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Variation in the level and growth in family income among Iowa counties, 1950-1960

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VARIATION IN THE LEVEL AND GROWTH IN FAMILY INCOME AMONG IOWA COUNTIES, 1950 — 1960

by

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INTRODUCTION

The objectives of this study were, (a) to describe the variability in family income among Iowa counties both in 1950 and 1960 as well as the variation in family income growth among Iowa counties between 1950 and 1960; (b) to develop and test the various hypotheses that might explain inter-county family income variability in Iowa. Thus, this study seeks to identify the factors associated with family income variation among Iowa counties in 1950 and in 1960 and from 1950 to 1960 as Iowa continued to change from a dominantly agricultural economy to one including increased industry and services.

The post-war period has been characterized by a significant rise in median family income in both Iowa and the Nation. Iowa median all-family income rose 65 percent over the 1950-1960 period (from $3,079 to $5,069); while for the United States as a whole the increase was 84 percent (from $3,319 in 1950 to $5,620 in 1960).

We find that underlying the rise in median all-family income in both Iowa and the total United States there has been a major shift of families upward along the entire income scale as shown in Table 1. The proportion of U.S. families with incomes of less than $5,000 has declined from 77 percent in 1950 to 42 percent of the population in 1960; while the proportion of Iowa families in this income category decreased from 82 percent to 49 percent, Table 1. (However, the 1960 dollar was worth only 82 cents compared to the 1950 dollar based on change in the consumer price index). In addition, the number of U.S. families receiving incomes between $5,000 and $10,000 has increased from 20 percent

Table 1. Percent of families in three income groups, United States and Iowa, 1950 and 1960[a]

All-family income	U.S.		Iowa	
	1950	1960	1950	1960
Under $5,000	77	42	82	49
$5,000 to $10,000	20	44	15	40
$10,000 and over	3	14	3	11

[a]Source: (38, 39)

to 44 percent over the same period; while those from Iowa with comparable incomes have risen from 15 percent in 1950 to 40 percent in 1960. Both the U.S. and Iowa had 3 precent of families with over $10,000 income in 1950 with the U.S. and Iowa families in this category increasing to 14 percent and 11 percent of total respectively by 1960.

In 1950 Iowa had 78 percent of its urban families with incomes below $5,000; while by 1960 this group made up only 36 percent of the total. Eighteen percent of Iowa's urban families had incomes of $5,000 to $10,000 in 1950 as compared to 50 percent in 1960. The percentage of Iowa urban families with an income of $10,000 and over increased from 3 percent in 1950 to 14 percent in 1960. The median income gap between Iowa's urban and rural-farm families widened between 1950 and 1960 as reported in the U.S. Population Census Report and shown in Table 2.

Table 2. Types of Iowa family incomes, 1950 and 1960 and change from 1950 to 1960[a]

Type of family income	Median family income		1950 to 1960	
	1950	1960	Absolute Change	Percent Change
All-Family	$3,079	$5,069	$1,990	64.6
Urban	$3,419	$5,955	$2,536	74.2
Rural-Nonfarm	$2,630	$4,626	$1,996	75.9
Rural-farm	$2,670	$3,352	$ 682	25.5

[a]Source: (38, 39)

Median rural-farm family income in Iowa dropped from 78 percent of the median income of urban families in 1950 to 56 percent in 1960.

The industrialization that had occurred in Iowa up to 1960 was not sufficient to absorb the labor that was moving from Iowa's increasingly mechanized farms. As a result Iowa had a net outmigration of 228,607 persons between 1950 and 1960 (40). Increased capital investments in the new technology have made it possible for fewer and fewer Iowa farmers to operate Iowa's larger farms. Although the total number of Iowa farm families decreased over the 1950 to 1960 period, the amount of decrease varied among the counties. The total number of families among Iowa's counties in both 1950 and 1960 included varying numbers of urban, rural-nonfarm and rural-farm families, Table 3. The U. S.

Census Report of 1950 and 1960 definitions of urban, rural-nonfarm and rural-farm families were used in this study: urban families were defined as those living in urban areas of 10,000 population or more and in urban places with 2,500 to 10,000 population; rural-nonfarm families were defined as families living in areas of less than 2,500 population; while rural-farm families were defined as those living on farms.

Table 3. Iowa families 1950 and 1960 and change from 1950 to 1960[a]

	Number in 1950	Percent of total in 1950	Number in 1960	Percent of total in 1960	Change 1950 to 1960 Number	Percent
All Families	686,785	100	711,716	100	24,931	3.6
Urban Families	333,405	48.5	374,485	52.6	41,080	13.3
Rural Non-Farm Families	154,305	22.5	166,697	23.4	12,392	7.4
Rural Farm Families	199,075	29.0	170,534	24.0	-28,541	-14.3

[a]Source: (38, 39)

Rural-farm families constituted 29.0 percent of Iowa's total families in 1950 but the percentage dropped to 24.0 by 1960, Table 3. Iowa's urban families made up 48.5 percent of the total number in 1950 but increased to 52.6 percent of the total by 1960. Twenty-one Iowa

counties contained no urban families in 1950 while twenty counties included no urban families in 1960. Rural-nonfarm families made up 22.5 percent of total Iowa families in 1950. By 1960 this group had increased to include 23.4 percent of the total.

Economists have observed that a nation's dependence upon agriculture declines as its income rises and as its economic activities grow in volume and diversity (1). Economists usually describe it in terms of a reduced proportion of the labor force engaged in agriculture as the economy develops. The agricultural labor force is now declining in absolute terms as well as relative terms in all States of the United States including Iowa. For Iowa, the decline in employment in farm occupations during the 1950's was 27.3 percent compared to the national decline of 41.3 percent. However, the agricultural labor force is declining at different rates among the counties of Iowa, Figure 1.

High proportions of unemployed (or underemployed) persons and low-income families are usually the result of acute reduction in the demand for labor by one or more industries, without comparable increases in demand for labor by other activities (13). Rapid mechanization and adoption of new technology on Iowa's farms has caused an acute reduction in the demand for labor by the agricultural industry.

A look at the national economic picture shows new emphasis is now being placed on economic growth and the solution of the poverty problem in our nation. The national anti-poverty effort and the increased responsibility assumed by various public and private welfare agencies

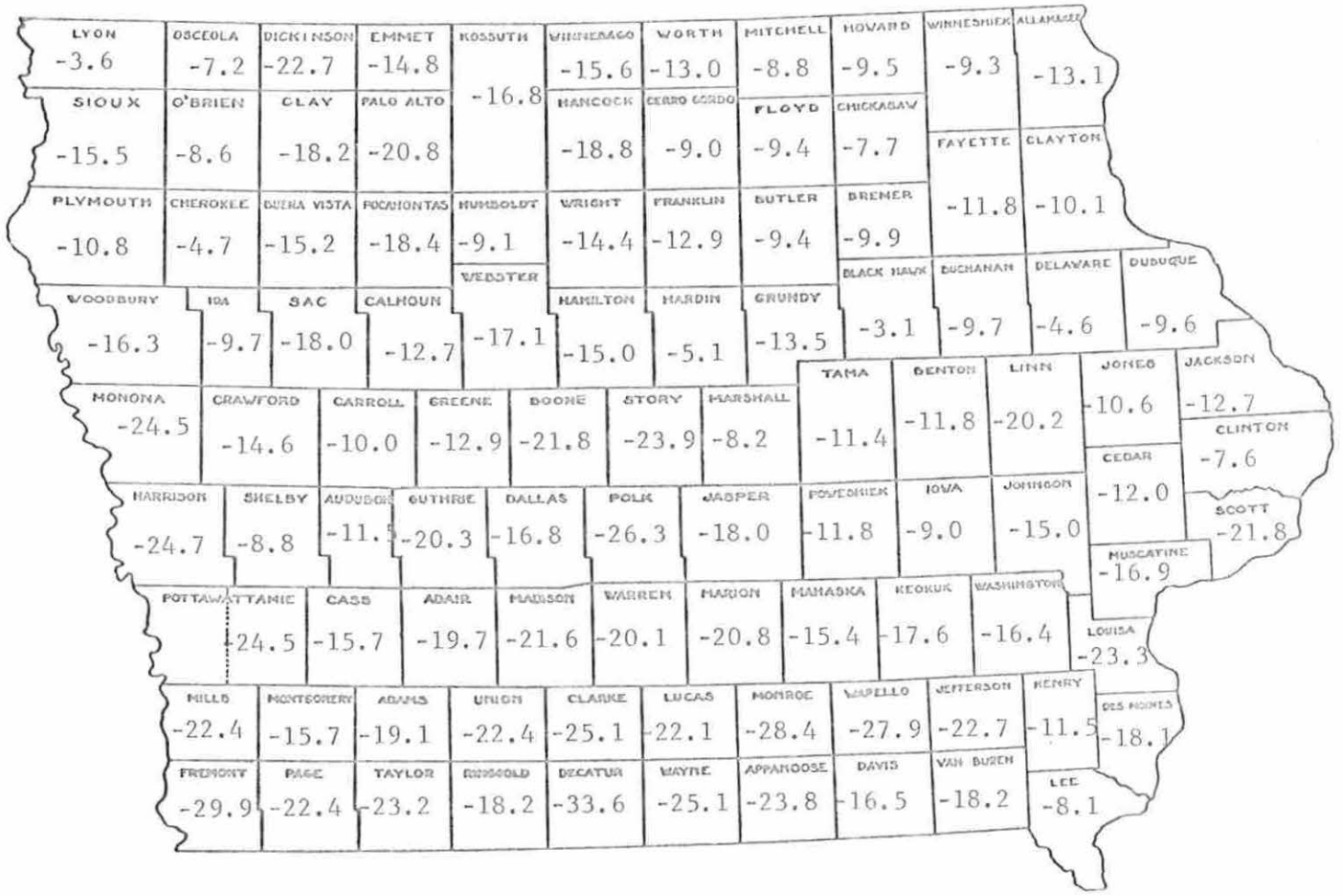


Figure 1. Percent decrease in rural farm population, Iowa, 1950 to 1960 (Source: (38, 39))

are all aimed at solving the problems of the socially and economically disadvantaged. These efforts point up the need for more detailed and accurate information on income distribution and the factors explaining income inequality. This study is an attempt to identify some of the forces associated with family income differences among Iowa counties in 1950 and in 1960 and from 1950 to 1960.

DATA SOURCES AND LIMITATIONS AND MEASUREMENT OF FAMILY INCOME AND FAMILY INCOME VARIABILITY AMONG IOWA COUNTIES

Most of the family income data included in this study came from two sources: The B series of the 1950 census of Population-General Characteristics (38) and the C series of the 1960 U. S. Census of Population-General Social and Economic Characteristics (39). However, some data such as that on property assets per family for each Iowa County were derived from the Iowa Tax Commission Reports for 1950 (16) and 1960 (17). Information also was used from the U. S. Department of Agriculture Census for the year of 1959 (37).

In this study, income data were presented for families only. Information on the income of unattached individuals was not included. The latter income statistics can be unduly affected in many counties by the inclusion of large and fluctuating numbers of military personnel; large numbers of migratory workers and by comparatively large enrollments of college students.

The different types of family income measurements reported in the U. S. Population Census in 1950 and 1960 are shown in Table 4.

In both 1950 and 1960 Census of Population reports, family income was defined as income to the family head as well as to other family members. This consisted of monetary receipts in the form of wages and salaries; net returns from self-employment in farming and other businesses or profession; and any rents, interest, dividends, social security benefits, pensions, military allotments, unemployment insurance payments, as well as public assistance or contributions for support from

Table 4. Types of family income measurements[a]

Types of income	1950	1960
1. Median all-family[b]	Reported	Reported
2. Mean all-family	Reported[c]	Reported[c]
3. Median rural-farm family	Not reported	Reported
4. Mean rural-farm family	Not reported	Reported[c]
5. Median rural population family	Not reported	Reported
6. Mean rural population family	Not reported	Reported[c]
7. Mean rural-nonfarm family	Not reported	Reported[c]
8. Median urban family[d]	Not reported	Reported
9. Mean urban family[d]	Not reported	Reported[c]

[a]Source: (38, 39)

[b]A family consists of two or more persons living in the same household who are related to each other by blood, marriage or adoption

[c]Reported in such a way that means could be computed for families on county basis

[d]Reported on an urban community basis for the 79 counties of Iowa's 99 that contained urban communities in 1960. (By census definition a town must contain 2,500 population or more to be considered urban)

individuals not a part of the immediate household.

The income data in this report covers money income only. Many farm families receive a portion of their income in the form of housing and consumable products raised on the farm. This fact should be taken into

consideration when comparing the income of farm and non-farm residents.

The income information on families with income under $1,000 contained many families who reported no income in 1950 or 1960. Many of these were living on income "in kind", savings, gifts, etc., or were newly created families or families in which the sole breadwinner had recently died or had left the household.

Several measures of income level can be used in comparing family incomes among Iowa counties. The measure used most often in this study is the median family income which divides the population of families into two equal groups. Mean family income per county also is used and it reflects the total income received by county families divided by the total number of families in each Iowa county. The modal income was examined in this study as a possible measure. The modal income is that income which is common to most families; however, it was not used in this study. All of these are measures of the central tendency (herein applied to income) and each has certain advantages and disadvantages. Generally, the median distribution is more stable than the mean since it is influenced less by a few extremes.

A high correlation was found to exist between median all-family incomes and mean all-family incomes among Iowa counties ($r = .98$). A high correlation was also found to exist between median rural-farm family incomes and mean rural-farm family incomes among Iowa counties ($r = .95$).

Relatively high correlations were found between median and mean all-family incomes and all-family income components among Iowa counties.

Evidently it would make little difference whether one used the median or the mean to measure the levels of county family income.

Mean all-family income per Iowa county was not reported as such in either the 1950 or 1960 U. S. Population Census. The mean all-family income for each Iowa county was estimated. The estimate was obtained by multiplying the number of families falling in each income interval in the U. S. Population Census in each Census year by the mid-point of the income interval and summing overall intervals and then dividing the estimated total family income by the number of families in the county. A similar procedure was used in computing the 1960 mean rural-farm family income for each Iowa county.

The procedure for estimating the 1960 mean rural-nonfarm and urban family incomes respectively among Iowa counties was similar to that used to estimate mean all-family incomes. The estimated total family income received by rural population families in each Iowa county as reported in the 1960 U. S. Census of Population was computed in the same manner as that for all-families. The estimated total income received by rural-farm families in each county was then subtracted from the estimated rural population family income total, the remainder being the estimated rural-nonfarm family income total. This total was then divided by the number of rural-nonfarm families to arrive at the estimated mean rural-nonfarm family income in 1960.

The estimated mean urban family incomes for each Iowa county with urban population (only 79 Iowa counties contained urban population in 1960) were computed in much the same manner as those for all-family

income for each county as a whole, except that estimated total urban-family income was computed for each urban community within a county, then summed to obtain an estimated total urban-family income for all urban families of the county. The total was then divided by the number of urban families of the county to get the estimated mean urban family income. In the derivation of aggregated amounts of family income among counties in 1960, families in the open-end interval "$25,000 and over" were assigned an estimated mean of $50,000. In 1950 the open-end interval "$10,000 and over" families were assigned an estimated mean of $20,000. These assigned open-end estimated means were suggested in the report of the 1960 U. S. Population Census (39) and by the Chief of the U. S. Census of Population Division for 1950.

A further delineation of estimated mean income to each family member was derived. Because some counties, particularly those with more rural population, might include families with more members per family, estimates of mean income per family member were prepared. Income per-family-member in 1960 was estimated by dividing the total all-family income of each county by the total number of members in families in the respective counties. However, a correlation of $r = .96$ between 1960 income per-family member and 1960 mean all-family income was found indicating that variation in family size had little effect on the amount of income available per family member. Because of the high correlation found between estimated per-family-member income and estimated mean all-family income among the Iowa counties, there was little to be gained in this study by measuring income on a family member basis.

The inflation that occurred between 1950 and 1960 in the United States dollar was not adjusted for in this study. The change in the consumer price index between 1950 and 1960 as noted earlier, would indicate that the 1950 dollar was only worth eighty-two cents by 1960.

It was assumed in this study that equal amounts of all-family median income in the various Iowa counties would purchase equal quantities of goods and services of a particular quality. The cost of purchasing equal quantities of goods and services of a particular level of quality may actually vary from one Iowa county to another. The cost of a home of equal size and quality or dues to the local country club are greater in Mason City in Cerro Gordo County than in Rock Rapids in Lyon County. The set of consumer goods and services that would put a family into the desired "in" group in one county might be higher priced than in another. The same level of median family income in one Iowa county might not purchase the same amount of consumer satisfaction as in another.

FAMILY INCOME VARIATION AMONG IOWA COUNTIES, 1950 AND 1960

All-Family Income

The ninety-nine Iowa counties were ranked from the highest median all-family income county to the lowest median all-family income county and divided into quartiles both in 1950, Figure 2, and 1960, Figure 3. The high median all-family income quartile will be referred to as quartile A, the second high as quartile B, the third high as quartile C and the lowest as quartile D.

The median income for all-Iowa families was $3,079 in 1950. The median all-family incomes among Iowa counties in 1950, Figure 4, ranged from a low of $1,781 in Wayne County which had 52 percent of its families classified as rural-farm to a high in Black Hawk County of $3,714 with only 8 percent of its families classes as rural-farm.

Quartile A counties in 1950 were located for the most part in northwest Iowa with a few scattered in central and eastern Iowa, Figure 2.

All seven Iowa counties which had cities of 49,000 or more population in 1950, were included in Quartile A. Five of the seven counties with cities of 20,000 to 49,000 in 1950 were also in this quartile.

Most of the Quartile D counties in Iowa in 1950 were in southern Iowa with a few in northeast Iowa. Forty-six percent of the Quartile D counties had no urban population (towns of 2,500 or more population). Only four counties in the low income group had towns of 5,000 to 10,000 population in 1950. The Quartile D counties with no urban population had from 31 percent to 58 percent of their families classified

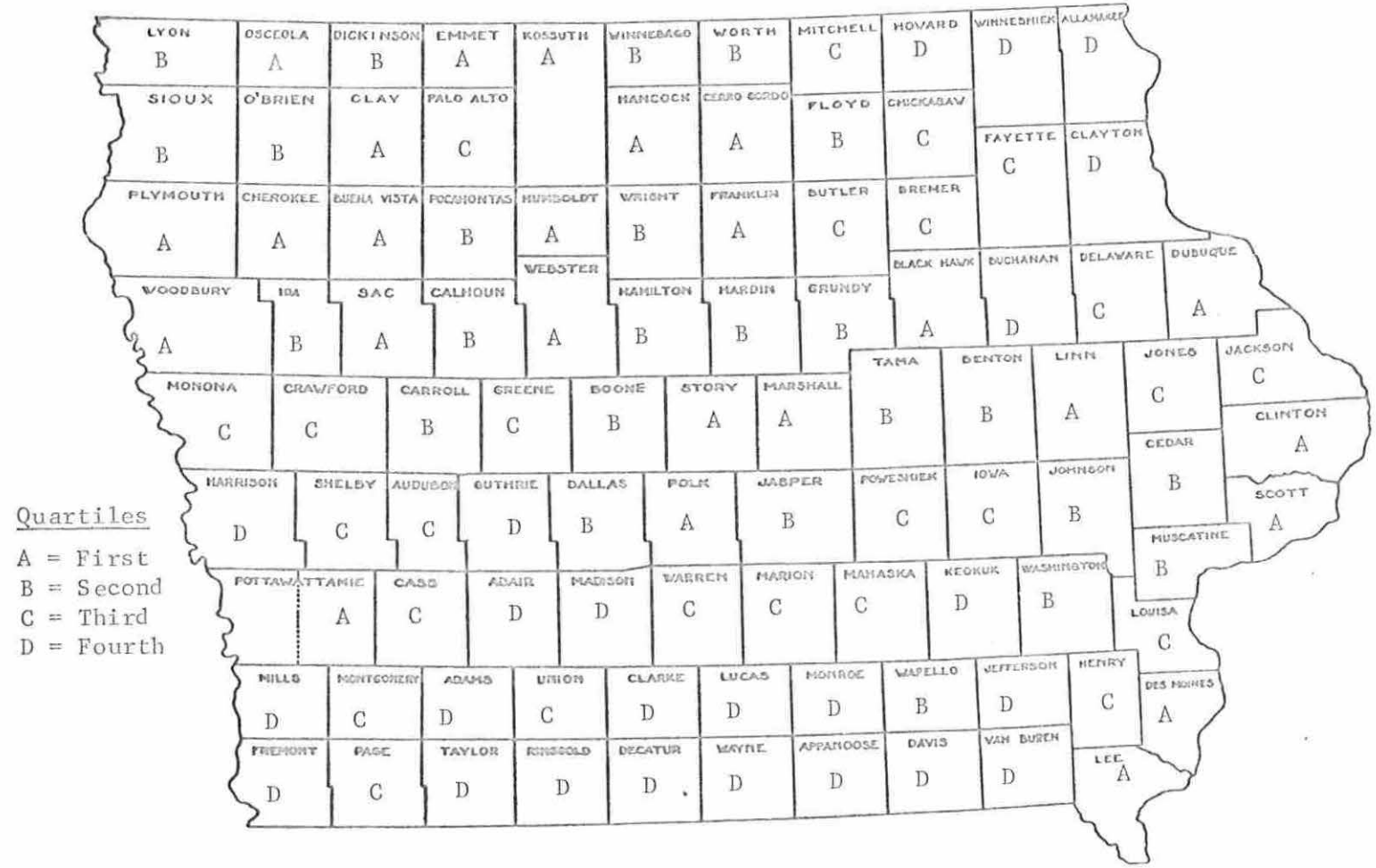
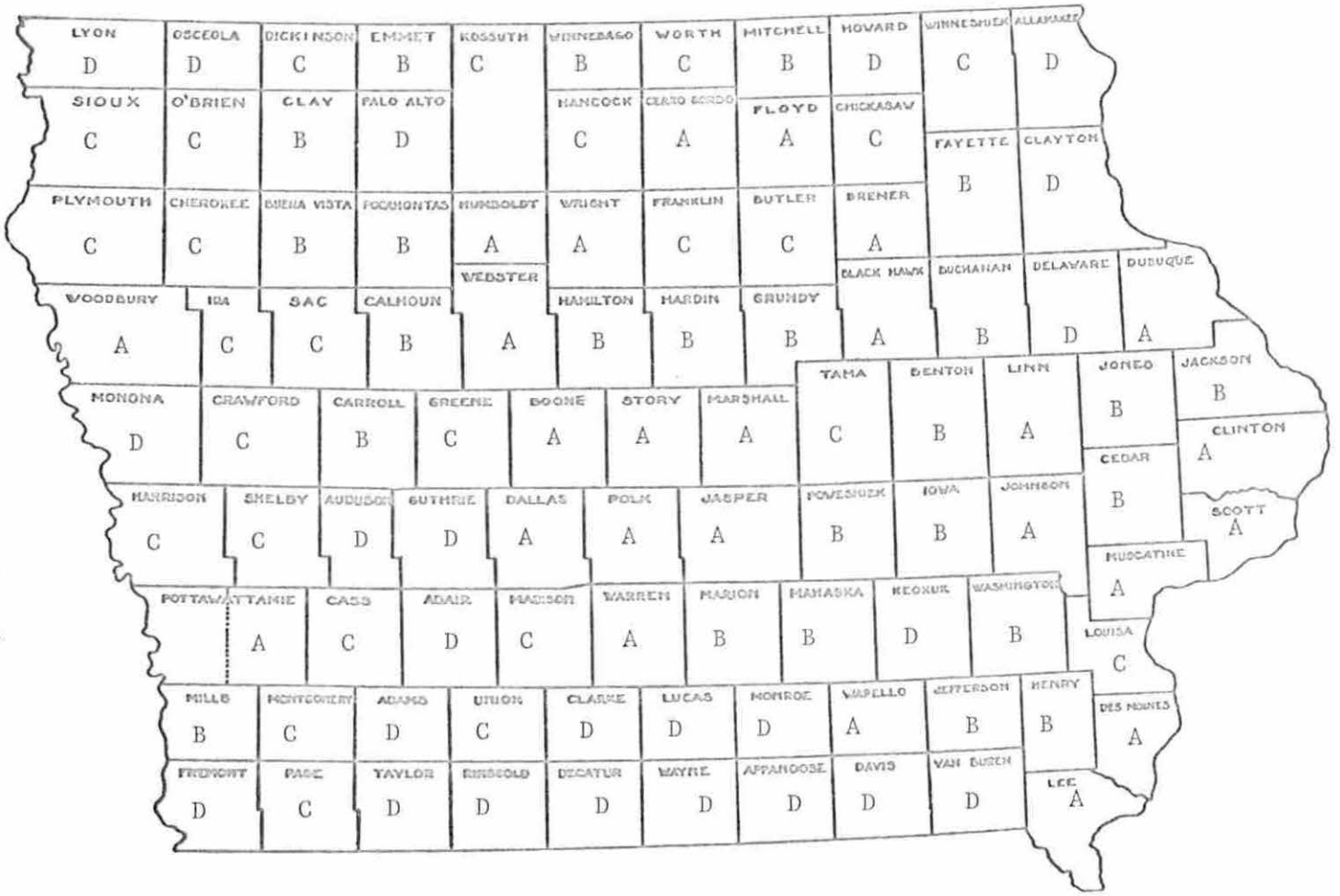


Figure 2. Quartile rank of Iowa families on median all-family income in 1950 (Source: (38))



Quartiles

A = First
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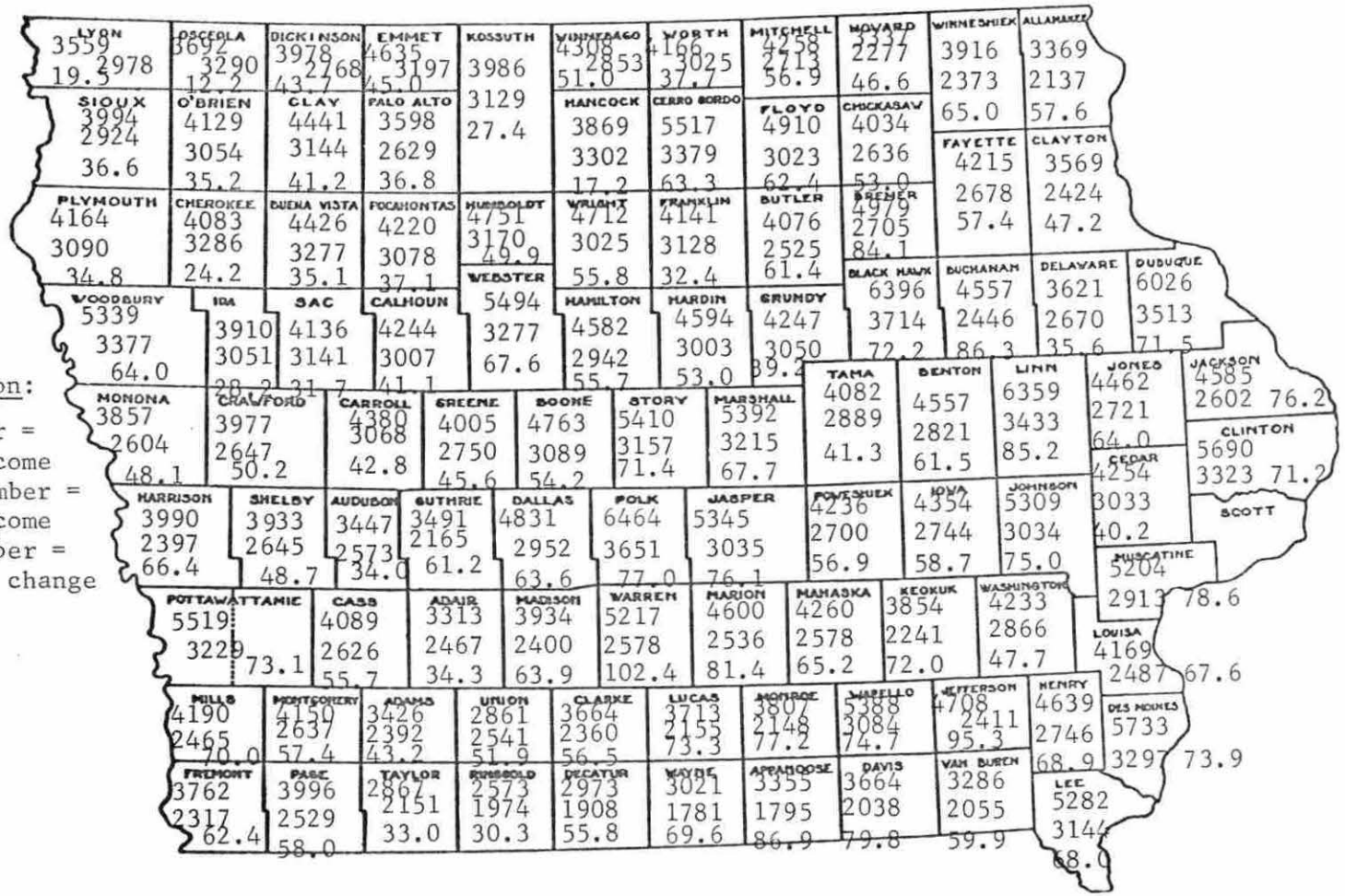
Figure 3. Quartile rank of Iowa families on median all-family income in 1960 (Source: (39))



Explanation:

Top number = 1960 income
Second number = 1950 income
Third number = percent change

Figure 4. Median all-family income in 1960 and 1950 and percentage change from 1950 to 1960 among Iowa counties (Source: (38, 39))

as rural-farm.

The 1960 median all-family incomes among Iowa counties was $5,069, Table 2, and ranged from a low of $2,573 in Ringgold County to a high of $6,464 in Polk County. The coefficient of variation of mean all-family incomes among Iowa counties in 1960 was 16.6 percent slightly above the 15.1 percent in 1950. In 1950, the lowest Iowa county on median all-family income had 49.5 percent of the median all-family income of the highest median all-family income county. In 1960 the lowest county in the State when counties were ranked on median all-family income had only 44.3 percent of the income of the highest median all-family income county.

In 1960, most of the Quartile A counties on median all-family income were located in central and eastern Iowa. Quartile A counties in 1960 contained all fourteen of the cities of 25,000 or more population and ten of the eleven Iowa cities containing 10,000 to 25,000 population. Eighteen of the Quartile A counties had an average of 71 percent of their families classified as urban. The other seven high income counties were adjacent to counties with relatively large urban centers.

Most of the Quartile D counties, Figure 3, on median all-family income in 1960 were located in southern Iowa with a few in northeast and northwest Iowa. Eleven of the twenty-four Quartile D counties had no families classified as urban by U. S. Population Census definition. The other thirteen counties had an average of 43 percent of their families classified as rural-farm families.

Rural-Farm Family Median Income

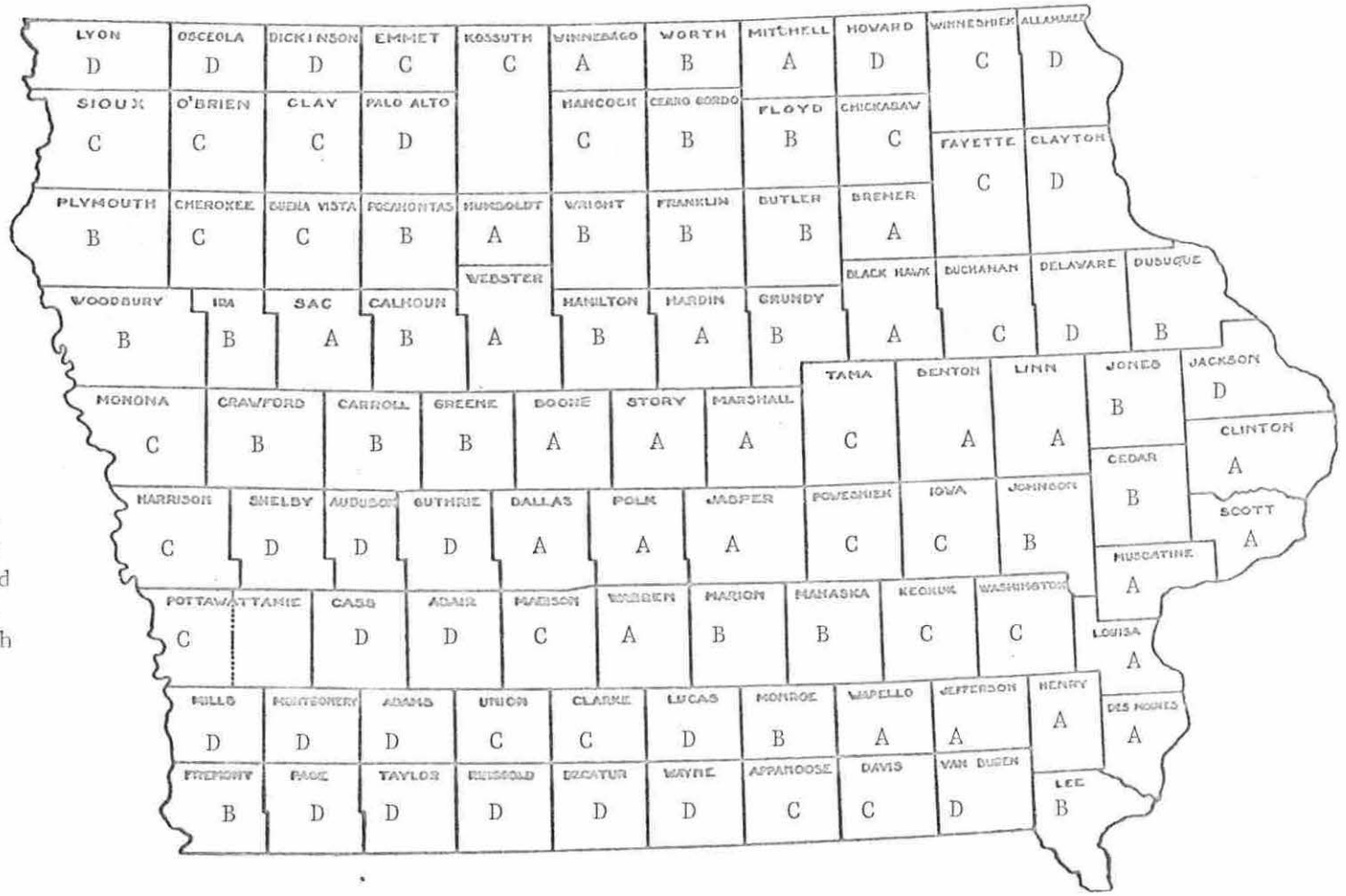
The 199,075 rural-farm families in Iowa in 1950 made up 29 percent of all families in the state. The median income of $2,670 for rural-farm families in 1950 was 80 percent of that for rural-farm families in 1960. The median rural-farm family income for the state as a whole was reported in the U. S. Population Census in 1950 (38) but it was not reported for each county. The median rural-farm family income for Iowa had risen to $3,352 by 1960 for the 170,534 families in that group which made up 24 percent of the total Iowa families at that time.

In 1960, seventeen of the high quartile counties when ranked on median rural-farm family income, Figure 5, were also in the 1960 Quartile A for median all-family income. These high quartile counties on median rural-farm family income were located mostly in central and eastern Iowa. Thirteen of the twenty counties containing cities of 10,000 or more people in 1960 were among the high quartile median rural-farm income counties.

Fourteen of the high quartile median rural-farm family income counties in 1960 were also in the top quartile rank in number employed in manufacturing, Figure 6. Eleven of the fourteen were in the top quartile rank in the percent employed in manufacturing, Figure 7.

Fifty-eight percent of the low quartile counties on median rural-farm family income were located in southeast Iowa in 1960. The rest were located in extreme northeast and extreme northwest Iowa.

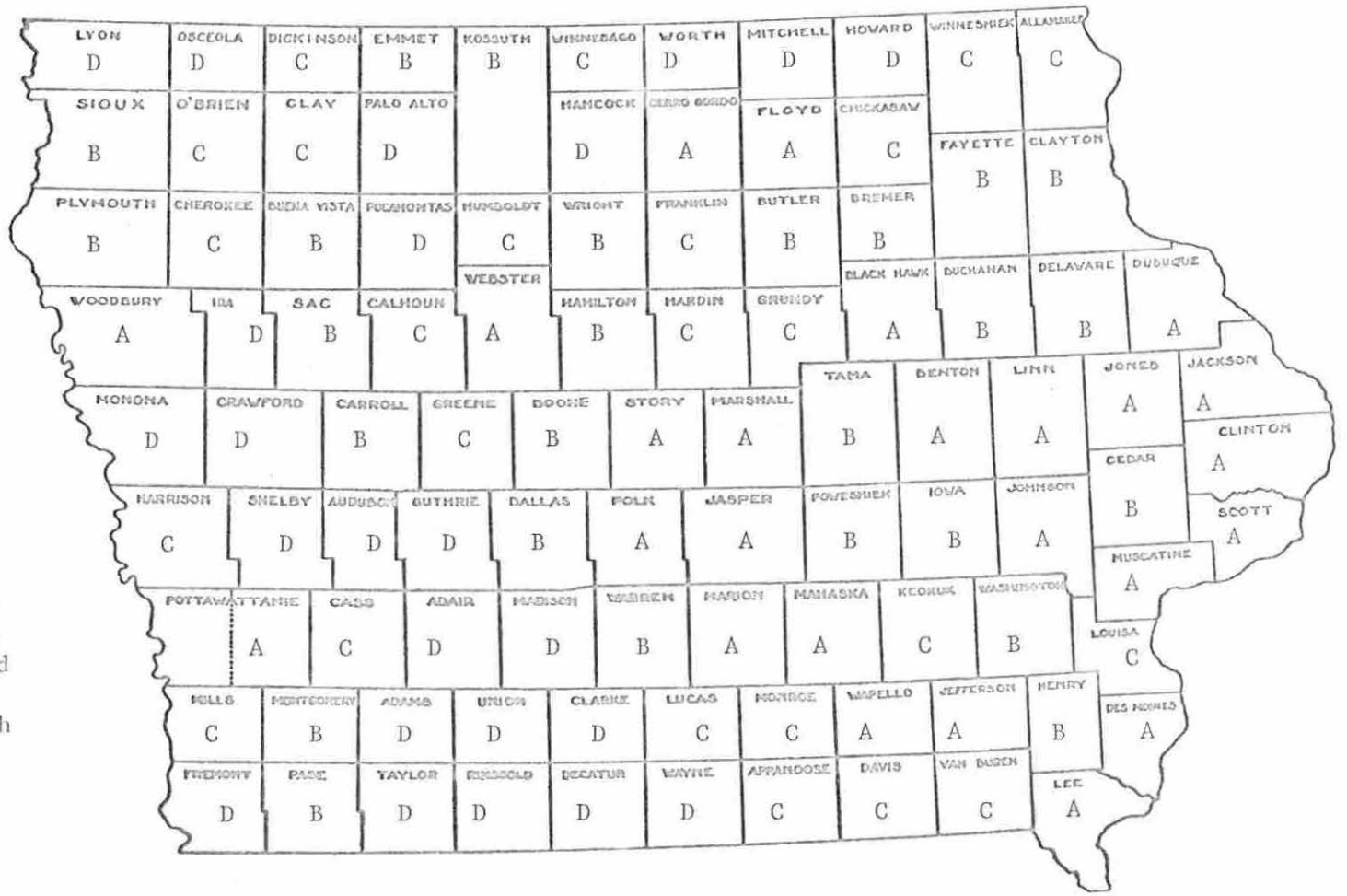
Seventeen of the low quartile median rural-farm family income counties in 1960 were also in Quartile D on median all-family income.



Quartiles

A = First
B = Second
C = Third
D = Fourth

Figure 5. Median rural-farm family median income of Iowa counties in 1960 by quartiles (Source: (39))



Quartiles

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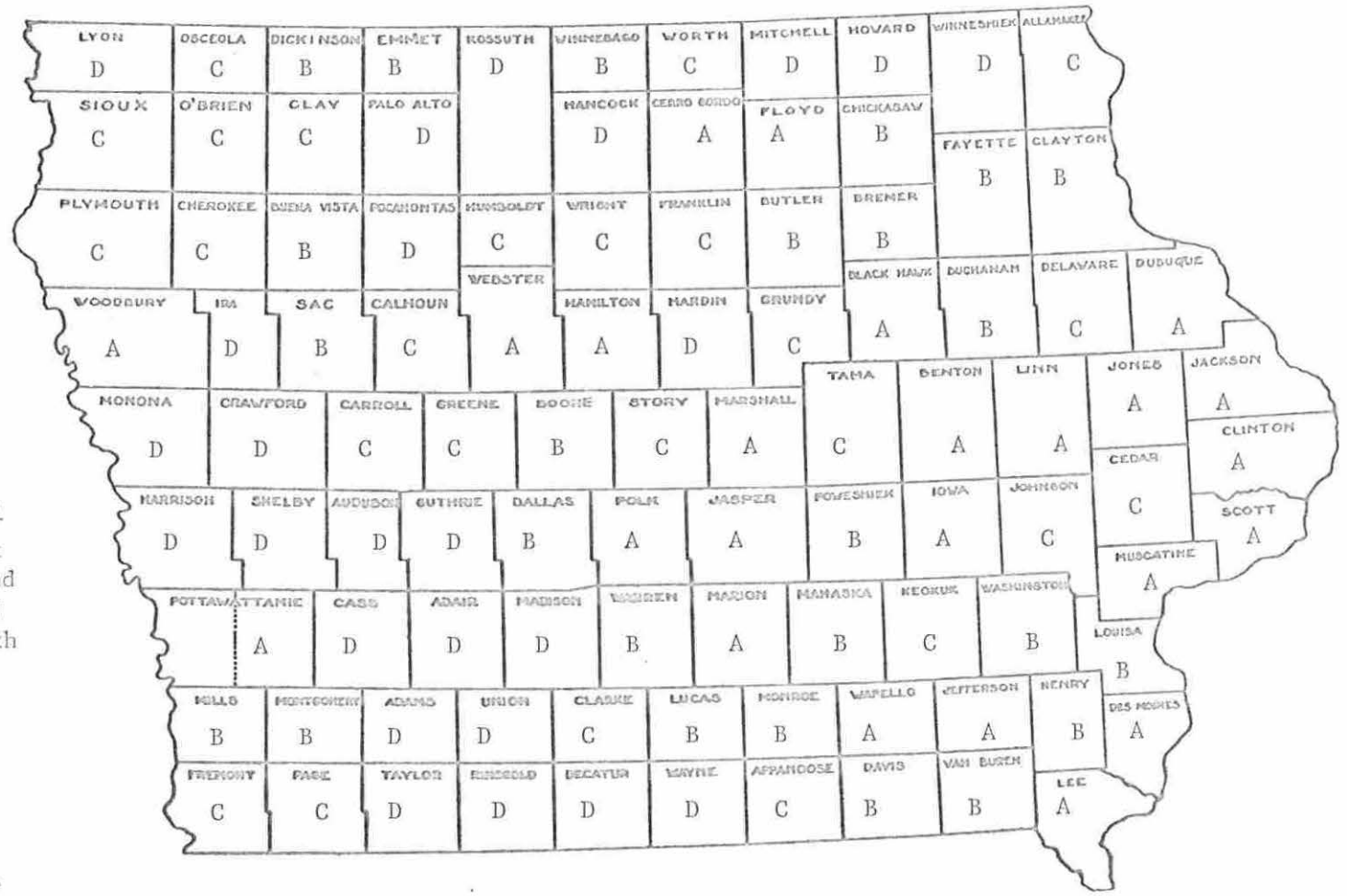
Figure 6. Quartile rank of Iowa counties in 1960 on number employed in manufacturing (Source: (39))



Quartiles

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Figure 7. Quartile rank of Iowa counties in 1960 on the percent of the employed in manufacturing (Source: (39))

Fifty-four percent of the low median rural-farm family income counties in 1960 were also in the low quartile on the number employed in manufacturing. The low 24 counties on median rural-farm family income in 1960 had 43 percent of their families classified as rural-farm compared to only 24 percent for the state as a whole.

The high quartile median rural-farm family income county group in 1960 had 52.4 percent of their average gross sales per farm of $10,000 or more; while the low quartile had 41.9 percent of their sales in that category.

Rural-Nonfarm Family Incomes

Rural-nonfarm families made up 22.5 percent of all Iowa families in 1950 and 23.4 percent of the total in 1960. High quartile median rural-nonfarm family income counties in 1960 were located mostly in central and eastern Iowa. Low median rural-nonfarm family income counties in 1960 were located mostly in southern Iowa. Eighteen of the Quartile A counties on median all-family income were also in the high quartile on median rural-nonfarm family income. Eighteen of the Quartile D counties on median all-family income in 1960 were also among the low quartile that year on median rural-nonfarm family income. Eighteen of the high quartile counties on median rural-farm family income in 1960 were also in the high quartile on median rural-nonfarm family income. Fourteen of the low quartile counties on median rural-farm family income in 1960 were among the low quartile on median rural-nonfarm family income. Median rural-nonfarm family incomes were higher than median rural-farm family incomes in all but five Iowa counties

in 1960.

Fifteen of the high quartile median rural-nonfarm family income counties in 1960 were among the twenty counties which contained cities of 10,000 or more population. High median rural-nonfarm family income counties had an average of 27.8 percent of their families classified rural-nonfarm. Sixteen of the seventeen counties that were in the high quartile in 1960 (both on median rural-farm family income and median all-family income) were also in the high quartile on median rural-nonfarm family income. Thirteen of the high quartile counties on median urban-family income were also in the high quartile on median rural-nonfarm family income. Only two of the 79 counties with urban families had higher mean rural-nonfarm family incomes than mean urban-family incomes.

Urban Family Income

Only 79 of Iowa's 99 counties in 1960 contained urban population by U. S. Population Census definition. Urban families made up 48.5 percent of the total number of families in Iowa in 1950. By 1960 urban families were 52.6 percent of all families. While Iowa's urban families increased 13.3 percent from 1950 to 1960, rural-farm families decreased 14.3 percent over the same period. Iowa's urban families had mean incomes in 1960 ranging from $4,470 in Monroe County to $7,945 in Linn County with an overall state mean of $6,306, Figure 8.

Seventy percent of the high quartile counties on mean urban family income contained one or more cities of 10,000 or more people or were

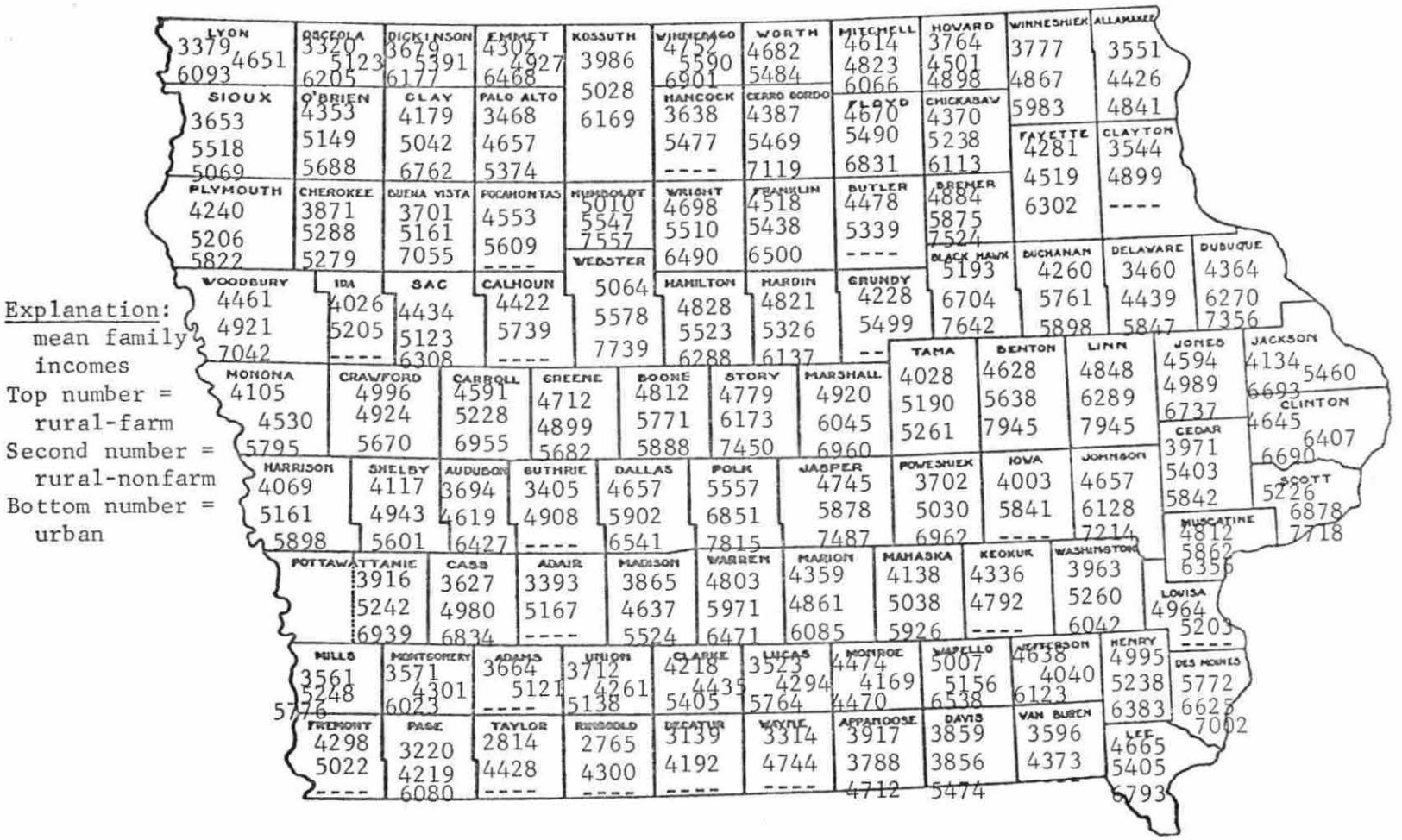


Figure 8. Component mean family incomes, rural farm, rural-nonfarm and urban among Iowa counties in 1960 (Source: (39))

adjacent to such counties. The seven counties with cities of 50,000 or more population in 1960 were all in the high mean urban family income quartile. Five of the seven counties with cities in the 25,000 to 50,000 population group in 1960 were also in the high mean urban family income county quartile.

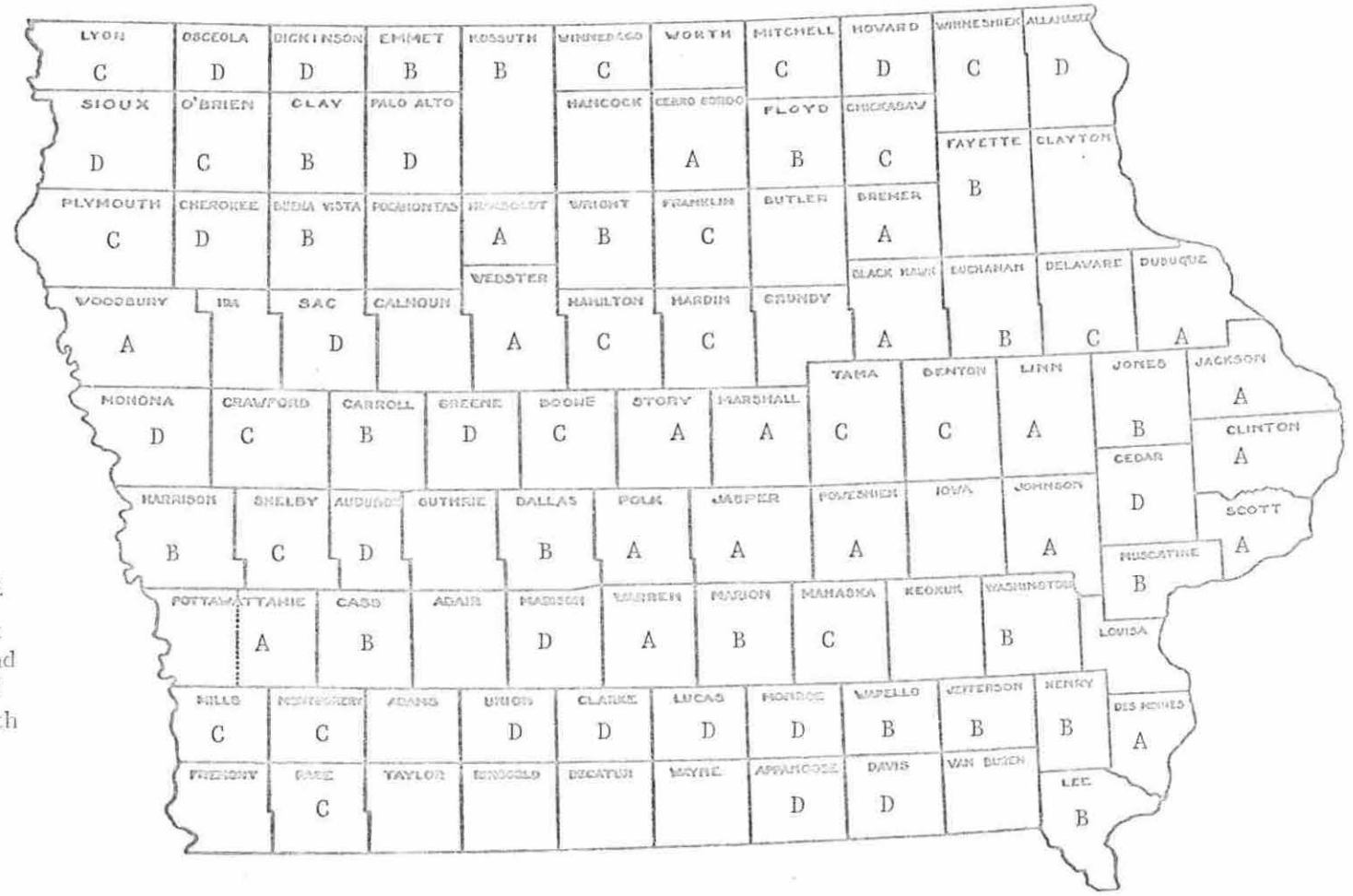
About a third of the low quartile counties on mean urban family income in 1960 were in southern Iowa; another third were in western and northwestern Iowa; with the remainder scattered over the state, Figure 9.

Seventy percent of the high mean urban family income counties were in the high quartile on the number employed in manufacturing, Figure 6, in 1960.

Correlations Among Rural-Farm, Rural-Nonfarm and Urban Family Incomes

Components of all families in Iowa counties include; rural-farm families; rural nonfarm families and urban families with the latter present in only 79 of Iowa's 99 counties. The simple correlation coefficient of mean rural-farm family income per county to mean rural-nonfarm family income per county was $r = 0.655232$ with $n = 99$. The simple correlation coefficient of mean rural-farm family income per county to mean urban family income per county was $r = 0.549292$ with $n = 79$, the lowest of the correlations (only 79 of Iowa's 99 counties have urban population by census definition).

The simple correlation coefficient of mean rural-nonfarm family income per county to mean urban-family income per county in the 79 counties containing urban families was $r = 0.701498$, the highest



Quartiles

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Figure 9. Quartile rank of Iowa's 79 counties with urban population on mean urban family income in 1960 (Source: (39))

correlation of the group.

Interrelationships were shown to exist among the three components of mean all-family income among Iowa counties in 1960. However, mean urban family incomes among Iowa counties in 1960 were higher than mean rural-nonfarm and mean rural-farm family income among respective counties. Mean rural-nonfarm family incomes in turn were higher than those for rural-farm families among Iowa counties in 1960.

It appears that a number of similar forces affecting income level are associated with the three components of all-families among Iowa counties. However, the forces that influence higher county mean family incomes are more associated with urban families than with the rural-nonfarm and rural-farm components of all-family income.

Those forces that influence a lower level of county mean family income are more associated with rural-farm families than with rural-nonfarm and urban families. If the forces associated with higher levels of mean family income among Iowa counties can be identified and increased in the population of Iowa county families, then family income levels can be improved. Likewise if the forces associated with low levels of mean family income among Iowa counties can be identified and decreased within the population of Iowa families, then improvements in the level of county mean family incomes can occur.

CHANGE IN FAMILY INCOME AMONG IOWA COUNTIES FROM 1950 TO 1960

Data were not available for some types of family income on a county basis in 1950 because family incomes were combined with those of unrelated individuals. This was true of rural-farm, rural-nonfarm and urban family incomes in 1950. Thus only all-family income changes among Iowa counties could be examined over the ten-year period from 1950 to 1960.

Median all-family income change from 1950 to 1960 varied from a $402 increase in Osceola County to an increase of $2,926 in Linn County, Figure 10. The increase in median all-family income for Iowa was $1,990 over the ten-year period, Table 2, compared to an increase of $2,301 in median all-family income for the United States.

Quartile A counties, those ranking in the upper one-fourth among Iowa counties on median all-family income increases had increases ranging from $1,887 to $1,926 between 1950 and 1960 and were located mostly in central and eastern Iowa. All fourteen Iowa counties with cities of 25,000 or more in 1960 were in Quartile A on median all-family income increase. Fifteen of the Quartile A counties in 1950 were also in the high quartile on median all-family income change from 1950 to 1960. Only seven of the Quartile D counties, those ranked in the lowest one-fourth on median all-family income in 1950, were among the low quartile on median all-family income change from 1950 to 1960 among Iowa counties.

Eighty-four percent of the Quartile A counties on median all-family income in 1960 were among the high quartile counties on median all-family income change from 1950 to 1960. Half of the Quartile D counties, those ranked in the lowest one-fourth on median all-family income in 1960, were

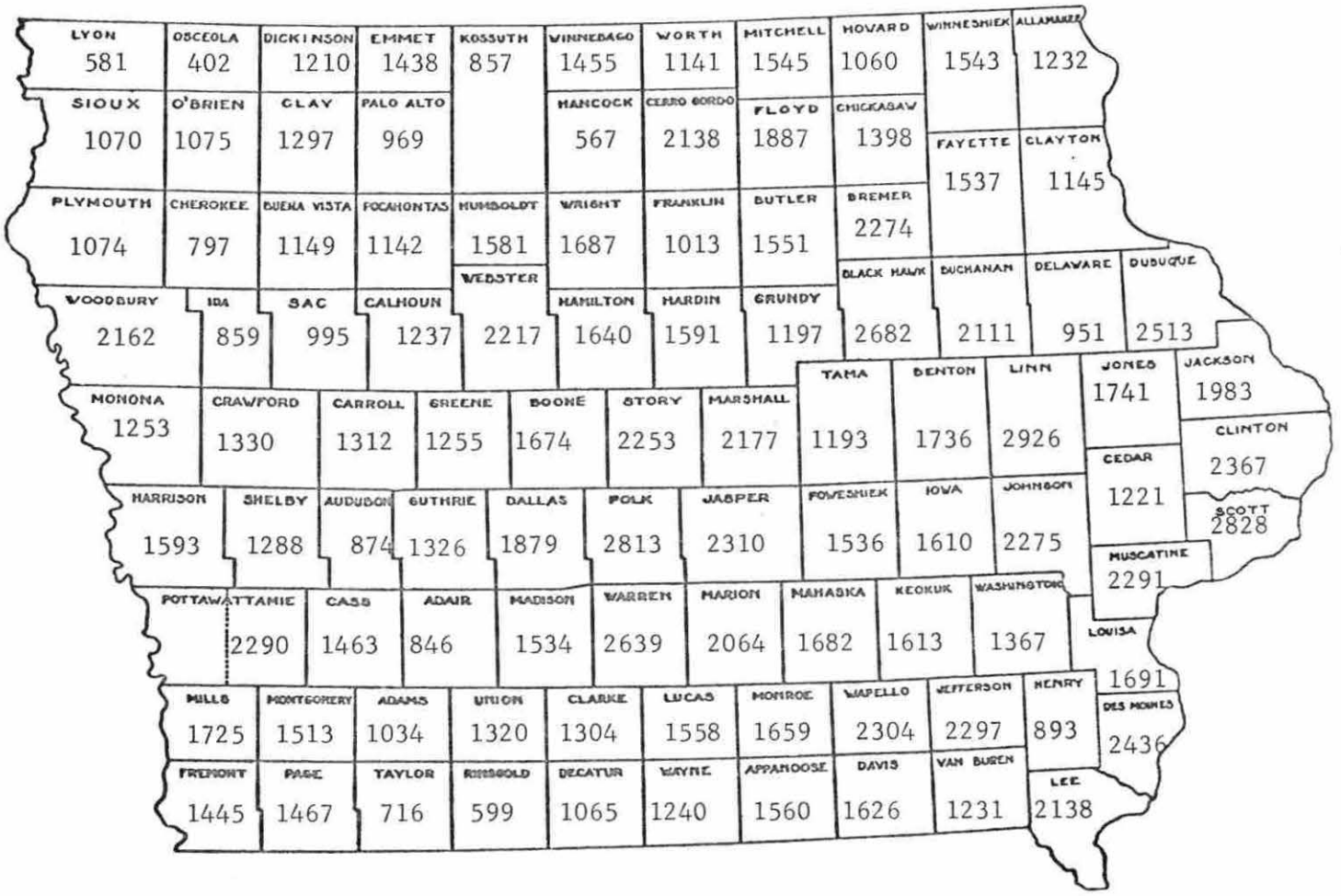


Figure 10. Median all-family income increase in dollars by Iowa counties, 1950 to 1960 (Source: (38, 39))

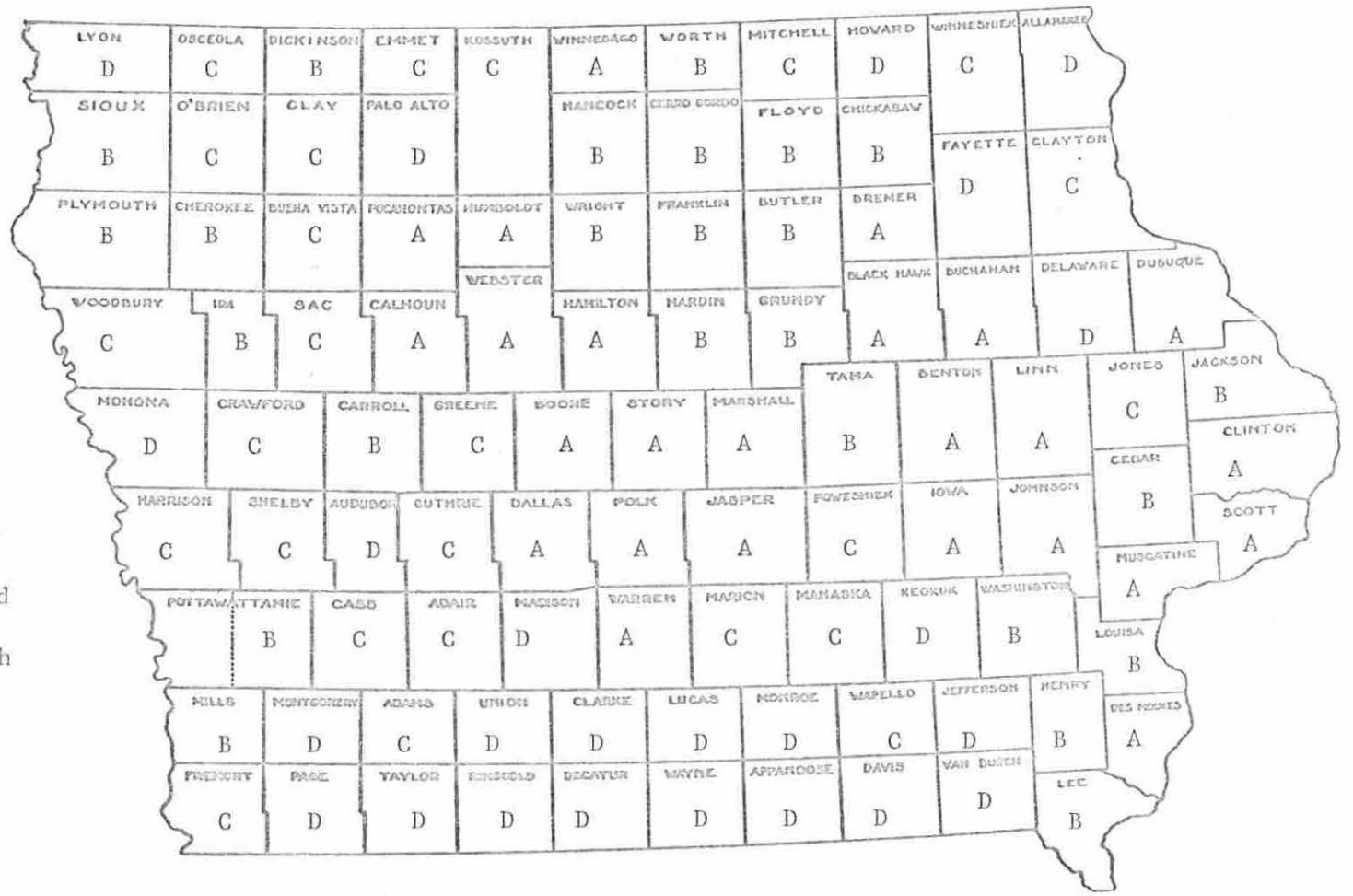
among the low quartile on median all-family income change from 1950 to 1960.

Sixty-four percent of the high quartile median rural-nonfarm family income counties in 1960, Figure 11, were among the high quartile counties on median all-family income change from 1950 to 1960. Eight of the low quartile median rural-nonfarm family income counties in 1960 were among the low quartile median all-family income change counties in 1950 to 1960. Seventeen of the high 25 counties on median urban-family income in 1960 were in the high quartile on median all-family income change from 1950 to 1960. Ten of the low median all-family income change quartile counties had no urban population. Fifteen of the high quartile counties on median rural-farm family income in 1960 were among the high quartile on median all-family income change from 1950 to 1960.

County indices of median all-family income change are shown, Figure 12, with the mean change of $1,594 = 100. The high quartile counties on median all-family income change from 1950 to 1960 had indexes ranging from 121.8 to 188.9. The lowest quartile had indexes ranging from 26.0 to 73.9.

Twenty-six counties ranking in the upper half on median all-family income in 1950 among Iowa counties and also on median all-family income change from 1950 to 1960 were located mostly in central and eastern Iowa. These counties had an average of 58 percent of their families classified as urban in 1950.

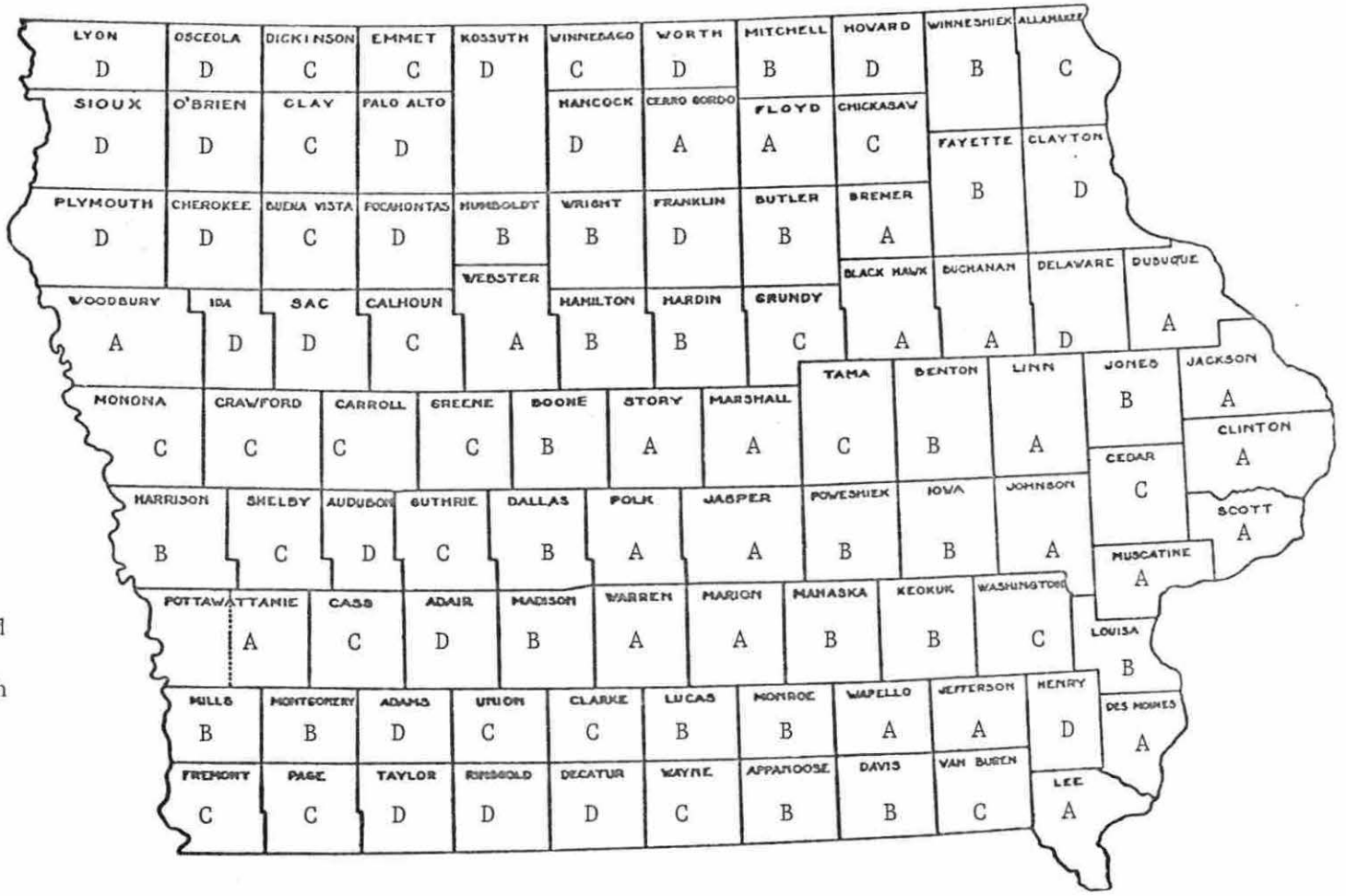
The twenty-four counties, Figure 13, in the upper half of all Iowa counties, when ranked on median all-family income in 1950, and ranked in



Quartiles

A = First
B = Second
C = Third
D = Fourth

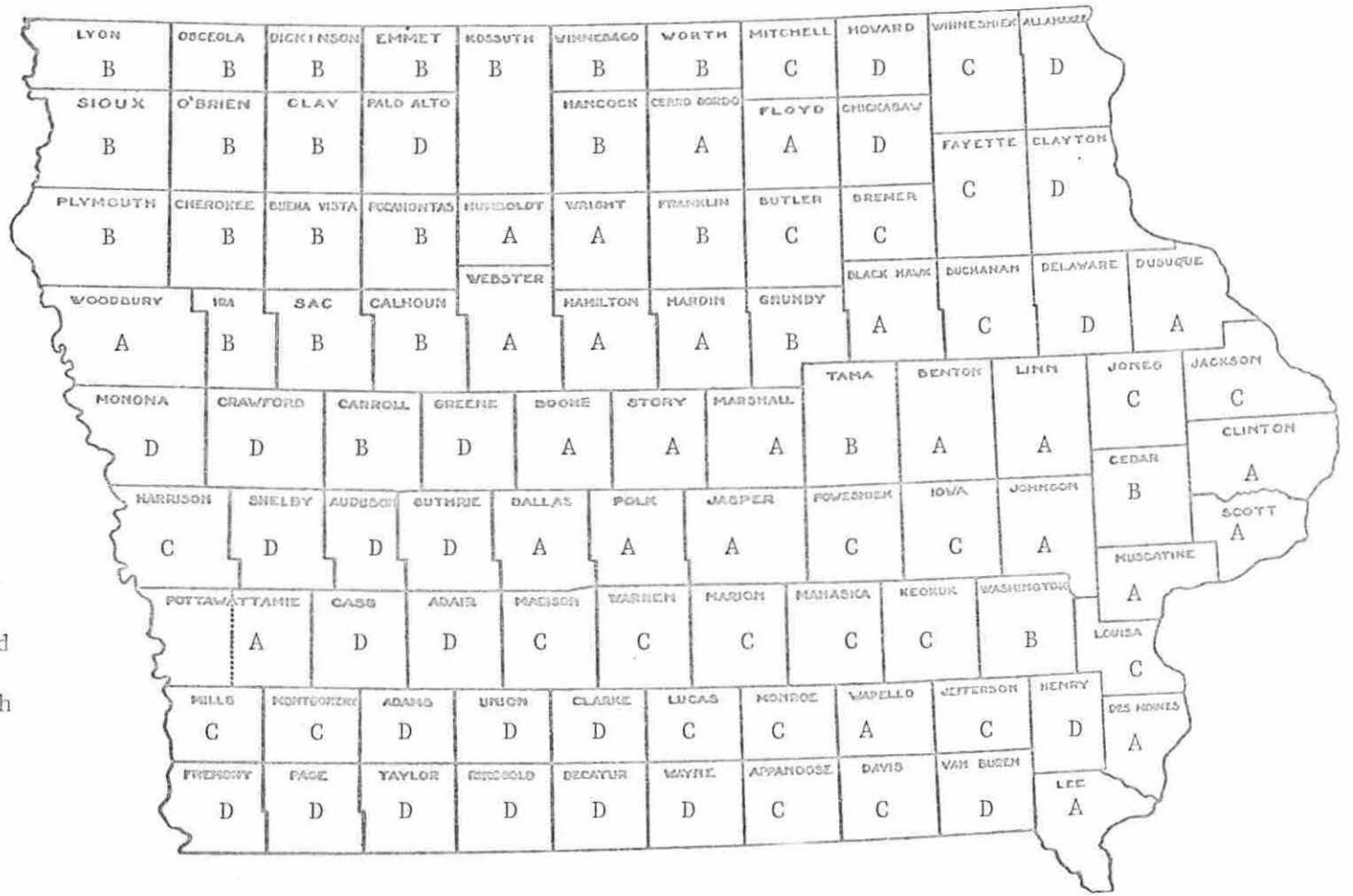
Figure 11. Quartile rank of Iowa counties on rural-nonfarm mean family income, 1960 (Source: (39))



Quartiles

A = First
B = Second
C = Third
D = Fourth

Figure 12. Median all-family income change by quartiles from 1950 to 1960 among Iowa counties (Source: (38, 39))



Quartiles

A = First
B = Second
C = Third
D = Fourth

Figure 13. Iowa counties ranked by quartiles on family income in 1950 and family income change, 1950 to 1960 (Source: (38, 39))

the lower half on median all-family income change over the ten years period from 1950 to 1960, were concentrated in northwest Iowa. These counties had an average of 47 percent rural-farm families. Seven had no urban population.

The twenty-four counties in the lower half of Iowa's counties on median all-family income in 1950 which were in the upper half on median all-family income change from 1950 to 1960, Figure 12, were located mainly in southeast Iowa with a few in the northeast part of the state. The twenty-five Iowa counties ranking in the lower half, both on median all-family income in 1950 and on median all-family income change from 1950 to 1960, were located mainly in southwest Iowa, with a few in the northeastern part of the state.

Although many southern Iowa counties saw a large percentage increase in median all-family income over the 1950 to 1960 period, Figure 4, their 1950 starting base was low and the absolute level of median all-family income reached in 1960, still remained below that of counties in most other parts of the state.

ANALYSIS OF THE VARIATION IN THE LEVEL OF FAMILY INCOMES AMONG IOWA COUNTIES IN 1960 AND THEIR GROWTH OVER THE 1950 TO 1960 PERIOD

General

We have seen that considerable variation did exist in the level of all-family, rural-farm, rural-nonfarm and urban family incomes in 1960 among Iowa counties. Variations were seen in the changes in median all-family income from 1950 to 1960 among Iowa counties. Some of the factors thought to be associated with variations in county median all-family income, were examined. How were differences in the percent of population employed, labor productivity and property assets among Iowa counties associated with county median all-family income differences among Iowa counties in 1960?

Considerable variation was noted in mean rural-farm family income among Iowa counties in 1960. To what degree might the value of land and buildings per farm per county, the percent of farm land operated by tenants in each county, and the percent of farm operators working off the farm 100 days or more in each county be associated with mean rural-farm family income variation among Iowa counties in 1960?

What could account for the variations found in realized net farm income per farm in 1959 among Iowa counties? Could indicies including: the value of land and buildings per farm per county, the capital input per farm among counties, farm workers per farm among counties, departure from average weather in 1958-59 among counties and cattle-hog specialization per farm among Iowa counties in 1959 be related to

realized net farm income variation found among Iowa counties in 1959?

Considerable growth in median all-family income was noted over the 1950 to 1960 period among Iowa counties. How much of the variation in income growth can be accounted for by changes in labor force participation over the 1950 to 1960 period, changes in labor force productivity, changes in property assets per family and labor demand changes over the ten-year period from 1950 to 1960 among Iowa counties?

What influence might size of major community within counties have had on the variation in the level of median all-family income and median rural-farm family income among Iowa counties in 1960?

Before we analyze the contribution the above factors made to family income variability among Iowa counties in 1960 and over the 1950 to 1960 period, it would be well to examine what others have reported on the subject.

Samuelson (32) attributed much of the inequality of incomes in America to the large number of subsistence-level farmers and low-paid Negro workers.

Welch (42) states that although Iowa's per capita personal income has been increasing over the years, the increase has been due primarily to Iowa's slower-than-average rate of population growth. Iowa's population growth was 5.2 percent over the 1950 to 1960 period as compared with 18.5 percent for the U. S. as a whole.

In current programs, to stimulate economic development and increase income, much stress is placed upon the human resource and upon advancement of knowledge. This has real basis, for in assessing the source of

national income among factors of production in the United States, Dennison (10) attributed 77 percent to labor and only 3 percent to land. Furthermore, two-thirds of the income to land was from non-agricultural areas, particularly locations for commercial, industrial, residential or similar use. The remainder was attributed to reproducible capital goods.

Property income as a whole, according to Perloff, et al. (31) contributes only one-eighth of the total personal income on a national basis while transfer payments such as pensions, social security payments and the like are an even smaller part of total income. Perloff, et al. (31) found that of the total income components, it is participation income

> ". . . wages and salaries and other labor income, plus income of unincorporated enterprises — that is the main contributor to state per capita income differentials."

Employment opportunities have greatly increased in the urban metropolitan areas of the U. S. Fifty-three percent of the nation's total employment was in urban and metropolitan areas in 1950; while by 1960, this proportion of the total employment in the U. S. had grown to 61 percent.

While Iowa had only a 1.7 percent gain in total employment from 1950 to 1960 (22) some nine states had increases of over 25 percent in total employment over the same period (35). Some 1,600 U. S. counties were shown to have a sharp decline in total employment, while another 552 counties barely held their own. There has been an accelerated shifting of employment opportunity and increased family incomes to U. S. population centers.

Iowa's seven counties with the largest population centers (Black Hawk, Dubuque, Linn, Polk, Pottawattamie, Scott and Woodbury) saw an increase of 10.7 percent in employment and an increase of 69.8 percent in all-family mean income from 1950 to 1960. The seven counties in 1950 had 29.9 percent of Iowa's families and received 34.1 percent of the state's total family income. In 1960 the same seven had 32.1 percent of Iowa's 711,716 families and received 39.6 percent of Iowa's total family income of $4,272,103,000. The mean income for families of the seven counties was 114 percent of that for all-Iowa families in 1950 and moved up to 121 percent of the mean income of all-Iowa families in 1960.

In cities of from 5,000 to 10,000 employment increased only 1 percent; and there was shown to be a sharp decrease in total employment in population centers of 5,000 and less. In this latter group of counties, employment was found to be highly related to agriculture and opportunity for employment in other areas had not compensated for the decline in agricultural jobs.

These data would indicate that urbanization or non-agricultural employment is related to high income change while lack of it (or a higher percentage of persons in agriculture) was associated with low incomes and low income change.

Above average increases in median all-family income were almost without exception, noted over the 1950 to 1960 period in Iowa counties with cities of 10,000 population or more. Twenty-five such cities are included in twenty Iowa counties. Median all-family incomes ranged above the 65 percent average increase from 1950 to 1960 for the state in all except

three of these twenty counties.

There was a 13.5 percent loss in population in Iowa outside the counties with the twenty-five cities of 10,000 or more population during the 1950 to 1960 period. Fifty-eight Iowa counties had a smaller total population in 1960 than in 1950.

While Iowa's total population over the 1950 to 1960 period was increasing 5.2 percent, the rural population was decreasing 5.3 percent and the urban population was increasing 17.1 percent, bringing Iowa's population to 2,757,537 in 1960.

An important shift has been taking place in Iowa's population over the past several decades from rural to urban and from lower to higher median all-family income.

The number of Iowa farmers decreased 2.8 percent; 5.0 percent; and 9.4 percent over each of the past five-year agricultural census periods ending in 1960 respectively. A total of 288,607 out-migrants were not absorbed by nonfarm job expansion from 1950 to 1960 within the state. Industrial growth in Iowa has been a slow, gradual process unlike the phenomenal growth which has occurred in some states.

In 1950 Iowa had 19 of its 99 counties with over 1,000 workers in manufacturing. This included six of the metropolitan counties (counties with over 50,000 population). According to Bloom (4), manufacturing activity tends to concentrate in relatively few Iowa counties, counties which have long been industrialized. Jefferson was the only county which was included in the nineteen counties which did not contain an urban place of 10,000 or more population in 1950. By 1960, the number of Iowa

counties with 1,000 or more workers engaged in manufacturing had increased to 33. Twenty of these counties had cities of 10,000 or more population, while the other 13 bordered such counties. Of the twenty such counties, nineteen were included in the upper quarter of Iowa counties when ranked on median all-family income in 1960.

The counties in Iowa with the largest proportion of their population employed in farming generally reflect lower family incomes than those counties in which manufacturing and service employment predominate. It should be noted here that data in this report cover money income only. Many farm families may receive other income in the form of housing for which they pay little or no rent and in the form of goods produced and consumed on the farm.

Dennison (10) suggested that about 23 percent of the growth of the U. S. economy between 1929 and 1957 was associated with an increase in education of the labor force. Schultz (34) suggests the growth figure at 30 to 50 percent and believed that between 36 and 70 percent of the hitherto unexplained rise in earnings of labor can be explained by the additional education of workers. In this same vein, J. K. Norton (28) found a high positive correlation between educational development and per capita income. As the relationship of education to family income is further considered, Weisbrod (41) noted that schooling benefits many persons other than the student. Schooling also benefits employers who are seeking a trained labor force and who are usually willing to share some of those benefits from the more highly productive labor force.

In another publication, Schultz (34) compared farm land and school

investments. He stated that while investment in land is large, the rate of return is roughly 5 percent. When compared to the 30 percent or more rate of return estimated to be had from schooling and provides a relatively low return. A recent national report (30) states that the uneducated become the victims of progress rather than its beneficiaries.

Most studies, according to Mauch (25), underestimate considerably the total value of education in our society. Gill (12) stated that in every society a very important kind of intangible capital is its accumulated stock of knowledge, skills and know-how.

Factors Associated With Variation in the Level of All-Family Mean Income Among Iowa Counties in 1960

It was hypothesized that the economic environment among Iowa Counties in 1960 most conducive to high levels of mean all-family income would include three factors: a high level of family and family member employment; a high level of family labor productivity and a high level of property assets per family.

From existing U. S. Population Census data it was not possible to determine the number and percent of families or family members employed in each Iowa county. This factor was represented in an indirect manner for each Iowa county by determining the percent of the population of the county employed. The percentage of the population in the county employed was derived by dividing the population, reported in the C series of the U. S. Population Census for 1960 (39) for each Iowa county, into the

number reported as employed in that county.

Holmes (14) found that as additional full-time earners joined the family work force, family income increased but by amounts less than proportional to the added number of workers. The second and additional full-time earners probably received smaller average incomes than the primary breadwinner. Women, young people, the elderly and others likely to be secondary earners in the family, usually receive less because they have less training or experience or work in lower paying occupations. The families with only one full-time earner may have had more members with part-time work during the year. Jobs by wives working less than full-time can still add substantially to family income. The husbands or other primary full-time earners in the families with two or more job holders, probably had a lower average income than the husbands who were the only full-time workers in the family. The thing that brings many wives into paid employment, according to Holmes (15) is the fact that their husbands do not earn enough to meet all the family needs. About one-third of all U. S. urban wives were in the labor force in 1960, though not all of them were full-time workers. The urban families with 2 earners averaged 35 percent more income than those with 1 earner and the families with 3 or more earners averaged 80 percent more than the 1 earner group. Incomes of the rural-nonfarm and farm families followed the same general pattern as the urban, but at a lower level.

Existing data would not permit the direct measurement of the second factor associated with the level of mean all-family income, the family labor productivity in each Iowa county in 1960. However, an indirect

estimate of this second factor was derived by formulating an index of the productivity level of the labor force of each Iowa county (Figure 15). The number reported as employed in each of eleven occupational groups in the U. S. Population Census for each Iowa county was weighted by the average state income received by each of eleven occupational groups in 1960. The resulting subtotals were summed and the total was divided by the number employed in the county. This was repeated for each Iowa county in 1960. A mean for the state as a whole in 1960 was divided into the total for each county in the respective year to arrive at an index of family labor productivity for each county. The median years of schooling for each of the occupation groups had a correlation of 83.9 with mean wages for each of the groups.

Glasgow (13) stated that among the factors he had been able to test quantitatively for effect on incomes in the South relative to the nation as a whole, education of the labor force does most to explain the differentials. The simple relation between education and income is clear according to the Committee for Economic Development (5). People with much education, on the average, have higher incomes than people with little education. A much larger proportion of people with little education than of people with much education have low incomes. Level of education is closely related to income according to Bird (3). In 1960 the incidence of poverty decreased as the level of education of the U. S. family head increased.

The third factor associated with the level of mean all-family income among Iowa counties in 1960, property assets per family per Iowa county

could not be measured directly from existing data. However, an index of property assets per family among Iowa counties in 1960 was derived from Iowa Tax Commission reports (17) for that year. Seven indicators of property assets for each county were used as a measure of the property assets owned by families in each county in 1960. The total value of monies and credits and various types of real property including the value of farm real estate from the Iowa Tax Commission reports for each Iowa county in 1960 was divided by the number of families in the county to estimate property assets per family.

Pavlick (29) in a study of low family income in West Virginia, found that too few resources divided among too many people was associated with low incomes.

Multiple regression was used in measuring the variation in the level of mean all-family income among Iowa counties in 1960 (Figure 14) associated with three independent variables.

The regression model

$$\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3$$

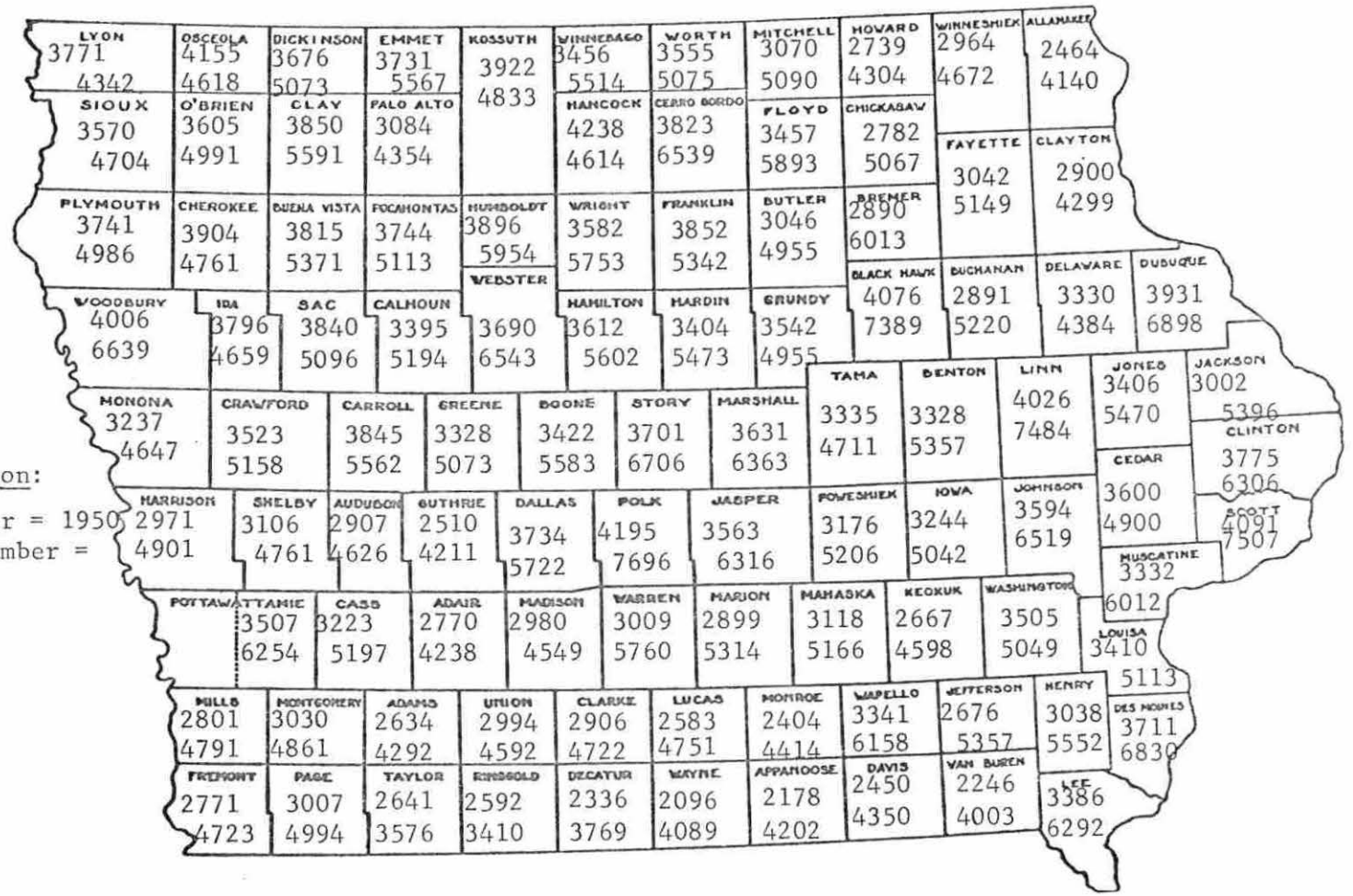
where

$\hat{Y}$ = The level of mean all-family income among Iowa counties in 1960.

X_1 = Percent of population employed in respective Iowa counties in 1960.

X_2 = Index of productivity of the family labor force in respective Iowa counties in 1960.

X_3 = The index of property assets per family per Iowa county in 1960.



Explanation:

Top number = 1950
Bottom number = 1960

Figure 14. Mean all-family income in 1950 and 1960 in Iowa counties (Source: (38, 39))

with

$$\hat{Y} = -7288.404059 + 41.266546X_1 + 97.592879X_2 + 0.447041X_3$$

A considerable amount, 84.9 percent (highly significant) of the variation in the level of mean all-family income in 1960 is thus explained by the above model involving the three independent variables; percent of county population employed; index of county family labor productivity and the index of property assets per family per county, Table 5.

The multiple regression coefficient 41.266546 (significant) was found to be associated with each unit change in the percent of population employed. A one percent change in the percent of population employed resulted in a change of $14.85 in mean all-family income for the state. The percent of population employed is shown to be an important factor associated with the variation in mean all-family income among Iowa counties in 1960.

Appanoose County with 31.8 percent of its population employed in 1960 had only 56.1 percent as much mean all-family income as Linn County which had 40.7 percent of its population employed.

A higher percent of the population employed in a particular county resulted in a larger mean all-family for that county. Conversely a lower percent of the population employed in a county resulted in a lower mean all-family income for that county. This quantitative factor is an important one influencing mean all-family income differences among Iowa counties.

The "b" value of 97.592879 (highly significant) was found to be associated with each unit change in the productivity level of the labor

force among the counties in Iowa in 1960. A one percent change in the index of labor force productivity resulted in a change of $97.61 in Iowa mean all-family income. The higher level of index of labor productivity in a particular county would be expected to result in a higher level of mean all-family income in that county, other things being equal (Figure 15). Polk County, for example, in 1960 had an index of labor productivity 1.32 times higher than that of Ringgold County. Polk County also had a median all-family income 2.25 times larger than that of Ringgold County. Proper compensation for this higher productivity would mean higher mean all-family incomes to families of that county. This is brought out further by the fact that twenty-one of the quartile A Iowa counties, the high ranking one-fourth in 1960 on median all-family income, were also in the high quartile on index of labor productivity (Figure 16). Conversely fourteen of the low indexing Iowa counties on labor productivity were also in quartile D, the lowest ranking one-fourth on median all-family income in 1960.

A multiple regression coefficient of 0.447041 (highly significant) was found to be associated with a unit of change in property assets among Iowa counties in 1960 (X_3). A one percent change in the index of property assets resulted in a $12.84 change in mean all-family income for Iowa. Polk County, with two and one-half times the index of property assets per family of Ringgold County, had 2.26 times more median all-family income. However, only nine of the high-property-indexing Iowa counties were among the high twenty-five on median all-family income.

A parallel might be found between the comparison of income differences

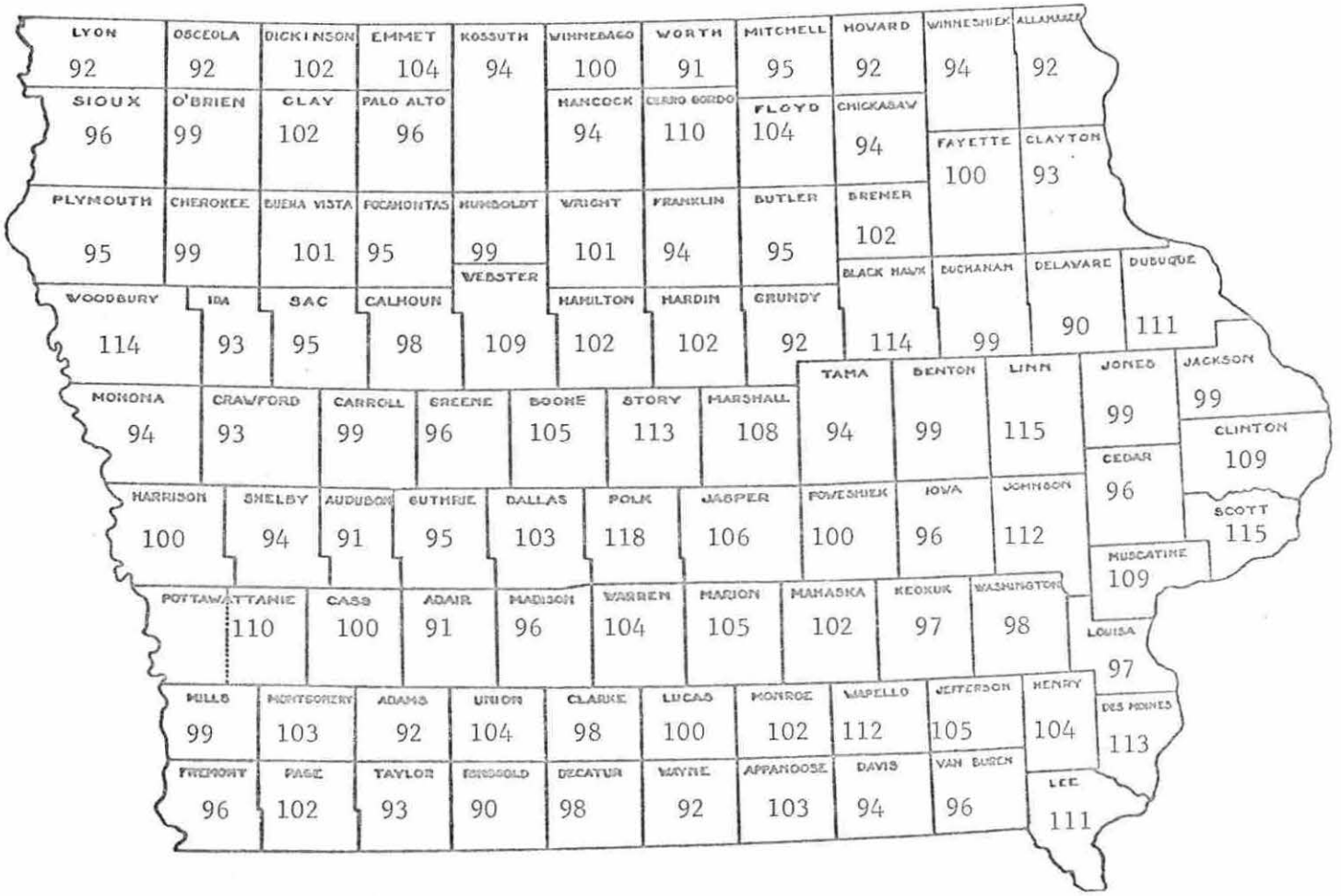


Figure 15. Index of productivity of the labor force of Iowa counties in 1960 (Source: (39))

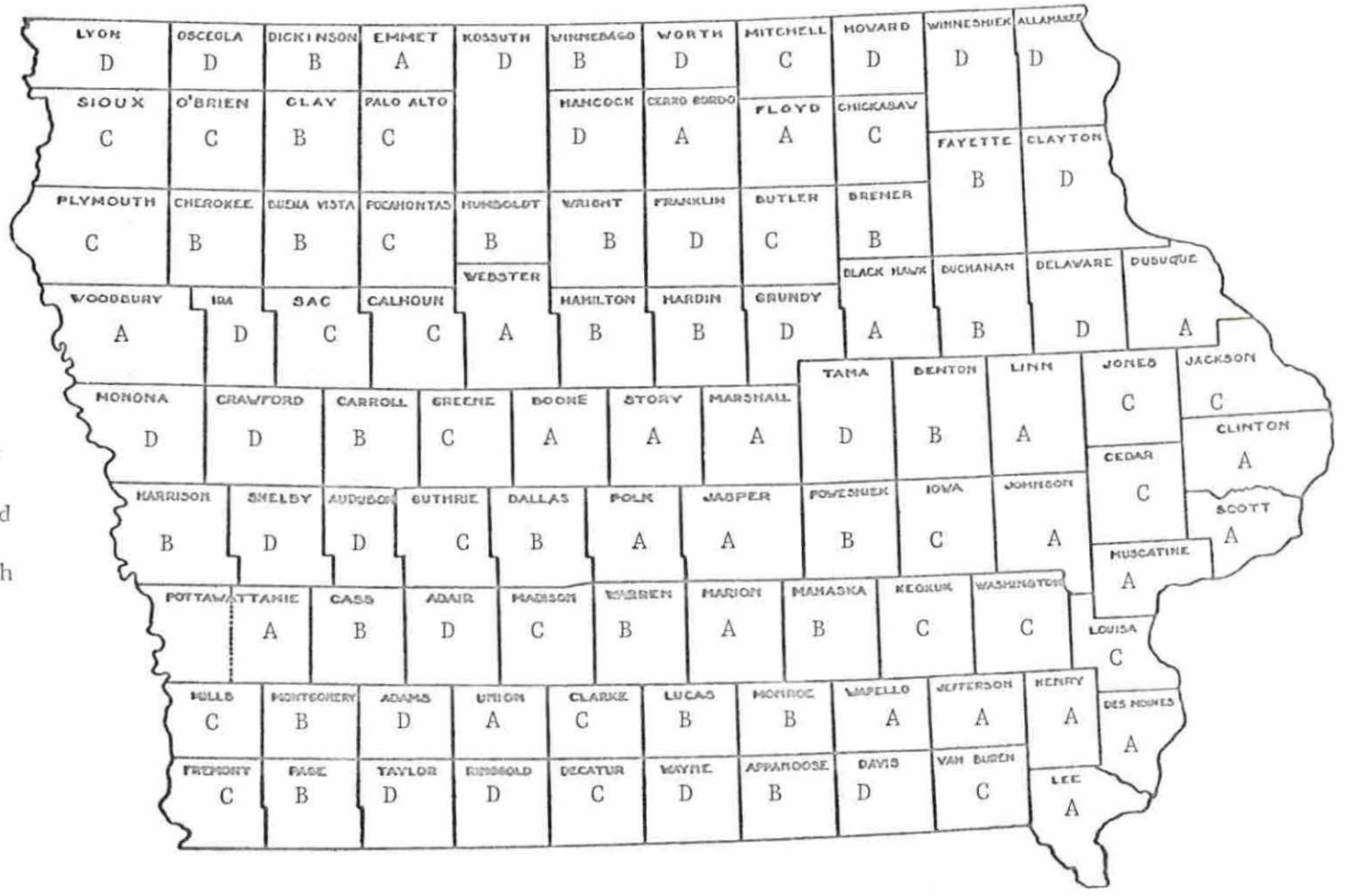


Figure 16. Iowa counties ranked by quartiles on index of labor productivity in 1960 (Source: (39, 40))

among Iowa counties and an analysis of interstate differences in per capita participation-income by Perloff et al. (31). They found two key determinants associated with interstate income differences were: (1) percentage of population employed and (2) average earnings of employed persons. They also found that in states of high participation income that a relatively high proportion of the population is found to be 14 years or older and that a high proportion of this group is in the labor force. Iowa ranked first among all the states in 1960 in the proportion of its population which was over 65 and many of whom are not a part of the labor force.

Factors Associated With the Variations in Rural-Farm Family Mean Income Among Iowa Counties in 1960

The hypothesis considered was that an important part of the mean rural-farm family income difference among Iowa counties in 1960, Figure 8, were associated with three factors: (1) the volume of farm business per farm (2) the degree of tenancy within the county and (3) the proportion of the farmers within the county working off the farm 100 days or more.

The assumption was that a relatively larger volume of farm business per farm per county, a higher percent of farms owned by the operator per county, and a greater proportion of the farmers per county working off the farm 100 days or more, would result in a relatively higher mean rural-farm income for a county than where these factors were relatively less. The rational for the above assumption was that a larger volume of farm business per farm would result in economies of scale, owner-operator farms would have more of the return accruing to the operator, and

additional off-farm income would be added to that produced on the farm.

Multiple linear regression is used to explain the mean rural-farm family income among Iowa counties in 1960, Figure 8, associated with the three independent variables.

In regression model $a + b_1X_1$

$$\hat{Y} = a + b_1X + b_2X_2 + b_3X_3$$

where

$\hat{Y}$ = Mean rural-farm family income among Iowa counties in 1960.

X_1 = The value of land and buildings per farm among Iowa counties in 1960.

X_2 = The percent of farm land in each Iowa county operated by tenants in 1960.

X_3 = The percent of farm operators working off-farm 100 days or more in 1960.

The result

$$\hat{Y} = 2215.247943 + .028064X_1 - 4.454276X_2 + 58.509618X_3$$

with

$$R^2 = 0.447621$$

thus 44.8 percent of the variation in the level of mean rural-farm family income among Iowa counties in 1960 is explained by the three independent variables.

The coefficient value of 0.028064 (highly significant) was found to be associated with each unit change in the size of the farm business, Table 10. The per-farm-value of land and buildings among Iowa counties in 1960 varied from a low of $19,804 in Monroe County to a high of $80,788 in Humboldt County. Six other counties besides Humboldt had

per-farm investments in land and buildings exceeding $70,000. These included Calhoun, Greene, Grundy, Pocahontas, Webster and Wright counties.

A one percent change in the value of land and buildings per farm for the state other factors held constant resulted in a $13.85 change in the mean farm-family income for Iowa.

The percentage of farmland in the county which was operated by tenants varied from a high of 58.7 percent in Calhoun County to a low of 16.0 percent in Monroe County. Lyon, Grundy and Emmett Counties had over 55 percent of the farmland in the county operated by tenants. A total of twenty counties had over fifty percent of the farmland operated by tenants.

As the percent of farmland operated by tenants increased, the mean rural-farm family income decreased as was evidenced by the minus value of the coefficient b = - 4.454276. However the coefficient was not statistically significant (nonsignificant). The farm tenant operator must share returns from the land resource not owned with the owner. Those Iowa counties with a higher percent of land operated by tenants, other things being equal, would tend to have lower rural-farm family income. A one percent change in this factor resulted in a change of only $1.74 in Iowa mean farm family income.

The percentage of farm operators working off the farm 100 days or more varied from 4.6 percent in Osceola County to 32.9 percent in Wapello County. In six Iowa counties over 25 percent of the farm operators worked off the farm for 100 days or more during the year. These included Wapello, Davis, Des Moines, Monroe, Polk and Warren counties. Sixteen counties had 20 percent or more of their farm operators working off the

farm 100 days or more during the year.

The coefficient or "b" value 58.509618 (highly significant) was found associated with a unit of change in the percent of farm operators working off the farm 100 days or more, Table 10. A one percent change in this factor resulted in a $8.19 change in mean farm family income for Iowa.

It was found that two essentials for higher income were in evidence here: both the need for additional income to supplement that from the farm as well as the opportunity for a non-farm job within commuting distance of the farm. Improved automobiles and highways plus the creation of more nonfarm jobs in Iowa, have provided more off-farm job opportunities. Some counties are in less favored locations in spite of these improvements in relation to nonfarm jobs. Thirty-one counties had less than ten percent of their farmers working 100 days or more at off-farm employment during the year.

Thus two factors above are found associated in a positive way with mean rural-farm family income among Iowa counties in 1960. A larger value of land and buildings per farm and a larger percent of farm operators working off the farm 100 days or more were found associated with higher mean rural-farm family incomes among Iowa counties. However, a larger percent of farmland operated by tenants, other things being equal, tended to push mean rural-farm family income among Iowa counties in a negative direction.

Des Moines County with 2.1 times the mean rural-farm family income of Ringgold County in 1960 had 1.7 times more value in land and buildings

per farm; about the same percent of land operated by tenants; and about twice the number of farm operators working off the farm 100 days or more.

Factors Associated With the Variation in Realized Net Farm Income Per Farm in 1959 Among Iowa Counties

The hypothesis considered was that the variation in realized net farm income per farm among Iowa counties in 1959 was associated with five variables. The first variable, the value of land and buildings each farmer has to work with, is an important input associated with realized net farm income. The more land the farmer has, the more acre units of potential production he has. When the land and buildings factor is measured by its value, the quantity and quality of both tend to be combined into one measurement of productivity and potential realized net farm income. When the buildings are included in the value with value of land, the tools of production such as housing for the family labor supply for the farm; storage for harvested crops and protection for livestock and machinery all can contribute to more realized net farm income. In many individual cases the farmer can spend excessively for farm buildings or the land may be valued beyond its agricultural productive worth due perhaps to its geographic location for nonagricultural purposes. The assumption here is that deviation from normal investment in land and buildings in relation to productivity would tend to average out among counties.

The first of the five factors associated with realized net farm income, the value of land and buildings per farm per county, was measured by an index that was derived by dividing tabulated county figures for the

1959 value of land and buildings per farm for each Iowa county as reported in the 1959 Census of Agriculture (37) by the state value of land and buildings per farm and multiplying by 100.

The second factor, capital inputs, is becoming increasingly important especially in relation to labor as farmers adopt more and more modern technological practices. Included were such capital input items as grains, combines, corn pickers, pickups, balers, motor trucks, tractors, milking machine, field forage harvestors and livestock, including milk cows, other cattle and calves and hogs and pigs. The assumption was made that the average value of the machine items was seventy-five percent of that of the value of new machines. The assumption was made that other cattle would be on the farm about three-fourths of the year and hogs half of the year so the total values were listed at these respective percentages or part of the capital inputs per farm. Each of the above machinery and livestock capital input items in each county were multiplied by their respective listed value weight and summed. Each county was then divided by the number of farms in the county to get the average per farm. The total sum for all Iowa counties was divided by the total number of Iowa farms to obtain a state average per farm and this figure was divided into the figure for each county to derive a county index of capital input per farm. Here again, as with land and buildings, the capital input items, especially machinery may be inventoried on individual farms in amounts beyond their ability to best fit with the other factors of production. The imbalance would result in inefficiency and less realized net farm income than could otherwise be had. However, it is

assumed that any such deviation as the above would equalize among counties.

Farm labor, the third of the five factors felt associated with realized net farm income variation among Iowa counties in 1959, is relatively less important than some of the other inputs, especially value of land and buildings and capital inputs. For estimating farm workers per farm by counties, the self-employed male and female worker and the unpaid male and female family workers in agriculture as per the Table 14, General Social and Economic Characteristics, 1960 Population Census for Iowa (39) was used. The above four items were summed for each county, the number working off the farm 100 days or more (from Table 4 part 16 of the 1959 Census of Agriculture) in the county, was subtracted to give an adjusted total which was divided by the number of farms in the county and this figure was divided by the similarly derived state figure and multiplied by 100 to get an index of farm workers per farm by counties.

The fourth factor associated with realized net farm income was the departure from normal weather in 1958 and 1959 by counties. An index representing this factor was derived indirectly by considering the corn yield per acre over the 1945-54 period, for each county as an average normal base, then the average yield for corn for 1958 and 1959 for each county was averaged and the 1945-54 base period figure divided into it to arrive at a figure and the state figure divided into that figure for each county to arrive at an index of departure from normal weather. Iowa farmers claim there is no such thing as a normal weather year, however, they do grant that some more nearly approach normal than others.

The fifth and final of the factors considered here is associated with

realized net farm income per farm by counties in 1960 was that of cattle-hog specialization. An index of this factor was derived by estimating value added through subtracting cattle and calf purchases from sales dividing their total for each county into the sales of live hogs and pigs by counties and dividing the similarly derived state ratio into that sum to arrive at an index for the county (data derived from the 1959 Census of Agriculture).

A multiple regression model is used in explaining the variations in realized net farm income per farm among Iowa counties in 1959 as it is associated with the five independent variables discussed above.

The model

$$\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5$$

where

$\hat{Y}$ = Realized net farm income per farm among Iowa counties in 1959.

X_1 = Index of the value of land and buildings per farm among Iowa counties in 1959.

X_2 = Index of capital input per farm among Iowa counties in 1959.

X_3 = Index of farm workers per farm among Iowa counties in 1959.

X_4 = Index of departure from average weather in 1958-59 among Iowa counties.

X_5 = Index of cattle-hog specialization per farm among Iowa counties in 1959.

The result

$$\hat{Y} = 3207.644800 + 18.252180X_1 + 30.224248X_2 + 2.591853X_3 + 21.863938X_4 + 0.786752X_5$$

The resulting coefficient of determination was $(R^2) = 0.554783$. Thus 55.5 percent of the variation in realized net farm income among Iowa counties is accounted for by these five factors, Table 5. Each factor appeared to be associated in a positive manner with the variation in realized net farm income among Iowa counties. Some carried more weight than others. The five factors varied in the manner and the amount they related to realized net farm income variations among Iowa counties in 1959.

The index of the value of land and buildings incorporating both the quantity and quality of the land and buildings input index was found to have the highest correlation of the five with realized net income per farm with r = 0.661081 (highly significant), Table 6. The corresponding "b" value of 18.252180 for this factor was highly significant. A one percent change in this factor resulted in a change of $17.98 in mean realized net farm income for Iowa.

The index of capital input per farm for each Iowa county encompassed the value of several types of machinery and various livestock common to well managed farms. As stated previously, farm machinery and a livestock program of scope add to the farm income when properly managed. The second highest correlation of the five was found between the capital input index and realized net income per farm among Iowa counties in 1959 with r = 0.532607 (highly significant). The corresponding "b" value of 30.224248 for this factor was highly significant, Table 5. A one percent change in the index of capital input per farm resulted in a change of $29.92 in realized net per farm income for Iowa.

Table 5. Results of regression of selected factors on family income level in 1950 and 1960 and on family income change from 1950 to 1960 among Iowa counties

Dependent variables	Independent variables	b value	Standard error of b	T value	D.F.	F ratio	R^2
Level of All-Family mean income among Iowa counties in 1960	Percent of county population employed in 1960	41.266546	19.848121	2.079116*			
	Index of labor force productivity of county in 1960	97.592879	5.564462	17.538600**	3/95	133.306**	.848779
	Index of property assets per family for county in 1960	.447041	.060643	7.371691**			
Level of Rural-farm family mean income among Iowa counties in 1960	Value of land and buildings per farm among Iowa counties in 1960	.028064	.006208	4.520511**			
	Percent of farmland in each county operated by tenants in 1960	-4.454276	9.656590	.461268	3/95	19.246**	.447621
	Percent of farm operators working off-farm 100 days or more in 1960	58.509618	9.825425	5.954920**			

Table 5 (Continued)

Dependent variables	Independent variables	b value	Standard error of b	T value	D.F.	F ratio	R^2
Realized net farm income per farm among Iowa counties in 1959	Index of the value of land and buildings per farm among Iowa counties in 1959	18.252180	2.471318	7.385605**			
	Index of capital input per farm among Iowa counties in 1959	30.224248	7.471949	4.045028**		19.315**	.554783
	Index of farm workers per farm among Iowa counties in 1959	2.591853	6.389170	.405663	5/93		
	Index of departure from average weather in 1958-59 among Iowa counties	21.863938	9.230996	2.368535*			
	Index of cattle-hog specialization per farm among Iowa counties in 1959	0.786752	1.571764	.500554			

Table 5 (Continued)

Dependent variables	Independent variables	b value	Standard error of b	T value	D.F.	F ratio	R^2
Growth in all-family income from 1950 to 1960	Index of change in county labor force participation from 1950 to 1960	-3.880213	1.014246	-3.825712*			
	Index of change in county labor force productivity, 1950 to 1960	1.276923	9.562224	0.133538	4/94	24.719710**	0.512647
	Index of change in property assets per family per county, 1950 to 1960	1.014195	5.445793	1.862345			
	Index of labor employment demand change per county, 1950 to 1960	4.897366	5.884562	8.322397**			

Table 6. Correlation matrix for factors explaining county variation in realized net farm income per farm, 1959[a]

Variable	Y^b	$X_1{}^c$	$X_2{}^d$	$X_3{}^e$	$X_4{}^f$	$X_5{}^g$
Y^b	1.00+					
$X_1{}^c$	.66+	1.00+				
$X_2{}^d$	.53+	.39+	1.00			
$X_3{}^e$	.32+	.22+	.69+	1.00+		
$X_4{}^f$	.20-	.34-	.49-	.40-	1.00+	
$X_5{}^g$	.08-	.13-	.10-	.12+	.04+	1.00+

[a]Source: (39, 40)

[b]Y = Realized net farm income per farm in 1959 among Iowa counties

[c]X_1 = Index value of land and buildings per farm

[d]X_2 = Index of capital input per farm

[e]X_3 = Index of farm workers per farm

[f]X_4 = Index of departure from normal weather 1958-59

[g]X_5 = Index of cattle and hog specialization

The labor factor although becoming a smaller part of the total farm input is very important as increased amounts of land and capital are managed and operated by the individual. In using this factor, labor quality is assumed equal among the counties.

The correlation between the index of farm workers per farm and realized net income per farm was r = 0.317423 (highly significant). The "b" value for this factor of 2.591853 was nonsignificant. A one percent change in this independent variable resulted in a $2.57 change in realized net per farm income for Iowa.

Weather is still an important factor in farm production. Any considerable variation from normal weather in the census year or preceding it that would affect soil moisture available to crops going into the census production year or adverse weather during the year affecting planting, cultivation or harvesting, could be reflected in net farm income for the year.

An index for the weather factor was based on corn yields over a ten-year period in relation to the 1958-59 years, as reflecting normal or abnormal weather. In Iowa where little land is irrigated, extremely dry weather can be a yield and eventually net farm return depressing factor. Also, where inputs are more used to maximum capacity such as fertilizer, herbicides and the like and with high plant populations, anything less than normal moisture can be a deterrent to expected high yields. Any reduction in crop yields results mostly in a reduction in the net portion of farm returns.

The index of departure from normal weather was found to be negatively

correlated with realized net farm incomes per farm among Iowa counties in 1959 with r = - .196867 (significant). The "b" value for this factor of 21.863938 was significant. A one percent change in this factor resulted in a change of $16.53 in realized net per farm income for Iowa.

The index measuring the specialization in hogs and cattle, the fifth factor associated with realized net farm income per farm among Iowa counties, should reflect the additional income derived by processing more grain through hogs and cattle. The larger sales per farm should result in a larger realized net farm income. However in this study, the index of cattle-hog specialization is negatively correlated with net farm income per farm with r = - 0.07885 (nonsignificant). The "b" value for this factor of 0.786752 was nonsignificant. A one percent change in this fifth factor resulted in a change of $0.88 in realized net per farm income for Iowa.

The index of farm workers per farm and the index of cattle-hog specialization per farm among Iowa counties in 1959, appeared to have the least association to net farm income per farm of the five indexes considered. These two "b" values did not have statistical significance whereas the other three indexes had significant coefficients.

Farm labor is a less important part of total inputs than it once was. The years when cattle and hogs are low in price compared to other farm produce, that type of specialization would be expected to result in lower net farm returns because of the greater volume of low priced produce relatively to the total. When near-normal cattle-hog prices prevail, then the specialized farmer should benefit from the special enterprise

skills and greater volume of production he adds by specializing.

Factors Associated With Variation in Growth in Median All-Family Income Among Iowa Counties from 1950 to 1960

The hypothesis was made that the variation in the growth in median all-family income over the 1950 to 1960 period among Iowa counties, Figure 10, was associated with four factors.

Multiple regression was used to explain the relation of the four factors to the variation in the dollar growth of median all-family income from 1950 to 1960.

The model

$$\hat{Y} = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

where

$\hat{Y}$ = dollar growth in median all-family income over the 1950 to 1960 period among Iowa counties.

X_1 = Index of change in labor force participation over the 1950 to 1960 period among Iowa counties.

X_2 = Index of change in family labor force producitivty over the 1950 to 1960 period among Iowa counties.

X_3 = Index of change in property assets per family over the 1950 to 1960 period among Iowa counties.

X_4 = Index of labor employment change over the ten-year period from 1950 to 1960 period among Iowa counties.

The result

$$\hat{Y} = 5.939165 - 3.880213X_1 + 1.276923X_2 + 1.014195X_3 + 4.897366X_4$$

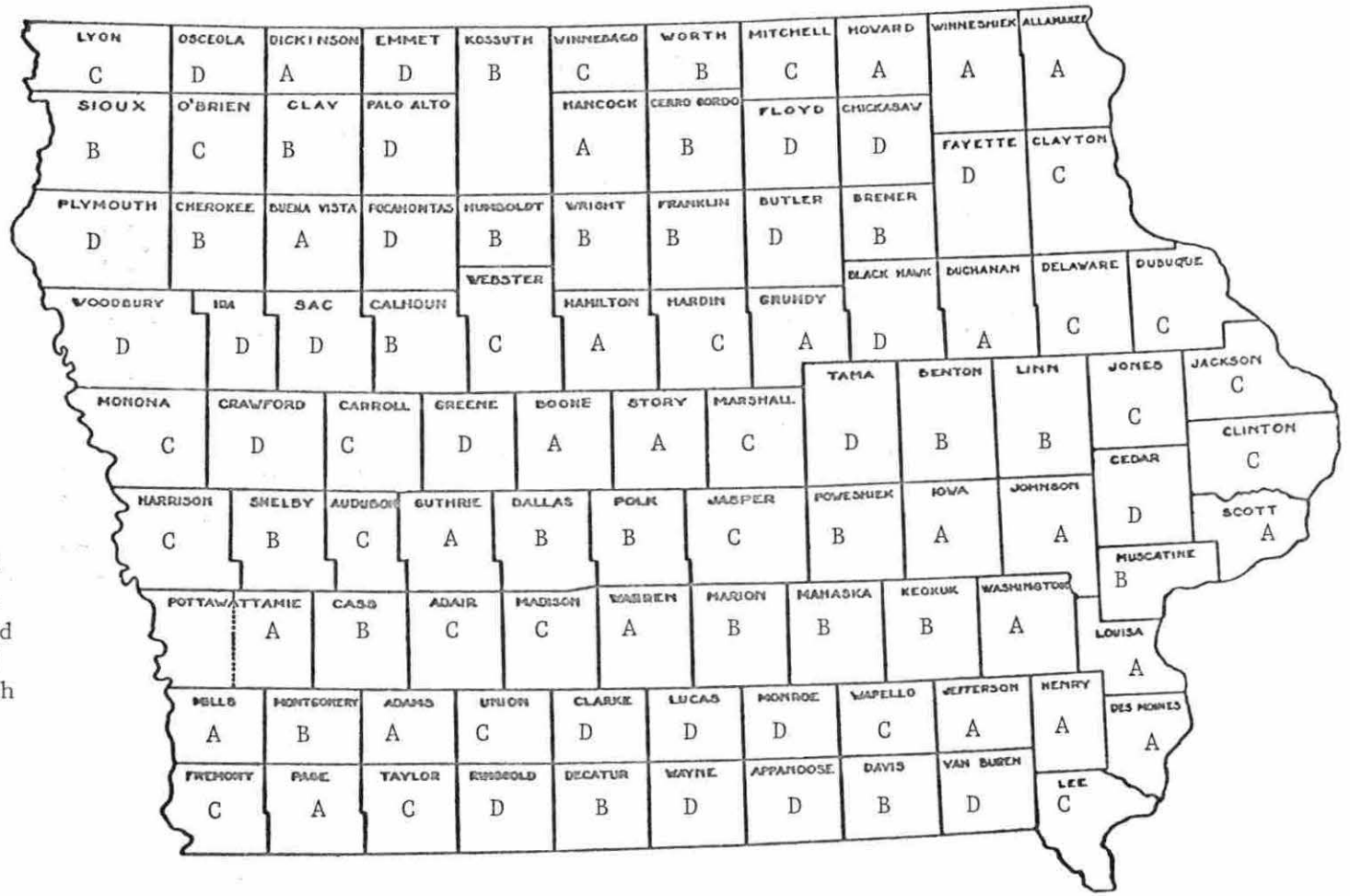
The coefficient of determination was $R^2 = 0.512647$. Thus 51.26 percent (significant) of the variability in the growth of median all-family income from 1950 to 1960, is explained by the four independent variables,

Table 10.

The first factor, the change in the labor force participation among Iowa counties from 1950 to 1960, Figure 17, was measured as follows: The number enrolled in school 14 to 29 years was subtracted from the total civilian population 14 years and older for the county, then the total number employed was divided into the result. A similar percentage figure for 1960 for each county was obtained, then the 1950 figure was divided into the 1960 figure to arrive at an index of change in family labor force participation.

It was hypothesized that low median all-family income counties in 1950 were motivated by the low income position toward a greater labor force participation. Statistical proof was sought, however, a low correlation ($r = 0.03991$) was found between rank on all-family median income in 1950 and rank on the index of change in labor force participation over the 1950 and 1960 period among Iowa counties. However, this factor had a significant "b" value of - 3.825712.

Counties with relatively high median all-family incomes in 1950 did not evidently have the pressure toward larger force participation that low income counties had but still made more rapid growth in median all-family income over the 1950 to 1960 period, due perhaps to greater economic opportunity. The second factor, index of county family labor productivity for 1950, was computed in the same manner as the explained earlier for 1960 with the index of county family labor productivity for 1950 for each county subtracted from that of 1960 for respective counties to determine the change in the index of county family labor productivity



Quartiles

A = First
B = Second
C = Third
D = Fourth

Figure 17. Quartile rank of index of change in labor force participation among Iowa counties, 1950 to 1960 (Source: (38, 39))

from 1950 to 1960 among Iowa counties. The mean change for the state was then divided into that for each county to attain an index of labor productivity change for the county. Public education has been generally available for a number of years, however, people in all counties have not taken full advantage of the opportunity. When Iowa counties are compared on labor force productivity or skill, it is noted that many of the initially high income counties were already at a high level of productivity. Many of those pushed off the farm may lack the productivity level of others who remain. They migrate into the urban centers found in high income counties and tend to moderate the increase in labor productivity improvement. This is shown by a significant coefficient for this factor associated with the variation in the level of mean all-family income among Iowa counties in 1960 but less important differences in change shown associated with this factor over the 1950 to 1960 period when b = 1.276923 (nonsignificant) and a low correlation of 4 = .1030 (nonsignificant) Table 7, with change in median all-family income over the ten-year period.

Scott County with an index of labor productivity change of 115.0 compared to an index of change of 89.6 for Ringgold County had a median all-family income increase of $2,828 from 1950 to 1960 which was 4.7 times that of Ringgold County. Education and training are becoming increasingly important. Increased lifetime income is generally associated with additional education. However, Cowhig (8) states that differences in education account for only a minor part of farm non-farm income differences. Cowhig states that, for example, if males 25-44 years old living on farms and those living in central cities in 1960 had had

Table 7. Correlation matrix for factors explaining growth variation in median all-family income among Iowa counties from 1950 to 1960[a]

Variable	Y[b]	X_1[c]	X_2[d]	X_3[e]	X_4[f]
Y[b]	1.0000				
X_1[c]	0.2301	1.0000			
X_2[d]	-0.1030	-0.0738	1.0000		
X_3[e]	0.3412	0.1152	-0.3265	1.0000	
X_4[f]	0.6384	0.6921	-0.1079	0.2787	1.0000

[a]Source: (38, 39)

[b]Y = All-family median income growth, 1950 to 1960

[c]X_1 = Change in the index of labor force participation among Iowa counties, 1950 to 1960

[d]X_2 = Change in the index of labor productivity among Iowa counties, 1950 to 1960

[e]X_3 = Change in the index of property assets among Iowa counties, 1950 to 1960

[f]X_4 = Change in the index of labor employment among Iowa counties, 1950 to 1960

identical educational distributions, the aggregate income of farm males would have been increased by 16 percent. But if farm males had received incomes equal to those of central city males with similar levels of

education, the aggregate income of farm males would have been increased by 55 percent. This means that under existing income differences, an increase in the educational level of farm males to the level of central city males would have raised the aggregate income of farm males only about 30 percent as much as if farm and urban incomes for each educational level were equalized with no improvement in education of the farm males at all. Income differences between farm and urban residents, according to Cowhig, are due less to differences in education than to occupational distributions and the associated lower earnings of farm workers in agriculture.

The effect of the education level upon the income of American males as shown by Miller (26) appears in Table 8. Education serves several important functions in stimulating median all-family income growth. It provides the basis for the acquisition of skills which command a higher return in the labor market. The dissemination of knowledge contributes to the continued development and increased productivity of the family wage earner or earners with the resulting increase in income.

The late President Kennedy stated (20) in his January 1963 message on education that

> "This nation is committed to greater investments in economic growth and recent research has shown that one of the most beneficial of all such investments is education, accounting for some 40 percent of the nation's growth and production in recent years. Education is an investment which yields a substantial return in the higher wages and purchasing power of trained workers, in the new products and techniques which come from skilled minds and in the constant expansion of this nation's storehouse of useful knowledge."

The middle-income family spends a substantial amount (nearly $10,000 to

Table 8. Education and lifetime earnings: men[a]

Highest grade completed	Earnings at 1960 rates[b]
All education groups	$229,000
Elementary school	
Less than 8 years	143,000
8 years	184,000
High School	
1 to 3 years	212,000
4 years	247,000
College	
1 to 3 years	293,000
4 years	385,000
5 years or more	455,000

[a]Source: (26)

[b]These are the total amounts that a man with the specified education would earn from age 18 to age 64 if he earned at each year of age the average income that a man of that age and education earned in 1960

$15,000) to raise and educate a child and a community invests a near equivalent, according to Klietch (21).

Neiderfrank (27) estimates nearly half of the new workers entering the labor force before 1970 will not be ready for anything more than an unskilled or mediocre job.

The third factor used in this particular analysis of variability in growth from 1950 to 1960 mean all-family income among Iowa counties, was an index of property assets per family. The index of property

assets in 1950 among Iowa counties was computed in the same way as that explained earlier for 1960. The index of property assets among Iowa counties for 1950 was subtracted from that of 1960 among respective Iowa counties to determine change in the index of property assets among Iowa counties from 1950 to 1960.

The coefficient or "b" value of 1.014195 associated with the change in the index of property assets from 1950 to 1960 among Iowa counties was significant at the ten percent level. Although ownership of property is still an important factor associated with income differences, it had less importance than two of the four factors. The factor had a highly significant correlation of r = .3412 with median all-family income changes from 1950 to 1960 among Iowa counties.

Perloff et al. (31) found that the most variable of all income components is property income per capita. In 1950, it ranged from $519 in Delaware to $58 in Mississippi. Its relative variation was found to be twice that of total income per capita. Perloff et al. also found that high levels of property income are concentrated in the northeastern sector of the country — the New England, Middle Atlantic and Great Lakes states. These areas of property income are highly urbanized and industrialized and a similarity is found in Iowa. High income property levels are found in the counties with a high degree of urban development and industrial concentration. Polk and Linn Counties, two of Iowa's higher median all-family income counties are examples of this.

The fourth factor, the index of change in labor employment among Iowa counties from 1950 to 1960, was determined by dividing the number

employed in 1960 in each Iowa county by the number employed in 1950 in each respective Iowa county. It was used as a proxy for job availability. Linn County with almost twice the labor employment index of Ringgold County had almost five times the amount of family income increase of Ringgold over the 1950 to 1960 period.

The index of labor employment change had a multiple regression coefficient of b = 4.897366, the only highly significant of the four independent variables. The simple correlation coefficient of this index with the increase in median all-family income from 1950 to 1960 at r = 0.6384 was highly significant. These results would appear to show that the change in the index of the labor employment had an important association with the change in median all-family income.

This study has shown that many factors are associated with both the level and the change in the variation in median all-family income among Iowa counties. An additional indicator of the variation of family income level and change among Iowa counties in 1960 and over the 1950 to 1960 period is that of size of the major community in the county. The following Table 9 shows this influence.

Families in the more urbanized Iowa counties received higher incomes relative to those in the more rural populated counties as shown in Table 9. Size of major community in the county appears to be associated with other factors such as county family labor productivity. The average of indexes of labor force productivity among Iowa counties in 1960 from the smallest major center within Iowa counties group (0, -2,499) to the largest major center within Iowa counties group (25,000 and over) were 89.6; 95.9;

Table 9. Median all-family and rural-farm family incomes by size of major community among Iowa counties in 1960[a]

Group No.	Size of major community	Number of counties	Median income by size of major community in county	
			All-family family	Rural-farm family
			Dollars	Dollars
1.	0 - 2,499	20	3670	3068
2.	2,500 - 4,999	31	3972	3253
3.	5,000 - 9,999	28	4360	3294
4.	10,000 - 24,999	6	5041	3740
5.	25,000 and over	14	5812	3912

[a]Source: (39)

101.0; 106.8 and 112.5 respectively. Evidently the Iowa counties with the larger major community centers have relatively more highly trained and more highly paid labor force members than counties with smaller major community centers.

Median all-family incomes increased over the 1950 to 1960 period as the major center within the county increased in size. The twenty Iowa counties with major community size of 0-2499 in 1960 had average median all-family income increases of $1,164; those thirty-one in the 2500 to 4,999 group had an average increase of $1,276; those twenty-eight in the 5,000 to 9,999 major center of county group had an average increase of

$1,573; the six counties in the 10,000 to 24,999 group had an average increase of $2,045 and the fourteen counties of 25,000 and over major center had an average increase in median all-familiy income of $2,443 over the 1950 to 1960 period.

The influence of the size of the major community in the county upon the increase in the level of median all-family income of the county in 1960 is noted in Table 9. As you go from the group No. 1 counties with the smallest size of major community to group No. 5 counties with larger centers, dollar increases of $302; $388; $681 and $771 respectively are noted. Comparable percentage increases of 8.2 percent; 9.8 percent; 15.6 percent and 15.3 percent are noted respectively from group No. 1 to group No. 5. The larger increases in median all-family income per county are noted as you go from group No. 3 (5,000 - 9,999 size of major center) to group No. 4 (10,000 - 24,999) and from group No. 4 to group No. 5 (25,000 and over).

Increases in median rural-farm family income per county as you move from group No. 1 to group No. 5, Table 9, are $185; $41; $446 and $172 respectively. The respective percent increases were: 6.0; 1.3; 13.5 and 4.4 percent. The largest increase in per county median rural-farm family income ($446 and 13.5 percent) was seen as the size of the major center in the county changed from the 5,000 to 9,999 size to the 10,000 to 24,999 size group.

If moving to the larger community center would automatically guarantee higher income urbanization of Iowa and the nation would proceed at an even faster pace. It takes only a brief look at the urban slums

to show us that urbanization alone is not the answer. Many of the factors in this study found to be associated with the higher level and increased level of family incomes among Iowa counties would need to be in evidence in the economic environment be it rural or urban and among the people whether they be of farm or city.

Hopefully this study may have opened the door to further thinking about the forces that may be associated with the variation in the level of family income among Iowa counties in 1970 and the growth in family income over the 1960 to 1970 period.

SUMMARY OF FACTORS ASSOCIATED WITH FAMILY INCOME VARIATIONS AMONG IOWA COUNTIES IN 1960 AND BETWEEN 1950 AND 1960

1. Factors associated with variations in the level of mean all-family income among Iowa counties in 1960: Eighty-four percent of the variations was explained by three independent variables; (1) percent of county population employed in 1960; (2) index of productivity of the county labor force in 1960 and (3) index of property assets per family in 1960.

2. Factors associated with the variations in mean rural-farm family income among Iowa counties in 1960: Forty-five percent of the variation was explained by three independent variables: (1) value of land and buildings per farm per county in 1960; (2) percent of farm land operated by tenants in each county in 1960 and (3) the percent of farm operators working off the farm 100 days or more in each county in 1960.

3. Factors associated with the variations in realized net farm income per farm in 1959 among Iowa counties: fifty-five percent of the variation was explained by five independent variables: (1) index of the value of land and buildings per farm per county in 1959; (2) index of capital input per farm among counties in 1959; (3) index of farm workers per farm among counties in 1959; (4) index of departure from average weather in 1958-59 among counties and (5) index of cattle-hog specialization per farm among Iowa counties in 1959.

4. Factors associated with variation in growth in median all-family income over the 1950 to 1960 period among Iowa counties: Fifty-one

percent of the variation was explained by four independent variables; (1) index of change in labor force participation over the 1950 to 1960 period among Iowa counties; (2) index of change in labor force productivity over the ten-year period among Iowa counties; (3) index of change in property assets per family over the 1950-60 period among Iowa counties and (4) index of labor employment change over the ten-year period 1950 to 1960 among Iowa counties.

5. High correlations were found between: (1) median all-family income and mean all-family incomes among Iowa counties with r = .98; (2) median rural-farm family incomes and mean rural-farm family income among Iowa counties with r = .95; (3) mean rural-farm family income per county to mean rural-nonfarm family income per county with r = .66; (4) mean rural-farm family income per county to mean urban family income per county with r = .55; (5) mean rural-nonfarm family income per county and mean urban-family income per county with r = .70.

6. An indicator of the variability in family income level in 1950 and 1960 and change over the 1950 to 1960 period among Iowa counties was found to be the size of the major community in the county. Both median all-family incomes and median rural-farm family incomes were larger in the counties with the relatively larger major communities. Increases in median all-family income was greater from 1950 to 1960 in the counties with relatively larger major communities.

In 1950 the lowest ranking Iowa county on median all-family income had 49.5 percent of median all-family income of the highest ranking county. In 1960 the similar percentage figure had dropped to 44.3 percent.

In 1950 Black Hawk County, with 8 percent of its families classed rural-farm, had the highest median all-family income among Iowa counties of $3,714. Wayne County ranked lowest among Iowa counties in 1950, with 52 percent of its families rural-farm, median all-family income of $1,781.

In 1950 Iowa's median all-family income was $3,079 and by 1960 had risen to $5,069. In 1960 median all-family income among Iowa counties ranged from a low of $2,573 in Ringgold County to a high of $6,464 in Polk County.

Quartile A counties, those of highest median all-family income, in 1950 were located mostly in northwest Iowa with a few in central and eastern Iowa. Quartile D counties in 1950, the lowest one-fourth among Iowa's counties, ranked on median all-family income, were located mostly in southern Iowa with a few in northeast Iowa.

By 1960 most of the Quartile A counties on median all-family income were located in central and eastern Iowa. Quartile D counties on median all-family income in 1960 were located mostly in southern Iowa with a few in northeast and northwest Iowa.

Median rural-farm family income in 1950 in Iowa was 80 percent of that for Iowa rural-farm families in 1960. In 1960 seventeen of the Quartile A Iowa counties on median rural-farm family income were also in the Quartile A group on median all-family income. Seventeen of the low Quartile D counties on median rural-farm family income in 1960 were in the Quartile D on median all-family income.

Only two of the 79 Iowa counties with urban families in 1960 had

higher mean rural-nonfarm family incomes than mean urban family incomes. Mean urban family incomes among Iowa counties in 1960 ranged from $4,470 in Monroe County to $7,945 in Linn County with an overall state mean income for urban families of $6,306.

Median all-family income change from 1950 to 1960 among Iowa counties varied from a $402 increase in Osceola County to an increase of $2,926 in Linn County. Above average increases among Iowa counties in median all-family income from 1950 to 1960 were noted almost without exception in counties with cities of 10,000 population or more. Size of the major community among Iowa counties in 1960 appeared to be associated with median all-family income and growth in median all-family income from 1950 to 1960. The same appeared to be true for median rural-farm family income in 1960 when related to size of major community within the county. Larger median incomes in 1960 and median income increases over the 1950 to 1960 period were found associated with larger sizes of major community within the county for both all-families and rural-farm families.

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