase in rural population in the metropolitan areas as a whole indicates that the presence or introduction of opportunities for nonagricultural employment attracts many people to rural nonfarm residence. This poses perplexing questions that have implications for the social and economic organization of both the losing and gaining areas. That is, what is the relative social cost of introducing industrial and other work opportunities in population surplus areas in contrast to the costs of migrations to areas of employment opportunity where heavy population concentrations may result? That migration is necessary and good has been assumed rather generally. But individual and societal costs of migration have not been studied adequately enough to provide answers or guidance in terms of a migration policy.

Migration in the North Central states, as in other parts of the United States, is a complex pattern of streams of migration. Principal changes in the rural population of the North Central states include:

1. *Movement from farms of entire farm operator families.* Evidence of this lies in the 11-percent reduction in number of farms and the 20-percent reduction in farm population between 1940 and 1950.

2. *Movement of young adults from farms.* Farm families have always maintained a relatively high birth rate. If there were no migration from farms between 1950 and 1960, 121 young farm men would reach the age of 25 during the decade for every 100 men leaving farms through death

or through reaching age 70.[21] For the decade 1940 to 1950 the replacement rate was 159.

3. *Movement of hired farm workers and their families.* Reduction in the number of farms, greatly increased mechanization in agricultural production and the region-wide reduction in farm wage expenditures between 1939 and 1949 of nearly 6 percent (after adjustment had been made for the increase in farm wage rates over the 10-year period) was associated with migration from farms.

4. *Movement of rural nonfarm persons and families from small to larger centers.* Such movement usually follows as rural people increasingly have come to rely on urban centers for many services and institutional facilities formerly provided by smaller centers.

5. *Movement to rural areas of many persons and families with urban employment* who by preference or necessity find housing in rural areas. A part of this same movement is the movement to new rural locations of persons or families who live in rural areas and who do not care to move to the more congested urban areas where they are employed. These movements represent a significant part of the migration around the larger centers where industrial expansion has taken place in the North Central states.

For the North Central states as a whole, the first four types of migration, involving movement away from rural areas, were the most important. Near large centers and in the metropolitan areas, the fifth was the most important. Detailed analyses of migration would be concerned with movements from rural farm areas to rural nonfarm areas, to urban fringe areas and into large cities and vice versa, and any combination of these. For example, such analyses would include movement from one rural farm area to another rural farm area, from one rural nonfarm location to another rural nonfarm location and other movements which altogether total at least 16 different migration streams. Further subdivision by distance of migration, size of center and whether or not it includes migration across state and area lines serves only to illustrate the complexity of these streams of migration.

While the metropolitan areas showed net migration to rural areas, actually urban-rural migration took place in varying degrees in all parts of the North Central states and had the effect of concealing the full impact of the first four types of movement. Thus, available data on the net change in rural population due to migration do not fully account for the change due to net migration from farms.

Migration from farms cannot be estimated by the methods used in this analysis until data on births and deaths by age and sex are available for the farm population and until satisfactory means are found for accounting for change in definition of farm residence between 1940 and 1950 and for changed classification of the same household, even when a constant definition of farm residence is used. In fact, age-sex specific migration differentials are considered to be the starting point for any systematic analysis of differential migration. Any reasonably precise conclusions regarding the association of various agricultural factors to migration from farms will have to await the availability of more detailed demographic data and clarification in residential classification.

In this analysis, the agricultural factors selected for examining the relationship with migration are those believed related to clusters of factors. Thus, change in number of farms is related to change in size of farming operation, enterprises, tenure arrangements, etc. Therefore, any generalizations regarding the association of changes in selected agricultural factors and volume of migration should be statistically determined by holding constant the influence of other variables that might otherwise disturb the effect upon the association. This will be taken up more specifically in the next regional unit of study.

REDUCTION IN NUMBER OF FARMS

For the North Central states as a whole, the number of farms declined from 2,349,542 to 2,086,535, a loss of 11 percent. In the metropolitan areas, the loss was 17 percent, suggesting considerable consolidation of small units or conversion of farmland to other uses. In the nonmetropolitan areas, the decline was 10 percent, or approximately three-fifths as much as in the metropolitan areas.

Change in number of farms among the subregions ranged from an increase of nearly 2 percent in Subregion 76, the Missouri Bootheel area, to a 27-percent decrease in Subregion 31, in southeast Kentucky. Most subregions with the largest percentage decreases were located in the mountainous areas of Kentucky, the industrial areas, the Cutover and the Great Plains portions of the North Central states.

The 18 subregions showing percentage decrease in number of farms in excess of the average accounted for a loss of 141,104 or more than half of the total decline in number of farms.[22] These subregions were concentrated along the eastern border of the region, in the Michigan portion of the Great Lakes industrial area, southern Illinois, southwestern Indiana and western Kentucky, and, generally, in the Great Plains areas of the North Central states.

The definition of a farm used in the 1950 Census of Agriculture was not identical with that used in 1940 with respect to the cutoff point for small or marginal units. It would be principally among

[21] Bowles, Gladys K. and Taeuber, Conrad. Replacement ratios and rates for rural-farm males of working age, 1950-60. U. S. Agricultural Marketing Service and U. S. Bureau of the Census. (In process).

[22] The 18 subregions were 28, 29, 30, 31, 49, 50, 51, 52, 62, 66, 83, 90, 93, 94, 103, 104, 105 and 106.

TABLE 20. NUMBER OF FARMS, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940 AND 1950.

Subregion	Number of farms		Percentage change 1940-50
	1940	1950	
Total	2,349,542	2,086,535	—11.2
28*	54,554	45,815	—16.0
29*	35,064	29,153	—16.9
30*	32,210	25,438	—21.0
31	76,789	56,378	—26.6
44	32,479	29,254	—9.9
45	53,512	51,156	—4.4
46*	42,384	37,668	—11.1
47*	110,406	98,500	—10.8
48*	112,596	102,285	—9.2
49*	90,106	75,381	—16.3
50*	35,458	29,224	—17.6
51*	50,043	43,148	—13.8
52	57,201	50,370	—11.9
53	35,147	33,234	—5.4
62	39,086	33,524	—14.2
63*	60,602	57,034	—5.9
64*	33,553	30,846	—8.1
65*	71,533	66,211	—7.4
66*	91,740	70,376	—23.3
67	36,014	32,318	—10.3
68*	81,970	74,795	—8.8
69*	90,249	86,649	—4.0
70*	79,676	74,736	—6.2
71	123,924	110,343	—11.0
72*	47,853	42,710	—10.7
73	66,910	59,955	—10.4
76	21,431	21,774	1.6
82	15,439	15,067	—2.4
83	32,978	28,112	—14.8
84	45,266	40,492	—10.5
85*	147,671	135,060	—8.5
86*	63,185	62,336	—1.3
87	33,716	33,350	—1.1
88	37,002	33,504	—9.5
89	29,323	26,924	—8.2
90	43,794	38,461	—12.2
91	24,555	22,720	—7.5
92	50,038	45,610	—8.8
93	47,494	40,148	—15.5
94*	30,096	25,192	—16.3
103	39,286	32,135	—18.2
104	25,151	20,188	—19.7
105	13,406	11,430	—14.7
106	8,652	7,531	—13.0

* Subregions containing one or more metropolitan state economic areas.

TABLE 21. NUMBER OF FARMS, METROPOLITAN AND NONMETROPOLITAN AREAS, NORTH CENTRAL STATES, 1940 AND 1950.

Area	Number of farms		Percentage change 1940-50
	1940	1950	
Total	2,349,542	2,086,535	—11.2
Metropolitan	197,143	163,127	—17.3
Nonmetropolitan	2,152,399	1,923,408	—10.5

units of less than 10 acres that the definitions might have caused lack of comparability.

In the North Central states, farms under 10 acres accounted for only 6.3 and 6.1 percent of all farms in 1940 and 1950, respectively. The effect of the change in definition appears to have had only slight effect on the total picture with respect to change in number of farms.

For the region as a whole, the reduction in number of farms of 10 acres or more was 11.1 percent. This is almost identical with the 11.2-percent reduction in all farms. Farms under 10 acres declined 13.4 percent. The significance of

these data with respect to rural-urban migration is that more than 95 percent of the farms were operated by resident farm operators and their families, so that the reduction in farms approximates the reduction in farm operator families.

The reduction in number of farms and migration of farm populations must be attributed in part to the prosperity of the wartime decade. That period provided many alternative employment opportunities for the farm population. It permitted farmers who remained in agriculture to acquire more machinery and thus enabled them to operate larger units with less family and hired labor.

INCREASE IN FARM MECHANIZATION

Farm mechanization in the North Central states made rapid strides during the 1940-50 decade. An index used to measure change in farm mechanization is the percentage increase in number of tractors. By 1950 the number of tractors on farms increased 101 percent and was double the number in 1939. The number of farms reporting tractors increased 52 percent; or, to express mechanization in still another way, 38 percent of all farms reported tractors in 1940 while 65 percent did so in 1950. This represented an increase of 27 percentage points in proportions of farms reporting tractors.

The reduction in farms and increase in tractors raised mechanization from 42 tractors per 100 farms to 95 tractors per 100 farms. Automobiles, trucks, and gasoline and electrically driven power equipment further increased mechanization. This is a partial explanation of increased farm production despite decreases in family and hired labor along with a decline in rural farm population. Considerable variation existed in the degree to which farm mechanization occurred in the various subregions over the 10 years. The increase in tractors on farms was from a low of 36-percent increase in Subregion 94 to 976 precent in Subregion 31.

In general, the subregions with the least mechanization in 1940 showed the largest increases. These were located mainly in the eastern and southern areas of the region and in the Cutover. These were also areas showing the largest relative losses of rural population. Subregion 31 in southeast Kentucky, with the highest increase in mechanization, was estimated to have lost 211,664 rural people through migration during the decade. This loss was at the rate of 296 persons per 1,000 population in 1940. At the same time, the number of tractors in the subregion increased from 217 to 2,335. Most subregions containing metropolitan areas, however, showed increases in rural population and mechanization. Such increases were mainly in the unincorporated nonfarm population. The net effect is that, for the North Central states as a whole, only a very small inverse relationship was seen between increase in mechanization and change in rural population through migration (r = —0.29). By comparison, a positive relationship

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(r = +0.26) was found between the percentage increase in tractors and net rural out-migration in the nonmetropolitan areas.

In the metropolitan areas, the number of tractors increased 87 percent and, in the nonmetropolitan areas, 102 percent. In the former, tractors per 100 farms increased from 43 to 98 and, in the latter, from 42 to 95—representing an almost identical change.

As in the case of number of farms, it should be clear that the variable "farm mechanization" cannot be completely isolated from other factors in farm technology nor can cause-effect relationships be identified precisely. A few generalizations are possible however.

The association between decreases in farms and in farm population with increases in farm mechanization have been mentioned. It is generally well-known that farm mechanization is associated with fewer youths in the most migratory ages in the farm population thereby increasing the proportions of persons in the older and very young age groups. Usually in the highly mechanized areas, farm operators devote less time to off-farm work. Cropland acreages per farm usually are increased as land adapted to mechanized farming is shifted to that purpose. Accompanying mechanization is the increased commercialization of farms accompanied by increase in level of living.

It may be safely assumed that those areas in the North Central states that are most highly mechanized will continue mechanizing but at a slower rate than areas presently least highly mechanized. In those areas in which there are large numbers of small farms, limited working capital, relatively dense population on farms and irregular topography, mechanization may be expected to proceed slowly. This relationship is supported by available information. In those subregions which in 1940 had fewer than 10 percent of the farms mechanized, mechanization did not progress as rapidly as in the subregions where from 10 to 25 percent of the farms reported tractors. Similarly, subregions in 1940 with more than 25 percent of the farms reporting

TABLE 22. FARMS REPORTING TRACTORS AND NUMBER OF TRACTORS ON FARMS, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1940 AND 1950.

Subregion	Farms reporting tractors				Tractors on farms			
	1940	1950	Increase 1940-50		1940	1950	Increase 1940-50	
			Number	Percent			Number	Percent
Total	900,383	1,369,753	469,370	52.1	986,196	1,982,989	996,793	101.1
28*	19,547	31,854	12,307	63.0	21,013	43,398	22,385	106.5
29*	6,491	15,756	9,265	142.7	6,844	20,124	13,280	194.0
30*	2,492	7,807	5,315	213.3	2,630	9,452	6,822	259.4
31	213	2,147	1,934	908.0	217	2,335	2,118	976.0
44	750	4,968	4,218	562.4	769	5,491	4,722	614.0
45	2,687	14,060	11,373	423.3	2,881	17,263	14,382	499.2
46*	9,427	18,963	9,536	101.2	9,942	23,932	13,990	140.7
47*	54,139	70,637	16,498	30.5	58,375	109,928	51,553	88.3
48*	52,454	75,740	23,286	44.4	56,708	112,372	55,664	98.2
49*	36,008	57,322	21,314	59.2	38,852	81,344	42,492	109.4
50*	10,105	19,918	9,813	97.1	10,754	25,505	14,751	137.2
51*	13,252	24,095	10,843	81.8	14,345	33,941	19,596	136.6
52	5,003	16,966	11,963	239.1	5,206	20,045	14,839	285.0
53	2,938	12,204	9,266	315.4	3,088	14,601	11,513	372.8
62	7,283	16,963	9,680	132.9	7,715	21,232	13,517	175.2
63*	42,252	45,572	3,320	7.9	49,952	84,920	34,968	70.0
64*	17,843	22,660	4,817	27.0	20,069	36,679	16,610	82.8
65*	40,306	54,734	14,428	35.8	42,740	80,010	37,270	87.2
66*	20,431	43,754	23,323	114.2	21,519	51,025	29,506	137.1
67	10,415	22,796	12,381	118.9	10,830	27,392	16,562	152.9
68*	32,576	57,148	24,572	75.4	34,360	73,990	39,630	115.3
69*	52,202	71,385	19,183	36.7	57,172	107,544	50,372	88.1
70*	47,428	60,401	12,973	27.4	52,302	97,907	45,605	87.2
71	33,635	64,840	31,205	92.8	35,993	83,868	47,875	133.0
72*	14,219	25,779	11,560	81.3	14,948	33,770	18,822	125.9
73	3,957	15,069	11,112	280.8	4,124	16,839	12,715	308.3
76	3,149	10,383	7,234	229.7	3,698	15,705	12,007	324.7
82	1,651	4,872	3,221	195.1	1,778	5,898	4,120	231.7
83	13,922	18,846	4,924	35.4	15,160	24,702	9,542	62.9
84	12,159	23,273	10,754	85.9	13,384	28,939	15,555	116.2
85*	72,619	102,519	29,900	41.2	79,681	148,252	68,571	86.1
86*	44,284	53,380	9,096	20.5	49,426	87,307	37,881	76.6
87	22,730	29,574	6,844	30.1	25,143	46,401	21,258	84.5
88	10,765	24,816	14,051	130.5	11,266	29,207	17,941	159.2
89	19,164	23,499	4,335	22.6	22,180	40,696	18,516	83.5
90	24,358	34,086	9,728	39.9	26,884	55,311	28,427	105.7
91	14,578	20,132	5,554	38.1	16,319	33,532	17,213	105.5
92	25,400	38,041	12,641	49.8	27,369	54,134	26,765	97.8
93	25,301	32,714	7,413	29.3	27,194	45,404	18,210	67.0
94*	20,712	20,650	—62	—0.3	23,774	32,306	8,532	35.9
103	27,937	27,585	—352	—1.3	33,223	47,547	14,324	43.1
104	9,737	15,037	5,300	54.4	11,000	24,010	13,010	118.3
105	7,733	10,255	2,522	32.6	8,377	16,672	8,295	99.0
106	5,771	6,553	782	13.6	6,992	12,059	5,067	72.5

* Subregions containing one or more metropolitan state economic areas.

tractors increased more slowly than those in the 10- to 25-percent group.

CHANGE IN USE OF HIRED LABOR

The use of hired labor among farmers in the North Central states changed markedly during the decade.

In 1939, 39 percent of the farm operators reported expenditures for cash wages during the year (table 23). The average wage bill for the 917,921 farmers who hired some labor was $249 per farm. In 1949, 55 percent, or 1,150,633 farmers, reported spending an average of $155 each after adjustment for change in wage rates, 1939-49. This is 62 percent of the average per-farm wage bill in 1939. The unadjusted wage bill per farm was $536.

By subregions, the percent of farm operators reporting expenditures for wages in 1939 ranged

TABLE 23. PERCENTAGE OF FARMS REPORTING EXPENDITURES FOR HIRED LABOR, 1939 AND 1949 AND PERCENTAGE CHANGE IN CASH WAGE EXPENDITURES ADJUSTED FOR CHANGE IN WAGE RATES, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1939 AND 1949.

Subregion	Percentage of farms reporting cash wage expenditures			Percentage change in adjusted wage expenditures 1939-40
	1939	1949	Percentage change 1939-49	
Total	39.1	55.1	40.9	—22.1
28*	35.4	40.8	15.3	—27.6
29*	32.4	47.2	45.7	—14.7
30*	22.5	37.3	65.8	—3.0
31	16.9	27.6	63.3	—1.8
44	21.9	40.1	83.1	16.5
45	42.6	63.7	49.5	—7.8
46*	28.6	44.9	57.0	—22.4
47*	40.9	54.9	34.2	—21.8
48*	36.6	49.8	36.1	—20.9
49*	39.8	48.8	22.6	—27.3
50*	41.8	52.6	25.8	—8.0
51*	30.0	47.9	59.7	—2.3
52	21.0	41.2	96.2	8.5
53	26.3	49.3	87.5	19.5
62	22.9	41.4	80.8	7.2
63*	54.4	63.0	15.8	—26.0
64*	43.6	48.9	12.2	—22.9
65*	51.0	63.1	23.7	—26.5
66*	27.5	42.4	54.2	—15.0
67	36.4	56.2	54.4	—20.7
68*	51.1	67.4	31.9	—24.6
69*	55.6	65.6	18.0	—26.2
70*	50.7	64.3	26.8	—32.3
71	34.4	54.8	59.3	—21.5
72*	35.8	50.8	41.9	—35.1
73	22.3	36.6	64.1	—5.3
76	45.9	61.6	34.2	3.0
82	20.8	41.7	100.5	—4.4
83	34.2	50.5	47.7	—43.9
84	27.4	49.1	79.2	—29.4
85*	45.8	61.0	33.2	—34.3
86*	59.8	70.1	17.2	—40.4
87	62.8	72.7	15.8	—32.2
88	37.5	58.5	56.0	—9.9
89	62.3	69.3	11.2	—17.3
90	50.6	66.5	31.4	—21.9
91	48.4	69.0	42.6	5.3
92	33.6	62.9	87.2	—3.3
93	33.1	62.3	88.2	—9.2
94*	52.2	67.4	29.1	—42.8
103	40.4	74.1	83.4	20.5
104	37.1	60.5	63.1	—6.4
105	38.7	62.1	60.5	13.1
106	59.0	76.3	29.3	—37.0

* Subregions containing one or more metropolitan state economic areas.

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TABLE 24. PERCENTAGE OF FARMS REPORTING EXPENDITURES FOR HIRED LABOR, 1939 AND 1949, AND PERCENTAGE CHANGE IN CASH WAGE EXPENDITURES ADJUSTED FOR CHANGE IN WAGE RATES, METROPOLITAN AND NONMETROPOLITAN AREAS, NORTH CENTRAL STATES, 1939 AND 1949.

Area	Percentage of farms reporting cash wage expenditures			Percentage change in adjusted wage expenditures 1939-49
	1939	1949	Percentage change 1939-49	
Total	39.1	55.1	40.9	—22.1
Metropolitan	39.2	49.0	25.0	—32.2
Nonmetropolitan	39.1	55.7	42.5	—20.4

from 17 percent in Subregion 31, in southeastern Kentucky, to 63 percent in Subregion 87, the Minnesota-South Dakota Corn Belt Margin. In 1949, the range was from 28 percent in Subregion 31 to 74 percent in Subregion 103 in western Kansas. Subregion 87 had increased to 73 percent.

In the combined 13 states the average amount of labor used by farmers who reported hired help decreased 22 percent. Of the 44 subregions, 36 showed decreases and 8 increases. Those with increases were concentrated mainly in southern and western Kentucky, southern Illinois, western Kansas, northeastern South Dakota and southwestern North Dakota. Decreases prevailed throughout the remainder of the region and, in general, were greatest in subregions containing metropolitan areas where alternative nonfarm employment opportunities usually were available.

Several factors are involved in the change in the hired labor situation. More farmers are apparently using some hired labor to accomplish work formerly done by sons or other family members who had left the farm. Other farmers who could not afford hired help or who had adequate family help in 1939 were able to hire workers for rush periods in the late 1940's. More farmers seem to be using hired labor only during peak periods of farm work. Hired farm workers, therefore, must depend more upon short-time seasonal employment which must be supplemented by nonfarm employment.

Increased mechanization has played a major role in reducing the demand for other than short-period hired farm labor. Greater efficiency in farm management practices and more widespread use of custom machine hire are among the factors associated with the reduction.

During the 10-year period, the volume of hired labor employed in all economic areas in the region decreased 22 percent; in the metropolitan areas the decrease was 32 percent, and in the nonmetropolitan areas 20 percent. In part, the larger percentage decrease in the metropolitan areas may be attributed to farm workers taking advantage of alternative employment opportunities available in industry.
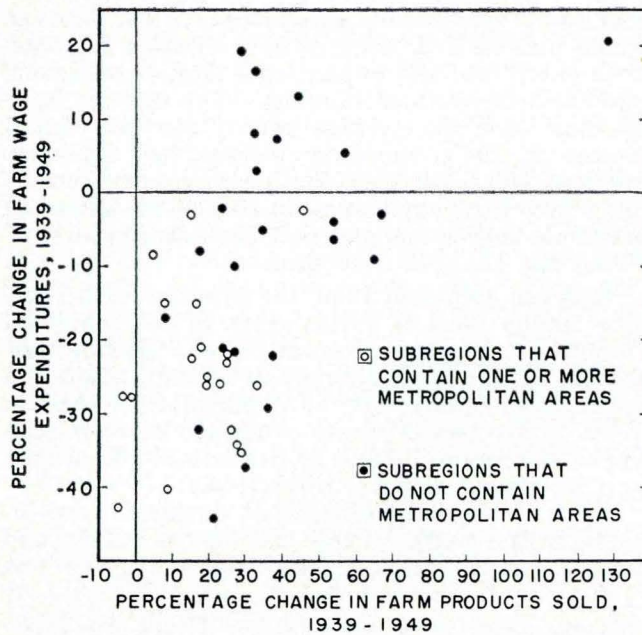
Fig.10. Percentage change in farm wage expenditures (adjusted for wage rate changes) in relation to percentage change in farm products sold (adjusted for price changes), 1939-49, economic subregions.

Changes in the volume of hired labor used on farms in the North Central states are supported by the Census of Agriculture data on the number of hired workers employed at the time of the census. In the 1940 census, 485,907 hired farm workers were reported. By 1950 that number had declined to 381,780, or more than 21 percent. It is probable that this decline is conservative inasmuch as the week to which hired labor data relates was several weeks later in the 1950 than in the 1940 census and was nearer the time of the year when seasonal employment is increasing.[23]

INCREASE IN FARM PRODUCTION

Even though the number of farms declined and less hired farm labor was used with significant migration occurring from the rural areas, increased mechanization and more efficient and intensive farming methods combined to increase agricultural production substantially during the decade.

The aggregate value of farm products sold in the combined 13 states between 1939 and 1949 increased 26 percent (after adjustments for changes in prices received by farmers). By subregions, the range was from a decline of 5 percent in Subregion 94, the Wichita Prairies in central Kansas, to an increase of 130 percent in Subregion 103 in western Kansas. The metropolitan areas showed an increase of 11 percent while the nonmetropolitan areas showed an increase of 27 percent (see tables 25 and 26).

The largest relative gains occurred in the sub-

[23] In the 1940 census, the employment figures related to the last week in March. In the 1950 census, they related to the week immediately preceding the date of census enumeration.

TABLE 25. AVERAGE VALUE OF PRODUCTS SOLD PER FARM, 1949, AND PERCENTAGE CHANGE IN VALUE OF PRODUCTS SOLD (ADJUSTED FOR CHANGES IN PRICES RECEIVED BY FARMERS), ECONOMIC SUBREGIONS, 1939-49.

Subregion	Average value of products sold per farm reporting, 1949	Percentage change in total value of products sold (adjusted for price changes), 1939-49
Total	$ 5,103	25.9
28*	3,422	—0.2
29*	2,799	15.0
30*	1,652	15.8
31	654	24.4
44	1,341	33.4
45	3,865	17.7
46*	2,791	14.6
47*	5,690	25.0
48*	4,691	17.8
49*	3,607	—3.1
50*	3,280	5.1
51*	3,706	46.2
52	1,912	32.7
53	2,431	29.8
62	2,375	39.5
63*	9,363	19.2
64*	7,099	24.5
65*	5,441	22.4
66*	2,148	7.6
67	3,430	23.3
68*	5,044	20.3
69*	7,579	32.9
70*	8,895	25.7
71	4,594	26.1
72*	3,594	28.5
73	1,836	35.2
76	4,675	33.5
82	2,194	53.8
83	4,909	20.4
84	3,742	36.0
85*	7,739	27.6
86*	8,936	8.7
87	6,809	17.7
88	4,501	27.7
89	8,936	8.7
90	5,749	37.9
91	6,182	56.8
92	6,416	67.0
93	5,426	64.8
94*	5,660	—4.6
103	9,096	129.6
104	8,258	54.0
105	5,462	44.9
106	12,324	29.9

* Subregions containing one or more metropolitan state economic areas.

TABLE 26. AVERAGE VALUE OF PRODUCTS SOLD PER FARM, 1949, AND PERCENTAGE CHANGE IN VALUE OF PRODUCTS SOLD (ADJUSTED FOR CHANGES IN PRICES RECEIVED BY FARMERS), METROPOLITAN AND NONMETROPOLITAN AREAS, 1939-49.

Area	Average value of products sold per farm reporting, 1949	Percentage change in total value of products sold (adjusted for price changes), 1939-49
Total	$ 5,103	25.9
Metropolitan	5,131	10.8
Nonmetropolitan	5,100	27.2

regions in central Ohio and central Indiana, the Ohio River valley portions of southwestern Indiana, southwestern Kentucky and southern Illinois, northeastern Iowa, northwestern Illinois and southwestern Minnesota, southern Iowa and northern Missouri, southern and west central Missouri

and east central Kansas and the Missouri River valley portion of the Great Plains states. In general, the subregions with the greater proportionate gains in farm production had the smaller decreases or showed actual increases in volume of hired labor used (fig. 10). On the other hand, the subregions containing metropolitan areas generally showed decreases in volume of hired labor used and at the same time small increases in volume of farm products sold.

<center>RISE IN FARM FAMILY LEVELS OF LIVING</center>

Along with the reduction in number of farms and farm families, the decrease in rural population through migration, the increase in farm mechanization, the improvment of farm management practices, the increase in farm production and the marked decrease in use of hired labor, a substantial increase in average farm operator family level of living took place in the North Central states.

A measure of how farm families fared as these changes and adjustments took place has been prepared from data provided by the 1930, 1940, 1945 and 1950 Censuses of Agriculture.[24] The level of living indexes are based upon a selection of items that enter into the annual consumption of goods and services by farm families. The indexes have as their base the average county for the United States in 1945, and this average has an index value of 100. The data for the successive periods show how farm families compared in the different economic subregions and how the average level of living has changed over time.

Between 1930 and 1940, the average farm operator family level of living index in the combined North Central states remained at 98. During that period, 21 of the 44 subregions actually showed a lower farm family level of living in 1940 than in 1930. Only two of these contained metropolitan areas, subregions 30 and 94 in southeast Kentucky and in central Kansas, respectively.

Most of the subregions that declined were located in the south central part of the region and in the Great Plains states, where drouths and

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[24] Hagood. Farm operator family level-of-living indexes for counties of the United States, 1930, 1940, 1945 and 1950. Op. cit.

TABLE 27. AVERAGE FARM OPERATOR FAMILY LEVEL OF LIVING INDEXES, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1930, 1940, 1945 AND 1950. (U. S. AVERAGE FOR 1945 EQUALS 100)

Subregion	Average index value				Percentage change			
	1930	1940	1945	1950	30-40	40-45	40-50	30-50
Total	98	98	121	141	0.0	23.5	43.9	43.9
28*	109	121	142	150	11.0	17.4	24.0	37.6
29*	88	98	119	138	11.4	21.4	40.8	56.8
30*	73	71	83	115	—2.7	16.9	62.0	57.5
31	14	15	22	47	7.1	46.7	213.3	235.7
44	33	29	38	62	—12.1	31.0	113.8	87.9
45	62	78	90	120	25.8	15.4	53.8	93.5
46*	87	94	114	130	8.0	21.3	38.3	49.4
47*	113	132	156	166	16.8	18.2	25.8	46.9
48*	109	124	148	158	13.8	19.4	27.4	45.0
49*	100	121	140	151	21.0	15.7	24.8	51.0
50*	87	106	126	141	21.8	18.9	33.0	62.1
51*	81	88	110	132	8.6	25.0	50.0	63.0
52	54	53	67	90	—1.9	26.4	69.8	66.7
53	50	58	96	100	16.0	65.5	72.4	100.0
62	65	67	81	107	3.1	20.9	59.7	64.6
63*	123	131	162	177	6.5	23.7	35.1	43.9
64*	122	134	161	166	9.8	20.1	23.9	36.1
65*	119	127	150	163	6.7	18.1	28.3	37.0
66*	71	77	95	120	8.4	23.4	55.8	69.0
67	95	90	113	138	—5.3	25.6	53.3	45.3
68*	117	118	143	159	0.9	21.2	34.7	35.9
69*	126	130	160	175	3.2	23.1	34.6	38.9
70*	134	141	170	183	5.2	20.6	29.8	36.6
71	106	101	121	144	—4.7	19.8	42.6	35.8
72*	92	95	110	132	3.3	15.8	38.9	43.5
73	57	50	60	80	—12.3	20.0	60.0	40.4
76	37	45	61	82	21.6	35.6	82.2	121.6
82	68	66	84	111	—2.9	27.3	68.2	63.2
83	113	103	120	144	—8.8	16.5	39.8	27.4
84	101	91	110	130	—9.9	20.9	42.9	28.7
85*	128	119	148	169	—7.0	24.4	42.0	32.0
86*	132	140	170	182	6.1	21.4	30.0	37.9
87	107	103	126	157	—3.7	22.3	52.4	46.7
88	96	92	112	134	—4.2	21.7	45.7	39.6
89	100	97	119	148	—3.0	22.7	52.6	48.0
90	94	82	108	129	—12.8	31.7	57.3	37.2
91	102	86	110	141	—15.7	27.9	64.0	38.2
92	119	97	121	152	—18.5	24.7	56.7	27.7
93	126	102	131	153	—19.0	28.4	50.0	21.4
94*	124	121	151	163	—2.4	24.8	34.7	31.5
103	113	93	142	156	—17.7	52.7	67.7	38.1
104	85	85	100	129	0.0	17.6	51.8	51.8
105	86	80	108	124	—7.0	35.0	55.0	44.2
106	106	105	140	169	—0.9	33.3	61.0	59.4

* Subregions containing one or more metropolitan state economic areas.

dust storms greatly affected agricultural production. The decline for these subregions ranged from 2 to 19 percent. On the other hand, 23 subregions showed no change or increases ranging up to 26 percent. Eighteen of these subregions contained metropolitan areas.

Between 1940 and 1945, the level of living index increased 24 percent and by 1950, 44 percent over 1940 indicating a slightly more rapid gain during the first half of the decade. But, the rise since World War II was also substantial. This continuing increase in the average level of living of farm operator families is part of an increase in the level of living of all families generally. While a similar index is not available for nonfarm families, it is known that the disposable income per capita (income after taxes) increased substantially —one-third between 1940 and 1950.[25]

The increase of 44 percent in the North Central states was somewhat lower than the 54-percent increase over the same period for the United States. In actual index points, the increases were identical—43 points.

During the decade, the percentage increases were greatest in the subregions that had the least improvement or a decline in index during the 1930-40 period. In 18 of the 21 subregions that declined in level of living during the 1930-40 decade, net losses were sustained in the rural population in the following decade. The coefficient of correlation between percentage change in level of living index 1930-40 and the percentage change in the rural population due to migration, 1940-50, for the North Central states was 0.52.

Between 1940 and 1950, all of the subregions showed increases in farm operator family level of living. The subregions ranking in the highest one-third in terms of percentage change in level of living were located mainly in the Cutover, along the southeast and south borders of the region, western Kansas and western Nebraksa and in the central portions of North and South Dakota. These subregions were also areas of heavy rural outmigration. In such areas of heavy out-migration, particularly from farms with little or no replacement of population, livestock and land are generally taken over by farmers remaining, who thereby increase the size of their operations.

The correlation of percentage change in number of farms 1940-50 with percentage change in level of living for the same period resulted in a coefficient of —0.28 which indicates an inverse relationship between these two factors. When a correlation was computed for the same factors for the nonmetropolitan areas, the coefficient was 0.07. A plotting of the percentage change in level of living between 1940-50 for each of the economic subregions against the percentage change in number of farms for the same period is shown in fig. 11. The presence of metropolitan areas within subregions tended to be associated with stability in the relationship between the two

[25] Ibid. p. 1.
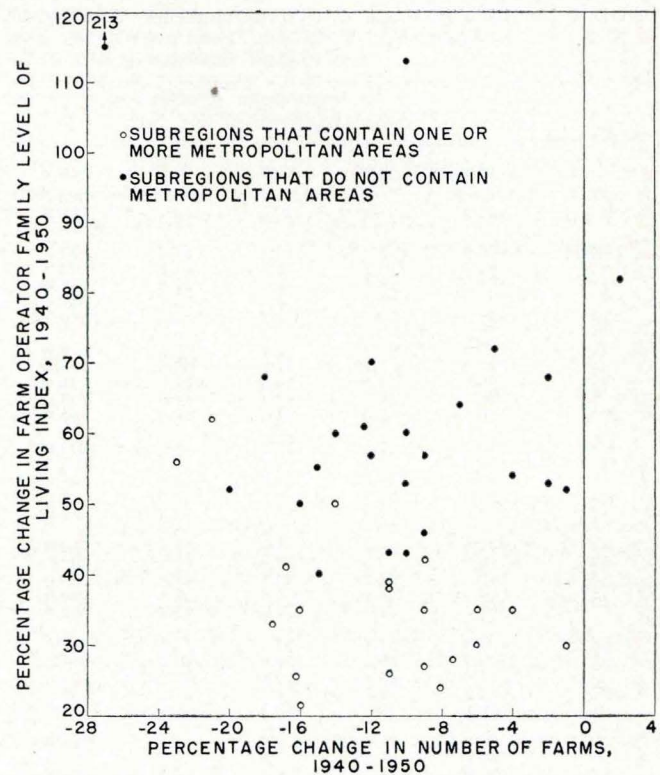
Fig. 11. Percentage increase in farm operator family level of living index in relation to percentage change in number of farms, 1940-50, economic subregions.

factors, more so than in subregions not containing metropolitan areas.

INDUSTRIAL FACTORS

During the 1940-50 decade, the North Central states experienced considerable industrial growth. World War II and the postwar prosperity period had stimulated expansion in manufacturing and in commercial services. The presence of manufacturing or its expansion largely was concentrated in the metropolitan and highly urbanized areas of the region.

Employment during the decade rose from 14,617,912 to 18,180,890—an increase of 24 percent. This increase is in excess of the 10-percent increase in total population. The increase was brought about by the higher proportion of persons in the civilian labor force engaged in some kind of employment in 1950 than in 1940. The proportions for the 2 years were 86 and 96 percent, respectively.

The increased employment was accompanied by considerable change in the distribution of employed workers by industry groups (table 28). In 1940, 20 percent of all employed workers were in agriculture; in 1950, only 14 percent were so employed. The proportions in manufacturing at the beginning and at the end of the decade were 24 and 28 percent, respectively. The proportions in all other occupations were 55 and 57 percent, respectively.

TABLE 28.   PERCENTAGE DISTRIBUTION OF EMPLOYED PERSONS ENGAGED IN AGRICULTURE, MANUFACTURING AND ALL OTHER OCCUPATIONS, 1940 AND 1950, AND PERCENTAGE CHANGE IN SUCH EMPLOYED PERSONS, 1940-50, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES.

| Subregion | Percentage distribution of employed persons | | | | | | | | Percentage change 1940-50 | | | |
| | 1940 | | | | 1950 | | | | | | | |
	Total	Agr.	Mfg.	All other	Total	Agr.	Mfg.	All other	Total	Agr.	Mfg.	All other
Total	100.0	20.4	24.5	55.1	100.0	14.4	28.4	57.2	24.4	—12.4	44.0	29.3
28*	100.0	5.7	40.1	54.2	100.0	3.4	42.8	53.8	33.7	—21.5	42.8	32.7
29*	100.0	17.7	28.1	54.2	100.0	12.3	31.9	55.8	18.4	—17.6	34.4	21.8
30*	100.0	24.0	19.5	56.5	100.0	18.2	22.8	59.0	17.8	—10.8	38.4	22.9
31	100.0	41.2	5.1	53.7	100.0	26.6	6.8	66.6	4.4	—32.7	39.8	29.5
44	100.0	72.6	3.8	23.6	100.0	57.7	7.8	34.5	3.0	—18.0	110.0	50.4
45	100.0	47.8	5.9	46.3	100.0	36.7	9.6	53.7	13.7	—12.8	86.8	31.8
46*	100.0	8.9	29.1	62.0	100.0	5.9	31.1	63.0	26.7	—15.8	35.5	28.7
47*	100.0	14.0	29.4	56.6	100.0	8.9	33.2	57.9	34.1	—14.7	51.4	37.1
48*	100.0	26.7	24.4	48.9	100.0	17.4	31.4	51.2	25.7	—18.5	62.3	31.7
49*	100.0	7.4	41.9	50.7	100.0	4.0	43.4	52.6	33.5	—27.3	38.4	38.7
50*	100.0	17.8	33.4	48.8	100.0	10.4	38.2	51.4	30.6	—23.3	49.1	37.6
51*	100.0	23.9	18.7	57.4	100.0	16.2	23.1	60.7	23.6	—16.4	53.2	30.7
52	100.0	45.6	10.6	43.8	100.0	33.3	17.0	49.7	12.5	—18.0	81.2	27.7
53	100.0	46.8	9.3	43.9	100.0	34.7	14.4	50.9	10.2	—18.3	71.7	27.6
62	100.0	27.3	11.3	61.4	100.0	21.5	12.5	66.0	12.6	—11.4	24.2	21.1
63*	100.0	21.2	18.7	60.1	100.0	15.4	23.3	61.3	21.9	—11.5	52.0	24.4
64*	100.0	2.1	35.8	62.1	100.0	1.4	38.9	59.7	28.3	—14.7	39.3	23.4
65*	100.0	28.9	24.1	47.0	100.0	20.3	29.3	50.4	28.4	—10.1	56.2	37.8
66*	100.0	26.6	15.3	58.1	100.0	18.9	18.1	63.0	17.4	—16.7	39.1	27.3
67	100.0	42.8	17.5	39.7	100.0	33.6	21.8	44.6	18.9	—6.7	48.4	33.3
68*	100.0	21.2	16.2	62.6	100.0	15.5	20.6	63.9	28.1	—6.5	63.1	30.8
69*	100.0	36.9	18.0	45.1	100.0	29.4	22.3	48.3	19.9	—4.5	48.9	28.3
70*	100.0	28.6	19.6	51.8	100.0	21.8	23.7	54.5	18.5	—9.8	43.7	24.7
71	100.0	43.5	9.0	47.5	100.0	35.7	11.9	52.4	6.6	—12.4	40.8	17.6
72*	100.0	9.4	29.5	61.1	100.0	6.5	31.7	61.8	23.4	—15.4	32.6	25.0
73	100.0	45.8	8.7	45.5	100.0	35.9	12.3	51.8	19.5	—6.4	70.3	35.8
76	100.0	55.9	9.3	34.8	100.0	43.9	11.0	45.1	7.8	—15.3	26.9	39.6
82	100.0	30.6	14.4	55.0	100.0	26.7	15.5	57.8	21.4	6.1	30.3	27.5
83	100.0	31.5	8.0	60.5	100.0	23.8	11.3	64.9	6.8	—19.4	50.8	14.6
84	100.0	47.4	4.7	47.9	100.0	39.0	7.9	53.1	8.7	—10.6	82.8	20.5
85*	100.0	23.7	13.0	63.3	100.0	17.5	15.9	66.6	21.5	—10.2	49.2	27.7
86*	100.0	36.8	7.6	55.6	100.0	28.9	10.8	60.3	17.6	—7.7	66.1	27.7
87	100.0	56.7	2.4	40.9	100.0	48.2	3.3	48.5	8.1	—8.1	48.1	28.2
88	100.0	60.1	4.1	35.8	100.0	51.0	6.1	42.9	12.3	—4.6	66.3	34.5
89	100.0	48.0	3.9	48.1	100.0	37.6	4.8	57.6	10.5	—13.4	37.9	32.1
90	100.0	56.4	1.7	41.9	100.0	47.3	2.0	50.7	10.4	—7.4	26.3	33.7
91	100.0	52.7	2.8	44.5	100.0	45.8	3.0	51.2	15.4	0.3	23.6	32.7
92	100.0	51.7	2.7	45.6	100.0	44.4	3.3	52.3	16.0	—0.4	45.6	32.8
93	100.0	52.2	3.4	44.4	100.0	45.1	4.2	50.7	8.7	—6.0	33.0	24.1
94*	100.0	25.2	10.3	64.5	100.0	16.6	16.8	66.6	31.9	—13.4	116.4	36.1
103	100.0	45.0	2.6	52.4	100.0	35.5	3.1	61.4	22.7	—3.1	49.0	43.6
104	100.0	48.6	3.3	48.1	100.0	40.9	3.4	55.7	10.1	—7.4	16.0	27.3
105	100.0	63.4	1.7	34.9	100.0	54.5	1.9	43.6	13.1	—2.8	32.7	41.0
106	100.0	44.5	4.0	51.5	100.0	34.1	4.9	61.0	18.5	—9.2	44.0	40.3

* Subregions containing one or more metropolitan state economic areas.

The number of workers engaged in agriculture declined 12 percent, those in manfacturing increased 44 percent and those in all other occupations increased 29 percent. The 12-percent decrease in workers engaged in agriculture approximates the 11-percent decline in number of farms.

Decreases in employed workers in agriculture were noted in all except subregions 82 and 91, the Springfield Plains area in southwest Missouri and the Black Prairies area in northeast South Dakota and southeast North Dakota, respectively. Such changes ranged from a 27-percent decrease in Subregion 49, southeastern Michigan, to a 6-percent increase in Subregion 82, in southwest Missouri. Nineteen subregions had decreases in excess of the average for the 13 states.

Increases in persons employed in manufacturing occurred in all of the subregions, ranging from a 16-percent increase in Subregion 104 to 116 percent in Subregion 94. Likewise, increases in persons employed in all other occupations, not including agriculture, occurred in all of the sub-

regions. Here the range was from a 15-percent increase in Subregion 83 in southeast Kansas to a 50-percent increase in Subregion 44, the Eastern and Western Highland Rim area in south central Kentucky. Decreases in numbers of persons employed in agriculture and increases in those in all other occupations did not vary as greatly as did the increases in those engaged in manufacturing.

The increase in manufacturing jobs during the decade was an important "pull" factor in affecting rural-urban migration. It also affected migration into rural areas that were close enough to industrial plants for workers to commute daily.

Subregions with large proportions of their total employed workers in manufacturing tended to retain their natural increase and to be more attractive to migrants than those with small proportions of their employed workers in manufacturing. Sixteen of the 17 subregions that had 20 percent or more of their employed workers engaged in manufacturing either gained in total and urban populations through migration or lost no more than 10

percent (table 29). However, only 5 of the 27 subregions with fewer than 20 percent of their workers in manufacturing gained or lost no more than 10 percent in their total population through migration. In the case of the urban population, 23 of the 27 subregions gained or lost no more than 10 percent. This suggests that the urban characteristics of these areas played an equally important if not more important role in retaining or actually increasing the urban population than did the proportions of workers who were engaged in manufacturing.

In the case of the rural population, 13 of the 17 subregions with 20 percent or more of their employed workers in manufacturing gained or had less than a 10-percent loss in population through migration, four subregions lost more than 10 percent of their population. Conversely, only two of the 27 subregions with fewer than 20 percent of their employed workers in manufacturing retained a relatively stable population or gained, while 25 lost more than 10 percent.

The average gain in population per subregion through migration for the 16 subregions with 20 percent or more of their employed workers in manufacturing was 55,762 compared to a loss of 59,236 persons for each of the subregions with fewer than 20 percent of the employed workers in manufacturing. For the urban population, the two figures were gains of 10,814 and 581 persons, respectively. For the rural population, the two figures were a gain of 47,307 persons and a loss of 61,299, respectively. The coefficients of contingency computed from table 29 were: total, 0.59, urban, 0.14 and rural, 0.71. This confirms the fact that areas with the larger proportions of employed workers engaged in manufacturing were more successful in retaining their populations or actually increasing particularly their total and rural populations through migration than were those with smaller proportions of employed persons engaged in manufacturing. This relationship is shown graphically in fig. 12.

TABLE 29. RELATIONSHIP OF NET CHANGE IN TOTAL, URBAN AND RURAL POPULATION DUE TO MIGRATION, 1940-50 TO PRESENCE OF 20 PERCENT OR MORE OF ALL EMPLOYED WORKERS EMPLOYED IN MANUFACTURING IN A SUBREGION, NORTH CENTRAL STATES.

Employed workers in manufacturing and population	Total	Subregions with population change due to migration, 1940-50	
		Gain or less than 10 percent loss	10 percent loss or more
Total	44	21	23
20 percent or more	17	16	1
Less than 20 percent	27	5	22
Urban	44	39	5
20 percent or more	17	16	1
Less than 20 percent	27	23	4
Rural	44	15	29
20 percent or more	17	13	4
Less than 20 percent	27	2	25

With the data now available, it is not possible to explore adequately the extent to which nonagricultural industries outside of the North Central states attracted migrants from the region or the extent to which such industries within attracted migrants from outside the region. The evidence for the population of the North Central states indicated, however, that the influence of urbanization and industrialization does not stop at state lines.

Distribution of employed persons engaged in agriculture, manufacturing and all other industries varied widely between the metropolitan and nonmetropolitan areas. In the metropolitan areas, only 3 percent were employed in agriculture in 1940 and 2 percent in 1950. In manufacturing the ratios were 35 and 37 percent, respectively, and all other occupations, 62 and 61 percent, respectively. In the nonmetropolitan areas, 37 percent of all employed persons were engaged in agriculture in 1940. This ratio dropped to 28 percent by 1950. In manufacturing, the ratios were 14 and 19 percent, respectively; all other industries, 48 and 53 percent, respectively (table 30).

It is apparent that, accompanying the marked out-migration from the nonmetropolitan areas, there were greater shifts in the occupational distribution of employed persons than in the metropolitan areas which either did not lose or which gained population through migration.

In the metropolitan areas, the small shift in proportion of employed persons to manufacturing involved small declines in proportions in agriculture and in all other occupations. However, in the nonmetropolitan areas, gains in proportions in manufacturing and in all other occupations were at the expense of the proportions in agriculture.

POPULATION TRENDS AND PROSPECTS[26]

Analysis of population growth covering the past 50 years and of rural-urban migration in the last
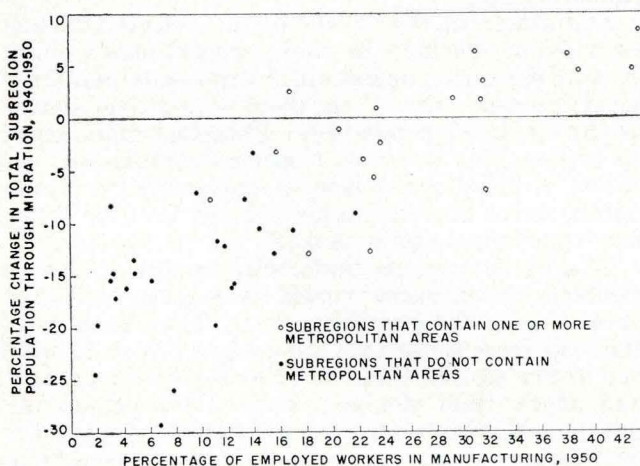

Fig. 12. Percentage change in population due to migration, 1940-50, in relation to percentage of employed workers in manufacturing, 1950, economic subregions.

[26] Material of this section is taken and adapted largely from Hagood, Margaret Jarman and Sharp, E. F. Rural-urban migration in Wisconsin, 1940-50. Wis. Agr. Exp. Sta. Res. Bul. 176. August 1951. pp. 39-42.

TABLE 30. PERCENTAGE DISTRIBUTION OF EMPLOYED PERSONS ENGAGED IN AGRICULTURE, MANUFACTURING AND ALL OTHER OCCUPATIONS, 1940 AND 1950 AND PERCENTAGE CHANGE 1940-50, METROPOLITAN AND NONMETROPOLITAN AREAS, NORTH CENTRAL STATES.

| Area | Percentage distribution of employed persons | | | | | | | | | | | |
| | 1940 | | | | 1950 | | | | Change 1940-50 | | | |
	Total	Agr.	Mfg.	All other	Total	Agr.	Mfg.	All other	Total	Agr.	Mfg.	All other
Total	100.0	20.4	24.5	55.1	100.0	14.4	28.4	57.2	24.4	—12.4	44.0	29.3
Metropolitan	100.0	3.2	34.8	62.0	100.0	2.0	36.9	61.1	31.3	—18.6	39.6	29.3
Nonmetropolitan	100.0	37.5	14.3	48.2	100.0	28.1	18.9	53.0	17.5	—11.9	54.7	29.3

decade provides some basis for understanding the present manpower situation and for anticipating developments during the next decade. The probable future population of any area is of importance as a guide to future planning and development of the region's physical, social, economic and population resources. Specifically, such information is of special interest to school personnel, city and county planners, highway officials, producers and distributors of agricultural and industrial products, business and professional personnel, demographers and many others.

Population research is one field in which predictions or projections are attempted. Mistakes of the past have pointed up several lessons in the field of population projection. Among those lessons is that: (1) Economic factors and international issues that affect the general level of employment and income are associated with both fertility and migration. (2) The majority of families in the United States now exercise control over their size and over the timing of their children. (3) The long-time downward trend in birth rate has come about mainly from the transfer of families from the large to the small-to-medium family pattern. (4) Technological and related developments are so accelerated that changes in the past decade are greater than those that took several decades in the last century and even longer periods in still earlier times. Hence, at present, the effect or relationship of such developments to demographic changes is more difficult to implement, and future changes are more difficult to predict successfully.

In spite of such lessons and the fact that birth, death and migration rates generally tend to change slowly, it is difficult to project demographic trends into the future with a high degree of confidence. Similarly, migration streams rarely change direction abruptly.

TABLE 31. POPULATION GROWTH IN THE NORTH CENTRAL STATES, RURAL AND URBAN 1900-1950.

| Year | Total | Urban | Rural | Percentage change over preceding decade | | |
				Total	Urban	Rural
1900	28,480,178	10,632,980	17,847,198	—	—	—
1910	32,178,447	14,042,641	18,135,806	13.0	32.1	1.6
1920	36,436,422	18,409,509	18,026,913	13.2	31.1	—0.6
1930	41,208,689	23,150,115	18,058,574	13.1	25.8	0.2
1940	42,988,959	24,286,810	18,702,149	4.3	4.9	3.6
1950	47,405,568	27,986,456†	19,419,112†	10.3	15.2	3.8

† According to 1940 definition of urban and rural population.

For these reasons, projections of population must allow for several alternative possibilities even for short-run projections.

POPULATION TRENDS, 1900-1950

Between 1900 and 1950, the population of the United States increased from 76,000,000 to 151,000,000, thus it practically doubled during the 50-year period.

During the same period, the population of the North Central states increased from 28,500,000 to 47,400,000—an increase of 72 percent (table 31). A 100-year population history for total, urban and rural populations in the 13 states is shown in figs. 13, 14 and 15.

In 1900 the population of the 13 states represented nearly 38 percent of the total in the United States; in 1950 it represented slightly more than 31 percent. This represents a substantial decline in the proportion of the nation's population residing in the North Central states. The states in the East North Central Division, exclusive of Kentucky, however, have since 1920 continued to have one-fifth of the nation's population.[27] Ohio, Indiana, Illinois, Michigan and Wisconsin—the states that make up the East North Central Division—have varied somewhat in rates of growth over the last few decades. Ohio and Indiana have maintained their shares of the division's population rather steadily, Michigan has gained in its share, while Illinois' and Wisconsin's shares declined slightly.

The states in the West North Central Division as a whole declined in their proportionate share of the nation's population. Minnesota and Missouri gained slightly in their respective shares of the division's population. Iowa just maintained its share. The Dakotas, Nebraska and Kansas declined in their proportionate shares. (For population, rural and urban by states, 1900 to 1950, see Appendix A, table A-4.)

The 44 subregions that make up the 13 North Central states have varied widely in rates of growth over the past 50 years. They ranged all the way from those four subregions which in 1950 had fewer people than in 1900 to the three that had more than doubled their 1900 population. Subregions whose populations declined during the past 50 years were 71, 82, 84 and 93 located in

[27] Kentucky has declined in its proportion of population during each of the past 5 decades.
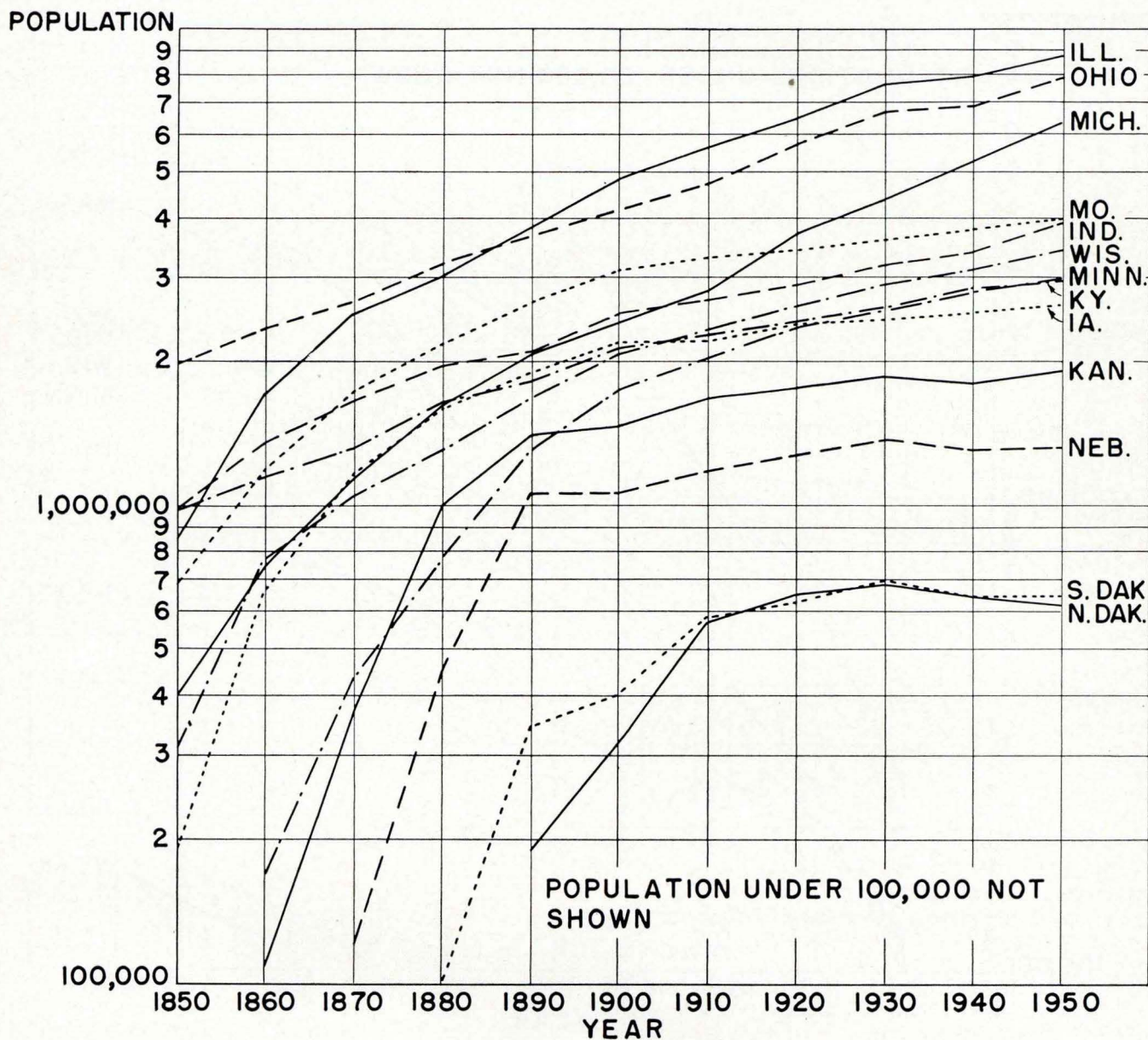
Fig. 13. Population growth by states, 1850-1950.

north and southwest Missouri, east central Kansas and in the Kansas-Nebraska border area. Those that had more than doubled their 1900 populations, 49, 105 and 106, were located in industrialized southeast Michigan, in southwest North Dakota and west central Nebraska. The first contained metropolitan areas, the latter two did not. The latter were among the latest in being settled.

The population in the combined metropolitan areas increased 177 percent over that of 1900. Population in the nonmetropolitan areas increased 20 percent.

FUTURE PROSPECTS

The latest official projections of the total population of the United States were issued by the Bureau of the Census in August 1953.[28] They are based on the assumption that there will be no disastrous wars, major economic depressions, epidemics or national catastrophes. Within this basic assumption, four series of projections were given. Series A involves the assumption that present age-specific fertility rates will continue to 1975; Series B, that present age-specific rates will continue to 1965 and then decline linearly to roughly the 1940 levels by 1975; Series C, that present age-specific rates will decline linearly from the present to roughly the 1940 levels by 1975; Series D, that present age-specific rates will decline linearly from the present to roughly the 1940 level by 1960 and then continue at that level to 1975.

[28] Bureau of the Census. Current population reports. Series P-25, No. 78.
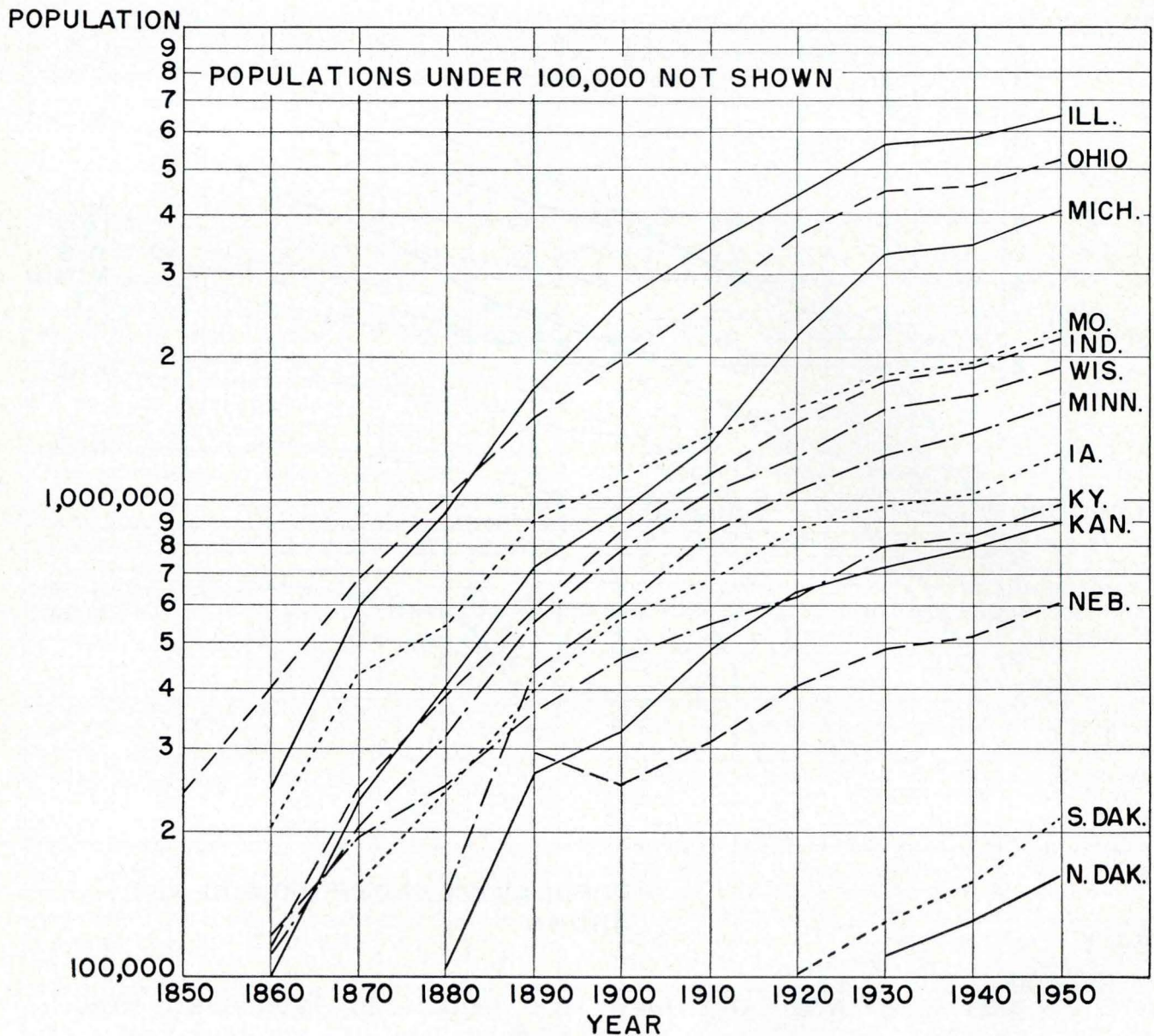
Fig. 14.   Urban population growth by states, 1850-1950.

The projections show that the population of the United States is expected to increase to between 173.8 and 177.4 million by 1960. If age-specific birth rates and death and migration rates do not deviate markedly from the present rates, the population will be nearer 176.1 million than either of the two limits of the range.

The projections were carried further into the future with an ever widening range. For 1975, the projected population is expected to be between 198.6 and 221.0 million. Population projected on the basis of Series B and C projection is expected to be between 206.6 and 213.6 million. The 22-million difference between the totals for the low and high series in 1975 is due entirely to the difference in fertility assumptions.

The ever widening range between the high and low estimate as projections are made into the more distant future indicates that the components of population change cannot be predicted precisely. For example, population analysts are generally agreed that the crude birth rates of the past decade are not likely to continue indefinitely at their present levels, but there is no consensus as to how soon or what the rate of decline may be or what will be the size of completed families in the future. In the population projections prepared by the Bureau of the Census and cited above, the Series A or high projection is based on the assumption that the 1950-53 age-specific fertility rate would remain constant through 1975. It should be emphasized that by far the most important area of uncertainty in the forecasting of the national population lies in the forecasting of fertility.

This much may be expected however. As the large number of children born in the 1940's and

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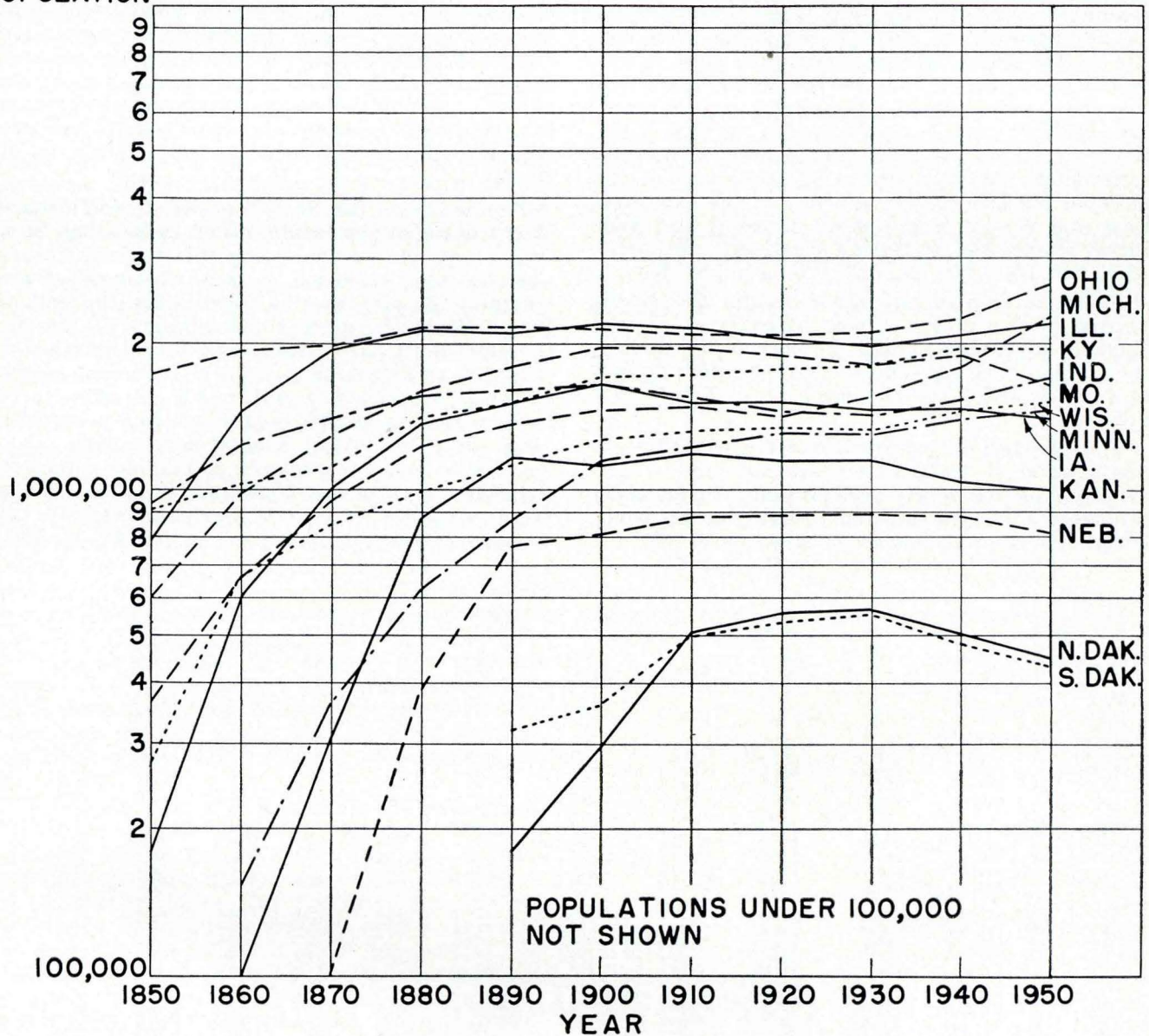
POPULATION

Fig. 15. Rural population growth by states, 1850-1950.

early 1950's enters the marriage and child bearing ages in the 1960's and 1970's a marked increase in labor force, marriages and births will occur. At present the baby crop of the 1940's represents a social investment and an economic cost. Its contribution to the national economy will take place beginning in the 1960's providing that the economy continues to expand so as to give that increase in labor force an opportunity to provide for itself a satisfying level of living.

Population redistribution within the United States has shown fairly persistent trends through depression, war and peacetime prosperity. People have moved mainly to the borders of the country, the West Coast, the Great Lakes industrial areas, the Atlantic Seaboard and the Gulf Coast.

Shifts expected in the next 2½ decades are a

continuation of the movement to the Pacific Coast and, to a lesser extent, to the Mountain and South Atlantic states. The New England, Middle Atlantic, and West North Central states are expected to show slower population growth than the country as a whole.

Against this backdrop, no significant change is indicated in the share of the national population that will live in the East North Central Division of the North Central Region, excluding Kentucky, as long as trends shown in the past persist.[29] This division, which is the most populous of the nation's nine major geographic divisions, is ex-

[29]Hagood, Margaret Jarman and Siegel, Jacob S. Projections of the regional distribution of the population of the United States to 1975. Agricultural Economics Research. Vol. III. No. 2. Bur. Agr. Econ. U. S. Dept. Agr. April 1951.

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pected to continue to have one-fifth of the nation's population as it has had since 1920.

The share of the national population that will live in the West North Central Division is expected to decline as long as the trends shown in the past tend to persist. For the present at least, this division may be considered a surplus population area from which net out-migration may be expected to continue. Even so, the share of the national population that will live in the combined East and West North Central divisions and Kentucky is expected to remain relatively stationary with, however, the possibility of a slight decline.

Redistribution of population within the North Central states, however, may be expected to continue in a pattern similar to that of the 1940's. Assuming peacetime conditions, that redistribution may be expected to take place at a slower rate, however.

The prospective continuation of inequalities in distribution of population poses not only a continuation of community problems but of population problems. In the past, and to the present, population has been considered a free commodity for which potential receiving areas need offer only the promise of a job, and, perhaps, good living conditions. It is no longer enough for the population exporting areas to reap the benefits of the possible improved local conditions resulting from population export. Population increases through migration involve direct social and economic costs which are repaid by the receiving areas only indirectly, if at all.

The decline in the North Central Region's share of the national population, noted earlier, has been fairly regular. In projecting this region's future share of the population, it makes little difference whether one projects the trend since the end of World War I or since the beginning of the depression of the 30's. Assuming a continuation of the 1930 to 1950 trend, about 30.6 percent of the national population would reside in the North Central Region in 1960 and about 29.6 percent in 1975. Should fertility remain rather high (Census Series A), the region's population would be 54,196,000 in 1960 and 65,372,000 in 1975. Should fertility take a low course (Census Series D), the region's population would be 53,096,000 in 1960

TABLE 32. POPULATION GROWTH, ECONOMIC SUBREGIONS, NORTH CENTRAL STATES, 1900-50.

Subregion	1900 (000)	1910 (000)	1920 (000)	1930 (000)	1940 (000)	1950 (000)	Percent change over 1900				
							1910	1920	1930	1940	1950
Total	28,480.2	32,178.4	36,436.4	41,208.7	42,989.0	47,405.6	13.0	27.9	44.7	50.9	66.5
28*	1,177.7	1,540.4	2,232.7	2,752.5	2,834.5	3,325.8	30.8	89.6	133.7	140.7	182.4
29*	472.0	541.7	582.0	603.3	628.1	641.0	14.8	23.3	27.8	33.1	35.8
30*	399.4	398.2	404.6	419.9	441.5	433.0	−0.3	1.3	5.1	10.5	8.4
31	381.6	454.4	558.9	667.8	774.2	745.1	19.1	46.5	75.0	102.9	95.3
44	169.9	185.7	188.8	186.3	208.8	193.6	9.3	11.1	9.7	22.9	13.9
45	503.1	486.8	482.8	480.4	506.2	530.8	−3.2	−4.0	−4.5	0.6	5.5
46*	1,128.5	1,200.0	1,250.4	1,445.2	1,532.7	1,797.2	6.3	10.8	28.1	35.8	59.3
47*	1,820.6	1,994.9	2,244.3	2,515.2	2,673.7	3,208.2	9.6	23.3	38.2	46.9	76.2
48*	1,338.8	1,359.4	1,401.1	1,464.1	1,529.4	1,731.3	1.5	4.7	9.4	14.2	29.3
49*	1,366.9	1,631.0	2,542.1	3,689.3	3,997.4	4,956.6	19.3	86.0	169.9	192.4	262.6
50*	431.8	483.6	515.8	617.4	658.8	786.6	12.0	19.5	43.0	52.6	82.2
51*	687.9	743.0	743.0	726.4	761.6	791.9	8.0	8.0	5.6	10.7	15.1
52	481.9	488.2	479.1	478.9	502.6	514.5	1.3	−0.6	−0.6	4.3	6.8
53	297.7	314.0	308.3	301.6	320.1	320.4	5.5	3.6	1.3	7.5	7.6
62	407.8	440.7	483.6	457.6	487.4	448.5	8.1	18.6	12.2	19.5	10.0
63*	975.4	1,032.2	1,079.3	1,152.7	1,202.9	1,321.9	5.8	10.7	18.2	23.3	35.5
64*	2,697.3	3,524.0	4,470.4	5,917.0	6,128.4	7,025.4	30.6	65.7	119.4	127.2	160.5
65*	807.1	862.1	930.3	1,025.1	1,114.4	1,272.5	6.8	15.3	27.0	38.1	57.7
66*	808.7	1,093.8	1,190.8	1,145.0	1,235.7	1,209.2	35.3	47.2	41.6	52.8	49.5
67	274.2	300.0	332.4	338.2	365.1	379.3	9.4	21.2	23.3	33.2	38.3
68*	1,085.2	1,247.9	1,389.9	1,565.4	1,686.8	1,896.8	15.0	28.1	44.2	55.4	74.8
69*	897.0	893.6	962.4	1,018.7	1,083.6	1,165.7	−0.4	7.3	13.6	20.8	30.0
70*	1,046.9	1,062.0	1,106.6	1,119.1	1,156.7	1,240.0	1.4	5.7	6.9	10.5	18.4
71	1,280.0	1,217.9	1,188.0	1,099.5	1,088.0	1,016.8	−4.9	−7.2	−14.1	−15.0	−20.6
72*	1,140.5	1,351.3	1,480.2	1,698.8	1,804.9	2,051.3	18.5	29.8	49.0	58.3	79.9
73	506.2	526.6	506.4	497.9	530.6	508.0	4.0	0.0	−1.6	4.8	0.4
76	111.5	154.7	174.8	195.2	252.4	257.0	38.7	56.8	75.1	26.4	30.5
82	181.8	180.8	163.2	161.3	171.7	166.7	−0.6	−10.2	−11.3	−5.6	−8.3
83	366.9	409.8	445.6	429.6	400.3	386.4	11.7	21.4	17.1	9.1	5.3
84	435.6	416.0	394.1	372.0	350.5	318.9	−4.5	−9.5	−14.6	−19.5	−26.8
85*	1,942.3	2,044.7	2,249.0	2,494.2	2,496.1	2,665.7	5.3	15.8	28.4	28.5	37.2
86*	566.3	590.0	688.4	722.3	769.0	808.0	4.2	21.6	27.5	35.8	42.7
87	225.9	246.6	270.1	271.6	278.3	276.0	9.2	19.6	20.2	23.2	22.2
88	200.6	220.9	257.3	254.0	275.2	262.5	10.1	28.3	26.6	37.2	30.9
89	223.6	240.0	263.4	267.8	288.9	292.3	7.3	17.8	19.8	29.2	30.7
90	156.8	335.4	370.4	386.1	353.4	335.9	113.9	136.2	146.2	125.4	114.2
91	132.0	197.2	214.4	225.6	200.0	196.1	49.4	62.4	70.9	51.5	48.6
92	317.7	404.3	442.0	456.3	408.9	395.8	27.3	39.1	43.6	28.7	24.6
93	406.1	409.3	393.2	389.0	338.3	309.9	0.8	−3.2	−4.2	−16.7	−23.7
94*	278.1	338.1	365.7	415.5	419.9	487.6	21.6	31.5	49.4	51.0	75.3
103	199.0	294.7	310.6	348.5	316.3	332.0	48.1	56.1	75.1	59.0	66.8
104	105.9	199.8	202.8	231.7	220.9	214.8	88.7	91.5	118.8	108.6	102.8
105	21.6	84.0	107.1	114.6	103.5	95.7	288.9	395.8	430.6	379.2	343.1
106	24.4	38.7	70.1	90.1	91.3	92.9	58.6	187.3	269.3	274.2	280.7

* Subregions containing one or more metropolitan state economic areas.

and 58,746,000 in 1975. A more moderate course (Census Series C) would result in a population in the North Central states of 53,799,000 in 1960 and 61,112,000 in 1975. These projections involve only one estimate of the future trend of mortality and immigration.

Realization of the high fertility assumptions would see a 38-percent increase in the region's population between 1950 and 1975. The moderate assumptions project a 29-percent increase in the same period, and the low assumptions an increase of 24 percent.

In preparing projections for the subregions, the regional projection derived from Census Series C was used as a control, and two series of subregional figures were prepared based on different assumptions regarding the internal distribution of population within the region as a whole. The first subregional projection, designated Series C_1 assumes that from 1950 to 1960 the annual rate of change in each subregion's proportion of the regional population will be the same as that obtained from 1940 to 1950. This is stipulated since population trends in the present decade are rather similar thus far to those of the 1940's. From 1960 to 1975, the 1940 to 1950 rate of change continues with diminishing force under an assumption that all change in subregional shares would cease 50 years after 1960. The effect of Series C_1 assumptions is to project low population figures for subregions that have been losing population or have been gaining slowly and to forecast large population gains for those that have been gaining rapidly.

The second method of projecting the subregional populations, called Series C_2, provides for continuation of the annual rate of change in subregional population shares observed in the overall period 1930 to 1950. This is a more conservative projection, embracing in its base both a period of depression and a period of great prosperity. Essentially, the depression period was characterized by much more uniformity in the rates of subregional population growth than was the period of great population redistribution after 1940. Series C_2 provides that changes in subregional shares of the region's population begin to converge toward stabilization after 1950 and that stability in the distribution of population is reached in the year 2000.

Under Series C_1 forecast for 1960, 14 subregions show prospective small declines in population, and 30 show prospective gains.[30] Most of those showing prospective losses are located along the southern border of the region. Others include the Southern Iowa-Northern Missouri-West Central Illinois area, the Minnesota Forest Margin area, all of North Dakota except along the Red River, the Nebraska-South Dakota Corn Belt Margin and the Kansas-Nebraska Corn Belt Winter Wheat Transition areas. The largest gains generally are

expected in the subregions containing metropolitan areas. The range in population change by subregions is expected to be from a 7-percent loss to a 27-percent gain (see table 33 and Appendix A, table A-5).

Under Series C_2 forecast for 1960, which assumes the same rate of change as from 1930 to 1950, only six subregions show prospective small declines in population.[31] Thirty-eight show prospective gains.

Ten of the 13 subregions expected to show small declines by 1960 under Series A assumptions will continue to show such declines in 1975. Those expected to reverse their losing trend are subregions 73, 82 and 88, while 104, which showed a small gain for 1960, is expected to show a small decline. Thirty-three subregions are expected to show gains.

[31] These include subregions 84, 90, 91, 92, 93 and 105.

TABLE 33. PERCENTAGE CHANGE IN PROJECTED TOTAL POPULATION OF THE NORTH CENTRAL STATES, INCLUDING ARMED FORCES OVERSEAS, TO 1975 OVER 1950, BY ECONOMIC SUBREGIONS, WITH PERCENTAGE CHANGE 1900 TO 1950.

Subregion	Percentage change 1900-1950	Series C_1		Series C_2	
		1960	1975	1960	1975
Total	66.5	13.5	28.9	13.5	28.9
28*	182.4	19.9	42.0	15.6	33.7
29*	35.8	4.4	9.2	9.0	18.3
30*	8.4	0.2	1.6	7.4	15.0
31	95.3	—1.6	—1.7	1.4	23.8
44	13.9	—5.7	—8.8	7.7	15.5
45	5.5	7.2	15.3	11.0	22.8
46*	59.3	19.9	43.0	17.1	37.4
47*	76.2	22.7	48.0	18.5	40.2
48*	29.3	15.7	32.8	16.1	31.0
49*	262.6	26.8	57.3	21.2	47.8
50*	82.2	22.0	46.6	18.3	40.4
51*	15.1	6.2	13.1	10.2	21.1
52	6.8	4.5	10.0	9.3	19.4
53	7.6	2.5	5.6	9.1	18.4
62	10.0	—5.8	—5.4	5.1	9.6
63*	35.5	12.3	25.6	12.9	27.2
64*	160.5	17.2	35.9	14.7	31.5
65*	57.7	16.7	35.0	17.1	37.2
66*	49.5	0.1	1.3	8.8	17.6
67	38.3	6.3	26.6	11.9	24.5
68*	74.8	14.9	31.1	15.7	34.0
69*	30.0	10.0	20.8	12.7	27.0
70*	18.4	9.6	20.0	11.1	23.1
71	—20.6	—4.4	—7.1	2.4	3.7
72*	79.9	16.2	33.8	15.6	33.6
73	0.4	—2.0	—2.6	7.1	14.0
76	30.5	3.9	8.9	20.2	44.7
82	—8.3	—0.6	0.6	7.8	15.6
83	5.3	—1.3	—1.3	1.3	0.4
84	—26.8	—6.9	—11.6	—1.3	—3.4
85*	37.2	9.2	19.2	9.3	19.0
86*	42.7	7.3	15.5	11.5	24.1
87	22.2	1.4	4.0	2.9	13.4
88	30.9	—1.5	—1.9	8.0	22.9
89	30.7	3.4	7.9	10.6	21.6
90	114.2	—2.7	—3.9	—0.3	—2.1
91	48.6	0.5	2.0	—0.5	—2.0
92	24.6	—1.0	—0.8	—0.8	—2.3
93	—23.7	—6.5	—10.6	—4.2	—9.7
94*	75.3	18.4	39.0	14.0	30.0
103	66.8	7.2	15.4	3.6	6.6
104	102.8	—0.9	—0.5	2.3	3.7
105	343.1	—6.3	—9.4	—2.1	—6.3
106	280.7	4.3	9.7	7.5	15.1

* Subregions containing one or more metropolitan state economic areas.

[30] The subregions showing prospective losses include 31, 44, 62, 71, 73, 82, 83, 84, 88, 90, 92, 93, 104 and 105.

Under Series C_2 forecast for 1960 and 1975, which assumes the same rate of change as from 1930 to 1950 and which embraces both a period of depression and of great prosperity, only six subregions are expected to show small declines in population. All six are among those indicated as also showing prospective losses under Series C_1 assumptions.[32]

In 1975, the population as estimated will range from a 10-percent loss in Subregion 93 to a 47-percent increase in Subregion 49.

All of the subregions containing metropolitan areas are expected to show increases in population under both Series C_1 and Series C_2 assumptions. But only 9 of the 24 subregions not containing metropolitan areas show expected increases in population under both assumptions, most of these have considerable urban population and some industrial activity.

In 1975, roughly 50 to 60 percent of the population of the region will be comprised of those born before 1950, or those 25 years old or over.[33]

[32] These include subregions 84, 90, 91, 92, 93 and 105.
[33] Adapted from Bureau of the Census. Current population reports. Series P-25, No. 78.

The differences between the Series C_1 and C_2 forecasts in 1975 for the region and subregions reflect the differences in assumptions regarding migration. Additional assumptions such as those regarding economic trends and forecasts, prospective distribution and expansion of industry, technological changes in agriculture and industry, and others would be desirable for giving "reasonable" appearing population forecasts for each of the subregions. However, to the authors' knowledge there is no method of integrating all of these assumptions to give subregional results that would be additive to the projected regional total.

It is the judgment of the authors that more precise projections of population in each of the subregions will have to be done on the basis of emerging factors that will either encourage or discourage population increases or will tend to maintain a stationary population. On the basis of the foregoing projections, choices of series or revisions can be made best by those who have an intimate knowledge of local conditions and with such information regarding population change as may become available from time to time.

APPENDIX A.

DETAILED TABLES FOR STATE ECONOMIC AREAS AND ECONOMIC SUBREGIONS

TABLE A-1. TOTAL POPULATION, BIRTHS, DEATHS AND NET MIGRATION, ECONOMIC AREAS, NORTH CENTRAL STATES, 1940-50.

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950	Net change through migration as percentage of 1940 population
Total	43,006,327	9,667,884	4,617,218	—651,425	47,405,568	—1.5
Subregion 28	2,834,472	658,165	307,299	140,476	3,325,814	5.0
E (Ohio)	1,267,270	281,527	137,180	53,894	1,465,511	4.3
F (Ohio)	339,405	86,911	32,726	16,442	410,032	4.8
G (Ohio)	234,887	60,753	27,496	15,050	283,194	6.4
H (Ohio)	372,566	81,959	36,480	—1,501	416,544	—0.4
4a (Ohio)	190,391	46,371	23,591	26,909	240,080	14.1
4b (Ohio)	205,068	48,951	23,290	11,509	242,238	5.6
5 (Ohio)	224,885	51,693	26,536	18,173	268,215	8.1
Subregion 29	628,058	128,111	71,540	—43,624	641,005	—6.9
J (Ohio)	193,743	39,079	19,445	—29,142	184,235	—15.0
6a (Ohio)	157,439	33,459	19,365	3,697	175,230	2.3
6b (Ohio)	276,876	55,573	32,730	—18,179	281,540	—6.6
Subregion 30	441,388	96,639	47,930	—57,139	432,958	—12.9
L (Ohio)	46,705	11,390	4,763	—4,217	49,115	—9.0
C (Ky.)	45,732	12,387	4,012	—4,158	49,949	—9.1
8a (Ohio)	187,689	43,256	20,115	—30,357	180,473	—16.2
8b (Ohio)	161,262	29,606	19,040	—18,407	153,421	—11.4
Subregion 31	772,293	253,040	54,382	—225,884	745,067	—29.2
8 (Ky.)	265,803	76,176	18,113	—89,247	234,619	—33.6
9 (Ky.)	506,490	176,864	36,269	—136,637	510,448	—27.0
Subregion 44	208,170	55,762	16,021	—54,303	193,608	—26.1
5 (Ky.)	208,170	55,762	16,021	—54,303	193,608	—26.1
Subregion 45	512,336	115,557	58,488	—38,628	530,777	—7.5
6 (Ky.)	324,360	75,596	34,698	—39,067	326,191	—12.0
7 (Ky.)	187,976	39,961	23,790	439	204,586	0.2

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950	Net change through migration as percentage of 1940 population
Subregion 46	1,533,596	366,538	196,316	93,377	1,797,195	6.1
A (Ky.)	386,656	105,573	52,045	44,431	484,615	11.5
B (Ky.)	164,680	36,498	19,509	—1,219	180,450	—0.7
F (Ind.)	66,081	19,371	8,502	15,335	92,285	23.2
K (Ohio)	621,987	141,775	80,586	40,776	723,952	6.6
7 (Ohio)	156,698	33,243	18,513	—3,914	167,514	—2.5
8 (Ind.)	137,494	30,078	17,161	—2,032	148,379	—1.5
Subregion 47	2,673,718	652,803	329,918	211,556	3,208,159	7.9
B (Ohio)	388,712	95,783	48,937	67,852	503,410	17.5
C (Ohio)	331,343	95,685	40,660	70,965	457,333	21.4
D (Ohio)	120,249	30,866	13,078	9,166	147,203	7.6
D (Ind.)	460,926	115,068	57,320	33,103	551,777	7.2
2b (Ind.)	308,160	65,702	38,950	1,740	336,652	0.6
3 (Ohio)	412,101	95,769	52,035	9,857	465,692	2.4
4 (Ind.)	418,734	102,965	49,858	9,991	481,832	2.4
5 (Ind.)	233,493	50,965	29,080	8,882	264,260	3.8
Subregion 48	1,529,404	355,332	182,393	28,976	1,731,319	1.9
C (Ind.)	155,084	38,323	16,965	7,280	183,722	4.7
G (Mich.)	101,913	25,591	10,784	9,987	126,707	9.8
1 (Ohio)	280,731	61,789	31,705	—8,231	302,584	—2.9
2 (Ohio)	393,272	91,123	48,386	—2,449	433,560	—0.6
2a (Ind.)	120,559	27,228	14,269	1,329	134,847	1.1
3 (Ind.)	199,293	43,486	23,903	—5,976	212,900	—3.0
9a (Mich.)	108,310	26,071	14,217	6,583	126,747	6.1
9b (Mich.)	170,242	41,721	22,164	20,453	210,252	12.0
Subregion 49	4,008,024	1,018,957	404,054	333,671	4,956,598	8.3
A (Ohio)	344,333	77,539	41,898	15,577	395,551	4.5
A (Mich.)	129,980	34,555	13,807	2,787	153,515	2.1
D (Mich.)	227,121	59,861	20,021	4,002	270,963	1.8
E (Mich.)	136,285	36,762	13,201	13,095	172,941	9.6
F (Mich.)	2,372,949	611,186	225,405	257,467	3,016,197	10.8
5a (Mich.)	189,221	51,054	20,626	—2,120	217,529	—1.1
5b (Mich.)	97,872	22,731	10,894	—7,465	102,244	—7.6
7 (Mich.)	282,165	66,142	33,413	10,893	325,787	3.9
8 (Mich.)	228,098	59,127	24,789	39,435	301,871	17.3
Subregion 50	656,383	165,224	74,175	39,189	786,621	6.0
B (Mich.)	245,366	59,442	26,305	9,789	288,292	4.0
C (Mich.)	94,119	29,976	10,330	7,780	121,545	8.3
6a (Mich.)	101,288	25,561	11,039	5,434	121,244	5.4
6b (Mich.)	123,885	30,210	15,516	16,307	154,886	13.2
3 (Mich.)	91,725	20,035	10,985	—121	100,654	—0.1
Subregion 51	761,103	162,447	87,563	—44,111	791,876	—5.8
E (Ind.)	130,783	33,002	16,164	12,801	160,422	9.8
2 (Ky.)	126,942	31,115	13,706	—15,926	128,425	—12.5
6 (Ind.)	388,028	78,373	45,534	—31,336	389,531	—8.1
9 (Ill.)	115,350	19,957	12,159	—9,650	113,498	—8.4
Subregion 52	501,512	116,559	49,210	—54,331	514,530	—10.8
3a (Ky.)	211,646	48,671	20,101	—50,721	189,495	—24.0
3b (Ky.)	99,853	24,738	9,756	7,189	122,024	7.2
7 (Ind.)	190,013	43,150	19,353	—10,799	203,011	—5.7
Subregion 53	321,437	69,099	36,371	—33,769	320,396	—10.5
1 (Ky.)	157,811	31,853	16,171	—23,261	150,232	—14.7
4 (Ky.)	163,626	37,246	20,200	—10,508	170,164	—6.4
Subregion 62	487,429	90,148	52,299	—76,780	448,498	—15.8
8 (Ill.)	144,748	27,643	13,843	—26,563	131,985	—18.4
10 (Ill.)	200,440	36,415	20,514	—28,039	188,302	—14.0
11 (Ill.)	142,241	26,090	17,942	—22,178	128,211	—15.6
Subregion 63	1,202,894	246,380	139,972	12,621	1,321,923	1.0
D (Ill.)	211,736	47,322	23,619	15,073	250,512	7.1
E (Ill.)	117,912	24,063	13,532	3,041	131,484	2.6
5 (Ill.)	188,181	38,327	27,790	6,748	205,466	3.6
6a (Ill.)	221,431	43,330	24,650	—7,275	232,836	—3.3
6b (Ill.)	463,634	93,338	50,381	—4,966	501,625	—1.1
Subregion 64	6,128,430	1,299,743	672,895	270,136	7,025,414	4.4
A (Ind.)	293,195	79,559	27,778	23,176	368,152	7.9
B (Ind.)	161,823	40,442	15,845	18,638	205,058	11.5
C (Ill.)	4,532,332	929,154	510,216	175,942	5,127,212	3.9
C (Wis.)	766,885	163,035	78,520	19,647	871,047	2.6
1 (Ind.)	164,130	40,310	18,422	15,378	201,396	9.4
2 (Ill.)	52,513	12,213	6,520	9,520	67,726	18.1
9 (Wis.)	157,552	35,030	15,594	7,835	184,823	5.0
Subregion 65	1,114,376	253,427	116,481	21,138	1,272,460	1.9
B (Wis.)	130,660	33,544	12,676	17,829	169,357	13.6
6 (Wis.)	169,067	35,867	17,274	—17,133	170,527	—10.1

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950	Net change through migration as percentage of 1940 population
7 (Wis.)	451,457	105,202	45,754	—5,307	505,598	—1.2
8 (Wis.)	363,192	78,814	40,777	25,749	426,978	7.1
Subregion 66	1,233,326	263,788	127,140	—160,726	1,209,248	—13.0
A (Minn.)	206,397	42,317	20,516	—22,136	206,062	—10.7
A (Wis.)	47,119	9,799	5,504	—4,699	46,715	—10.0
1 (Wis.)	208,876	42,367	20,165	—36,371	194,707	—17.4
1 (Mich.)	200,421	37,568	21,255	—38,483	178,251	—19.2
2 (Mich.)	122,823	29,069	12,644	—15,241	124,007	—12.4
2 (Minn.)	206,365	46,747	19,465	—32,275	201,372	—15.6
4a (Mich.)	130,773	29,825	15,726	—7,435	137,437	—5.7
4b (Mich.)	110,552	26,096	11,865	—4,086	120,697	—3.7
Subregion 67	365,080	81,862	33,735	—33,903	379,304	—9.3
4 (Wis.)	262,159	61,644	23,296	—21,729	278,778	—8.3
5 (Wis.)	102,921	20,218	10,439	—12,174	100,526	—11.8
Subregion 68	1,694,953	388,525	169,125	—17,531	1,896,822	—1.0
B (Minn.)	947,919	224,364	95,471	39,697	1,116,509	4.2
6 (Minn.)	390,738	87,004	38,499	—23,418	415,825	—6.0
2a (Wis.)	182,542	36,699	17,502	—21,487	180,252	—11.8
2b (Wis.)	173,754	40,458	17,653	—12,323	184,236	—7.1
Subregion 69	1,083,611	238,591	114,209	—42,297	1,165,696	3.9
B (Ill.)	121,178	30,028	12,673	13,852	152,385	11.4
1 (Ill.)	220,821	45,290	26,447	2,363	242,027	1.1
3 (Wis.)	121,403	25,711	13,051	—13,032	121,031	—10.7
4 (Iowa)	380,588	84,096	38,356	—26,781	399,547	—7.0
7 (Minn.)	239,621	53,466	23,682	—18,699	250,706	—7.8
Subregion 70	1,156,709	243,600	130,993	—29,257	1,240,059	—2.5
A ((Ill.)	113,323	25,692	13,922	8,465	133,558	7.5
D (Iowa)	84,748	20,290	9,897	5,557	100,698	6.6
3 (Ill.)	306,801	57,359	34,548	—19,075	310,537	—6.2
5 (Iowa)	244,441	48,176	26,040	—25,682	240,895	—10.5
6 (Iowa)	407,396	92,083	46,586	1,478	454,371	0.4
Subregion 71	1,087,888	188,380	125,943	—133,500	1,016,825	—12.3
2a (Mo.)	226,183	35,597	25,478	—41,965	194,337	—18.6
2b (Mo.)	268,532	47,302	33,184	—16,241	266,409	—6.0
3a (Iowa)	130,339	23,957	13,123	—20,041	121,132	—15.4
3b (Iowa)	185,290	34,452	19,757	—29,125	170,860	—15.7
4 (Ill.)	277,544	47,072	34,401	—26,128	264,087	—9.4
Subregion 72	1,805,114	391,120	209,621	64,681	2,051,294	3.6
B (Mo.)	1,115,840	246,483	136,455	67,111	1,292,979	6.0
F (Ill.)	316,248	73,010	37,055	36,099	388,302	11.4
6 (Mo.)	222,218	44,801	21,402	—18,027	227,590	—8.1
7 (Ill.)	150,808	26,826	14,709	—20,502	142,423	—13.6
Subregion 73	530,420	114,032	51,057	—85,429	507,966	—16.1
5 (Mo.)	138,129	30,256	13,410	—24,454	130,521	—17.7
7 (Mo.)	258,265	55,470	25,141	—31,177	257,417	—12.1
8 (Mo.)	134,026	28,306	12,506	—29,798	120,028	—22.2
Subregion 76	252,412	77,031	22,264	—50,219	256,960	—19.9
9a (Mo.)	97,662	27,952	8,969	—12,633	104,012	—12.9
9b (Mo.)	154,750	49,079	13,295	—37,586	152,948	—24.3
Subregion 82	171,676	37,410	20,061	—22,360	166,665	—13.0
4 (Mo.)	171,676	37,410	20,061	—22,360	166,665	—13.0
Subregion 83	400,287	74,739	41,893	—46,764	386,369	—11.7
5 (Kan.)	206,265	38,907	20,073	—15,040	210,059	—7.3
7b (Kan.)	194,022	35,832	21,820	—31,724	176,310	—16.4
Subregion 84	350,464	57,369	42,320	—46,662	318,851	—13.3
3 (Mo.)	210,231	34,486	25,707	—27,375	191,635	—13.0
7a (Kan.)	140,233	22,883	16,613	—19,287	127,216	—13.7
Subregion 85	2,496,249	515,753	268,569	—77,683	2,665,750	—3.1
A (Iowa)	103,627	23,091	10,167	—12,634	103,917	—12.2
A (Neb.)	100,585	20,753	10,809	9,213	119,742	9.2
A (Mo.)	508,245	110,300	62,017	29,728	586,256	5.8
B (Iowa)	66,756	14,434	6,873	—4,635	69,682	—6.9
B (Kan.)	178,398	42,763	18,939	25,879	228,101	14.5
B (Neb.)	258,397	57,913	27,690	8,093	296,713	3.1
1 (Mo.)	278,907	46,830	33,004	—28,877	263,856	—10.4
1a (Iowa)	175,930	38,078	15,630	—23,633	174,745	—13.4
1b (Iowa)	178,993	35,068	17,682	—28,729	167,650	—16.0
4b (S.D.)	143,883	32,510	13,456	—7,527	155,410	—5.2
6 (Neb.)	116,983	23,556	10,554	—15,587	114,398	—13.3
6 (Kan.)	252,944	47,503	28,753	—6,660	265,034	—2.6
7 (Neb.)	132,601	22,954	12,995	—22,314	120,246	—16.8

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950	Net change through migration as percentage of 1940 population
Subregion 86	768,059	170,427	69,992	—60,514	807,980	—7.9
C (Iowa)	195,835	43,813	20,189	6,551	226,010	3.3
2a (Iowa)	112,162	25,493	9,150	—16,154	112,351	—14.4
2b (Iowa)	272,163	56,796	25,627	—24,117	279,215	—8.9
8 (Minn.)	187,899	44,325	15,026	—26,794	190,404	—14.3
Subregion 87	277,183	62,299	23,773	—39,748	275,961	—14.3
4a (S.D.)	86,856	19,492	7,448	—12,234	86,666	—14.1
5 (Minn.)	190,327	42,807	16,325	—27,514	189,295	—14.5
Subregion 88	273,906	57,773	26,325	—42,833	262,521	—15.6
3 (Minn.)	147,770	32,151	14,720	—22,456	142,745	—15.2
4 (Minn.)	126,136	25,622	11,605	—20,377	119,776	—16.2
Subregion 89	291,058	66,053	25,117	—39,677	292,317	—13.6
1 (Minn.)	152,751	34,180	13,080	—24,062	149,789	—15.8
4 (N.D.)	138,307	31,873	12,037	—15,615	142,528	—11.3
Subregion 90	352,216	82,177	28,357	—70,088	335,948	—19.9
2a (N.D.)	57,098	13,305	4,387	—8,744	57,272	—15.3
2b (N.D.)	64,139	15,477	4,087	—14,773	60,756	—23.0
3a (N.D.)	144,618	34,629	12,038	—31,560	135,649	—21.8
3b (N.D.)	86,361	18,766	7,845	—15,011	82,271	—17.4
Subregion 91	199,972	43,557	16,570	—30,816	196,143	—15.4
2a (S.D.)	57,827	12,931	4,463	—10,031	56,264	—17.3
2b (S.D.)	93,251	20,470	8,371	—10,949	94,401	—11.7
3c (N.D.)	48,894	10,156	3,736	—9,836	45,478	—20.1
Subregion 92	408,927	84,014	36,346	—60,813	395,782	—14.9
3a (S.D.)	37,678	8,288	3,078	—8,006	34,882	—21.2
3a (Neb.)	148,278	31,752	13,780	—16,513	149,737	—11.1
3b (S.D.)	85,825	17,959	7,097	—12,974	83,713	—15.1
3b (Neb.)	137,146	26,015	12,391	—23,320	127,450	—17.0
Subregion 93	338,298	59,189	33,218	—54,362	309,907	—16.1
4 (Kan.)	92,849	14,374	8,880	—19,337	79,006	—20.8
4 (Neb.)	95,330	17,783	8,762	—14,602	89,749	—15.3
5 (Neb.)	150,119	27,032	15,576	—20,423	141,152	—13.6
Subregion 94	419,952	99,730	42,474	10,348	487,556	2.5
A (Kan.)	143,311	46,389	15,743	48,333	222,290	33.7
3a (Kan.)	165,474	32,298	15,219	—23,259	159,294	—14.1
3b (Kan.)	111,167	21,043	11,512	—14,726	105,972	—13.2
Subregion 103	316,365	69,077	27,264	—26,161	332,017	—8.3
1 (Kan.)	81,181	20,336	7,139	2,329	96,707	2.9
2a (Kan.)	156,348	33,275	13,551	—16,240	159,832	—10.4
2b (Kan.)	78,836	15,466	6,574	—12,250	75,478	—15.5
Subregion 104	222,706	49,784	19,067	—38,630	214,793	—17.3
1 (S.D.)	137,641	33,492	12,415	—17,314	141,404	—12.6
1 (Neb.)	85,065	16,292	6,652	—21,316	73,389	—25.1
Subregion 105	103,143	25,334	7,321	—25,474	95,682	—24.7
1 (N.D.)	103,143	25,334	7,321	—25,474	95,682	—24.7
Subregion 106	91,330	22,339	7,157	—13,578	92,934	—14.9
2 (Neb.)	91,330	22,339	7,157	—13,578	92,934	—14.9

TABLE A-2. URBAN POPULATION, BIRTHS, DEATHS AND NET MIGRATION, ECONOMIC AREAS, NORTH CENTRAL STATES, 1940-50.

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950†	Net change through migration as percentage of 1940 population
Total	24,358,243	5,701,685	2,825,017	199,532	27,434,443	0.8
Subregion 28	2,251,861	524,336	242,165	—6,610	2,527,422	—0.3
E (Ohio)	1,207,772	267,441	130,138	17,577	1,362,652	1.5
F (Ohio)	292,817	74,248	27,137	—2,487	337,441	—0.8
G (Ohio)	165,380	44,383	18,880	—8,689	182,194	—5.3
H (Ohio)	273,370	61,954	27,062	—30,702	277,560	—11.2
4a (Ohio)	119,854	29,423	14,837	15,611	150,051	13.0
4b (Ohio)	85,901	21,838	10,334	—47	97,358	—0.1
5 (Ohio)	106,767	25,049	13,777	2,127	120,166	2.0
Subregion 29	274,199	60,946	34,196	—20,732	280,217	—7.6
J (Ohio)	95,497	20,080	10,608	—15,140	89,829	—15.9
6a (Ohio)	63,549	15,770	8,677	—2	70,640	—*
6b (Ohio)	115,153	25,096	14,911	—5,590	119,748	—4.9
Subregion 30	159,482	36,582	19,884	—17,049	159,131	—10.7
L (Ohio)	15,851	3,598	1,922	—1,194	16,333	—7.5
C (Ky.)	33,909	9,211	3,230	—4,009	35,881	—11.8
8a (Ohio)	72,331	15,169	9,176	—13,347	64,977	—18.5
8b (Ohio)	37,391	8,604	5,556	1,501	41,940	4.0
Subregion 31	57,230	20,252	5,792	—14,220	57,470	—24.8
8 (Ky.)	3,607	986	316	—1,018	3,259	—28.2
9 (Ky.)	53,623	19,266	5,476	—13,202	54,211	—24.6
Subregion 44	6,125	2,588	864	—752	7,097	—12.3
5 (Ky.)	6,125	2,588	864	—752	7,097	—12.3
Subregion 45	144,423	36,928	23,424	—6,038	151,889	—4.2
6 (Ky.)	53,874	14,782	8,208	—609	59,839	—1.1
7 (Ky.)	90,549	22,146	15,216	—5,429	92,050	—6.0
Subregion 46	1,092,041	254,869	143,483	9,232	1,212,659	0.8
A (Ky.)	320,742	80,447	43,449	4,526	362,266	1.4
B (Ky.)	129,595	27,295	15,757	—6,893	134,240	—5.3
F (Ind.)	36,907	10,960	5,114	1,278	44,031	3.5
K (Ohio)	544,766	120,973	71,109	13,968	608,598	2.6
7 (Ohio)	29,070	6,978	3,913	—2,014	30,121	—6.9
8 (Ind.)	30,961	8,216	4,141	—1,633	33,403	—5.3
Subregion 47	1,648,492	436,182	213,518	43,034	1,914,190	2.6
B (Ohio)	330,268	78,887	42,056	46,852	413,951	14.2
C (Ohio)	237,096	75,045	30,175	—9,197	272,769	—3.9
D (Ohio)	84,568	22,790	9,924	1,156	98,590	1.4
D (Ind.)	390,879	101,407	51,654	—7,774	432,858	—2.0
2b (Ind.)	119,300	29,215	16,142	5,675	138,048	4.8
3 (Ohio)	174,106	44,097	24,386	3,732	197,549	2.1
4 (Ohio)	244,559	67,232	28,807	—6,237	276,747	—2.6
5 (Ind.)	67,716	17,509	10,374	8,827	83,678	13.0
Subregion 48	646,548	163,519	83,303	7,508	734,272	1.2
C (Ind.)	118,410	29,262	13,335	—730	133,607	—0.6
G (Mich.)	55,087	15,571	6,299	—6,655	57,704	—12.1
1 (Ohio)	79,374	19,922	10,700	9,400	97,996	11.8
2 (Ohio)	195,073	48,142	25,937	572	217,850	0.3
2a (Ind.)	19,140	4,900	2,914	948	22,074	5.0
3 (Ind.)	63,922	15,592	8,506	898	71,906	1.4
9a (Mich.)	33,379	8,859	4,522	3,361	41,077	10.1
9b (Mich.)	82,163	21,271	11,090	—286	92,058	—0.3
Subregion 49	3,062,651	773,560	307,760	105,986	3,634,437	3.5
A (Ohio)	287,032	66,358	37,663	—6,563	309,164	—2.3
A (Mich.)	82,484	21,259	9,149	—1,676	92,918	—2.0
D (Mich.)	156,597	38,039	13,546	—10,831	170,259	—6.9
E (Mich.)	96,907	22,303	8,722	5,480	115,968	5.7
F (Mich.)	2,125,586	539,706	202,098	117,653	2,580,847	5.5
5a (Mich.)	84,735	24,476	9,394	—93	99,724	—0.1
5b (Mich.)	7,820	1,788	918	277	8,967	3.5
7 (Mich.)	105,427	27,599	13,797	—5,273	113,956	—5.0
8 (Mich.)	116,063	32,032	12,473	7,012	142,634	6.0
Subregion 50	346,595	89,188	39,245	—18,224	378,314	—5.3
B (Mich.)	168,523	40,206	18,915	—6,896	182,918	—4.1
C (Mich.)	63,636	19,532	6,814	—9,097	67,257	—14.3
6a (Mich.)	36,775	8,715	3,810	—1,653	40,027	—4.5
6b (Mich.)	45,998	13,661	5,937	—732	52,990	—1.6
3 (Mich.)	31,663	7,074	3,769	154	35,122	0.5
Subregion 51	325,731	82,392	44,409	10,785	374,499	3.3
E (Ind.)	97,062	27,223	13,176	17,527	128,636	18.1
2 (Ky.)	50,701	14,075	6,801	—1,055	56,920	—2.1
6 (Ind.)	151,058	35,267	21,063	—9,054	156,208	—6.0
9 (Ill.)	26,910	5,827	3,369	3,367	32,735	12.5

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950†	Net change through migration as percentage of 1940 population
Subregion 52	80,987	22,113	9,713	424	93,811	0.5
3a (Ky.)	23,108	7,081	3,315	—1,117	25,757	—4.8
3b (Ky.)	3,656	1,433	572	1,290	5,807	35.3
7 (Ind.)	54,223	13,599	5,826	251	62,247	0.5
Subregion 53	92,168	21,440	12,838	—2,973	97,797	—3.2
1 (Ky.)	50,349	11,025	6,402	—3,945	51,027	—7.8
4 (Ky.)	41,819	10,415	6,436	972	46,770	2.3
Subregion 62	180,418	38,034	21,555	—18,403	178,494	—10.2
8 (Ill.)	42,869	10,043	4,497	—6,502	41,913	—15.2
10 (Ill.)	95,237	19,494	11,515	—9,393	93,823	—9.9
11 (Ill.)	42,312	8,497	5,543	—2,508	42,758	—5.9
Subregion 63	606,376	134,030	72,699	11,564	679,271	1.9
D (Ill.)	139,211	31,670	14,602	—2,943	153,336	—2.1
E (Ill.)	75,503	16,481	9,589	—767	81,628	—1.0
5 (Ill.)	97,413	21,811	11,160	—1,908	106,156	—2.0
6a (Ill.)	103,518	22,173	13,135	687	113,243	0.7
6b (Ill.)	190,731	41,895	24,213	16,495	224,908	8.6
Subregion 64	5,597,477	1,181,363	612,731	—193	6,165,916	*
A (Ind.)	264,780	70,334	24,770	2,689	313,033	1.0
B (Ind.)	129,566	32,255	12,575	—422	148,824	—0.3
C (Ill.)	4,256,601	876,468	475,952	3,587	4,660,704	0.1
C (Wis.)	705,672	146,463	72,530	—1,848	777,757	—0.3
1 (Ind.)	99,229	24,288	11,803	—1,367	110,347	—1.4
2 (Ill.)	21,255	5,051	2,971	1,575	24,910	7.4
9 (Wis.)	120,374	26,504	12,130	—4,407	130,341	—3.7
Subregion 65	543,262	126,920	60,467	16,493	626,208	3.0
B (Wis.)	72,190	19,380	7,327	16,646	100,889	23.1
6 (Wis.)	46,997	10,652	5,525	—1,660	50,464	—3.5
7 (Wis.)	272,367	64,148	29,330	—3,635	303,550	—1.3
8 (Wis.)	151,708	32,740	18,285	5,142	171,305	3.4
Subregion 66	498,068	114,415	54,703	—52,360	505,420	—10.5
A (Minn.)	152,273	31,784	15,636	—14,694	153,727	—9.6
A (Wis.)	35,136	7,628	4,253	—3,186	35,325	—9.1
1 (Wis.)	54,110	11,955	6,124	—5,661	54,280	—10.5
1 (Mich.)	96,915	19,826	10,234	—16,574	89,933	—17.1
2 (Mich.)	60,858	16,417	7,003	—6,035	64,237	—9.9
2 (Minn.)	48,734	13,968	5,412	—4,475	52,815	—9.2
4a (Mich.)	28,569	7,043	3,515	311	32,408	1.1
4b (Mich.)	21,473	5,794	2,526	—2,046	22,695	—9.5
Subregion 67	113,687	27,653	11,727	—908	128,705	—0.8
4 (Wis.)	92,718	22,763	9,527	159	106,113	0.2
5 (Wis.)	20,969	4,890	2,200	—1,067	22,592	—5.1
Subregion 68	1,079,063	249,494	113,411	—8,331	1,206,815	—0.8
B (Minn.)	859,291	198,033	86,291	—12,733	958,300	—1.5
6 (Minn.)	131,398	30,749	16,538	2,524	148,133	1.9
2a (Wis.)	18,094	4,323	2,298	2,336	22,455	12.9
2b (Wis.)	70,280	16,389	8,284	—458	77,927	—0.7
Subregion 69	407,003	95,870	50,329	26,583	479,127	6.5
B (Ill.)	87,462	19,758	9,197	3,491	101,514	4.0
1 (Ill.)	87,558	20,219	11,825	4,082	100,034	4.7
3 (Wis.)	18,529	3,850	2,685	1,752	21,446	9.5
4 (Iowa)	141,157	32,905	16,852	13,374	170,584	9.5
7 (Minn.)	72,297	19,138	9,770	3,884	85,549	5.4
Subregion 70	571,911	127,906	74,554	23,235	648,498	4.1
A (Ill.)	92,732	20,404	12,277	2,216	103,075	2.4
D (Iowa)	69,182	15,400	8,175	3,274	79,681	4.7
3 (Ill.)	103,376	21,614	14,104	714	111,600	0.7
5 (Iowa)	65,970	13,799	9,502	1,267	71,534	1.9
6 (Iowa)	240,651	56,689	30,496	15,764	282,608	6.6
Subregion 71	317,859	63,447	47,148	8,334	342,492	2.6
2a (Mo.)	41,406	7,963	5,892	—1,668	41,809	—4.0
2b (Mo.)	79,483	16,899	12,070	13,053	97,365	16.4
3a (Iowa)	26,361	4,982	3,965	1,706	29,084	6.5
3b (Iowa)	63,680	14,085	8,070	—4,872	64,823	—7.6
4 (Ill.)	106,929	19,518	17,151	115	109,411	0.1
Subregion 72	1,269,761	284,384	155,701	1,463	1,399,907	0.1
B (Mo.)	951,271	209,317	120,098	3,265	1,043,755	0.3
F (Ill.)	213,175	51,614	24,348	1,567	242,008	0.7
6 (Mo.)	78,457	17,335	7,976	—2,298	85,518	—2.9
7 (Ill.)	26,858	6,118	3,279	—1,071	28,626	—4.0

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950†	Net change through migration as percentage of 1940 population
Subregion 73	100,090	25,816	12,596	1,387	114,697	1.4
5 (Mo.)	12,756	4,650	1,908	3,430	18,928	26.9
7 (Mo.)	67,900	16,242	8,289	—722	75,131	—1.1
8 (Mo.)	19,434	4,924	2,399	—1,321	20,638	—6.8
Subregion 76	48,694	16,135	6,419	5,539	63,949	11.4
9a (Mo.)	25,264	7,894	3,174	4,467	34,451	17.7
9b (Mo.)	23,430	8,241	3,245	1,072	29,498	4.6
Subregion 82	68,531	16,260	9,847	—3,412	71,532	—5.0
4 (Mo.)	68,531	16,260	9,847	—3,412	71,532	—5.0
Subregion 83	175,049	40,497	22,544	—1,826	191,176	—1.0
5 (Kan.)	76,156	19,733	9,816	7,481	93,554	9.8
7b (Kan.)	98,893	20,764	12,728	—9,307	97,622	—9.4
Subregion 84	90,814	17,660	13,855	—1,550	93,069	—1.7
3 (Mo.)	52,557	10,085	8,067	—28	54,547	—0.1
7a (Kan.)	38,257	7,575	5,788	—1,522	38,522	—4.0
Subregion 85	1,415,702	320,077	176,274	33,205	1,592,710	2.3
A (Iowa)	82,364	18,346	8,199	—8,520	83,991	—10.3
A (Neb.)	81,984	18,301	8,800	7,399	98,884	9.0
A (Mo.)	426,394	94,459	55,159	28,541	494,235	6.7
B (Iowa)	41,439	9,537	4,851	—696	45,429	—1.7
B (Kan.)	125,437	30,716	14,319	—6,688	135,146	—5.3
B (Neb.)	223,844	52,460	25,386	199	251,117	0.1
1 (Mo.)	113,813	20,733	17,046	395	117,895	0.3
1a (Iowa)	35,655	7,702	5,518	1,331	39,170	3.7
1b (Iowa)	43,337	8,696	5,893	—933	45,207	—2.2
4b (S.D.)	58,490	16,766	7,298	5,467	73,425	9.3
6 (Neb.)	24,936	5,667	3,341	3,125	30,387	12.5
6 (Kan.)	123,086	29,451	16,039	5,014	141,512	4.1
7 (Neb.)	34,923	7,243	4,425	—1,429	36,312	—4.1
Subregion 86	315,364	77,015	35,775	3,511	360,115	1.1
C (Iowa)	164,071	37,387	17,679	—199	183,580	—0.1
2a (Iowa)	20,578	5,247	2,548	63	23,340	0.3
2b (Iowa)	89,786	21,866	10,566	3,949	105,035	4.4
8 (Minn.)	40,929	12,515	4,982	—302	48,160	—0.7
Subregion 87	45,693	14,097	5,688	771	54,873	1.7
4a (S.D.)	21,221	6,435	2,756	1,416	26,316	6.7
5 (Minn.)	24,472	7,662	2,932	—645	28,557	—2.6
Subregion 88	40,578	10,694	6,924	3,171	47,519	7.8
3 (Minn.)	26,664	7,556	5,508	3,051	31,763	11.4
4 (Minn.)	13,914	3,138	1,416	120	15,756	0.9
Subregion 89	88,647	25,098	9,319	3,387	107,813	3.8
1 (Minn.)	29,263	9,079	3,406	2,884	37,820	9.9
4 (N.D.)	59,384	16,019	5,913	503	69,993	0.8
Subregion 90	59,712	16,437	6,523	2,399	72,025	4.0
2a (N.D.)	5,738	1,735	753	658	7,378	11.5
2b (N.D.)	15,384	4,436	1,307	127	18,640	0.8
3a (N.D.)	23,213	6,548	2,527	1,225	28,459	5.3
3b (N.D.)	15,377	3,718	1,936	389	17,548	2.5
Subregion 91	39,369	10,399	4,168	2,832	48,432	7.2
2a (S.D.)	7,330	2,199	916	855	9,468	11.7
2b (S.D.)	27,858	7,084	2,896	1,793	33,839	6.4
3c (N.D.)	4,181	1,116	356	184	5,125	4.4
Subregion 92	79,421	20,097	9,815	4,216	93,919	5.3
3a (Neb.)	47,858	13,322	5,993	3,507	58,694	7.3
3b (S.D.)	10,633	2,528	1,406	368	12,123	3.5
3b (Neb.)	20,930	4,247	2,416	341	23,102	1.6
Subregion 93	54,315	13,867	6,880	3,398	64,700	6.3
4 (Kan.)	9,397	2,171	1,226	—558	9,784	—5.9
4 (Neb.)	12,222	3,169	1,581	1,476	15,286	12.1
5 (Neb.)	32,696	8,527	4,073	2,480	39,630	7.6
Subregion 94	222,371	66,955	26,523	25,043	287,846	11.3
A (Kan.)	114,966	41,576	13,434	25,171	168,279	21.9
3a (Kan.)	66,084	15,578	7,752	—1,772	72,138	—2.7
3b (Kan.)	41,321	9,801	5,337	1,644	47,429	4.0
Subregion 103	60,344	19,020	7,312	14,997	87,049	24.9
1 (Kan.)	12,897	4,398	1,864	2,965	18,396	23.0
2a (Kan.)	32,478	10,032	3,831	8,132	46,811	25.0
2b (Kan.)	14,969	4,590	1,617	3,900	21,842	26.1

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950†	Net change through migration as percentage of 1940 population
Subregion 104	39,349	11,169	4,653	5,370	51,235	13.6
1 (S.D.)	32,555	9,590	3,855	5,231	43,521	16.1
1 (Neb.)	6,794	1,579	798	139	7,714	2.0
Subregion 105	12,821	3,790	1,391	—453	14,767	—3.5
1 (N.D.)	12,821	3,790	1,391	—453	14,767	—3.5
Subregion 106	27,961	8,191	2,892	—301	32,959	—1.1
2 (Neb.)	27,961	8,191	2,892	—301	32,959	—1.1

* Less than 0.05 percent.
† According to 1940 definition and classification of urban population.

TABLE A-3. RURAL POPULATIONS, BIRTHS, DEATHS AND NET MIGRATION, ECONOMIC AREAS, NORTH CENTRAL STATES, 1940-50.

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950†	Net change through migration as percentage of 1940 population
Total	18,648,084	3,966,199	1,792,201	—850,957	19,971,125	—4.6
Subregion 28	582,611	133,829	65,134	147,086	798,392	25.2
E (Ohio)	59,498	14,086	7,042	36,317	102,859	61.0
F (Ohio)	46,588	12,663	5,589	18,929	72,591	40.6
G (Ohio)	69,507	16,370	8,616	23,739	101,000	34.2
H (Ohio)	99,196	20,005	9,418	29,201	138,984	29.4
4a (Ohio)	70,537	16,948	8,754	11,298	90,029	16.0
4b (Ohio)	119,167	27,113	12,956	11,556	144,880	9.7
5 (Ohio)	118,118	26,644	12,759	16,046	148,049	13.6
Subregion 29	353,859	67,165	37,344	—22,892	360,788	—6.5
J (Ohio)	98,246	18,999	8,837	—14,002	94,406	—14.3
6a (Ohio)	93,890	17,689	10,688	3,699	104,590	3.9
6b (Ohio)	161,723	30,477	17,819	—12,589	161,792	—7.8
Subregion 30	281,906	60,057	28,046	—40,090	273,827	—14.2
L (Ohio)	30,854	7,792	2,841	—3,023	32,782	—9.8
C (Ky.)	11,823	3,176	782	—149	14,068	—1.3
8a (Ohio)	115,358	28,087	10,939	—17,010	115,496	—14.7
8b (Ohio)	123,871	21,002	13,484	—19,908	111,481	—16.1
Subregion 31	715,063	232,788	48,590	—211,664	687,597	—29.6
8 (Ky.)	262,196	75,190	17,797	—88,229	231,360	—33.6
9 (Ky.)	452,867	157,598	30,793	—123,435	456,237	—27.3
Subregion 44	202,045	53,174	15,157	—53,551	186,511	—26.5
5 (Ky.)	202,045	53,174	15,157	—53,551	186,511	—26.5
Subregion 45	367,913	78,629	35,064	—32,590	378,888	—8.9
6 (Ky.)	270,486	60,814	26,490	—38,458	266,352	—14.2
7 (Ky.)	97,427	17,815	8,574	5,868	112,536	6.0
Subregion 46	441,555	111,669	52,833	84,145	584,536	19.1
A (Ky.)	65,914	25,126	8,596	39,905	122,349	60.5
B (Ky.)	35,085	9,203	3,752	5,674	46,210	16.2
F (Ind.)	29,174	8,411	3,388	14,057	48,254	48.2
K (Ohio)	77,221	20,802	9,477	26,808	115,354	34.7
7 (Ohio)	127,628	26,265	14,600	—1,900	137,393	—1.5
8 (Ind.)	106,533	21,862	13,020	—399	114,976	—0.4
Subregion 47	1,025,226	216,621	116,400	168,522	1,293,969	16.4
B (Ohio)	58,444	16,896	6,881	21,000	89,459	35.9
C (Ohio)	94,247	20,640	10,485	80,162	184,564	85.1
D (Ohio)	35,681	8,076	3,154	8,010	48,613	22.4
D (Ind.)	70,047	13,661	5,666	40,877	118,919	58.4
2b (Ind.)	188,860	36,487	22,808	—3,935	198,604	—2.1
3 (Ohio)	237,995	51,672	27,649	6,125	268,143	2.6
4 (Ind.)	174,175	35,733	21,051	16,228	205,085	9.3
5 (Ind.)	165,777	33,456	18,706	55	180,582	*.
Subregion 48	882,856	191,813	99,090	21,468	997,047	2.4
C (Ind.)	36,674	9,061	3,630	8,010	50,115	21.8
G (Mich.)	46,826	10,020	4,485	16,642	69,003	35.5

Area	Population April 1, 1940	Births April '40 to April '50	Deaths April '40 to April '50	Net change through migration April '40 to April '50	Population April 1, 1950†	Net change through migration as percentage of 1940 population
Subregion 69	676,608	142,721	63,880	—68,880	686,569	—10.2
B (Ill.)	33,716	10,270	3,476	10,361	50,871	30.7
1 (Ill.)	133,263	25,071	14,622	—1,719	141,993	—1.3
3 (Wis.)	102,874	21,861	10,366	—14,784	99,585	—14.4
4 (Iowa)	239,431	51,191	21,504	—40,155	228,963	—16.8
7 (Minn.)	167,324	34,328	13,912	—22,583	165,157	—13.5
Subregion 70	584,798	115,694	56,439	—52,492	591,561	—9.0
A (Ill.)	20,591	5,288	1,645	6,249	30,483	30.3
D (Iowa)	15,566	4,890	1,722	2,283	21,017	14.7
3 (Ill.)	203,425	35,745	20,444	—19,789	198,937	—9.7
5 (Iowa)	178,471	34,377	16,538	—26,949	169,361	—15.1
6 (Iowa)	166,745	35,394	16,090	—14,286	171,763	—8.6
Subregion 71	770,029	124,933	78,795	—141,834	674,333	—18.4
2a (Mo.)	184,777	27,634	19,586	—40,297	152,528	—21.8
2b (Mo.)	189,049	30,403	21,114	—29,294	169,044	—15.5
3a (Iowa)	103,978	18,975	9,158	—21,747	92,048	—20.9
3b (Iowa)	121,610	20,367	11,687	—24,253	106,037	—19.9
4 (Ill.)	170,615	27,554	17,250	—26,243	154,676	—15.4
Subregion 72	535,353	106,736	53,920	63,218	651,387	11.8
B (Mo.)	164,569	37,166	16,357	63,846	249,224	38.8
F (Ill.)	103,073	21,396	12,707	34,532	146,294	33.5
6 (Mo.)	143,761	27,466	13,426	—15,729	142,072	—10.9
7 (Ill.)	123,950	20,708	11,430	—19,431	113,797	—15.7
Subregion 73	430,330	88,216	38,461	—86,816	393,269	—20.2
5 (Mo.)	125,373	25,606	11,502	—27,884	111,593	—22.2
7 (Mo.)	190,365	39,228	16,852	—30,455	182,286	—16.0
8 (Mo.)	114,592	23,382	10,107	—28,477	99,390	—24.8
Subregion 76	203,718	60,896	15,845	—55,758	193,011	—27.4
9a (Mo.)	72,398	20,058	5,795	—17,100	69,561	—23.6
9b (Mo.)	131,320	40,838	10,050	—38,658	123,450	—29.4
Subregion 82	103,145	21,150	10,214	—18,948	95,133	—18.4
4 (Mo.)	103,145	21,150	10,214	—18,948	95,133	—18.4
Subregion 83	225,238	34,242	19,349	—44,938	195,193	—20.0
5 (Kan.)	130,109	19,174	10,257	—22,521	116,505	—17.3
7b (Kan.)	95,129	15,068	9,092	—22,417	78,688	—23.6
Subregion 84	259,650	39,709	28,465	—45,112	225,782	—17.4
3 (Mo.)	157,674	24,401	17,640	—27,347	137,088	—17.3
7a (Kan.)	101,976	15,308	10,825	—17,765	88,694	—17.4
Subregion 85	1,080,547	195,676	92,295	—110,888	1,073,040	—10.3
A (Iowa)	21,263	4,745	1,968	—4,114	19,926	—19.3
A (Neb.)	18,601	2,452	2,009	1,814	20,858	9.8
A (Mo.)	81,851	15,841	6,858	1,187	92,021	1.4
B (Iowa)	25,317	4,897	2,022	—3,939	24,253	—15.6
B (Kan.)	52,961	12,047	4,620	32,567	92,955	61.5
B (Neb.)	34,553	5,453	2,304	7,894	45,596	22.8
1 (Mo.)	165,094	26,097	15,958	—29,272	145,961	—17.7
1a (Iowa)	140,275	30,376	10,112	—24,964	135,575	—17.8
1b (Iowa)	135,656	26,372	11,789	—27,796	122,443	—20.5
4b (S.D.)	85,393	15,744	6,158	—12,994	81,985	—15.2
6 (Neb.)	92,047	17,889	7,213	—18,712	84,011	—20.3
6 (Kan.)	129,858	18,052	12,714	—11,674	123,522	—9.0
7 (Neb.)	97,678	15,711	8,570	—20,885	83,934	—21.4
Subregion 86	452,695	93,412	34,217	—64,025	447,865	—14.1
C (Iowa)	31,764	6,426	2,510	6,750	42,430	21.2
2a (Iowa)	91,584	20,246	6,602	—16,217	89,011	—17.7
2b (Iowa)	182,377	34,930	15,061	—28,066	174,180	—15.4
8 (Minn.)	146,970	31,810	10,044	—26,492	142,244	—18.0
Subregion 87	231,490	48,202	18,085	—40,519	221,088	—17.5
4a (S.D.)	65,635	13,057	4,692	—13,650	60,350	—20.8
5 (Minn.)	165,855	35,145	13,393	—26,869	160,738	—16.2
Subregion 88	233,328	47,079	19,401	—46,004	215,002	—19.7
3 (Minn.)	121,106	24,595	9,212	—25,507	110,982	—21.1
4 (Minn.)	112,222	22,484	10,189	—20,497	104,020	—18.3
Subregion 89	202,411	40,955	15,798	—43,064	184,504	—21.3
1 (Minn.)	123,488	25,101	9,674	—26,946	111,969	—21.8
4 (N.D.)	78,923	15,854	6,124	—16,118	72,535	—20.4
Subregion 90	292,504	65,740	21,834	—72,487	263,923	—24.8
2a (N.D.)	51,360	11,570	3,634	—9,402	49,894	—18.3

TABLE A-4. POPULATION GROWTH IN THE NORTH CENTRAL STATES, RURAL AND URBAN, 1900-50.†

Year	Illinois	Indiana	Iowa	Kansas	Kentucky	Michigan	Minnesota	Missouri	Nebraska	North Dakota	Ohio	South Dakota	Wisconsin	Total	Percentage change over preceding decade
TOTAL															
1900	4,821,550	2,516,462	2,231,853	1,470,495	2,147,174	2,420,982	1,751,394	3,106,665	1,066,300	319,146	4,157,545	401,570	2,069,042	28,480,178	17.4
1910	5,638,591	2,700,876	2,224,771	1,690,949	2,289,905	2,810,173	2,075,708	3,293,335	1,192,214	577,056	4,767,121	583,888	2,333,860	32,178,447	13.0
1920	6,485,280	2,930,390	2,404,021	1,769,257	2,416,630	3,668,412	2,387,125	3,404,055	1,296,372	646,872	5,759,394	636,547	2,632,067	36,436,422	13.2
1930	7,630,654	3,238,503	2,470,939	1,880,999	2,614,589	4,842,325	2,563,953	3,629,367	1,377,963	680,845	6,646,697	692,849	2,939,006	41,208,689	13.1
1940	7,897,241	3,427,796	2,538,268	1,801,028	2,845,627	5,256,106	2,792,300	3,784,664	1,315,834	641,935	6,907,612	642,961	3,137,587	42,988,959	4.3
1950	8,712,176	3,934,224	2,621,073	1,905,299	2,944,806	6,371,766	2,982,483	3,954,653	1,325,510	619,636	7,946,627	652,740	3,434,575	47,405,568	10.3
URBAN															
1900	2,616,368	862,689	572,386	329,696	467,668	952,323	598,100	1,128,104	252,702	23,413	1,998,382	40,936	790,213	10,632,980	36.8
1910	3,479,935	1,143,835	680,054	492,312	555,442	1,327,044	850,294	1,393,705	310,852	63,236	2,665,143	76,469	1,004,320	14,042,641	32.1
1920	4,403,677	1,482,855	875,495	616,485	633,543	2,241,560	1,051,593	1,586,903	405,293	88,239	3,677,136	101,872	1,244,858	18,409,509	31.1
1930	5,635,727	1,795,892	979,292	729,834	799,026	3,302,075	1,257,616	1,859,119	486,107	113,306	4,507,371	130,907	1,553,843	23,150,115	25.8
1940	5,809,650	1,887,712	1,084,231	753,941	849,327	3,454,867	1,390,098	1,960,696	514,148	131,923	4,612,986	158,087	1,679,144	24,286,810	4.9
1950‡	6,486,673	2,217,468	1,229,433	903,468	985,739	4,099,007	1,607,446	2,290,149	606,530	164,817	5,273,206	216,157	1,906,363	27,986,456	15.2
RURAL															
1900	2,205,182	1,653,773	1,659,467	1,140,799	1,679,506	1,468,659	1,153,294	1,978,561	813,598	295,733	2,159,163	360,634	1,278,829	17,847,198	8.2
1910	2,158,656	1,557,041	1,544,717	1,198,637	1,734,463	1,483,129	1,225,414	1,899,630	881,362	513,820	2,101,978	507,419	1,329,540	18,135,806	1.6
1920	2,081,603	1,447,535	1,528,526	1,152,772	1,783,087	1,426,852	1,335,532	1,817,152	891,079	558,633	2,082,258	534,675	1,387,209	18,026,913	—0.6
1930	1,994,927	1,442,611	1,491,647	1,151,165	1,815,563	1,540,250	1,306,337	1,770,248	891,856	567,539	2,139,326	561,942	1,385,163	18,058,574	0.2
1940	2,087,591	1,540,084	1,454,037	1,047,087	1,996,300	1,801,239	1,402,202	1,823,968	801,686	510,012	2,294,626	484,874	1,458,443	18,702,149	3.6
1950‡	2,225,503	1,716,756	1,391,640	1,001,831	1,959,067	2,272,759	1,375,037	1,664,504	718,980	454,819	2,673,421	436,583	1,528,212	19,419,112	3.8

† U. S. Bureau of the Census. U. S. Census of Population: 1950, Vol. 1. Number of Inhabitants. Washington 25, D. C. 1952. Table 1 of state tables.
‡ According to 1940 definition of urban and rural population.

TABLE A-5. PROJECTIONS OF THE TOTAL POPULATION OF THE NORTH CENTRAL STATES, INCLUDING ARMED FORCES OVERSEAS, BY ECONOMIC SUBREGIONS, JULY 1, 1960 TO 1975, WITH FIGURES FOR APRIL 1, 1950.†

Subregion	April 1, 1950 (000)	Series C₁		Series C₂	
		1960 (000)	1975 (000)	1960 (000)	1975 (000)
Total	47,406	53,799	61,112	53,799	61,112
28*	3,326	3,989	4,722	3,844	4,446
29*	641	669	700	639	758
30*	433	434	440	465	498
31	745	733	732	830	922
44	194	183	177	209	224
45	531	569	612	589	652
46*	1,797	2,154	2,570	2,104	2,469
47*	3,208	3,936	4,749	3,800	4,498
48*	1,731	2,003	2,298	2,010	2,268
49*	4,957	6,283	7,797	6,010	7,324
50*	787	960	1,154	931	1,105
51*	792	841	896	873	959
52	515	538	566	563	615
53	320	328	338	349	379
62	448	422	424	471	491
63*	1,322	1,484	1,660	1,492	1,681
64*	7,025	8,232	9,550	8,056	9,237
65*	1,272	1,485	1,717	1,489	1,745
66*	1,209	1,210	1,225	1,315	1,422
67	379	403	480	424	472
68*	1,897	2,180	2,487	2,195	2,542
69*	1,166	1,282	1,408	1,314	1,480
70*	1,240	1,359	1,488	1,378	1,527
71	1,017	972	945	1,041	1,055
72*	2,051	2,383	2,744	2,370	2,741
73	508	498	495	544	579
76	257	267	280	309	372
82	167	166	168	180	193
83	386	381	381	391	390
84	319	297	282	315	308
85*	2,666	2,911	3,178	2,914	3,171
86*	808	867	933	901	1,003
87	276	280	287	284	313
88	262	258	257	283	322
89	292	302	315	323	355
90	336	327	323	335	329
91	196	197	200	195	192
92	396	392	393	393	387
93	310	290	277	297	280
94*	488	578	678	556	634
103	332	356	383	344	354
104	215	213	214	220	223
105	96	90	87	94	90
106	93	97	102	100	107

* Subregions containing one or more metropolitan state economic areas.
† Projection of the population of the North Central states computed from U. S. Bureau of the Census, Current Population Reports, Series P-25, No. 78, August 21, 1953. The share of the population of each of the economic subregions was projected by methods described in: White, Helen R., Jacob S. Seigel and Beatrice M. Rosen. Short cuts in computing ratio projections of population. Agricultural Economics Research, Vol. V, No. 1. Bureau of Agricultural Economics, January 1953.

TABLE A-6. SELECTED AGRICULTURAL AND INDUSTRIAL ITEMS, 1950, AND PERCENTAGE CHANGE IN SELECTED ITEMS, 1940-50, ECONOMIC AREAS, NORTH CENTRAL STATES.

Subregion and economic area	Number of farms, 1950	Percentage change in number of farms, 1940-50	Percentage change in number of tractors, 1940-50	Percentage change in cash farm wage expenditures (adjusted for change in farm wage rates) 1939-49	Percentage change in value of farm products sold (adjusted for price changes) 1939-49	Farm operator family level of living index, 1950	Percentage change in level of living index, 1940-50	Percentage of employed workers engaged in manufacturing, 1950	Percentage change in employed workers engaged in manufacturing, 1940-50
Total	2,086,535	—11.2	101.1	—22.1	25.9	141	43.9	28.4	44.0
Subregion 28	45,815	—16.0	106.5	—27.6	0.2	150	21.5	42.8	42.8
E (Ohio)	2,767	—33.0	56.0	—41.8	—14.3	169	22.5	40.5	39.2
F (Ohio)	2,461	—18.0	88.4	—27.2	—26.3	153	22.4	48.8	40.5
G (Ohio)	3,887	—17.4	132.0	—4.7	4.6	157	30.8	46.4	42.0
H (Ohio)	6,439	—4.0	94.0	—34.5	—1.3	148	22.3	49.6	33.6
4a (Ohio)	6,492	—13.0	89.0	—16.2	8.9	160	20.3	43.3	66.5
4b (Ohio)	12,673	—12.0	142.0	—13.3	10.5	143	23.3	37.1	52.0
5 (Ohio)	11,096	—22.2	106.5	—32.8	—8.6	147	30.0	37.2	68.6
Subregion 29	29,153	—16.9	194.0	—14.7	15.0	138	40.9	31.9	34.4
J (Ohio)	4,172	—24.0	201.5	—11.9	—3.0	121	44.0	32.7	15.9
6a (Ohio)	10,929	—11.0	170.1	—14.6	19.6	153	35.4	30.8	42.5
6b (Ohio)	14,052	—19.0	225.0	—15.7	14.3	132	43.5	32.0	44.3

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<p style="text-align:center;">TABLE A-6 (Continued)</p>

Subregion and economic area	Number of farms, 1950	Percentage change in number of farms, 1940-50	Percentage change in number of tractors, 1940-50	Percentage change in cash farm wage expenditures (adjusted for change in farm wage rates) 1939-49	Percentage change in value of farm products sold (adjusted for price changes) 1939-49	Farm operator family level of living index, 1950	Percentage change in level of living index, 1940-50	Percentage of employed workers engaged in manufacturing, 1950	Percentage change in employed workers engaged in manufacturing, 1940-50
Subregion 30	25,438	—21.0	259.4	—3.0	15.8	115	62.0	22.8	38.4
L (Ohio)	2,155	—23.0	407.3	—25.7	—0.1	100	78.6	30.7	85.4
C (Ky.)	686	—18.0	376.2	—14.3	—22.0	91	89.6	29.8	22.0
8a (Ohio)	10,058	—18.0	246.0	10.2	22.1	112	64.7	27.4	27.5
8b (Ohio)	12,539	—23.2	259.0	—7.4	16.3	124	55.0	12.9	57.4
Subregion 31	56,378	—26.6	976.0	—1.8	24.4	47	213.3	6.8	39.8
8 (Ky.)	28,089	—23.2	950.6	30.8	43.9	48	200.0	9.4	44.4
9 (Ky.)	28,289	—29.6	1,085.4	—39.2	—21.8	47	213.3	5.5	35.9
Subregion 44	29,254	—9.9	614.0	16.5	33.4	62	113.8	7.8	110.0
5 (Ky.)	29,254	—9.9	614.0	16.5	33.4	62	113.8	7.8	110.0
Subregion 45	51,156	—4.4	499.2	—7.8	17.7	120	53.8	9.6	86.8
6 (Ky.)	39,189	—5.1	519.0	5.4	18.8	115	59.7	10.4	75.4
7 (Ky.)	11,967	—2.2	458.0	—17.9	15.8	138	45.3	8.4	113.0
Subregion 46	37,668	—11.1	140.7	—22.4	14.6	130	38.3	31.1	35.5
A (Ky.)	2,673	—15.6	160.8	—26.2	—3.1	144	21.0	30.7	46.0
B (Ky.)	2,244	—14.3	344.2	—21.5	—3.3	148	54.2	29.2	21.1
F (Ind.)	2,959	—3.4	159.4	0.5	11.2	133	43.0	31.8	82.6
K (Ohio)	2,133	—26.0	80.3	—46.4	—2.9	159	18.7	34.0	25.5
7 (Ohio)	13,565	—11.1	146.0	—16.0	24.5	133	47.8	21.7	49.5
8 (Ind.)	14,094	—8.7	131.4	—12.2	18.3	122	37.1	28.5	57.2
Subregion 47	98,500	—10.8	88.3	—21.8	25.0	166	25.8	33.2	51.4
B (Ohio)	2,641	—25.0	68.0	—13.1	5.6	166	20.3	25.0	52.6
C (Ohio)	5,173	—18.2	64.5	—33.3	0.7	164	22.4	41.4	47.7
D (Ohio)	2,471	—15.5	85.2	—46.8	28.5	169	22.5	47.6	41.5
D (Ind.)	2,183	—29.2	88.6	—48.7	4.1	159	19.5	32.9	51.9
2b (Ind.)	21,941	—6.5	98.7	—9.0	36.1	169	33.1	21.6	62.8
3 (Ohio)	26,052	—10.1	88.0	—21.4	16.4	165	26.0	30.6	52.1
4 (Ind.)	17,198	—10.8	89.9	—24.1	32.4	166	22.1	44.1	43.8
5 (Ind.)	20,841	—8.8	85.7	—22.5	28.1	166	24.8	26.2	90.9
Subregion 48	102,285	—9.2	98.2	—20.9	17.8	158	27.4	31.4	62.3
C (Ind.)	3,582	—3.1	95.1	—14.1	16.4	158	17.0	38.8	52.0
G (Mich.)	2,518	—13.4	133.8	—26.1	4.4	161	26.8	39.7	36.8
1 (Ohio)	21,583	—10.1	73.0	—23.8	7.4	162	26.6	27.8	89.8
2 (Ohio)	23,979	—9.0	85.3	—26.9	15.5	161	23.8	28.6	52.6
2a (Ind.)	12,888	—6.2	130.4	15.9	48.8	155	40.9	21.4	141.2
3 (Ind.)	18,479	—6.1	105.4	—25.3	22.3	157	25.6	29.9	65.4
9a (Mich.)	9,465	—10.5	115.1	—26.4	10.3	151	19.8	32.6	78.6
9b (Mich.)	9,791	—14.4	166.1	—36.4	9.8	149	30.7	37.5	55.3
Subregion 49	75,381	—16.3	109.4	—27.3	—3.1	151	24.8	43.4	38.4
A (Ohio)	2,042	—15.0	61.1	—16.1	3.2	155	20.2	38.6	45.0
A (Mich.)	4,496	—16.2	98.1	—28.7	2.5	148	26.5	41.6	56.2
D (Mich.)	3,691	—30.1	91.3	—45.1	—8.7	160	28.0	55.8	45.6
E (Mich.)	2,531	—15.6	93.4	—30.9	1.8	158	17.0	30.8	37.4
F (Mich.)	8,765	—24.2	85.0	—31.8	—17.8	157	23.6	46.9	31.9
5a (Mich.)	12,712	—15.0	123.4	—33.4	2.4	142	31.5	33.2	65.9
5b (Mich.)	11,998	—12.1	129.7	—24.2	—3.6	148	27.6	15.2	126.6
7 (Mich.)	19,030	—12.9	116.4	—30.6	—3.1	155	24.0	33.2	73.0
8 (Mich.)	10,116	—16.1	110.5	—4.7	0.6	151	18.0	33.4	62.1
Subregion 50	29,224	—82.4	137.2	—8.0	5.1	141	33.0	38.2	49.1
B (Mich.)	4,302	—23.5	109.1	—26.4	—2.9	157	26.6	39.5	47.6
C (Mich.)	1,477	—35.1	76.6	—43.6	—19.1	137	18.1	50.5	27.0
6a (Mich.)	8,099	—11.4	138.8	—19.6	3.0	154	21.3	37.0	52.2
6b (Mich.)	8,463	—12.5	154.5	—11.0	1.4	147	26.7	36.9	73.2
3 (Mich.)	6,883	—21.3	149.9	22.8	26.3	132	43.5	21.5	66.6
Subregion 51	43,148	—13.8	136.6	—2.3	46.2	132	50.0	23.1	53.2
E (Ind.)	1,334	—18.7	193.0	—29.1	26.4	161	15.8	39.6	38.1
2 (Ky.)	8,275	—13.3	202.5	—6.2	18.5	109	87.9	20.8	66.8
6 (Ind.)	24,176	—13.6	125.9	5.0	64.5	139	51.1	18.9	73.3
9 (Ill.)	9,363	—14.0	104.2	—10.1	42.5	133	41.5	14.1	29.6
Subregion 52	50,370	—11.9	285.0	8.5	32.7	90	69.8	17.0	81.2
3a (Ky.)	21,170	—14.5	331.7	10.8	28.2	69	97.1	6.7	43.3
3b (Ky.)	13,406	—4.6	481.2	7.1	24.3	96	54.8	8.4	87.2
7 (Ind.)	15,794	—14.2	200.0	7.5	47.7	110	57.1	29.1	89.5
Subregion 53	33,234	—5.4	372.8	19.5	29.8	100	72.4	14.4	71.7
1 (Ky.)	15,145	—7.3	430.3	30.4	25.6	105	69.4	19.2	67.9
4 (Ky.)	18,089	—3.8	340.9	13.8	32.6	93	72.2	9.9	79.2

Subregion and economic area	Number of farms, 1950	Percentage change in number of farms, 1940-50	Percentage change in number of tractors, 1940-50	Percentage change in cash farm wage expenditures (adjusted for change in farm wage rates) 1939-49	Percentage change in value of farm products sold (adjusted for price changes) 1939-49	Farm operator family level of living index, 1950	Percentage change in level of living index, 1940-50	Percentage of employed workers engaged in manufacturing, 1950	Percentage change in employed workers engaged in manufacturing, 1940-50
Subregion 62	33,524	—14.2	175.2	7.2	39.5	107	59.7	12.5	24.2
8 (Ill.)	14,028	—15.7	149.4	—2.7	41.8	119	45.1	12.5	5.2
10 (Ill.)	10,560	—11.1	229.1	42.9	58.7	112	60.0	11.9	72.1
11 (Ill.)	8,936	—15.4	181.1	2.3	23.5	94	77.4	13.2	5.6
Subregion 63	57,034	—5.9	70.0	—26.0	19.2	177	35.1	23.3	52.0
D (Ill.)	4,380	—9.0	73.7	—28.2	26.2	171	20.4	38.3	47.8
E (Ill.)	2,734	—12.7	88.9	—5.2	16.6	180	41.7	19.9	64.8
5 (Ill.)	8,350	—4.0	60.5	—25.9	17.6	188	31.5	33.4	36.3
6a (Ill.)	12,584	—8.2	82.4	—20.7	27.9	174	42.6	18.4	58.1
6b (Ill.)	28,986	—4.2	66.6	—30.3	16.0	176	34.4	14.1	69.2
Subregion 64	30,846	—8.1	82.8	—22.9	24.5	166	23.9	38.9	39.3
A (Ind.)	1,858	—3.5	80.7	—31.4	28.2	155	29.2	53.6	31.5
B (Ind.)	2,408	—13.5	114.4	32.2	39.6	152	25.6	50.2	59.3
C (Ill.)	11,290	—7.1	69.5	—25.5	22.5	180	24.1	36.4	36.0
C (Wis.)	1,390	—25.3	46.0	—49.5	—9.5	170	18.1	42.8	50.1
1 (Ind.)	6,892	—8.6	128.2	—15.3	36.3	156	28.9	41.3	41.0
2 (Ill.)	3,510	—5.4	85.0	—11.8	33.0	182	28.2	30.2	64.1
9 (Wis.)	3,498	—2.3	76.7	—17.7	11.7	167	12.8	51.6	62.8
Subregion 65	66,211	—7.4	74.6	—26.5	22.4	163	28.3	29.3	56.2
B (Wis.)	5,472	—6.2	109.2	—11.4	30.2	184	31.4	16.3	73.3
6 (Wis.)	15,838	—9.8	109.6	—17.9	20.8	144	39.8	22.2	63.2
7 (Wis.)	21,087	—6.1	72.1	—33.4	16.7	167	26.5	34.3	44.4
8 (Wis.)	23,814	—7.3	86.8	—27.8	25.5	171	24.8	31.5	68.2
Subregion 66	70,376	—23.3	137.1	—15.0	7.6	120	55.8	18.1	39.1
A (Minn.)	4,686	—40.9	30.1	—58.5	—16.9	127	58.8	16.9	89.3
A (Wis.)	1,533	—27.1	147.0	—40.8	12.1	119	58.7	12.1	107.5
1 (Wis.)	16,023	—20.0	172.7	19.4	33.3	120	76.5	18.2	16.4
1 (Mich.)	4,952	—31.5	102.3	8.0	11.3	118	61.6	20.5	22.8
2 (Mich.)	5,438	—18.4	153.1	—7.4	7.3	115	45.6	25.5	16.0
2 (Minn.)	16,952	—23.5	132.1	—27.4	8.7	117	51.9	15.7	37.7
4a (Mich.)	11,576	—21.9	156.8	—27.9	—13.2	126	50.0	19.5	64.6
4b (Mich.)	9,216	—14.7	186.6	—19.8	0.3	120	50.0	15.3	47.1
Subregion 67	32,318	—10.3	152.9	—20.7	23.3	138	53.3	21.8	48.4
4 (Wis.)	21,836	—9.0	153.8	—24.4	25.8	139	52.7	24.8	43.3
5 (Wis.)	10,482	—12.7	151.0	—12.1	17.5	137	52.2	13.2	84.6
Subregion 68	74,795	—8.8	115.3	—24.6	20.3	159	34.7	20.6	63.1
B (Minn.)	7,024	—22.8	95.4	—34.2	1.0	162	33.9	25.2	58.8
6 (Minn.)	32,518	—5.4	99.0	—20.4	23.9	161	34.2	12.7	80.6
2a (Wis.)	21,654	—8.2	133.7	—20.5	24.7	158	38.6	9.7	108.5
2b (Wis.)	13,599	—8.8	158.4	—30.4	15.8	154	32.8	17.7	61.8
Subregion 69	86,649	—4.0	88.1	—26.2	32.9	175	34.6	22.3	48.9
B (Ill.)	2,006	—4.9	80.7	—30.8	46.4	181	29.3	49.8	44.5
1 (Ill.)	15,648	—4.7	73.9	—11.1	48.7	187	31.7	25.1	45.6
3 (Wis.)	12,334	—5.9	123.7	—32.4	38.7	172	32.3	9.5	80.1
4 (Iowa)	34,061	—3.2	87.2	—36.1	26.1	175	36.7	17.8	50.9
7 (Minn.)	22,600	—3.5	87.1	—22.3	25.2	167	33.6	14.0	53.8
Subregion 70	74,736	—6.2	87.2	—32.3	25.7	183	29.8	23.7	43.7
A (Ill.)	1,745	—4.3	91.7	—10.2	40.8	180	29.5	45.3	24.3
D (Iowa)	2,079	—9.1	67.5	—50.0	35.3	181	18.3	32.9	34.0
3 (Ill.)	23,022	—7.3	78.6	—25.3	32.6	183	31.7	19.0	50.5
5 (Iowa)	24,687	—5.0	88.4	—36.8	15.4	185	26.7	12.9	58.8
6 (Iowa)	23,203	—6.2	99.0	—34.3	28.5	181	34.1	23.5	50.9
Subregion 71	110,343	—11.0	133.0	—21.5	26.1	144	42.6	11.9	40.8
2a (Mo.)	29,163	—14.2	187.9	—17.1	29.9	134	47.3	5.4	50.2
2b (Mo.)	27,840	—12.1	147.4	—25.7	33.3	138	36.6	13.7	17.0
3a (Iowa)	15,588	—7.9	99.1	—24.7	21.9	167	42.7	5.5	106.8
3b (Iowa)	18,110	—8.4	147.2	—22.2	22.1	151	42.5	13.8	47.7
4 (Ill.)	19,642	—8.9	108.3	—19.1	23.8	145	43.6	16.5	54.2
Subregion 72	42,710	—10.7	125.9	—35.1	28.5	132	38.9	31.7	32.6
B (Mo.)	4,463	—19.3	78.4	—61.9	1.4	134	27.6	32.8	30.0
F (Ill.)	5,639	—10.3	100.5	—35.4	23.8	152	36.9	37.8	41.4
6 (Mo.)	19,763	—10.5	160.7	—34.8	28.0	120	36.4	24.4	31.8
7 (Ill.)	12,845	—7.9	130.5	—3.3	42.6	148	45.1	15.9	38.4
Subregion 73	59,955	—10.4	308.3	—5.3	35.2	80	56.8	12.3	70.3
5 (Mo.)	17,088	—13.9	215.6	—16.9	27.9	89	48.3	12.7	85.2
7 (Mo.)	30,353	—6.7	367.3	5.3	42.9	86	65.4	10.8	79.0
8 (Mo.)	12,514	—13.9	418.2	—12.2	26.1	61	64.9	15.6	47.2

Subregion and economic area	Number of farms, 1950	Percentage change in number of farms, 1940-50	Percentage change in number of tractors, 1940-50	Percentage change in cash farm wage expenditures (adjusted for change in farm wage rates) 1939-49	Percentage change in value of farm products sold (adjusted for price changes) 1939-49	Farm operator family level of living index, 1950	Percentage change in level of living index, 1940-50	Percentage of employed workers engaged in manufacturing, 1950	Percentage change in employed workers engaged in manufacturing, 1940-50
Subregion 76	21,774	1.6	324.7	3.0	33.5	82	82.2	11.0	26.9
9a (Mo.)	9,379	2.4	320.8	64.1	52.9	77	75.0	14.5	61.9
9b (Mo.)	12,395	1.0	327.0	—5.0	26.8	85	84.8	8.2	—2.4
Subregion 82	15,067	—2.4	231.7	—4.4	53.8	111	68.2	15.5	30.3
4 (Mo.)	15,067	—2.4	231.7	—4.4	53.8	111	68.2	15.5	30.3
Subregion 83	28,112	—14.8	62.9	—43.9	20.4	144	39.8	11.3	50.8
5 (Kan.)	16,177	—15.9	60.1	—44.5	25.0	151	38.5	7.8	54.1
7b (Kan.)	11,935	—13.1	68.0	—42.2	7.6	128	39.1	15.5	48.9
Subregion 84	40,492	—10.5	116.2	—29.4	36.0	130	42.9	7.9	82.8
3 (Mo.)	25,417	—8.5	134.3	—26.0	31.0	122	45.2	8.6	100.3
7a (Kan.)	15,075	—13.8	97.4	—34.5	42.8	140	42.9	6.9	57.2
Subregion 85	135,060	—8.5	86.1	—34.3	27.6	169	42.0	15.9	49.2
A (Iowa)	2,873	—10.0	75.3	—33.1	7.2	171	44.9	20.5	38.0
A (Neb.)	2,631	—9.7	91.0	—28.4	43.9	167	40.3	13.1	126.7
A (Mo.)	4,620	—20.4	156.6	—48.5	1.5	149	38.0	23.0	45.8
B (Iowa)	3,493	—7.9	77.1	—29.2	24.1	190	41.8	9.5	80.5
B (Kan.)	3,077	—14.8	130.8	—50.6	20.1	150	29.3	26.7	49.0
B (Neb.)	2,483	—12.1	67.7	—54.9	32.0	182	46.8	20.2	50.1
1 (Mo.)	21,983	—13.6	133.5	—34.8	24.1	152	42.1	15.4	38.3
1a (Iowa)	19,087	—0.7	83.6	—34.1	23.8	197	33.1	4.9	74.6
1b (Iowa)	19,105	—6.3	88.4	—26.5	22.2	181	42.5	4.6	65.3
4b (S.D.)	12,811	—2.4	78.3	—26.4	41.9	169	48.3	9.6	31.4
6 (Neb.)	13,175	—3.9	63.1	—17.9	50.2	174	46.2	6.2	138.0
6 (Kan.)	15,803	—11.7	85.2	—46.2	29.8	153	45.7	11.1	47.1
7 (Neb.)	13,919	—11.7	70.5	—40.8	25.9	161	42.5	6.6	36.7
Subregion 86	62,336	—1.3	76.6	—40.4	8.7	182	30.0	10.8	66.1
C (Iowa)	2,767	—11.9	94.0	—38.2	9.5	175	34.6	20.4	66.3
2a (Iowa)	12,590	—0.9	72.0	—43.4	12.2	187	30.8	5.0	9.5
2b (Iowa)	25,516	—1.9	73.4	—39.9	3.6	186	24.8	7.9	57.8
8 (Minn.)	21,463	0.5	81.7	—39.2	12.8	177	36.2	5.2	71.1
Subregion 87	33,350	—1.1	84.5	—32.2	17.7	157	52.4	3.3	48.1
4a (S.D.)	10,404	—1.6	113.0	—16.7	23.2	151	64.1	3.6	27.2
5 (Minn.)	22,946	—0.9	73.9	—37.2	15.8	160	46.8	3.2	61.7
Subregion 88	33,504	—9.5	159.2	—9.9	27.7	134	45.7	6.1	66.3
3 (Minn.)	17,676	—8.8	153.5	—4.9	27.2	132	48.3	4.7	43.0
4 (Minn.)	15,828	—10.2	166.9	—16.7	28.5	136	43.2	7.8	89.4
Subregion 89	26,924	—8.2	83.5	—17.3	21.1	148	52.6	4.8	37.9
1 (Minn.)	17,408	—7.7	84.3	—17.9	20.2	142	52.7	4.0	39.9
4 (N.D.)	9,516	—9.0	82.3	—16.7	22.1	158	51.9	5.7	36.5
Subregion 90	38,461	—12.2	105.7	—21.9	37.9	129	57.3	2.0	26.3
2a (N.D.)	7,160	—19.0	87.3	—0.3	85.1	129	67.5	1.3	28.3
2b (N.D.)	6,217	—9.0	149.6	31.3	45.1	109	41.6	2.3	41.5
3a (N.D.)	15,252	—13.6	94.6	—36.0	27.2	136	60.0	2.3	31.6
3b (N.D.)	9,832	—6.1	117.2	—18.4	28.0	136	61.9	1.7	4.5
Subregion 91	22,720	—7.4	105.5	5.3	56.8	141	64.0	3.0	23.6
2a (S.D.)	7,185	—9.0	119.3	70.6	123.2	140	62.8	1.4	17.2
2b (S.D.)	9,541	—7.8	91.8	18.5	63.8	144	69.4	4.3	29.3
3c (N.D.)	5,994	—4.9	111.6	—38.5	10.6	141	60.2	2.3	9.3
Subregion 92	45,610	—8.8	97.8	—3.3	67.0	152	56.7	3.3	45.6
3a (S.D.)	4,874	—12.5	111.9	29.3	86.2	139	49.5	1.1	—11.4
3a (Neb.)	13,845	—12.6	98.5	—31.7	40.9	149	52.0	4.5	58.4
3b (S.D.)	10,576	—5.9	107.3	57.0	90.2	151	54.1	2.3	31.8
3b (Neb.)	16,315	—6.2	86.8	4.0	80.6	153	53.0	3.3	42.6
Subregion 93	40,148	—15.5	67.0	—9.2	64.8	153	50.0	4.2	33.0
4 (Kan.)	12,000	—19.9	61.2	—9.1	35.0	144	41.2	2.6	12.3
4 (Neb.)	11,405	—16.3	76.8	—2.4	83.7	157	51.0	2.9	30.3
5 (Neb.)	16,743	—11.4	64.2	—16.0	74.4	154	52.5	6.0	40.6
Subregion 94	25,192	—16.3	35.9	—42.8	—4.6	163	34.7	16.8	116.4
A (Kan.)	2,694	—18.7	35.9	—47.7	—24.0	152	20.6	27.0	175.3
3a (Kan.)	12,942	—13.8	36.8	—45.6	—10.6	163	34.7	8.4	36.2
3b (Kan.)	9,556	—18.7	34.5	—34.7	12.4	165	37.5	6.9	21.1
Subregion 103	32,135	—18.2	43.1	20.5	129.6	156	67.7	3.1	49.0
1 (Kan.)	8,481	—17.0	51.9	29.4	181.8	162	88.4	3.9	71.2

Subregion and economic area	Number of farms, 1950	Percentage change in number of farms, 1940-50	Percentage change in number of tractors, 1940-50	Percentage change in cash farm wage expenditures (adjusted for change in farm wage rates) 1939-49	Percentage change in value of farm products sold (adjusted for price changes) 1939-49	Farm operator family level of living index, 1950	Percentage change in level of living index, 1940-50	Percentage of employed workers engaged in manufacturing, 1950	Percentage change in employed workers engaged in manufacturing, 1940-50
2a (Kan.)	16,204	—18.0	37.9	13.9	111.2	153	56.1	3.0	46.4
2b (Kan.)	7,450	—20.1	44.6	17.9	84.5	151	52.5	2.4	22.5
Subregion 104	20,188	—19.7	118.3	—6.4	54.0	129	51.8	3.4	16.0
1 (S.D.)	11,061	—19.2	102.2	15.8	106.8	118	63.9	4.4	18.8
1 (Neb.)	9,127	—20.3	140.8	—21.5	23.4	143	43.0	1.7	4.1
Subregion 105	11,430	—14.7	99.0	13.1	44.9	124	55.0	1.9	32.7
1 (N.D.)	11,430	—14.7	99.0	13.1	44.9	124	55.0	1.9	32.7
Subregion 106	7,531	—13.0	72.5	—37.0	29.9	169	61.0	4.9	44.0
2 (Neb.)	7,531	—13.0	72.5	—37.0	29.9	169	61.0	4.9	44.0

APPENDIX B

CHARACTERISTICS OF THE ECONOMIC SUBREGIONS[34]

The following is a brief description of each of the economic subregions shown in fig. 1. Each of the subregions represents a combination of state economic areas. Type of farming was one of the principal criteria used in delineating both types of areas, although population and industrial characteristics were also taken into account.

Subregion 28—Northeastern Ohio-Northwestern Pennsylvania. The manufacture and fabrication of iron and steel and the manufacture of machinery constitute much of the economic base of this subregion. Four metropolitan areas—Cleveland, Akron, Canton and Youngstown—and numerous smaller manufacturing cities are located in this area. Farming is fairly intensive and very prosperous. Dairying is the principal type of farming, but it is accompanied by large numbers of general farms, poultry farms, fruit and vegetable farms, livestock farms and "own use" farms. The level of living of the farm families is above the average for the region.

Subregion 29—East Central Ohio-Northwestern West Virginia. Manufacturing, the leading industry, is dispersed among many small and medium-sized cities. Wheeling-Steubenville is the only metropolitan area. Livestock, dairy and general farms predominate with an almost equal percentage of farms being classified as being of each type. The level of living is below the average for the region.

Subregion 30—Central Alleghany Plateau.

This is a predominantly rural area with hilly land where a majority of farms produce primarily for home consumption, and the level of living of the farm families is in the lowest one-fourth of the subregions of the region. Livestock farming is the principal type of commercial farming. The Huntington-Ashland Metropolitan Area, located on the Ohio River, is an industrial center.

Subregion 31—Southern Appalachian Coal Mining. This is a rural, hilly subregion of self-sufficing farming located in part in eastern Kentucky. Coal mining is an important industry. The level of living of the rural population is in the lowest one-fourth of the subregions. Fertility rates are high. A lack of sufficient opportunities for employment forces many workers to migrate.

Subregion 44—Eastern and Western Highland Rim. This subregion, located in part in south central Kentucky, is steep and eroded. The area is one of self-sufficient farming at or near the subsistence level in the lowest one-fourth of the subregions. Tobacco is grown for cash sale. Livestock and general farms constitute about one-fourth of all farms.

Subregion 45—Kentucky Bluegrass. The slopes of this area are less steep than the more hilly areas to the southeast. There are excellent pasture lands. Livestock farming is important. However, more than three-fifths of the farms are cash crop farms. This subregion is the major tobacco-growing area of Kentucky. The level of living is below average.

Subregion 46—Ohio-Indiana Flatlands. This subregion lies along the border of the Corn Belt just north of the Ohio River and is a transition area between that region and the hilly area of the south. Louisville and Cincinnati, the two metropolitan areas, are industrial and commercial

centers for a broad territory. General farming is the principal type of agriculture. However, cash crop farms and livestock farms are almost as numerous. Tobacco is grown in small amounts. The rural level of living is below the average of the region.

Subregion 47—West Central Ohio-Central Indiana. Livestock farming with hogs predominating is the prevailing type of farming. Winter wheat is an important crop. The level of living is in the highest one-fourth of the subregions. In addition to a prosperous agriculture, this area contains numerous large and medium-sized industrial concentrations — Dayton, Indianapolis, Columbus and Hamilton-Middletown Metropolitan areas—together with smaller industrial centers.

Subregion 48—Michigan-Ohio-Indiana Tri-State. The principal type of farming is livestock farming combined with general, cash crop and dairy farming. The farm family level of living is in the highest one-fourth of the subregions. Furniture and electrical machinery are the principal products of Kalamazoo and Fort Wayne, the two metropolitan centers.

Subregion 49—Southeastern Michigan. Manufacturing is the dominant industry concentrating largely in the five metropolitan areas—Detroit, Toledo, Flint, Saginaw and Lansing. The subregion is highly urbanized. The predominant type of agriculture is dairying, with special crop farms (sugar beets, vegetables) being almost as prevalent. Cash crops provide a larger share of the total farm income than dairying. Level of living is above average.

Subregion 50—Western Michigan Lake Shore. This subregion consists of the Grand Rapids Metropolitan Area and the tier of counties which borders on the eastern shore of Lake Michigan. The area as a whole is predominantly manufacturing. The subregion is specialized in truck farming, fruit growing and dairying. Farm families enjoy a level of living equal to the average for the region.

Subregion 51—Lower Wabash Valley. This consists of a southward extension of the Corn Belt from southern Illinois into the hilly and less productive areas of northern Kentucky. Alluvial soils in the valleys of the Wabash and Ohio rivers and a not too rugged topography permit the conducting of the feed grains and livestock industry in this area. However, the level of prosperity is lower than in most other Corn Belt subregions. Coal mining is an important secondary industry. Evansville Metropolitan Area is a manufacturing as well as distributing center.

Subregion 52—South Central Indiana and West Central Kentucky Hills. Tobacco and livestock farming form the basis of the economy of this subregion. The soil and terrain are not favorable either for crops or pasture as in Subregion 45. The subregion ranks in the lowest quartile for level of living. Coal fields in this subregion provide employment for about one-twelfth of the employed workers, some of whom farm on a part-time basis.

Subregion 53—Pennyroyal and Jackson Purchase. Tobacco farming dominates the agriculture of this area, located in part in southwestern Kentucky. The soil is considerably less suitable for tobacco than the bluegrass subregion, however. The recently established Atomic Energy Commission installation near Paducah, Kentucky has been responsible for bringing about considerable change in the economy of the area.

Subregion 62—Southern Illinois. This subregion adjoins the Corn Belt. It is less productive however, and has little of the feed grain and livestock economy of the Corn Belt. General farming and livestock farming are the two leading types of commercial farming. The subregion also contains coal mines and oil wells. However, it ranks in the lowest farm family level of living quartile.

Subregion 63—East Central Illinois. Farms are large and highly mechanized. Corn and small grains are raised and sold for cash. Land values are very high. Farm family level of living is in the highest quartile of subregions. Two metropolitan areas, Springfield and Peoria, are manufacturing as well as wholesale and commercial centers.

Subregion 64—Chicago and Environs. Consists of the densely populated and highly commercial and industrial area around the southern shore of Lake Michigan. It contains the metropolitan areas of Chicago, Milwaukee and South Bend. Agriculture consists of specialized farms of a great many varieties, with dairying as the leading type. The resulting level of living of farm families is in the top one-fourth of the subregions.

Subregion 65—Eastern Wisconsin. Manufacturing and agriculture are both large sources of employment in this subregion which includes the Madison Metropolitan Area. There is a very high degree of specialization in dairying and a well-developed vegetable farming industry in this subregion. Farms are very prosperous, highly mechanized and well above the regional average in income and level of living.

Subregion 66—Great Lakes Cutover. A high percentage of the land is cutover wasteland or forested area. Iron mining, lumbering, resort and vacation enterprises, copper mining, and small dairy farms form the economic base. Farm family level is below the average for the region.

Subregion 67—Central Wisconsin. This subregion is predominantly agricultural. Due to the fact that the soils here are generally poorer, the farms are less prosperous than subregions to the east and west but the level of living is just below the average for the region. There is somewhat less specialization in dairying.

Subregion 68—Upper Mississippi River Hill Lands. The manufacturing of this subregion is concentrated largely in the Minneapolis-St. Paul Metropolitan Area. Dairying is the dominant type of farming. Livestock farming is combined with dairying on a large share of the farms to make them general in character. Here the level of living is relatively high.

Subregion 69—Corn Belt-Dairy Transition.

This subregion includes parts of southeastern Minnesota, northeastern Iowa, southwestern Wisconsin and northwestern Illinois. The production of beef and pork are the major sources of farm income. Dairy farming is also important in the agricultural economy. Farm family level of living ranks in the highest one-fourth of the subregions. Rockford is the only metropolitan area.

Subregion 70—Eastern Iowa-Western Illinois. This is one of the richest agricultural subregions in the United States. The growing of feed grains and livestock including hogs and beef cattle is the principal type of farming. It represents the very best of the Corn Belt specialized in meat production. The Davenport-Rock Island-Moline Metropolitan Area is characterized by its manufacturing development.

Subregion 71—Southern Iowa-Northern Missouri-West Central Illinois. Although distinctively a Corn Belt area, it is less suited to the growing of feed grains and has a higher proportion of land in pasture. The growing of beef cattle tends to replace hogs. The resources are more limited, the farms are less prosperous and less mechanized than in other Corn Belt subregions. Farm family level of living is just above the average for the region.

Subregion 72—Missouri-Illinois Ozark-Corn Belt Transition. Like Subregion 62, this subregion is a transition from the Corn Belt to the less productive upland areas. It is a livestock farming area, with sizeable elements of general farming and self-sufficing farming. Farm family level of living is below the regional but above the national average. St. Louis Metropolitan Area is in this subregion.

Subregion 73—Ozark Plateau. Hilly, eroded and wooded land makes up the bulk of this subregion which is located in part in south central Missouri. Only about one-tenth of the land is in harvested crops, and less than one-half of the land is even enclosed in farms at all. Subsistence and livestock farms predominate. The level of living of the rural population ranks in the lowest one-fourth of the subregions.

Subregion 76—Mississippi River Delta. The soil of this subregion, located in part in the Missouri Bootheel, is alluvial and well suited to intensive farming. Cotton farming along with some cash grain, livestock and general farming is carried on. The population is predominantly rural, and about 11 percent is nonwhite. The level of living of the rural population ranks as low as in Subregion 73.

Subregion 82—Springfield Plains. This subregion, located in part in southwest Missouri, is less eroded and steep than the Ozark Plateau. Hence, a larger percentage of the total land area is in crops, and the general level of living is somewhat higher than in the Ozark Plateau. Dairy, general, livestock and poultry farming are the principal commercial types of agriculture.

Subregion 83—Flint Hills and Cherokee Plains. Although the moisture supply of this subregion, located in part in east central and southern Kansas, fits it for intensive small grain farming, the soil is poorly suited to such use and is used for pasture instead. Livestock farming is the leading type of farming. Some corn is grown. Oats, wheat and wild hay are other important crops. Level of living of the farm families is just above the average for the region.

Subregion 84—Kansas-Missouri Corn Belt Border. This subregion is a border between the Corn Belt and the Great Plains to the west and the Ozark Uplands to the south. Here are lower farm land values, less farm mechanization, less tenant-operated farms and a smaller percentage of total land area in crops than in other Corn Belt subregions. Most of the farm income is derived from the sale of cattle and hogs, but dairy and poultry products are more important than in the subregions to the north. Farm family level of living is below average for the region.

Subregion 85—Central Missouri River Valley. Livestock farming and feeding, which characterize this subregion, are supplemented by a variety of special cash crops grown in the alluvial soil of the Missouri River bottoms. Potatoes and a variety of truck crops are secondary sources of income. There are four metropolitan areas—Sioux City, Omaha, Lincoln and Kansas City. This subregion ranks in the highest one-fourth of the subregions in terms of farm family level of living.

Subregion 86—North Central Iowa-Southwestern Minnesota. This subregion equals or surpasses Subregion 70 in fertility and productivity. It is level and well adapted to intensive cropping and to mechanical cultivation. Consequently, it tends to be a cash grain area as well as a livestock area. Farm family level of living is near the top for the region. Des Moines is the one metropolitan area.

Subregion 87—Minnesota-South Dakota Corn Belt Margin. This subregion lies at the northernmost latitude at which corn can dominate the agricultural economy. It is a border between the dairying region to the northeast and the small grains and grazing region to the west. Farm family level of living is above the average.

Subregion 88—Minnesota Forest Margin. This subregion, adjoining Minneapolis on the northwest, is predominantly rural and specialized in dairying. Because soils are poor, the level of prosperity and the intensity of farming are below the average for the region.

Subregion 89—Red River Valley. This subregion has a larger supply of moisture than most of the Central Plains. Farms are highly mechanized and generally prosperous contributing to an above average level of living. Cash crop farms are the most numerous type, but general farms which combine livestock with cash crop farming are about one-fourth of all farms. Large acreages of Irish potatoes, corn, flax and sugar beets are also grown.

Subregion 90—North Dakota Central Plateau. This subregion is highly specialized in the grow-

ing of small grains. About two-thirds of all farms are cash grain farms. Wheat is grown on about one-half of all the harvested cropland. Oats and wild hay make up a large share of the remainder. Livestock enterprises supply only about one-third of the total farm income. Level of living of farm families is below average for the region.

Subregion 91—Black Prairies (Southern Part). This subregion lies adjacent to the Corn Belt and is located in northeastern South Dakota and southeastern North Dakota. Although wheat, oats and wild hay are the principal crops, there is also a large acreage of corn. In addition to cash grain wheat farms, there are many general farms and livestock farms. Farms are of smaller average size than in subregions to the west. The agricultural economy provides an average level of living.

Subregion 92—Nebraska South Dakota Corn Belt Margin. This subregion is a border between the Corn Belt and the more arid Central Plains. Its basic economy is that of the Corn Belt, but it bears evidence of the low rainfall of the Central Plains. Farms are larger, corn yields are smaller and a higher percentage of the land is in pasture. Beef cattle tend to replace hogs. Farm families enjoy an above average level of living.

Subregion 93—Kansas-Nebraska Corn Belt-Winter Transition. This subregion is a border between the Corn Belt and the Kansas winter wheat area. The Republican and Platte rivers supply water for irrigation, which assists in maintaining sufficient moisture for Corn Belt type of agriculture. Hard winter wheat is the principal cash crop. Hogs are displaced by cattle to a considerable extent in the livestock industry. As in Subregion 92, the farm families enjoy an above average level of living.

Subregion 94—Wichita Prairies. This subregion is highly specialized in wheat growing. There are also many general farms which combine wheat raising with livestock, contributing to a high farm family level of living. The Wichita Metropolitan Area is in this subregion.

Subregion 103—South Central Plains. This subregion, located in part in southwestern Kansas, is specialized in wheat production. Because the moisture supply is limited, much of the crop is planted on summer fallow. Sorghums are the principal tilled crop. Farms are of large average size. Irrigated crops are grown along the Arkansas River in western Kansas. Farm family level of living is above average.

Subregion 104—Western South Dakota, Northwest Nebraska and Southeast Montana. This is predominantly a ranching subregion. More than half of the farms are livestock farms. Wild hay and wheat are by far the principal crops, with corn, sorghums, oats and other small grains also grown on large acreages. Farms are of very large size. Level of living, however, is below average.

Subregion 105—Southwest North Dakota and Northern Montana. Rainfall over most of this subregion is much less than in subregions to the east. Farms are larger than in the eastern subregions, and the element of general farming is lacking. Although wheat is the principal crop, much of it is grown on summer fallow. Large areas of the land are broken and rough and are suitable only for range livestock. Level of living is below average.

Subregion 106—Upper Platte River. This is part of the larger subregion that includes the Yellowstone Valley and the Big Horn Basin. Although a large share of this subregion is dry wasteland or grazing land, it contains irrigation developments which make of it a mixed livestock and special crop farming area. Cash grain farms are the principal type of farms. Sugar beets, alfalfa, dry beans, corn and Irish potatoes are grown in the irrigated areas. Wheat is a principal crop and is grown largely in southwest Nebraska. Farm family level of living is very high.

APPENDIX C

PLAN OF ANALYSIS

GENERAL PROCEDURE

The first phase of the regional project "Population Dynamics in the North Central Region and Related Rural, Social and Economic Problems" NC-18 involved the participation of 13 agricultural experiment stations. While the present study is a complete unit in itself, each of the stations, in connection with the tabulation of the data for its own state, supplied economic area tabulations essential to the regional report. The stations participated in the development of the outline and in the review of the preliminary manuscript.

DESIGN OF THE STUDY

The report here was designed specifically to deal with the measurement of migration, its relation to population growth and to selected agricultural and industrial factors. Specifically it was to test the hypothesis that the net movement from farms to towns and cities, while large, was relatively well self contained in the North Central states during the 1940-50 decade.

Estimates of net population change through migration 1940-50 for rural, urban and total populations of economic areas and economic subregions and of metropolitan and nonmetropolitan areas were developed from published census data and both published and unpublished vital statistics data. The data were subject to adjustments described in "Method of Computing Estimates of Net Migration" (page 542).

For the regional report, the subregions were the principal units of analysis. Data submitted by

the states for all economic areas were consolidated into totals for the relatively homogeneous economic subregions which transcend state lines and into the region as a whole.

Data submitted by the individual states were assembled by the use of a uniform set of tables, previously agreed upon. This facilitated the consolidation of the economic area data into subregional totals.

<center>SOURCES OF DATA</center>

Population data were obtained principally from the 1940 and 1950 Censuses of Population. Historical data were obtained from earlier censuses. The 1940 and 1950 Censuses of Agriculture were sources of data on agricultural factors while the Censuses of Population provided data on employment in industry.

Basic vital statistics data were obtained from publications of the National Office of Vital Statistics. Special tabulations of unpublished data were likewise obtained from the NOVS. In three states basic vital statistics were obtained from the state offices of vital statistics.[35]

In the four states which reallocated the 1940 enrollment of college students from their parental residence to college community, information on 1940 spring enrollments and home residence was obtained from college registrars.

Estimates of populations involved in annexation and retrocession transfers were obtained by the various states from municipal governing bodies and state offices; where larger annexations or retrocessions were involved, such data were obtained from the Geography Division of the U. S. Bureau of the Census.

Level of living data were obtained from the publication of the Bureau of Agricultural Economics entitled "Farm Operator Family Level of Living Indexes for Counties of the United States, 1930, 1940, 1945 and 1950."

<center>METHOD OF COMPUTING ESTIMATES OF NET MIGRATION [36]</center>

The general method used for estimating net migration for the decade was to take the 1940 enumerated population of an area, add the births that occurred during the 10-year period, subtract the deaths and compare the resulting population with the population actually enumerated in 1950, imputing the difference as population change due to migration. This may be expressed in the following formula: $M = I - E = P_2 - P_1 - (B - D)$, where M = net migration, I = number of in-migrants, E = number of out-migrants, P_2 = the 1950 population, P_1 = the 1940 population, B = number of births and D = number of deaths. This method was applied separately to the rural

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[35] Illinois, Michigan and Wisconsin.

[36] Each state in completing its own unit of work, that led also to supplying economic area tabulations for the regional report, followed the same general procedure described in this section. Principal difference is that at the state level county data were consolidated into economic area totals, while for the regional report economic area data were consolidated into subregional totals.

and urban population of each subregion and to the population (rural and urban) of the combined metropolitan and of the combined nonmetropolitan areas in the North Central states.

Data on births and deaths were available from the National Office of Vital Statistics. Michigan, Wisconsin and Illinois obtained vital statistics data from their respective state offices of vital statistics. The NOVS county totals from which the economic area totals were computed were available for centers of 10,000 and over and for the remainder of population for the period 1940-45. After 1945, NOVS data were available for centers of 2,500 and over and for the rural population.

All birth data were available by usual residence of mother in the case of births and of the decedent in case of deaths.

In estimating net migration in the North Central states, several types of adjustments were necessary. These were: (1) to use and to correct for the 1940 definition and classification of urban and rural population in 1950; (2) to estimate births for April through December 1940 and January through March 1950 to conform to census dates (since the number of deaths for the first quarters of 1940 and 1950 were about the same, deaths for the calendar years 1940-49 were used); (3) to adjust for under-registration of births; (4) given births and deaths according to urban and rural classification 1946-49, to estimate births and deaths according to similar residence classification, 1940-45; (5) to reallocate single college students due to the differential methods of enumerating college students in the two censuses; (6) to account for population included in annexations and retrocessions to urban centers; (7) to adjust value of products sold in 1949 and data on cash expenditures for farm wages in 1949 to 1939 price levels; and (8) to compute average farm operator family level of living indexes.

The following paragraphs describe the above adjustments in more detail. For example, some incorporated places passed from rural to urban classification, i.e., attained a population of 2,500 or more inhabitants, between 1940 and 1950. A few retrogressed from urban to rural category. To determine the extent of rural-urban migration, the 1940 definition of population and classification of urban and rural centers were used throughout the decade for vital statistics and for the 1950 population enumeration.

Allowing for the April 1 dates of the 1940 and 1950 censuses meant adjusting the births for the last 9 months of 1940 and the first 3 months of 1950. Distributions of births were derived for the last 9 months of 1940 from "Vital Statistics of the United States, 1940," Part I, Table 1. It was assumed that the same seasonal pattern applies in the urban and rural parts of each county as in the urban and rural parts of the state under study. The ratio of births for the 9 months to the total for the 12 months was computed and then applied to the urban and rural parts of each

county. For 1950 birth data for the first 3 months were available for the states from state office of vital statistics reports. The total births in the states were distributed to the urban and rural parts of counties in proportion to the distribution of all births in 1949. For deaths the calendar years 1940 to 1949 were used since the number of deaths for the first quarters of 1940 and 1950 were about the same.

Adjustments for under-registration of births April 1, 1940 to March 31, 1950 were made for the urban and rural residence groups of each county on the basis of estimates of registration completeness furnished by the National Office of Vital Statistics. The completeness figures were based on the 1940 Birth Registration Test and on preliminary results of the 1950 Birth Registration Test.[37] Adjustments for under-registration were made by dividing registered births April 1, 1940, to March 31, 1950, by the average birth registration completeness figure and then by adjusting the resulting county figures to the independently estimated state total.

Estimates of births and deaths for the urban and rural residence groups involved use of published and unpublished data from the National Office of Vital Statistics. Published data provided resident births and deaths for the population in places of 10,000 and over and balance of counties. Special tabulations were supplied on resident births and deaths for the population in places of 2,500 and over for balance of counties for 1946 to 1949. Estimates of resident births and deaths by urban and rural residence categories were made as follows: (1) A computation was made of the ratios of births (or deaths) in urban places of 2,500 to 10,000 to those in these places plus rural areas for each county for the years 1946 to 1949 combined. (2) The ratios obtained in (1) were then multiplied by the corresponding number of births (or deaths) in urban places of 2,500 to 10,000 plus rural for each county for each year 1940 to 1945. (3) For each year, sums of the resulting estimates of births (or deaths) in small urban places for all counties were computed. (4) The sums were then divided into the state total of resident births (or deaths) in all urban places of 2,500 to 10,000 as published in National Office of Vital Statistics, *Vital Statistics of the United States,*" Part II for each of the years 1940 to 1945. (5) The ratios obtained in step (4) were correction factors applied to the county estimates of step (2). This had the effect of adjusting the first stage estimates of (2) so that the sum of the estimates equalled the published totals for a state. If any ratio obtained in step (4) did not fall below 0.90 or exceed 1.10 it was considered satisfactory for estimating purposes.

Prior to the completion of tabulations of data by the individual states and submission of such

data for this report, no standard procedure had been developed for use by all of the states to account for the differential methods of enumerating college students in the two censuses. Such a method, however, evolved out of this problem and recently was published.[38] Four of the 13 states, however, obtained more or less complete enrollment data from colleges and the place of residence of their students for the spring of 1940.[39] Such numbers were subtracted from the county of residence of the students' parental homes and added to the county of college community. Out-of-state students were added to the latter 1940 populations. As a result of adding out-of-state students to the 1940 populations in the four states, the total population of the North Central states was increased slightly more than 17,000 persons over that reported by the 1940 Census of Population.

The annexation of rural to urban territory or the retrocession of urban to rural territory involved another rural-urban population adjustment. During the 1940's a number of urban centers had one or more annexations of territory and a few had retrocessions. Accordingly, to make the 1940 and 1950 population figures comparable, transfers of persons from the urban to rural or rural to urban categories were necessary.

Data on value of products sold in 1949 were adjusted for comparison with data for 1939 on the basis of the index of prices received by farmers for various agricultural commodities.

Data on cash expenditures for farm wages in 1949 were adjusted for comparison with data for 1939. This likewise was done on the basis of the indexes for farm wage rates. The indexes used were those issued by the United States Bureau of Agricultural Economics. Computation of comparable wage rates involved taking the percentage the 1949 index was of the 1939 index and multiplying its reciprocal by the 1949 expenditures.

Computation of the average farm operator family level of living indexes for the economic subregions necessitated computing the mean of the indexes of all of the counties in the subregion.

METHOD OF COMPUTING PROJECTIONS OF POPULATION

The method for making these projections is described in Agricultural Economics Research.[40] Projected population for the North Central states was computed on the basis of the Series C forecast of the United States population from United States Bureau of the Census release P-25, No. 78. Projecting the region's share of the United States population was on the basis of its trend from 1930 to 1950. Thus, the North Central states

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[37] Completeness figures and procedure for estimating for under-registration were supplied the participating states by Sam Shapiro, Natality Analysis Branch, National Office of Vital Statistics, Public Health Service, U. S. Department of Health, Education and Welfare.

[38] French, Burton L. Procedure for adjusting 1940 census data for college students to be comparable with 1950 data. Agricultural Economics Research. Vol. VI. No. 2. Agr. Mkt. Ser., U. S. Dept. Agr. April 1954.

[39] Kentucky, Michigan, Minnesota and North Dakota.

[40] White, Helen R., Jacob S. Siegel and Beatrice M. Rosen. Short cuts in ratio projections of population. Agricultural Economics Research. Vol. V. No. 1. Bur. Agr. Econ., U. S. Dept. Agr. January 1953. pp. 5-11.

are expected to have 30.6 percent of the United States population in 1960 and 29.6 percent in 1975.

For each subregion two assumptions regarding the subregion's future share of the region's population were made. For Series C_1 it was assumed that the subregional ratios would change at the same rate as from 1940 to 1950 and for Series C_2 from 1930 to 1950.[41] Thus, while only one projected ratio of the North Central states population to the United States population was used, two ratios were used for each of the subregions.

To illustrate the procedure used in deriving the subregions' future shares of the projected population of the North Central states, the following is shown.[42] The rate of change in share is represented by r in this equation.

$$r = \frac{2\,(R_b - R_a)}{t\,(R_b + R_a)}$$

where r = average annual rate of change in the ratio
R_a = ratio at start of base period
R_b = ratio at end of base period
t = number of years in the base period.

Substituting the figures for Subregion 28 using the Series C_1, 1940-50 base period and solving the equation gives:

$$r = \frac{2\,(7.016 - 6.594)}{10\,(7.016 + 6.594)}$$

= 0.0062013 or 0.62 percent.

On the assumption that the annual rate of change in the proportion for a particular area would be reduced linearly to zero by a given future date, the annual reduction in the rate of change is computed and then added to, or sub-

[41] Series C_1 and C_2 as used here for the subregions are not to be confused with the C series used for the United States and regional projections.
[42] White, Siegel and Rosen. Op. cit.

tracted from, the initial rate of change serially to get the successive factors in the formula.

Here n = 25 or the number of years for which projections are being made.

R_o = ratio at start of projection period, coinciding with R_b as above.
R_i = ratio in the ith year of the projection period.

The ratios for 1951, 1952 and 1953, where n = 25, are obtained as follows:

$$\frac{r}{n} = \frac{0.0062}{25} = 0.00024.$$

$$R_1 = R_o\,(1 + r) = 6.594\,(1 + 0.0062) = 6.6349.$$

$$R_2 = R_1\,(1 + r - \frac{r}{n})$$
$$= 6.6349\,(1 + 0.0062 - 0.00024) = 6.6744.$$

$$R_3 = R_2\,(1 + r - \frac{2r}{n}).$$

This chain process is continued until the ratios for 1960 and 1975 are computed. With a set of multipliers, the ratios can be computed for any given year and thus the chain computations can be eliminated. In this study the 50-year convergence multipliers were used. This procedure is described in detail in the article cited above. Thus, in projecting the population for the subregions, it was assumed that the factors which have operated to make for different rates of growth in the base period would persist but with diminishing effects. For example, war, peacetime prosperity and depression have all been factors in the affecting population growth.

The final step was to apply the percentage distributions by subregions as shown above to the current Series C estimate of the total population of the North Central states under Series C_1 and C_2 forecasts for subregions for 1960 and 1975.