INDUSTRIALIZATION OF RURAL
AREAS : MICHIGAN

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ABSTRACT

INDUSTRIALIZATION OF RURAL
AREAS: MICHIGAN

by Richard Joseph Nanneman

In recent years there has been widespread concern about declining employment opportunities in many rural areas. National, state, county, and local groups have been actively engaged in 'promoting' industrial development for disadvantaged areas.

The purpose of the study was to investigate (1) factors of location which have been important to firms locating in rural areas, (2) on the basis of experienced employment growth, which industries are the most likely to be attracted to rural areas in Michigan, and (3) the relationships between comparative employment growth and levels of public and private services in a rural area in Michigan.

Recent literature dealing with surveys on factors influencing the location of industry in rural areas was reviewed for manager rankings of locational factors.

Markets, raw materials, labor, and transportation were of primary importance for location decisions.

Utilities, local taxes and legislation, and community atti-
tudes and inducements to firms were of much less importance.

There was evidence that communities attached too
much importance to the role that inducements play in at-
tracting firms. Community inducements often representing
a substantial cost were often accepted by firms but disre-
garded while making the location decision.

The shift-share technique, based on census employ-
ment data, was used to identify those export industries
for which employment shifted comparatively into rural areas
in Michigan from 1950 to 1960.

The manufacturing industries electrical and other
machinery, transportation other than motor vehicles, and
food and kindred products, had the greatest relative shifts
into rural counties in upper Michigan. Miscellaneous man-
ufacturing and chemicals and allied products had large re-
lative shifts into lower Michigan counties which were not
part of a standard metropolitan statistical area. These
industries deserve to be studied first to see if the trend
can be continued.

The statistical methods of regression and correla-
tion were used to test whether some of the differences in
comparative growth rates, 1950 to 1960, among counties in
a rural area in Michigan can be explained by differences
in the level of public and private services available.
The dependent variables consisting of share growth rates

of several industry aggregations were generated with the shift-share technique. Share growth rates were used to measure how well a particular county did in an industry (or group of industries) relative to how well all counties in the United States did in this industry (or group of industries).

The six explanatory variables used were (1) per-capita government expenditures for 1957, (2) per-capita education expenditures for 1957, (3) education completed, (4) number of transportation facilities, (5) percent of county population rural farm, and (6) size of largest city.

The six explanatory variables accounted for less than forty percent of the total variation in share growth rate of all industries, about fifty-nine percent of the variation in manufacturing share growth rate, and sixty-five percent of the variation in electrical and other machinery manufacturing share growth rate.

Per-capita government expenditures was the most important variable in explaining employment share growth rate of manufacturing industries. But it was relatively unimportant for share growth rate of all industries.

The variable, percent of population rural farm, was the second most important in accounting for differences in share growth rates of both all industries and manufacturing industries. However, the relationship was negative for all industries and positive for manufacturing industries.

A very strong negative relationship was found between number of transportation facilities and share growth rate of all industries.

The relationships were not all as expected. Results indicated that some public and private services are industry specific and the relationships can be understood only in terms of the process of change in this area.

INDUSTRIALIZATION OF RURAL

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by

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CHAPTER I

THE STUDY

Introduction

In a dynamic and growing economy such as exists in the United States, economic and technological conditions are constantly changing. As shifts occur in economic activity, some areas become disadvantaged and fall outside the mainstream of activity and growth. Pockets of unemployment, underemployment, low incomes, and outmigration develop. In most such areas, the problems are long-term and stem from an inability to compete economically. As a result, these areas have drifted into the backwaters of a growing national economy.

In recent years, much attention has been focused on the problems of disadvantaged areas. National, state, county, and local groups have formed in a concerted effort to restore such areas to prosperity. Many committees have devoted attention to the problems of obtaining new industry and job opportunities.

On the national level, designation of the President's Appalachian Regional Commission in 1963 was a major demonstration of the recognition of depressed conditions

in some areas. This commission studied the situation in Appalachia and made recommendations which led to the Appalachian Regional Development Act of 1965.

This Act provided for a variety of programs designed to stimulate the economic development of the Appalachian Region. Under the Act, public investments are concentrated on the development of physical and transportation facilities and human resources that are expected to generate diversified industry. Subsequently, economic development regions have been designated in such regions as New England, the Ozarks, and in the Northern Great Lakes States, through the assistance of the newly established Office of Regional Economic Development (ORED) in the Commerce Department.

The Public Works and Economic Development Act of 1965 (established the Economic Development Administration) provided for help in the economic development of distressed areas. This program required cooperation between public and private enterprise and officials at every level of government--local, county, state, and federal. Loans and grants were made available to designated areas for public works, public services or public facilities related to economic development. To encourage private investment, low-interest, long term loans were made for the purchase or development of land and facilities for industrial usage.

State legislatures, likewise, have been promoting new industries. In 1963 the Michigan Industrial Development

Revenue Bond Act was signed by the Governor. This Act
authorizes municipalities to issue revenue bonds, the
funds from which are used to acquire industrial facilities
for the purpose of leasing them to industrial firms.

Perhaps the groups most deeply concerned about em-
ployment opportunities have been the local communities.
Many communities have formed corporations for the sole
purpose of attracting new industry. In 1966, there were
close to 180 community industrial development corporations
in Michigan. Eighty-three percent of these were non-profit
corporations.

The President's National Advisory Commission on
Rural Poverty has aptly pointed out the consequences of
the lack of employment opportunities and has recommended
efforts to increase jobs in rural areas. In the summary
of its report to the President, the commission states:

> Technological progress brought sharp declines
> in the manpower needs of agriculture, forestry,
> fisheries, and mining. Other industries have not
> replaced the jobs lost, and they have supplied too
> few jobs for the young entries in the labor market.
> Larger towns and cities have taken over many of
> the economic and social functions of the villages
> and small towns.
>
> . . . .
> As the communities ran downhill, they offered
> fewer and fewer opportunities for anyone to earn
> a living. The inadequately equipped young people
> left in search of better opportunities elsewhere.
> Those remaining behind have few resources with
> which to earn incomes adequate for a decent living
> and for revitalizing their communities.
>
> . . . .
> Congress and state legislatures from time to
> time have enacted many laws and appropriated large
> sums of money to aid the poverty stricken and to
> help rural America. Very little of the legislation
> or money has helped the rural poor.

. . . .
    This commission questions the wisdom of massive
public efforts to improve the lot of the poor in
our central cities without comparable efforts to
meet the needs of the poor in rural America. Un-
fortunately, as public programs improve the lot of
the urban poor, without making similar improve-
ments in conditions for the rural poor, they pro-
vide fresh incentive for the rural poor to migrate
to the central cities.
. . . .
    The Commission has endeavored to chart a course
to wipe out rural poverty. . . . Improving the op-
eration of the private economy in order to provide
rural people with better opportunities for jobs
and a decent living is emphasized.[1]

The Commission presented recommendations of pol-

icies and programs to assist the rural poor, many of which

dealt with employment opportunities.

    The Commission recommends that the United
States adopt and put into effect immediately a
national policy designed to give the resident of
rural America equality of opportunity with all
other citizens. This must include equal access
to jobs.
. . . .
    The Commission recommends a thorough overhaul-
ing of our manpower policies and programs . . . to
deal effectively with rural unemployment and under-
employment.
. . . .
    To finance development, the Commission recom-
mends Federal grants, loans, and industrial devel-
opment subsidies as well as state and local tax
reform.[2]

Clearly, there is a need to examine the factors

and relationships relevant to industrialization of rural

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[1]National Advisory Commission on Rural Poverty,
The People Left Behind. A Report by the President's Na-
tional Advisory Commission on Rural Poverty (Washington:
U. S. Government Printing Office, 1967), pp. x-xi.

[2]Ibid., xi-xii.

areas. Some of the accepted beliefs on how to procure
industrial employment opportunities in rural areas need
to be investigated, and, if possible, new leverage points
need to be identified.

Objectives

The purpose of this study is to investigate some
of the aspects of procurement of employment opportunities
in rural areas. Identification of the factors important
to firm location decisions can furnish persons interested
in rural development with increased knowledge about the
role local groups might play in obtaining additional in-
dustry. Shifts in industrial employment can provide clues
as to which industries are most likely to be attracted to
rural areas.

Specifically, the study will examine: (1) the fac-
tors which have been important to firms locating in rural
areas, (2) industrial employment shifts in Michigan to de-
termine which industries have shown a tendency to locate
in rural areas in Michigan, and (3) relationships between
the level of public and private services available in
rural counties and comparative employment growth rates.

Procedures

A profile of Michigan is presented in Chapter II.
Michigan's population, income, and employment is compared

with that of the United States. Also, the highly indus-
trialized and heavily populated southern part of Michigan
is compared with the northern counties of Michigan.

In Chapter III, surveys on locational factors of
industry in rural areas are examined. Factors, which com-
munities are able to manage to some degree or which can be
proffered as inducements, are investigated for relative
importance in location decisions.

The shift-share technique is used in Chapter IV to
determine industry shifts between rural and urban areas
within Michigan from 1950 to 1960. Manufacturing indus-
tries are then analyzed in terms of potential contribution
to employment growth in rural areas; based on exhibited
employment shifts. The counties in Michigan are aggregated
into three groups; (1) those counties in upper Michigan
(i.e. the Upper Peninsula and the northern part of the
Lower Peninsula) containing no major urban-industrial cen-
ters, (2) counties in lower Michigan surrounding the Stand-
ard Metropolitan Statistical Areas, and (3) counties desig-
nated as Standard Metropolitan Statistical Areas.

The statistical procedures of regression and cor-
relation analysis are used in Chapter V to investigate the
association between levels of public and private services
available in rural counties and relative employment growth
rates (1950 - 1960) of the counties. Twenty-seven contig-
uous counties, with no major urban-industrial complexes,

are used in the analysis. These counties are located in the upper part of the lower peninsula in Michigan.

The final chapter contains a summary and some concluding remarks.

CHAPTER II

A PROFILE OF MICHIGAN

Introduction

The twentieth century witnessed a rapid transformation of the nation from a rural resource-based economy to an economy based upon manufacturing. In the process of this change Michigan became a leading industrial state. In 1960 only 3.4% of Michigan's employment was in agriculture, while 6.4% of U. S. employment was in agriculture.

Population has increased in Michigan faster than national rates and personal income has characteristically been higher in the state than for the entire United States.

Although the state as a whole has been exceptionally prosperous, the same cannot be said for all areas within the state. Most of the growth and prosperity has been concentrated in the southern part of Michigan. While many of the southern counties have prospered, the counties in the northern lower peninsula and the counties in the upper peninsula, which constitute a large part of Michigan's land area, have generally declined.

The rest of this chapter will deal with prosperity as exemplified by growth in population, income, and

industrial employment·growth in the state of Michigan.

Major emphasis will be on differential employment growth

in the industrialized South and the less prosperous North.

State Population, Income, and Employment

In 1968 Michigan had a population of over 7.8 mil-

lion. Population has increased in Michigan faster than in

the nation. Michigan population grew 223% from 1900 to

1960 while that of the U. S. grew 136% (Table 1).

Table 1.--Population of Michigan and the United States,
          1900, 1940, 1950, and 1960.

Year	Michigan	United States	Michigan as a percent of U. S.
1900	2,420,982	75,994,575	3.19
1940	5,256,106	131,669,275	3.99
1950	6,371,766	150,697,361	4.23
1960	7,823,194	179,323,175	4.36

Source: Michigan State University, Bureau of Business and
Economic Research, Michigan Statistical Abstract (6th ed.;
East Lansing, 1966), p. 6.

Michigan's proportion of the U. S. population grew

from 3.19 percent in 1900 to 4.36 percent in 1960. Per

capita income in Michigan has been above that of the nation

since 1938 (Table 2). In 1960, Michigan's per capita in-

come was 2,324 as compared to 2,215 for the nation.

Table 2.--Per-capita personal income in Michigan and the
United States, 1940, 1950, and 1960.

| Year | Per Capita Income (Dollars) | |
	Michigan	United States
1940	679	595
1950	1,700	1,496
1960	2,324	2,215

Source: Michigan State University, Bureau of Business and
Economic Research, Michigan Statistical Abstract (6th ed.;
East Lansing, 1966), p. 93.

The United States increased total employment by
26.7 percent from 1940 to 1950 and 15.5 percent from 1950
to 1960 (Table 3). Michigan had corresponding growth.
rates of 31.7 percent in the 40's and 14.0 percent in the
50's.

During the two decades, agriculture declined as a
source of employment in both Michigan and the United States.
Michigan's employment in agriculture declined at a faster
rate--minus 25.3 percent, in the 40's and minus 42.4 per-
cent in the 60's, as compared to -17.9 percent and -38.5
percent for the United States.

With the decline in agricultural employment there
has been heavy migration to urban areas. In 1950, 29.3
percent of Michigan's population was classified as rural.[1]

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[1]New urban census definition.

Table 3.--Employment and percent change in employment, U.S. and Michigan, agriculture and non-agriculture, 1940 to 1950 and 1950 to 1960.a

	Employment(thousands) 1940	1950	Percent Change (1940-1950)	Employment(thousands) 1950	1960	Percent Change (1950-1960)
United States						
Agriculture	8,430.7	6,917.7	-17.9	6,917.7	4,256.7	-38.5
Non-agriculture	36,945.1	50,557.2	36.8	50,557.2	62,115.9	22.9
All industries	45,375.8	57,474.9	26.7	57,474.9	66,372.6	15.5

Agriculture in 1960 was 6.4 percent of total employment

	Employment(thousands) 1940	1950	Percent Change (1940-1950)	Employment(thousands) 1950	1960	Percent Change (1950-1960)
Michigan						
Agriculture	213.9	159.9	-25.3	159.9	92.1	-42.4
Non-agriculture	1,611.0	2,244.1	39.3	2,244.1	2,648.1	18.0
All industries	1,824.9	2,404.0	31.7	2,404.0	2,740.0	14.0

Agriculture in 1960 was 3.4 percent of total employment

aCalculated from Lowell D. Ashby, Growth Patterns in Employment by County, 1940-1950 and 1950-1960, Vol. 3, U.S. Department of Commerce (Washington: U.S. Government Printing Office, 1965), p. 3-1 and 6-1, citing U.S. Census of Population: 1940, 1950 and 1960.

This had declined to 26.6 percent by 1960. The economic development of Michigan during the 20th century has been very dynamic. Production of durable goods, particularly motor vehicles, has to a large degree determined the industrial base and structured social and demographic patterns. As if by magnet, the state's population, influenced by the great automobile centers in the south, was drawn into urban clusters throughout Southern Michigan (Figure 1). The number of cities with more than 50,000 persons grew from 3 in 1910 to 10 in 1950 and reached 17 in 1960. Urban growth in the state has taken place largely in the southern part of the lower peninsula. No city with population in excess of 25,000 in 1960 was located north of the city of Midland. Most of these cities were within the Detroit urban complex.

During the first half of the century, Detroit grew from 285,704 to 838,517 inhabitants, whose prosperity reflected that of the automobile industry. Almost one-half of the states population now resides in the Detroit urban area of Wayne, Oakland, and MaComb counties.

While the motor vehicle industry has been the focal point of industrial development, other major industries have contributed to the growth of the urban complexes. Cereal production at Battle Creek, furniture manufacturing at Grand Rapids, paper products at Kalamazoo, and other industries provided impetus to the growth of cities of Southern Michigan.

Figure 1.--Major cities of standard metropolitan
statistical areas in Michigan.

X Major Cities
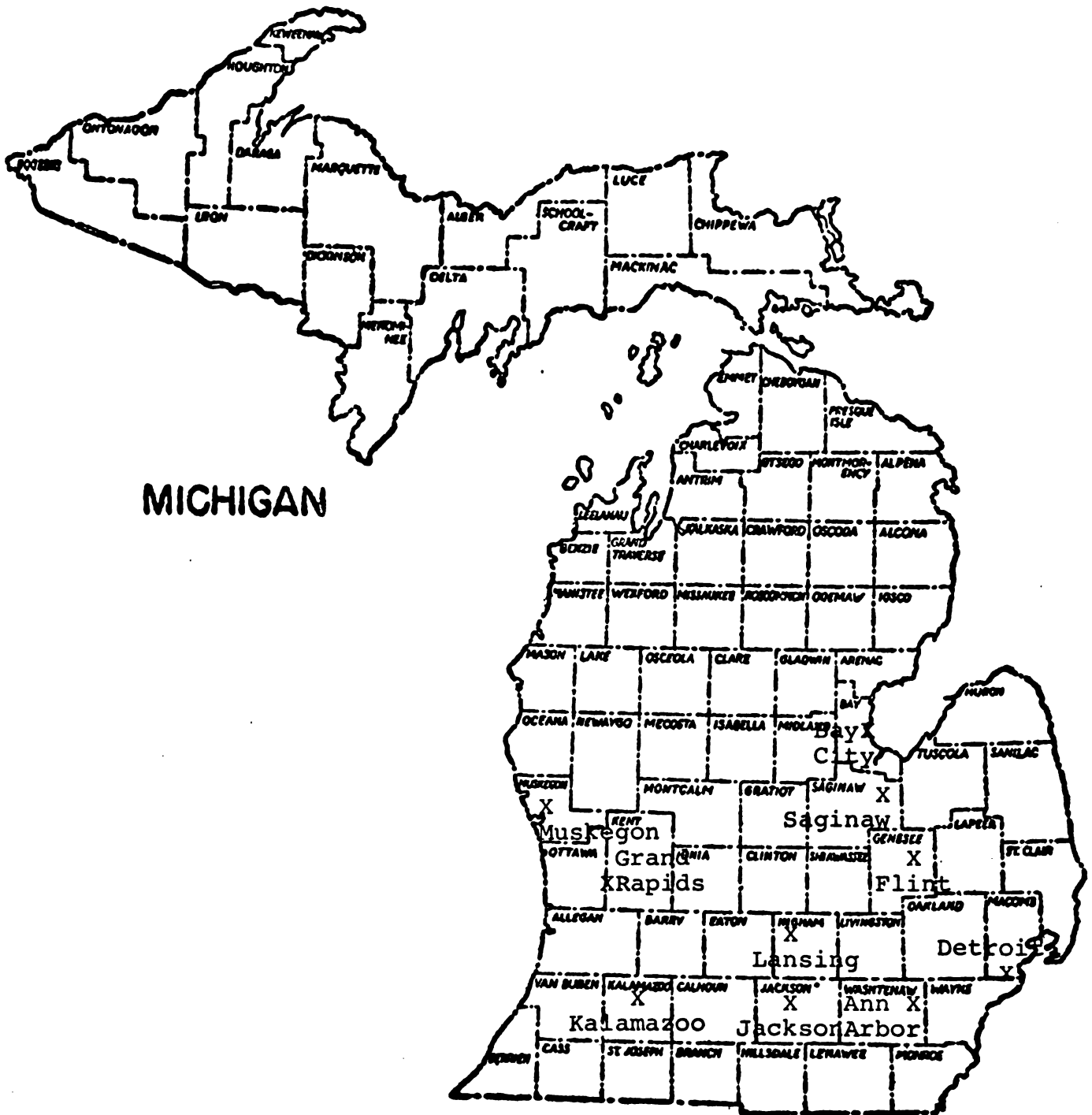
Northern Michigan and Southern Michigan

While Southern Michigan has experienced tremendous growth in urban areas, there are no major urban areas in any county north of Bay County (Figure 1). In 1960, almost 92 percent of the state's 7.8 million people resided in the 41 southern counties (Table 4).

Total Michigan population increased more than 1.4 million from 1950 to 1960--with 98 percent of this increase accounted for by southern counties. Total increase in Northern Michigan was only 30,048 people, or 4.97 percent of 1950 population.

The slow population growth rate in Northern Michigan was caused in large part by heavy outmigration. The 42 counties lost 46,958 people through outmigration. The 1960 census classified 62.8 percent of the population in Northern Michigan as rural. Only 23.4 percent of the people residing in Southern Michigan were classified as rural.

Incomes are higher in Southern Michigan, and unemployment is lower. Estimated buying income per-capita in the southern counties was $1,698 in 1959, while that in the northern counties was $1,309.[1] The census of 1960

[1]Michigan State University, Bureau of Business and Economic Research, Michigan Statistical Abstract (6th ed.; East Lansing, 1966), pp. 101-103.
Note: The dollar figures are simple averages of counties. A weighted (by population per county) average would result in a larger difference.

Table 4.--Population of Michigan, Northern and Southern
Michigan, 1950 and 1960, total change, percent
rural, and net migration.[a]

	Northern Michigan	Southern Michigan	Total
Number of counties	42	41	83
Population 1950	604,406	5,767,360	6,371,766
Population 1960	634,454	7,188,740	7,823,194
Total Change	30,048	1,421,380	1,451,428
Percent Change	4.97	24.64	22.78
Net Migration	-46,958	209,190	
Rural as percent of total pop. 1960[b]	62.82	23.45	26.64

[a]Calculated from Michigan State University, Bureau
of Business and Economic Research, Michigan Statistical
Abstract (6th ed.; East Lansing, 1966), pp. 9-15.

[b]Calculated from U. S. Bureau of the Census, U. S.
Census of Population: 1960, Volume 1, Part 24, p. 184.

estimated that 9.9 percent of the civilian labor force in
Northern Michigan was unemployed and 5.8 percent was unem-
ployed in the South. Actually, the unemployment in the
South was higher than normal, because the 1960 census co-
incided with a recession in the automobile industry.

The distribution of employment is similar to that
of population. The 41 southern counties accounted for
92.1 percent in 1950 (Table 5). Total employment in the
northern counties grew by 6,560 workers or 3.4 percent,
while employment in the southern part of Michigan increased
almost 15 percent, 1950-1960.

Table 5.--Employment in Northern and Southern Michigan, 1950 and 1960, employment change, and employment as a percent of total.[a]

	Employment 1950	Employment 1960	Employment Change	Percent Change	Employment as a percent of total Mich. employment (1950)	(1960)
Northern Michigan						
All industries	191,137	197,697	6,560	3.43	7.9	7.2
Agriculture	34,722	14,350	-20,372	-58.67		
Non-agriculture	156,415	183,347	26,932	17.22		
Ag. as percent of all	18.17	7.26				
Southern Michigan						
All industries	2,212,885	2,542,728	329,843	14.91	92.1	92.8
Agriculture	125,147	77,770	-47,377	-37.85		
Non-agriculture	2,087,738	2,464,958	377,220	18.06		
Ag. as percent of all	5.65	3.06				

[a]Calculated from Lowell D. Ashley, Growth Patterns in Employment by County, 1940-1950 and 1950-1960, Vol. 3, U.S. Department of Commerce (Washington: U.S. Government Printing Office, 1965), pp. 7-1 to 7-23.

The major reason for slow growth of the northern counties was heavy reliance on declining agriculture, which dwindled by almost 59 percent in those counties. Agriculture had accounted for more than 18 percent of Northern workers in 1950. By 1960 this had dropped to 7.3 percent--a loss of 20,372 workers.

All non-agricultural industries grew almost as fast in northern as in southern counties (17.2 as compared to 18.0 percent) from 1950 to 1960. Although it is unlikely that the growth rates would be quite as similar if the census had not occurred during an auto-makers recession in 1960, this does illustrate that in Northern Michigan, as in many similar regions, the problem is not so much a lack of growth in non-agricultural industries, but a major decline in agriculture, forestry, and mining. Non-agricultural industries need to grow much faster in order to prevent decline in the economy.

The heavy reliance on declining agriculture and slow growth industries creates many problems of adjustment for rural areas. Low incomes and high unemployment can be relieved only to the extent that outmigration occurs or new employment opportunities are created in other industries. Outmigration erodes the existing social and capital structures, and maintenance of social overhead, such as educational systems, becomes extremely difficult.

Thus, great demand arises for new or expanded industries that will provide employment opportunities. Manufacturing industries are particularly desired because of their export commodity producing nature and their attendant retail and service requirements.

It should be noted that there are some counties in Southern Michigan suffering a plight similar to those in Northern Michigan. However, there is the important difference that most counties in Southern Michigan, even those with predominantly rural economies, are inextricably tied to counties with large urban-industrial centers. Economic adjustments in these counties are associated with the growth of the urban counties.

CHAPTER III

LOCATION FACTORS

Introduction

The location of manufacturing establishments de-
pends on various factors, some of which are basic to a
location decision, and some of which are not major deter-
minants, yet influence the selection process.

Factors influencing the location of industry are
critical to area and community development. Knowledge of
location factors can be particularly valuable for local
development groups charged with the responsibility for in-
dustry "procurement."

Despite the many publications dealing with factors
of location, little is known about the relative importance
of economic, social, political and institutional factors
affecting industrial location in rural areas. Although
many rural communities have been heavily involved in ef-
forts to attract industry, there is confusion regarding
the amount of resources and the relative effectiveness of
various activities they might use to influence plant loca-
tion decisions.

The purpose of this chapter is to review what fac-
tors have been influential in attracting industry to rural
areas, and what role the community might play.

Major Location Factors

Much theoretical and empirical work has been done
on identification of location factors. Weber, one of the
originators of location theory, regarded transportation
and labor as the basic forces determining the region in
which a plant could minimize costs.[1] Agglomerating forces
(marketing advantages, proximity to auziliary industries,
external economies of scale, etc.) then determined a par-
ticular location within an area. This general theory of
location is applicable to all economic systems; but, ex-
cludes institutional (i.e., interest, taxes, insurance,
and management) and other factors.

More recently, Greenhut developed a model consist-
ing of three broad groups of locating factors: (1) demand,
(2) cost, and (3) purely personal considerations. He then
outlined an inclusive list of five demand factors, four
costs factors with numerous subgroups, and three personal
factors.[2]

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[1]Alfred Weber, Theory of the Location of Indus-
tries (Chicago: University of Chicago Press, 1928).

[2]Melvin L. Greenhut, Plant Location in Theory and
Practice (Chapel Hill: University of North Carolina Press,
1956), p. 279.

The factors of location treated in this paper are:

1). Markets--proximity to consumer, producer, or expanding market

2). Raw materials--quantity, quality and relative prices

3). Labor--supply, costs, and quality

4). Transportation--facilities available, costs and quality of facilities (transportation costs are also reflected in industry orientation)

5). Utilities--availability, rates and quality

6). Taxes and legislation--police and fire protection, health and sanitation codes, and zoning ordinances

7). Personal preferences

8). Community attitudes and economic inducements

The first four may be regarded as basic factors in that one or more is of primary economic importance to every location decision.

Relative importance of factors

The relative importance to a firm of each location factor, in theory, is determined by the proportion of costs or revenues accounted for by that factor. For example, if labor costs are a large part of a firm's total costs, then the firm will locate to it's best advantage with regard to the type, quantity, and cost of the labor desired.

However, the firm will not necessarily locate where labor costs are a minimum, but will pick another location so long as other costs can be reduced more than labor costs are increased. But, the labor intensive firm will have a greater incentive to locate at a minimum labor cost site.

Surveys of rural areas

Several studies have been conducted to determine the factors that affected plant location in rural areas. Wallace surveyed 72 new industrial plants which located in Southern Indiana from January, 1955, through December, 1958.[1] The study covered 33 counties which have declined in population as employment in agriculture decreased.

Polopolus and Williams surveyed the managers of 43 new plants in a five county area in South Central Louisiana.[2] This area is a rural area meeting the various criteria of designation by the Area Redevelopment Administration as a "redevelopment area."

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[1] L. T. Wallace, Factors Affecting Industrial Location in Southern Indiana, 1955-58, Indiana Ag. Exp. Sta. Res. Bul. #724 (Lafayette: 1961).

[2] Leo Polopolus and Robert W. Williams, Factors Influencing the Location of Manufacturing Plants in a Rural Area, La. Ag. Exp. Station, D.A.E. Res. Report No. 324 (1963).

Another study, not done in a rural area, but useful here is a study on location decisions in Michigan by Eva Mueller and others.[1]

Analysis of Basic Factors

Managers of the 72 new plants in Southern Indiana indicated that the four most important influences on their location decisions were availability of labor, adequacy of transportation, proximity to local and regional producer goods and consumer goods markets, and availability of local and regional raw materials[2] (Tables 8 and 9).

Response by plant managers in South Central Louisiana indicated that proximity to producer goods and consumer goods markets and the availability, quality, and price of raw materials were the major factors responsible for location decisions[3] (Tables 6 and 7). Michigan manufacturers mentioned most frequently labor costs, proximity to customers, markets and availability of skilled labor as their most important locational factors.[4]

Markets--In both the Indiana and the Louisiana study, proximity to markets was cited as the most

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[1]Eva Mueller et al., Location Decisions and Industrial Mobility in Michigan, 1961 (Ann Arbor: University of Michigan, 1961).

[2]Wallace, 1.

[3]Polopolus and Williams, 1.

[4]Mueller et al., 4.

Table 6.--Plant managers' rankings of location factors (in terms of importance), all manufacturing groups, South Central Louisiana.

Plant location factor	Rank										
	Number of managers placing factor in each rank										
	1	2	3	4	5	6	7	8	9	10	11
Markets	18	7	9	5	1	-	-	-	1	-	-
Raw materials	10	8	5	2	1	1	-	5	1	-	-
Labor (hired)	-	8	5	9	4	-	3	-	-	-	-
Proprietor's hometown	8	4	1	-	1	-	-	-	-	1	-
Transportation	-	2	6	4	5	2	2	2	-	1	-
Available facilities for expansion	-	3	4	7	1	6	2	1	1	-	-
Community attitudes	1	3	6	2	5	3	-	1	2	1	-
Taxes	-	-	1	1	1	3	7	3	1	-	1
Utilities	1	1	1	1	3	4	2	4	2	-	-
Local and state legislation	-	-	-	1	2	-	2	2	5	1	1
Available plant facilities	1	6	4	2	-	2	-	-	-	1	1
Proprietor's labor	4	-	-	-	-	-	-	-	-	-	-

Source: Leo Polopolus and Robert W. Williams, Factors Influencing the Location of Manufacturing Plants in a Rural Area, Louisiana Agricultural Experiment Station, D.A.E. Research Report No. 324, (1963), p. 26.

Table 7.--Plant managers' evaluation of location factors, all
industry groups, South Central Louisiana.

Plant location factor	Relative importance upon location decision			
	Very critical	Important to moderately important	No major influence	Disadvan- tageous
	Number of plant managers			
Markets				
Closeness to con- sumer market	17	19	5	0
Closeness to pro- ducer market	5	13	25	0
Closeness to ex- panding market	4	24	13	1
Raw materials				
Accessibility	19	12	9	2
Quality	19	18	5	0
Relative prices	20	16	3	2
Particular require- ments	5	0	0	0
Labor				
Supply:				
Men	8	23	11	0
Women	1	7	22	0
Costs:				
Men	5	20	17	0
Women	0	7	23	0
Quality:				
Skilled	9	26	8	0
Unskilled	2	13	26	0
Dependable	5	28	9	0
Attitude toward work	7	27	8	0
Transportation				
Available facilities	9	18	14	2
Quality of facilities	1	24	16	2
Costs	10	19	13	0
Available facilities for expansion				
Land	2	11	29	0
Buildings	1	12	29	0
Transportation facilities	0	9	32	1
Labor supply	0	13	29	0
Raw materials	5	12	24	0

Table 7.--(Continued)

| Plant location factor | Relative importance upon location decision | | | |
	Very critical	Important to moderately important	No major influence	Disadvantageous
	Number of plant managers			
Community attitudes				
Availability of sites and plants	0	14	28	0
Availability of financial assistance	0	7	35	0
Special inducements	0	4	37	0
Attitude of people	0	2	0	0
Taxes				
Local tax assessment and rates	1	6	35 ·	0
State taxes	1	6	30	1
State and local tax exemptions	2	9	30	0
Utilities ·				
Availability	17	20	6	0
Utility rates	0	9	31	2
Quality of existing facilities and services	1	8	33	0
State and local legislation				
Sanitation codes	2	2	38	0
Zoning ordinances	0	2	40	0
Right to work laws	1	3	38	0
Other legislation	0	0	29	0

Source: Leo Polopolus and Robert W. Williams, Factors Influencing the Location of Manufacturing Plants in a Rural Area, Louisiana Agricultural Experiment Station, D.A.E. Research Report No. 324, (1963), p. 28-29.

Table 8.--New Plant managers' rankings of nine location factors,
all industries, Southern Indiana.

Factors ranked	Number of managers placing factor in each rank								
	1	2	3	4	5	6	7	8	9
Markets	28	13	8	4	4	2	4	2	5
Raw materials	16	15	8	6	6	5	2	2	9
Transportation	8	13	21	12	3	7	1	1	5
Utilities	2	5	8	11	10	4	5	4	19
Labor	19	15	16	8	-	1	-	1	8
Taxes	-	2	9	12	10	8	4	2	21
State and local legislation	1	1	3	14	9	4	9	4	23
Community attitude	5	5	3	12	6	5	4	7	21
Other	15	2	4	5	3	5	4	3	22

Source: L. T. Wallace, Factors Affecting Industrial Location in
Southern Indiana, 1955-1958, Indiana Agricultural Experi-
ment Station Research Bulletin No. 724, (Lafayette:
Purdue University, 1961), p. 10.

Table 9.--Location factor priority rankings, all industries,
Southern Indiana.

Factor	Managers' response totals for the first four factor rankings in Table 3
Labor	58
Transportation	54
Markets	53
Raw materials	45
Utilities	26
Other	26
Community attitude	25
Taxes	23
State and local legislation	19

Source: Ibid.

influential location factor. Proximity to expanding markets was more important in Indiana than either producer or consumer goods markets. However, managers in Louisiana placed more importance on being near consumer markets. In both cases, producer markets were nearly as important as consumer markets.

Raw Materials--Manager responses also emphasized the importance of raw materials in both areas. Accessibility, quality, and relative prices were similarly important.

Labor--Although markets were ranked first by far the most frequently in Indiana, labor received a higher response total of the first four factor rankings and was second in number of primary rankings. Labor was not nearly as important in Louisiana. However, responses in both studies emphasized the importance of dependable labor with a willing attitude toward the work. Availability of skilled labor was relatively unimportant to the firms located in these areas.

Wage rates are often regarded as a location factor of great importance, especially for labor intensive, labor oriented industries. However, in both Southern Indiana and South Central Louisiana, plant managers placed labor costs below both supply and quality of labor. This indicates that wage levels were not very influential in the selection of a site by the new firms located in these two

areas. Since both areas were recognized as labor surplus-low wage areas, either the firms locating there were a type of industry for which wage levels were relatively unimportant or wage rates, in general, are not essential location factors.

Fuchs contends that on the national-all industry level the data do not support the view that relative wage levels are significantly associated with interstate movement of industry.[1] However, this does not mean that wage levels may not have been important for particular industries, but the factor was not significant for the general redistribution of manufacturing.

Furthermore, he argues, the relative wage level has been the most significant factor in determining the direction of population migration. "The absence of a significant relation between comparative growth of manufacturing and wage levels, suggests that the movement of surplus labor to industry has probably been as important as the movement of industry to labor in recent decades."[2]

The relative extent of unionization is often mentioned as a factor in plant location. Although unionization may be correlated with high wages the "union issue" is often noted quite apart from wage levels. Almost two

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[1] Victor R. Fuchs, Changes in the Location of Manufacturing in the United States since 1929 (New Haven: Yale University Press, 1962), p. 94.

[2] Ibid., p. 101.

thirds of the managers in Southern Indiana considered unions a detriment.[1] In addition to union wage scales some reasons given were: (1) loss of managerial prerogatives, (2) concern that "outside meddling" would increase costs through strikes and work stoppages--possibly even when their local plant had no grievance, and (3) previous unhappy experiences with unions, and the belief that the workers did not want unions.

Managers were often more concerned with local labor relations than with state labor laws, particularly in labor-intensive industries and where a considerable labor force is to be employed in the new plant. In some cases the labor relations history of the community was used as a basis for selecting the specific location.[2]

Transportation--transportation received relatively few number one rankings, but, at the same time, rated highly in terms of the number of times it was ranked second, third or fourth in the Louisiana and Indiana studies. This factor was of much greater significance in Indiana than in Louisiana. Firms in Louisiana tended to be more market oriented and, thus, product transportation rates were more important than in Southern Indiana. Availability and cost of truck transportation facilities received more weight than rail, air, and water facilities.

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[1]Wallace, p. 11.

[2]Glenn E. McLaughlin, and Stefan Robock, Why Industry Moves South (Washington: National Planning Association, 1949), p. 73.

Analysis of Secondary Factors

The previous four basic factors are, for the most part unalterable on a local basis. The following to some extent are manageable by communities and, therefore, of greater interest for this study.

The basic factors normally account for a large part of manufacturing costs. Relative differentials in markets, raw materials, labor and transportation often are not substantial within regions or areas. Therefore, the basic factors are important in selection of regions or areas and secondary factors are more effective in determining the site chosen within a specific area than in determining either the specific area or the general region.[1]

Utilities--Less significance was attached to utilities than to any of the factors so far discussed. Utility rates were a relatively minor consideration as compared to utility availability and quality. Managers (in Indiana and Louisiana primarily) were concerned about an adequate and reliable service. This suggests that adequate facilities are a precondition for locating in a community, but utilities will usually not be an important factor in selecting one community over others because most communities have the facilities. In Indiana managers placed electricity as most important, followed by water, gas, sewage facilities, and coal.

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[1]Wallace, 1.

In Michigan, an adequate water supply was one of the most frequently mentioned requirements, owing, perhaps, to the favorable position which the state enjoys in water resources and the industry located in the state for that reason.[1]

Taxes and local legislation--Although state and local government officials view tax rates and assessments as important to industrial location decisions, most studies indicate otherwise.[2] In Indiana and Louisiana both state and local taxes were considered equally unimportant.

There are three principle reasons why state and local taxes are apt to be unimportant: First, state and local taxes are usually only a small part of total costs of production and a large difference in tax rates would constitute only a small difference in total costs of the firm. Second, many managers view taxes as purchasing a service, higher levels of taxation associated with more and better services. Third, due to the intricate tax structure of various localities, firm A may have a lower tax rate than firm B at the same location. Undoubtedly there are instances where one locality is favored over another because of taxes, but this is likely to be only

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[1]Mueller et al., 10.

[2]Fuchs, 88.

when the two communities are equally satisfactory in more important location factors.

State and local legislation was evaluated by managers in Indiana and Louisiana as normally having no major influence upon the location decision. Plant protection (e.g., police and fire) and sanitation codes were attributed the most importance and were followed by zoning ordinances, political environment and water laws.

Personal preferences--Despite the emphasis placed on the quantifiable cost and demand considerations by manufacturers, there is evidence that the process of plant location cannot be fully understood in purely pecuniary terms. Detailed questioning often reveals that many plants were started in their present location because the founder lived there, had business connections, or because suitable plant facilities were readily available.[1] This sort of historical accident is far from the normally conceived method of locating by thorough investigations and calculation, but 19 percent of the managers in Louisiana ranked "proprietor's hometown" as the most influential factor affecting location.

Personal considerations and historical accidents are likely to play a much greater role in the location of small firms than in the location of branch or subsidiary

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[1]Mueller, 4.

plants of the large firms. Accounting cost considerations seem to play a greater role in new investment by large firms.[1]

Community attitudes--The factor, community attitudes, includes an assessment of community spirit and community willingness to cooperate with industry. Community spirit is evidenced in the attitude toward industry of local leaders and chambers of commerce, and especially in community provision of facilities and economic inducement for new firms.

In both Louisiana and Indiana, community attitudes had no major influence upon the location decision. Availability of sites was by far the most important aspect of this factor. Availability of building facilities and provision for plant expansion was often noted in connection with availability of sites. Managers showed an interest in being able to see specific site alternatives, and to have documentation of land-use planning. Except when there were personal preferences for an area, sites were selected on the basis of quantifiable cost factors.

There are factors which many communities can use as bargaining or negotiating factors. Those most commonly

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[1]Ibid., 17.

used to induce new firms include financing, taxation, sites, buildings and research.[1]

Financing--The usual inducement of this type is community financing of site, building, or plant with provision for long term repayment and low interest rates. The techniques or plans for financing most commonly available for communities are bond plans, both property and revenue, state authorities and financing, and capital credit banks. Also community members often play a very active role in formation of new firms through promotion of stock and bond issue.

Taxation--Exemption from property tax, special treatment on inventories, use and sales tax, corporate income tax and recently tax concessions on reinvested profits have been used as bargaining points.

Sites--There is an advantage in having specific site alternatives available to show prospective firms. Such sites may be held as industrial districts, community owned property, or private

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[1]Paul Brann, Actions to Influence Location Decisions of Firms, Papers presented at the Conference Area Development (Athens: University of Georgia, 1962), pp. 126-127.

property under option. These areas may be planned and developed or they may be held for development as they are sold to industry.

Buildings--Some communities seek to gain an advantage by having buildings under community ownership or available for immediate occupancy. These may be abandoned structures or shell buildings constructed for eventual occupancy.

Research--Location decisions are made by managers on the basis of their knowledge about specific alternative locations. Communities can inform managers of an accessible location by providing information useful to the firms decision. Such information might include data on labor supply, transportation facilities, markets, the location of complementary industries, and the general facilities available.

Although Wallace[1] concluded that communities affected a limited but significant number of Southern Indiana location decisions, there is evidence communities attach too much importance to the role that economic inducements play in attracting firms. Furthermore, economic

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[1]Wallace, 16.

inducements extended at a cost to the community may often be unnecessary.

Six of the 72 firms interviewed in Southern Indiana chose their sites primarily because of the incentives offered, while 15 additional firms accepted the incentives but did not consider the incentives crucial to their location decision. Twelve had not even considered other specific sites. Four of the six firms for which the incentives were crucial were in one industry, fabricated metal, machinery, and equipment.[1]

Twelve out of 43 firms in South Central Indiana received inducements, but only one indicated that the inducement was very important to the location decision. Eight of the remaining 11 considered the accepted inducement as not important and three did not even consider the inducement while making the decision. Some of the firms accepted inducements from more than one source, but a high proportion were Louisiana 10-year tax exemptions. The other inducements were free land, nominal building rent, low land and building rent, a low interest loan from the Area Redevelopment Administration.

Considerable evidence indicates that worth-while industry generally does not favor direct tax exemptions

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[1]Seven firms listed community actions designed to discourage location in the community. But in only one instance were these actions successful in preventing location.

or other financial subsidies but, rather want to become a
part of the community by paying their own way.[1]

There is widespread belief that research and dis-
semination of information on local conditions and oppor-
tunities can be an effective means of influencing location
decisions. "Industrialists seem to have high regard for
state and local development agencies which can provide
interested new or out-of-state firms with expert advice
and information regarding local conditions and opportuni-
ties. Personal solicitation by 'industrial ambassadors'
was stringently advocated by a number of Michigan manufac-
turers."[2]

Various agencies developed and provided information
regarding communities in Southern Indiana that was impor-
tant to plant managers. Local chambers of commerce, local
industrial committees and local governments along with
utilities were ranked by managers providing the greatest
amount of help in providing information.

There is some difference in opinion over whether
communities can more effectively influence location deci-
sions of small firms as compared to large firms. In
Louisiana it was found that little variation existed

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[1]Harold T. Smith, A Suggested Program for Financing
Area Development in Michigan, a report of the W. E. Upjohn
Institute for Employment Research (Kalamazoo: 1960), p. 51.

[2]Mueller et al., 9.

regarding the importance of inducements by size of firm.[1]

In contrast, the larger the plant, particularly a branch

plant or subsidiary, the less influence a community had on

location decisions in Southern Indiana.[2] Michigan manufac-

turers also supported the view that financial concessions

have some value in attracting smaller firms.[3]

Limitations of Surveys

Although labor, markets, transportation and raw

materials are the most important, it is apparent that the

relative importance of each of the basic locational fac-

tors varies with the region studied. Also the aspect of

each factor emphasized varied with the region. For exam-

ple Southern Indiana manufacturers stressed availability

of labor while Michigan manufacturers noted cost and skill

of labor as important to their location decision.

In reality this diversity is to be expected be-

cause of the wide variations in the needs of different

types of plants. The factor that is mentioned most often

in Southern Indiana is not the same as in Michigan or in

South Central Louisiana because the new firms have located

in the respective regions because of the characteristics

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[1]Polopolus, p. 42.

[2]Wallace, p. 18.

[3]Mueller et al., 9.

of that region. For instance, Southern Indiana was gen-
erally accepted as a labor surplus area and new firms lo-
cated there because of the availability of labor. Thus,
in a survey of plant managers in Southern Indiana, avail-
ability of labor would be stressed. Likewise Michigan
(i.e. Lower Michigan) is an area with high wage rates.
Thus, any new firms which have located there would do so
for skilled labor and a survey would reflect this. In
this way, local surveys do not indicate accurately the
correct ranking of location factors for all industries, or
even necessarily for a very large part of the industries.
Rather, a specific type of new firm is heavily represented
in each of the regions and a factor cited as important in
one is not necessarily regarded as important in another
region.

It has been the tendency to identify locational
factors by a survey of new plant managers in a local area
and then to attribute these same factors the same relative
importance for future development of that local area. How-
ever, it is unlikely that those factors stressed in local
areas will exert like influence for continuous growth in
the future or even that if similar factor influence did
persist it may not be a basis for substantial growth in
rural areas.

The surveys of local rural areas identified prox-
imity to markets as the most influential location

factor.[1] (Here it should be remembered that markets were
most influential for the _type_ of firm attracted to rural
areas.) Fuchs states, "the evidence suggests that demand
has not been a major determinant of locational change,
1929-54. We infer this, first, because market oriented
industries are only a small part of total manufacturing,
and, second, because a significant portion of the changes
in demand which did occur should properly be considered as
the result of the redistribution of manufacturing, rather
than its cause."[2] Thus, two points are relevant: (1) iden-
tification of the relative importance of location factors
in one rural area is not necessarily applicable to another
local area, nor to rural areas in general, and (2) the fac-
tors, identified in a local rural survey as of primary im-
portance, may be comparatively inconsequential for substan-
tial long-term growth of underdeveloped rural areas.

Analysis of Location Factors by Industry

A ranking of the importance of major factors by
manufacturing firms will vary from firm to firm, depending
on the particular needs of that firm. Individual manufac-
turing firms in the same industry often have similar needs
and thus will attach similar importance to the various

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[1]Wallace, p. 10 and Polopolus, p. 25.

[2]Fuchs, p. 162-63.

location factors. Thus, in many instances, it makes sense to use the industry as the unit of analysis.

Identification of important locational factors for each industry can be more fruitful than ranking factors by relative importance for all industries. If the important factors for each industry are recognized, development agencies can match an industry(s) with the attributes of the particular industry(s) for which the community can satisfy the most location requirements. For some of the industrial groupings dealt with, the fact will be mentioned that this industry has been growing or declining in the East North Central Region (including Michigan) relative to the rate of growth of the industry in all the regions. This is important because, except for industries strongly oriented to natural resources, rural areas tend to suffer greater comparative losses than do metropolitan areas as the industry shifts away from a region.

Food and kindred products

Because the food processing group is such a broad category, certain industries within the category make location decisions on different criteria. Many food industries are market oriented, that is, tend to locate close to local selling points. Such processors include ice cream, bakery, and beverage products. Major locational shifts of these industries have been related to geographical

shifts of income and population. In South Central Louis-
iana the remaining significant factors were transportation,
utilities, available plant facilities, community attitudes
and taxes, in that order.

Another group of food processors are primarily
influenced by the location of raw materials. These pro-
cessors normally use bulky, perishable, and/or heavy raw
materials that lose weight in the process. Examples in-
clude vegetable canneries, poultry processing plants, and
cheese factories.[1] For this group in South Central Louis-
iana markets, labor, transportation, available facilities
to expand, utilities, and proprietor's hometown were the
next important factors. When the source of raw material
changes, these processors change location.[2]

Textile, clothing and leather products

Labor is usually identified as the most critical
location factor by managers in this group. The desire to
avoid unions and to utilize less expensive labor has been
important in national employment shifts in this group.
Michigan and the East North Central States have suffered
comparative losses of employment in this group.

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[1]Fuchs, 250.

[2]Ibid.

Lumber, wood and paper products

There is no clear indication of the most important factors in this group. Proprietors hometown, markets and raw materials each received number one rankings in South Central Louisiana. Logging, sawmills, and millwork, which account for a large part of the employment in this group, are greatly influenced by the pull of natural resources. Likewise paper products are oriented to natural resources. The East North Central region has been a comparative loser of lumber and wood manufacturing because of Western sources of raw material.[1]

Furniture

The East North Central region has also experienced comparative losses in furniture manufacturing during 1929 to 1950. Expensive labor and lack of raw materials appear to be the primary reasons.[2]

Printing and publishing

Proximity to markets and labor are important to printing and publishing plants. Three of four firms in South Central Louisiana located their plants primarily to

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[1]Fuchs, 252.

[2]Ibid., 253.

utilize the typesetting skills available. Other factors, in order of importance, were markets, available facilities, and community attitudes.

Chemicals and allied products

The chemicals industry, apparently, is very sensitive to transportation rates and costs. Plants tend to locate either at the raw material source or within a local market. Plants were located in Southern Indiana and in South Central Louisiana, primarily to serve the local market. Some managers realized transportation rates on final products placed their manufactured goods at a disadvantage in wider consumer markets and at the same time were concerned with transportation rates of raw materials from other states.

Petroleum and coal

Natural resources has been the dominant factor in selection of a specific site--followed in South Central Louisiana by transportation, available facilities, and markets.

Stone, clay and glass products

Manufacturers of stone, clay and glass products primarily seek locations either near raw material sources or near consumers depending on the particular product of

the individual firm. Also in many cases the raw material is available at various locations. Then closeness to a desired market is the crucial factor. Concrete products are a large portion of this group in rural areas. In South Central Louisiana concrete plant managers considered closeness to consumer market as the most critical factor. This was followed by proprietor's hometown and community attitudes.

Primary metal products

The attraction of industrial or producer goods markets has been the major influence on primary metal producers in Southern Indiana; also of importance was Southern Indiana's central location for the widespread input sources for these plants and a supply of trainable labor.

Fabricated metal and machinery products

In Southern Indiana and South Central Louisiana metal fabricators primarily desired proximity to consumer markets. A trainable or skilled labor supply was also important. In addition, facilities available for expansion and community attitudes were mentioned. In Southern Indiana eight of twenty-eight firms in this group were influenced by community inducements. The inducements were mostly financial aid in obtaining building and land.

Motor vehicles and equipment
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Location of motor vehicle manufacturing plants is
known to be influenced by the economies and other advan-
tages of locating in metropolitan areas. Other transpor-
tation manufacturing appears to be more amenable to locat-
ing in non-metropolitan areas.

Recent Growth and Present Production
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Characteristics as Related
==
to Growth Potential
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In the short run, at least, the chances of attain-
ing additional jobs in a small community is greater for
those communities which had a recent favorable movement[1]
of industry.

The Michigan Department of Commerce, Office of
Economic Expansion, tabulates shifts in plant locations
as they appear in published sources.[2] In their reports
of Movements of Industry, for each calendar year, the com-
munity is identified in which the favorable movement took
place.

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[1]Favorable movement includes: move-ins from other
states, local expansions (new buildings constructed at the
same site or within the same county), in-state expansions
(companies establishing operations in a community different
from their existing location), new starts (by Michigan peo-
ple with Michigan capital), and re-openings of operations.

[2]Published information about plant expansions and
industrial movements is subject to limitations. News re-
leases are usually uncertain as to date when the movement
will actually occur. Also many small industry movements
are not newsworthy and so are never reported.

In the 1960 census of population, there were 419 communities in Michigan with populations of 5,000 or less.[1] Of these 419 communities, 188 did not have a reported favorable movement of industry during the years 1960 through 1966.

A total of 146 communities had at least one reported favorable movement of industry during the period 1960 through 1962. During the remaining four years, 1963 through 1966, a total of 189 communities had at least one favorable movement reported.

Of the 146 communities having a favorable movement the first period (60-62), 104 communities, or 71 percent, also had a favorable reported movement of industry during the second period (63-66).

Of the 273 communities which did not have a favorable movement reported in the first period, only 85, or 31 percent, had a favorable movement of industry during the second period.

For small communities seeking industry, the first step or the first increase in industrial employment is very important. After the initial growth, a community has a much greater chance of additional growth in employment.

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[1]Includes all incorporated places of 5,000 or less population (except incorporated places less than 2,500 located in an urbanized area) and all unincorporated places of 1,000 to 5,000.

Another aspect of industrial movement is the source or point of origin of the firm providing the additional employment. In Michigan, during the decade 1957 through 1966, sixty-seven percent of all reported industrial movements were local expansions. New starts accounted for 16 percent. In-state expansions (companies establishing operations in another community in addition to their existing operations) represented 9 percent, and move-ins from other states accounted for 6 percent.

Thus, at any point in time, the potential for employment growth within a community is highly related to the existing industrial complex. There is a resistance to establishing plants at places other than the existing facilities. Moves or expansions into new communities by firms already established in another community, either in-state or from another state, accounted for only 15 percent of all reported movement of industry in Michigan, 1957-1966.

Community programs designed to increase local employment should not overlook possibilities for expanding existing industry. Programs facilitating expansion of local industry may be less costly than attempting to overcome the resistance of non-local firms to establishing facilities at other than their present location.

The potential for attracting new firms would also be greatest for those industries which tie-in (either on input or output side) with existing and expanding industries.

Summary

While the managers of all firms placed great emphasis on several or all four of the basic location factors--markets, raw materials, labor and transportation, the relative rankings depended on the industry represented and on the individual firm.

Also, the overall importance of any one of the four was different for each of the areas surveyed. This follows from the differing characteristics and spatial location of the areas surveyed. Firms will locate in an area for the relative advantage that can be obtained in that area. Manager rankings of the factors reflect this advantage, which will vary for different areas.

Secondary factors were of much less importance to firms. However, they have received much attention because communities can bargain with firms over these factors.

In general, community offered inducements were thought to be ineffective. Evidence also suggests that often inducements are extended at a cost to the community, and firms take advantage of the offer when it was in no way crucial to their decision.

Managers often thought highly of "industrial ambassadors" who could provide useful information about prospective locations.

Recent industrial growth and present production patterns within a community are essential starting points for understanding the growth potential of that community.

CHAPTER IV

SHIFTS IN INDUSTRIAL EMPLOYMENT

Introduction

Changing economic conditions often cause dramatic relocation of industrial activity from one region to another. But perhaps even more important is the continuous re-adjusting of individual industries among states and even among areas within a state.

This shifting may be in response to growing or declining markets, new transportation routes, utilization of different resources, variations in labor availability or any number of locational factors. Any change in the important locational factors can make one area relatively more attractive than other areas. Theoretically, when an area gains an advantage its proportion of industrial activity will increase. Quite often this increase in activity will not be an easily detected upturn in the area's entire economy, but rather, only marginal movements by one or two specific industries. Even though these changing conditions may be quite obscure at any point in time they can be very significant over a period of time. Thus, it is important

for anyone interested in an area's development to be aware of the industries for which the area has an advantage and could be most easily attracted.

In this chapter, the question to be answered is; what industries in the state of Michigan have been shifting into rural areas? On the premise that the to be identified industries found it advantageous to shift to rural areas, some indication can be obtained as to which industries are most likely to locate in rural areas in Michigan. Development agencies can then concentrate efforts on those industries for which the rural community has a relative advantage.

Technique used

The technique to be used here for identifying the industries in which an area is advantaged is shift-share analysis.

Shift analysis[1] is a simple analytical approach based on a study of three main components of area growth: that part attributable to state growth, that part attributable to rates of growth of all industries, and that part due to differences between rates of growth of industries within a single area and rates of growth of the same industries in other areas. It is a means of comparing growth

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[1] An example of calculation is given in the Appendix A.

of the areas of the state with the growth of each other
by using the entire state as a base.

This method identifies and quantifies three compo-
nents of area industrial employment growth. <u>State growth</u>,
the first component, is the amount by which employment in
industry i would have grown in area j, if it had grown at
the same rate as the state all-industry average growth
rate.

The second component, <u>industry mix</u>, is the amount
employment in area j would have grown in industry i more
than (less than) state all-industry growth because industry
i was a fast (slow) growth industry in the state.

<u>Area share</u>, the third component, is the amount of
additional (less) employment in area j in industry i be-
cause industry i grew faster (slower) in area j than it
did in the state. Area share determines whether an area
maintained, gained, or lost in its 'proportion' of the
state's employment in industry i.

By summing the second component across all indus-
tries, it can be determined whether an area within the
state gained or lost employment relative to the rest of
the state because of it's mix of industries. An area with
a high porportion of fast growth industries will gain re-
lative to the remaining areas.

Likewise, by summing the third component across
all industries, it can be determined whether an area

maintained, gained, or lost in its proportion of employment in total industry.[1]

But, more important for purposes of this paper, this technique can be used to identify those industries which grew comparatively faster in rural areas.

Delineation of areas

The 83 counties in Michigan have been delineated into three groups or areas for shift analysis (Figure 2). Area 1 includes all 42 counties in the Upper Peninsula and in Northern Lower Michigan. Area 3 includes 14 counties in Lower Michigan which are Standard Metropolitan Statistical Areas (SMSA). Area 2 comprises 27 non-SMSA counties in Lower Michigan.

Three areas were designated in order that the rural counties could be compared with the highly industrialized counties and, at the same time, counties which are near large employment centers could be analyzed in terms of the influence of urban centers, even though some of these counties may be quite rural in orientation.

Of primary interest here is area 1, which is essentially rural with no major population and industrial concentrations.

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[1]The shift-share technique was used and the data published by the U. S. Department of Commerce. The Department of Commerce data is similar, but on the national basis instead of a state basis. Refer to footnote 1 in Appendix A, p. 109.

Figure 2.--Areas used for shift-share analysis.

Area 1 ☐
Area 2 ▦
Area 3 ▬
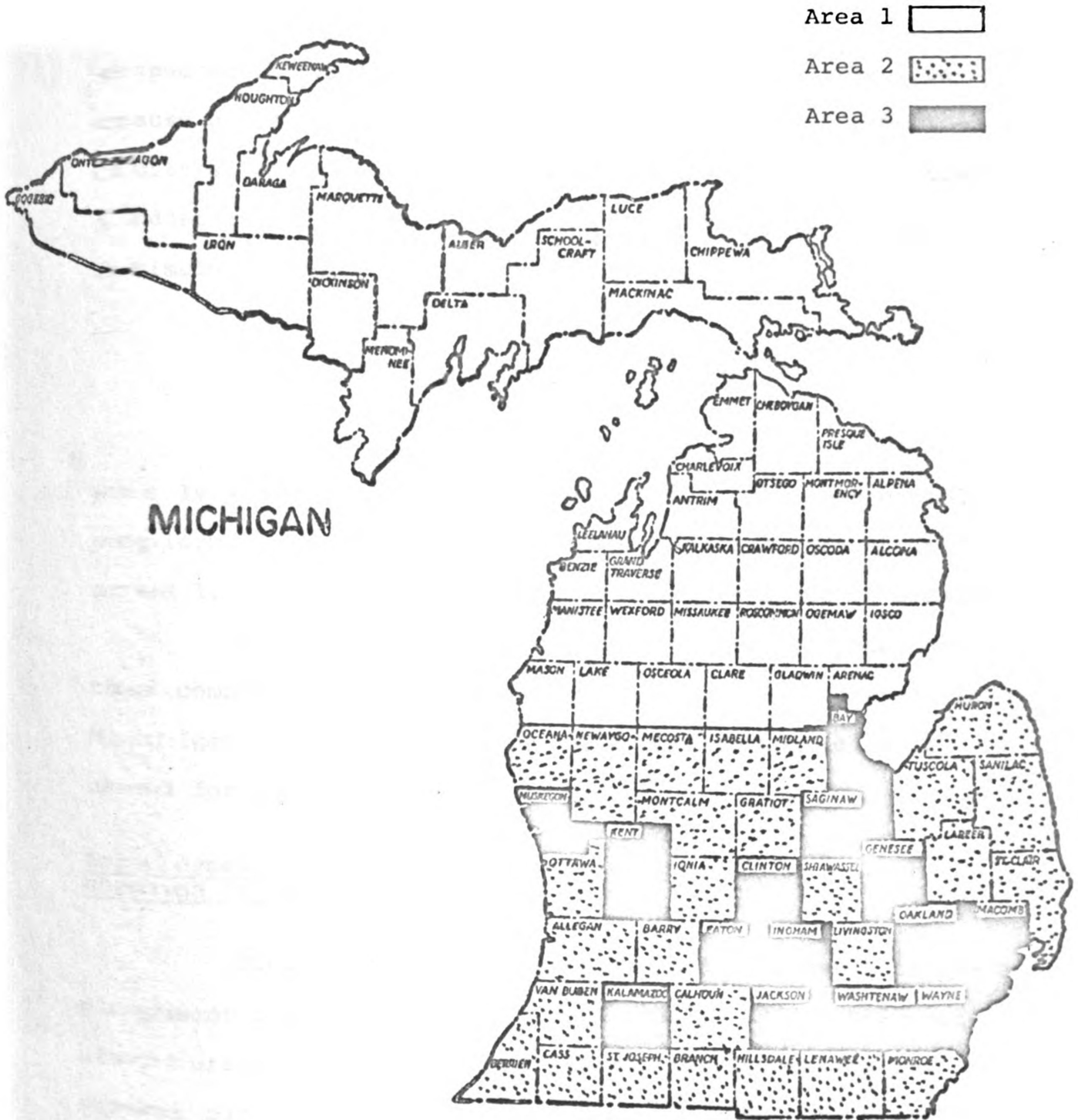
MICHIGAN

Area 2 includes the counties in Southern Michigan which do not contain major employment centers. Some of these counties are rural by all standards, and yet can be expected to be dissimilar from the counties in area 1 because of proximity to the SMSA's. Proximity to large industrial centers affects their economies through selective industrial movements in addition to providing a general stimulus to the county economy.

Employment and Components of Employment Change in Michigan, 1950 to 1960

The rate of growth of all employment in Michigan was 14 percent from 1950 to 1960. During the same period, employment in all industries increased: 3.4 percent in area 1, 16.5 percent in area 2, and 14.5 percent in area 3.

Table A in the Appendix B contains employment and the components of employment change for the three areas in Michigan from 1950 to 1960. Thirty-two industries were used for each of the three areas.

Employment and components of employment change in upper Michigan

Table 10 presents employment and components of employment change for area 1 during 1950 to 1960. Only manufacturing and other commodity producing industries are shown because they are generally considered to be basic or income generating industries through production for export.

Table 10.--Employment and components of employment change in area 1, 1950-1960, manufacturing and other commodity producing industries.

Industries	Employment in		Components of Employment Change			
	1950	1960	State Growth	Industrial Mix	Area Share	Total Change
Elec. & other mach. mfg.	2,471	5,871	345	675	2,380	3,400
Contract construction	11,373	13,882	1,591	- 905	1,823	2,509
Other trans. equip. mfg.	598	2,005	84	652	671	1,407
Food & kindred products	2,563	3,976	359	453	601	1,413
Printing & publishing	1,481	2,299	207	502	109	818
Textile mill products	176	137	25	- 72	8	- 39
Mining	11,979	11,777	1,676	- 1,833	- 45	- 202
Apparel mfg.	1,581	1,722	221	- 12	- 68	141
Forestries & fisheries	1,421	939	198	- 606	- 74	- 482
Chemicals & allied prod.	2,386	2,975	334	477	- 222	589
Other & misc. mfg.[1]	10,620	12,864	1,486	1,498	- 740	2,244
Motor vehicles & equip.	3,213	1,468	450	- 1,111	-1,084	- 1,745
Lumber, wood, furniture	13,231	8,494	1,851	- 3,684	-2,904	- 4,737
Agriculture	34,722	14,350	4,857	-19,573	-5,656	-20,372

[a] Appendix, Table A, p. 111.

[1] Other and miscellaneous manufacturing includes: primary metal, fabricated metal, stone, clay and glass products, paper and allied products, leather and leather products, and other, and not specified.

The industries are ranked by size of the regional share component. Of the manufacturing industries, area 1 obtained the largest increase in its share of electrical and other machinery manufacturing. Also, area 1 gained in its share of contract construction, other transportation equipment manufacturing, food and kindred products manufacturing, printing and publishing manufacturing, and textile mill products. Textile mill products, however, were unimportant and actually had a negative total change in employment.

The implications of this ranking are apparent. If past trends continue, the odds are against any significant growth of motor vehicle or lumber, wood, and furniture manufacturing in area 1. On the other hand, industries such as electrical and other machinery manufacturing, and food and kindred products have exhibited tendencies to shift into this area.

The ranking in table 10 in no way indicates the most desirable industry to be sought, but only indicates which industries showed a tendency to locate in this area. The industry (as well as the particular firm) easily attracted may very well not be the most desirable. Desirability of an industry is the result of several factors, one of which is growth rate. It is important to a community that a firm locating there will continue to increase employment.

Those industries which increased state employment
at a rate faster than Michigan all-industry rate of growth
have a positive figure in table 1 in the industrial mix
column. The positive figure is the amount of additional
employment in area 1 due to that industry's rate of growth
above the Michigan all-industry rate of growth. From this
standpoint, other and miscellaneous manufacturing, elec-
trical and other machinery manufacturing, other transpor-
tation equipment manufacturing, printing and publishing
manufacturing, and food and kindred products manufacturing
are the most desirable, in that order.

On the basis of employment growth due to industrial
mix and regional share, four industries are apparently the
best prospects for locating in area 1. The four industries
are electrical and other machinery manufacturing, contract
construction, other transportation equipment, and food and
kindred products manufacturing.[1] Although contract const-
ruction was a slow growth industry, its total growth was
the second largest.

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[1]The recreation industry is often considered to be
making great strides in upper Michigan which has favorable
natural resources for that industry. This was not evident
during the decade 1950 to 1960 (see entertainment, recrea-
tion services industry in Table A, Appendix B, p. 111).
Area 1 suffered a decline in employment in entertainment
and recreation services. However, the industry classifica-
tion includes many activities, such as motion pictures,
theatres, bowling, pool, baseball, football, and golf,
which would decline with a population decrease. The in-
dustry also includes bathing beaches, swimming, parks,

Employment and components of employment
change in lower Michigan, non-SMSA's,
1950-1960

Table 11 presents employment and components of em-

ployment change for counties in Lower Michigan (area 2)

which are not part of a Standard Metropolitan Statistical

Area. The effect on industrial location in rural counties

resulting from proximity to large urban-industrial complex-

es can be illustrated by comparing table 11 with table 10.

The number of employees in each industry per county is

much higher in area 2, and the effect of proximity to

large centers is evident in the particular industries

which shifted into area 2.

Motor vehicles and equipment manufacturing had the

largest shift into this area. However, this may not be an

established trend because during the census year 1960 the

automobile industry was in the low part of a short-term

cycle. The dramatic decreases in automobile employment in

Detroit for that year caused a comparative shift to area 2,

but could be completely reversed in a short time. Also,

the total change was negative.

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picnic grounds, and rental of boats, etc. The industry
classification may cover up a trend toward these latter
resource based activities.
    Also, it is not possible to know how much employ-
ment in retail sales, lodging, etc., was related to these
activities. (The data on components of employment growth
obtained with the shift-share technique could be used in a
valuable study of inter-industry linkages. For instance,
the association between recreation and retail trade might
be examined.)

Table 11.--Employment and components of employment change in area 2, 1950-1960, manufacturing and other commodity producing industries.

Industries	Employment in		Components of Employment Change			
	1950	1960	State Growth	Industrial Mix	Area Share	Total Change
Motor vehicles & equip.	27,676	27,115	3,872	- 9,570	5,137	- 561
Other & misc. mfg.	44,719	61,390	6,256	6,310	4,105	16,671
Chemicals & allied products	7,312	12,234	1,023	1,461	2,438	4,922
Contract construction	21,571	25,238	3,018	- 1,717	2,366	3,667
Lumber, wood & furniture	7,920	9,090	1,108	- 2,205	2,267	1,170
Agriculture	83,959	50,153	11,745	-47,330	1,779	-33,806
Other transportation equip.	2,469	7,027	345	2,694	1,519	4,558
Apparel mfg.	1,417	1,745	198	10	140	328
Elec. & other machinery	30,406	43,025	4,254	8,304	61	12,619
Textile mill products	1,284	954	180	- 525	15	- 330
Forestry & fisheries	417	284	58	- 178	- 13	- 133
Mining	1,888	1,785	264	- 289	- 78	- 103
Printing & publishing	4,575	6,508	640	1,549	- 256	1,933
Food & kindred products	15,792	18,082	2,209	2,792	-2,711	2,290

a
Appendix, Table A, p. 112.

The next largest increases in the share of area 2 were the industries other and miscellaneous manufacturing, chemicals and allied products, contract construction, lumber, wood and furniture manufacturing, and other transportation equipment manufacturing. Several additional industries had a small positive regional share increase in area 2.

Of those industries exhibiting a tendency to shift to area 2, the five accounting for the largest individual increases in employment due to fast growth were other and miscellaneous (primarily metal industries), chemicals and allied products, contract construction, other transportation equipment, and electrical and other machinery manufacturing.

In general (i.e. area 1 <u>and</u> area 2), electrical and other machinery, and transportation equipment, other than motor vehicles, were the most important industries resisting an overall trend toward location in metropolitan areas. In addition, other and miscellaneous manufacturing, and chemicals and allied products gained competitively in counties in lower Michigan, other than SMSA's. In upper Michigan, additional industries shifting into the area were food and kindred products, and printing and publishing manufacturing.

Several examples are presented in table 12 that
illustrate the relative shifts that have taken place among
the three areas.

Table 12.--Regional share component, 1950 to 1960, agri-
culture, electrical & other machinery, and
chemicals & allied products manufacturing, areas
1, 2, and 3.[a]

* * *	Agriculture	Electrical and other Mach. mfg.	Chemicals and Allied products
Area 1	-5,656[b]	-2,380	-222
Area 2	1,779	61	2,438
Area 3	3,884	-2,444	-2,216

[a]Appendix, Table A.
[b]The columns should sum to zero, but do not in some cases
due to rounding of growth rates.

Agriculture was the source of a major part of em-
ployment loss in counties distant from large urban centers.
All three areas lost employment in agriculture due to the
state decline in agriculture. However, area 1 lost 5,656
additional employees because agricultural employment de-
clined faster in area 1 than in the entire state. In
large part, this was due to the relatively poor agricul-
tural land in Northern Michigan. Areas 2 and 3 gained
what area 1 lost, with the major part going to area 3.
This partly exemplifies the fact that agriculture in Mich-
igan is becoming urban-oriented as large scale farms in-
crease on the urban fringes.

Electrical and other machinery grew comparatively
in area 1, with the major loss in area 3. Chemicals and
products gained in area 2.

By summing the regional share component across all
industries it is possible to see how competitive an area
was with the rest of the state in total employment. This
is shown in table A in the Appendix.

Employment Redistribution for
Non-Standard Metropolitan
Statistical Areas,
1958-1963

The coefficient of redistribution is essentially
another way of looking at the phenomena discussed above.
It can point out those industries which are shifting by
comparing an industry's percent distribution of employment
among areas at two different points in time.

For example, a coefficient of redistribution can
be calculated for food products manufacturing which com-
pares; the percentage food manufacturing in non-SMSA coun-
ties is of food manufacturing in Michigan for 1950, with
the proportion in 1960. By simply subtracting the 1950
percentage from the 1960 percentage, the absolute increase
or decrease in an area's proportion of an industry is ob-
tained. If the result is divided by 100 the value of the
coefficient ranges between -1 and +1. A positive value
for an industry in area 1 indicates that the industry

shifted into the area; and the larger the value, the greater was the positive shift.[1]

Table 13 presents the coefficient of redistribution for non-SMSA counties in Michigan for the period 1958-1963. The coefficient presents a picture similar to that of the change in regional share presented in tables 1 and 2. Except here, area 1 and area 2 are combined as simply non-SMSA counties. Also the industrial classification is somewhat more detailed and includes more recent data.

An example of interpretation from table 13 would be; counties, which were not SMSA's in Michigan, had an additional 6.5 percent of total electrical machinery manufacturing employment in 1963 which they did not have in 1958.

In general, the ranking in table 13 indicates the importance of the industrial shifts into non-SMSA counties. Electrical machinery and equipment was second only to leather products, which was minor in terms of total employment.

Miscellaneous manufacturing, rubber products and plastics, primary metal industries, and products of petroleum and coal are ranked high in terms of favorable

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[1]For a more complete formulation refer to Walter Isard, Methods of Regional Analysis: An Introduction to Regional Science (Cambridge: M.I.T. Press, 1960), p. 254.

Table 13.--Employment in Michigan and in non-standard metropolitan statistical areas, 1958-1963, coefficient of redistribution for non-S.M.S.A.

	Employment in non-S.M.S.A.[a]		Total Employment in Michigan[a]		Coefficient of Redistribution for non-S.M.S.A.
	1958	1963	1958	1963	
Leather & leather products	1,748	2,601	2,930	3,503	.116
Electrical mach. & equip.	13,415	17,090	32,801	36,037	.065
Miscellaneous mfg.	3,287	3,428	20,050	16,193	.048
Rubber products and plastics	2,899	4,983	12,507	17,859	.047
Machinery (exc. elec.)	24,940	32,251	131,709	144,868	.033
Primary metal industries	14,391	18,350	69,762	78,405	.028
Textile mill products	546	737	2,124	2,612	.025
Products of petroleum & coal	637	654	2,778	2,669	.016
Food and kindred products	21,927	19,723	61,250	53,036	.014
Lumber and wood products	9,553	10,231	13,831	14,611	.009
Chemicals and allied products	12,072	11,303	33,793	30,937	.008
Printing, pbl. & allied ind.	5,405	5,521	31,774	30,972	.008
Apparel and other fabric	2,858	3,544	12,694	15,655	.001
Transportation equip.	20,964	23,178	252,260	281,438	-.0007
Fabricated metal products	19,123	19,894	78,383	84,296	-.008
Paper and allied products	11,787	11,511	27,742	28,658	-.023
Instruments and related	1,584	1,687	9,431	13,043	-.039
Furniture & fixtures	8,071	7,657	20,668	21,957	-.042
Stone, clay & glass	8,065	5,450	19,116	24,139	-.196

[a]U.S., Dept. of Commerce, Census of Manufacturers, 1958 and 1956. The figures were calculated by using the average of size classifications given in the census.

redistribution toward non-SMSA counties. Previous analysis
(i.e. tables 10 and 11) indicated that this movement was
primarily into counties close to the counties containing
urban-industrial complexes.

Other industries, such as food and kindred products
and printing and publishing, which table 10 indicated as
shifting to area 1, did not have a high coefficient be-
cause area 2 contains a large part of the total employment
in non-SMSA's.

In fact, the ranking in table 13 may be viewed as
a combination of tables 10 and 11, with only 30 percent of
the weight on area 1. The shifts exhibited in the shift
analysis for the period 1950 to 1960 persisted into the
period 1958 to 1963.

Dispersion of Additional Employment

The dispersion of additional employment created by
an industry among the counties in the area also affects
the chances of a particular county for procuring that in-
dustry. For instance, of those counties in area 1, which
obtained additional employment in motor vehicle manufac-
turing during 1950 to 1960, two counties accounted for
more than 50 percent of the new employment; eleven of the
42 counties gained while twenty-nine lost. The chance of
a particular county in area 1 gaining employment in the
motor vehicle industry is small based on past performance.

Manufacturing industries are ranked in table 14 by the number of counties in area 1 that experienced an actual employment increase in that industry.

Table 14.--Number of counties gaining and losing employment by industry, area 1, 1950 to 1960[a]

	Number of Counties		
	Gained Employ- ment	Accounting for at least 50% of Gains	Lost Employ- ment
Elec. & other mach.	37	5	4
Food and kindred	32	7	10
Printing & pbl.	28	6	10
Other & Misc.	28	6	13
Other trans. equip.	23	2	12
Lumber, wood, furniture	20	6	21
Chemicals & allied	16	2	18
Apparel mfg.	15	2	15
Motor vehicles & . . .	11	2	29
Textile mill products	9	1	23

[a]Calculated from: Lowell D. Ashby, Growth Patterns in Employment by County, 1940-1950 and 1950-1960, Vol. 3, U. S. Department of Commerce (Washington: U. S. Government Printing Office, 1965), pp. 7-1 to 7-28.

Additional employment in electrical and other machinery manufacturing was widely dispersed among the counties. Thirty-seven of the 42 counties in area 1 gained additional employment during the decade.

Food and kindred products manufacturing was second
in terms of the number of counties which experienced gains
in that industry. This was followed by printing and pub-
lishing manufacturing and other and miscellaneous manufac-
turing.

Summary

Shift analysis was used in this chapter to identify
those industries which exhibited a relative tendency to
locate in rural counties in Michigan during 1950 to 1960.
Several manufacturing industries shifted relatively into
rural areas. These industries deserve to be studied first
to see if the trends can be continued.

Electrical and other machinery manufacturing, tran-
sportation equipment other than motor vehicles, and food
and kindred products manufacturing had the greatest relative
shift into counties distant from large urban-industrial
centers.

Miscellaneous manufacturing and chemicals and
allied products had large relative shifts into counties
which were not standard metropolitan statistical areas,
but were in Lower Michigan.

The dispersion among the rural counties of the
additional employment provided by the various industries
was usually the greatest for the industries which had the
largest shifts into rural counties.

CHAPTER V

IMPACT OF PUBLIC AND PRIVATE SERVICES
ON EMPLOYMENT GROWTH

Introduction

The attraction of industry is a competitive matter. As communities, areas, and regions vie for the employment created by industry, they are confronted with the task of improving their locational advantage.

Not only must an area's locational advantage be improved to attract industry, but it must be made favorable relative to other areas. The question of relative costs and returns is crucial; a favorable opportunity at a given place may not be exploited because of an existing greater advantage in another location. An essential starting point for understanding a region's or an area's potential for growth is a realistic appraisal of relative advantage with regard to input-output access; that is, consideration of a location's relative advantage in procurement of inputs and distribution of output.

Perloff[1] presents a scheme of types of regions that can exhibit different growth potentials. He classifies regions by (1) good or poor access to basic and intermediary inputs from external and national sources, (2) good or poor access to basic and intermediary inputs in home region, (3) good or poor access to external or national markets, and (4) good or poor access to markets in home region.

It is apparent that a location which can be classified as good by all four standards is preferable to a place classified as poor. Various regions would be preferred according to the market served and the range of input procurement.

However, spatial relationships and such factors as past growth and climate are factors not subject to control by communities. To the extent that a region's location in space and resource endowment determine potential for growth, a community will not be able to affect its own growth.

However, it is believed that regions and areas can influence their own potential for growth—one way is through the level of public and private services made available. "There are many things that a region can do to enhance its locational advantages, particularly with regard

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[1]Harvey S. Perloff, How a Region Grows: Area Development in the U. S. Economy, Supplementary Paper No. 17 (New York: Committee for Economic Development, 1963), pp. 29-34.

to facilities, as in improving transportation, and major services, such as better education."[1] "More and improved highways, airports, and communications are necessary to develop . . . the region."[2]

The existence and size of urban-industrial concentrations is often taken as an indication of the level of private services available.

> The probability of future growth in industries that ship products to other regions is greatest at points which already have some industrial concentration. . . . Manufacturing requires a set of available community facilities and business services. Where these are well developed, the services are cheaper when used by several firms rather than a single firm.

> The industry location process is quite complicated, and is different for each industry. Availability of complementary business services is only one of many factors . . . but availability of these services in a place increases the probability for industrial growth there.[3]

In addition to the industrial framework existing in urban complexes, the concentration of people can provide a home market for new industry. Size of city, thus, is often viewed as an indication of potential for growth.

The purpose of this chapter is to test; can some of the relative differences in employment growth among

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[1]Ibid., 29.

[2]Max F. Jordan and Lloyd D. Bender, An Economic Survey of the Ozark Region, U.S.D.A. Agricultural Economic Report No. 97 (Washington: U. S. Government Printing Office, 1966), p. 69.

[3]Ibid., 67.

counties in a rural area be explained by differences in the level of public and private services available?

Analysis of Growth as Related to Public and Private Services

The statistical methods of regression and correlation are used to analyze the relative importance of certain variables in explaining comparative employment growth, 1950-1960, in some rural areas.

The area.--The area studied is the upper portion (all counties above Bay) of the lower peninsula of Michigan. Twenty-seven contiguous counties are included in the area, which is predominantly rural.

The 1950 census classified the population in 18 of these counties as entirely rural and the remaining counties were all above 40 percent rural. Only three had cities with populations over 10,000, with the largest being 16,000.

Within the context of Perloff's model, this area has relatively poor access to both inputs and markets from external and national sources.

The variables.--The dependent variables chosen to be explained were (1) share growth rate of all industries, (2) share growth rate of manufacturing industries, and (3) share growth rate of electrical and other machinery manufacturing.

Share growth rate is the rate of growth in employ-
ment due to differences between rates of growth of indus-
tries within a single county and rates of growth of the
same industries in all counties in the United States. It
is simply the regional share component (or competitive ef-
fect), for the period 1950 to 1960, divided by the initial
employment in 1950.

Computations for the regional share component are
illustrated in Appendix A. Table A in Appendix B presents
an example of the regional share components. However,
there is this difference; the Appendix illustrates the
regional share component for regions within Michigan, and,
in this chapter, counties (rather than regions) were used.
Also, the entire United States was used as a base, rather
than the state of Michigan. The components of employment
change by county, for the United States, were published by
the U. S. Department of Commerce in Growth Patterns in
Employment by County, 1940-1950 and 1950-1960.

The question may be asked; did this county's share
of this industry grow faster than did the average of all
U. S. counties' shares? If it did grow faster, its share
growth rate will be positive. If its share grew slower,
then its share growth rate will be negative. The magni-
tude of the share growth rate, then indicates how much
better (if positive) or how much worse (if negative) the
county performed than did all U. S. counties.

The share growth rate for the industry electrical and other machinery manufacturing was calculated for each county (for 1950 to 1960) and used as a dependent variable in the statistical analysis (Table 15).

The same calculations can be applied to groups of industries, such as all manufacturing industries. The share growth rate of all manufacturing was calculated for each county from 1950 to 1960 and also used as a dependent variable.

Likewise, the share growth rate may be calculated for all industries for each county. This may be obtained by simply summing the regional share component of the individual industries and dividing that total by the total all industry employment at the beginning date. The all industry[1] share growth rate, 1950 to 1960, was also used as a dependent variable.

The six explanatory variables used were; (1) per-capita government expenditures, (2) per-capita education expenditures, (3) education completed, (4) transportation facilities, (5) percent of population rural farm, and (6) size of largest city.

The independent variable, per-capita government expenditures, comprises total general expenditures for all local government in 1957. Not only the county

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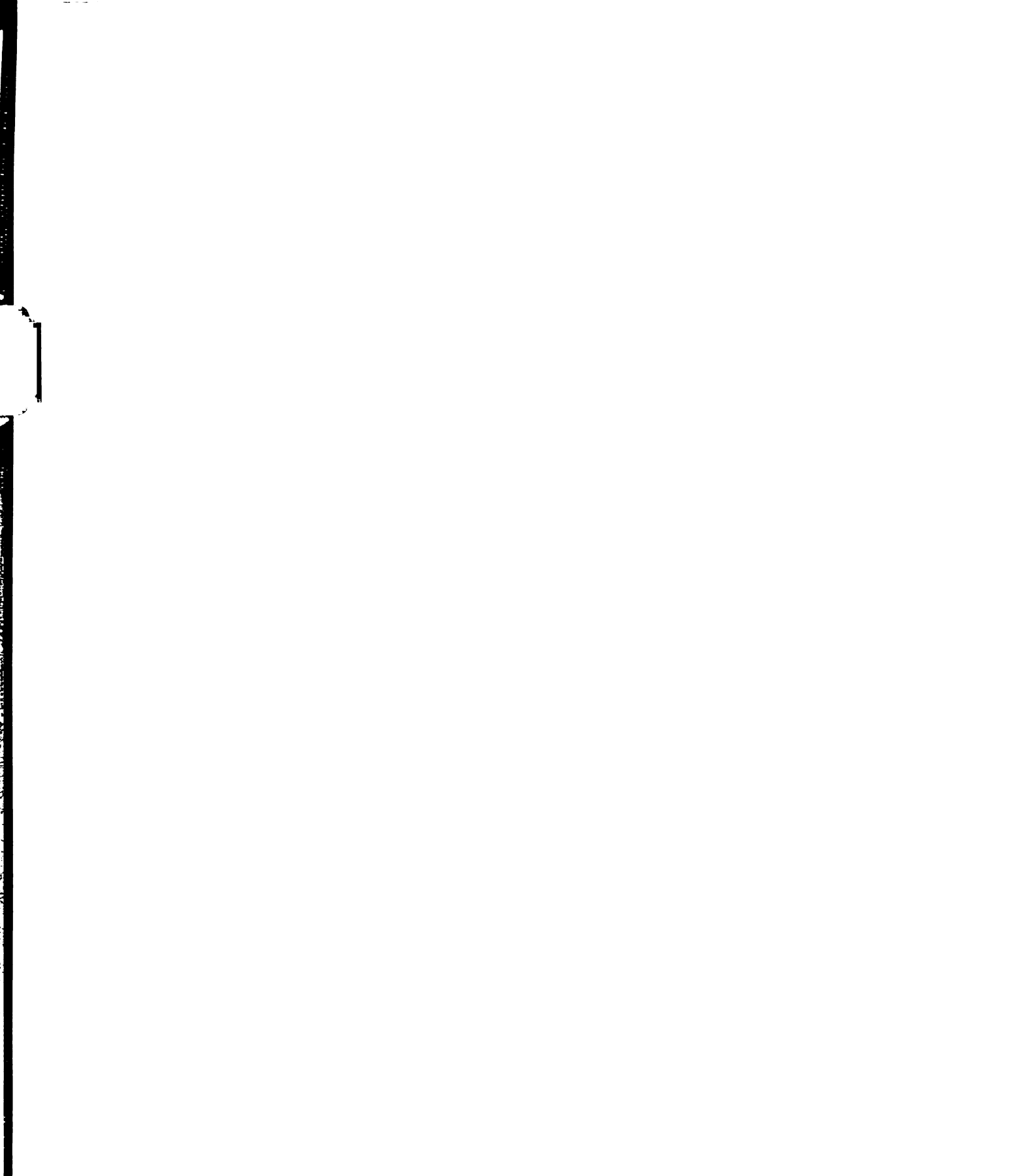[1]Same industry classification as in Table A, Appendix B.

Table 15.--Share growth rates, all industries, manufactur-
ing industries, and electrical & other machinery
manufacturing, 1950-1960, twenty-seven counties
in Northern Lower Peninsula.[a]

Counties	Share Growth Rates (percent)		
	[b]All Industries	Manufacturing	Electrical and Other Mach. Mfg.
Alcona	7.37	189.90	2,433.33
Alpena	19.69	46.37	82.10
Antrim	0.09	142.44	1,110.00
Arenac	5.27	159.12	285.00
Benzie	- 6.61	34.85	276.47
Charlevoix	1.30	40.54	1,345.45
Cheboygan	- 4.38	32.79	38.23
Clare	5.19	68.21	-64.28
Crawford	22.28	89.76	-28.57
Emmet	-16.76	-40.80	-15.38
Gladwin	12.69	102.56	200.00
Grand Traverse	- 5.67	10.84	17.30
Iosco	44.68	0.14	158.82
Kalkaska	1.38	186.71	500.00
Lake	0.54	103.84	163.63
Leelanau	8.60	77.90	170.83
Manistee	-12.94	8.35	27.61
Mason	- 4.92	8.40	-95.65
Missaukee	- 9.28	40.81	233.33
Montmorency	10.89	63.39	220.00
Ogemaw	- 3.46	123.79	23.07
Osceola	- 3.76	105.89	304.54
Oscoda	10.48	49.09	133.33
Otsego	7.70	53.78	36.36
Presque Isle	12.64	65.69	454.54
Roscommon	2.18	34.30	45.00
Wexford	-15.92	-19.18	409.30

[a]Calculated from regional share components as presented in
Lowell D. Ashby, Growth Patterns in Employment by County
1940-1950 and 1950-1960, Volume 3, U. S. Department of Com-
merce (Washington: U. S. Government Printing Office, 1965),
pp. 7-1 to 7-28.
[b]All industries includes all employment in all thirty-two
industries listed in Table A in Appendix.

government, but also any municipality, township, school
district, and special district expenditures were included.
Only utility systems and locally administered employee
retirement systems were omitted. Categories of expendi-
tures were education, highways, health and hospitals, pub-
lic welfare, police, fire protection, natural resources,
sewers and sewage disposal, other sanitation, parks and
recreation, and other general expenditures.[1]

Per-capita expenditures for education consisted of
direct local government provision and operation of elemen-
tary and high schools. All expenditures were included
which were administered by local agencies.[2]

The measure used for education completed was the
percent of the county population consisting of males, 25
years and older, with at least four years of high school
completed in 1950.[3]

Transportation facilities included the total num-
ber of state and U. S. routes, airports, buslines, common
carriers, and railroad lines.[4] This variable was included

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[1] U. S. Bureau of the Census, Local Government Fi-
nances and Employment in Relation to Population: 1957,
State and Local Government Special Studies No. 45, pp.
127-136.

[2] Ibid.

[3] U. S. Bureau of the Census, U. S. Census of Pop-
ulation: 1950.

[4] Michigan Economic Development Department, Research
Division, County Economic Data Sheets, 1961.

as a simple total because many writers have suggested that,
after a firm has chosen an area in which to locate, then
available transportation facilities are important in the
selection of a specific site.

Size of largest city was simply the total popula-
tion of the largest city or town in the county in 1950.[1]

The final explanatory variable used was, the per-
cent of the county population classified as rural farm by
the 1950 census. This variable was included to take into
account the differing degrees of urbanization which would
not be reflected in the size of the single largest city.

Regression and correlation analysis

For each of the dependent variables, the following
statistics were calculated; R^2, F-statistic for the overall
regression, regression coefficients, beta weights, F-
statistics for individual variables, partial correlation
coefficients, and R^2 deletes.

A review of the literature suggests that the fol-
lowing relationships should be found:

(1) Per-capita government expenditures are expect-
ed to be positively related to share growth rates. New
and expanding industries require police and fire protec-
tion, access roads, sewerage, water, and other services.

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[1] U. S. Bureau of the Census, U. S. Census of Pop-
ulation: 1950.

The absence of these facilities may seriously deter industry from locating in an area. Thus, areas providing a high level of public services should experience high growth rates relative to those areas with less provision for these services.

Although the measure, per-capita expenditures, may tend to obscure some significant differences in adequacy and efficiency (i.e. per-unit costs tend to be higher in smaller communities) of public services among counties, the measure does provide an indicator which is applicable to all services, and it gauges the level of services available relative to the population base to be served.

(2) An equally straightforward relationship may not exist between employment share growth rates and, either, per-capita expenditures for education, or education completed. To the extent that "good" school systems and availability of an "educated" labor force are desired by industrial firms and influence location decisions, the relationship will be positive.

However, since better educated workers are likely to be more mobile, outmigration may be higher in counties which spend more for education and have higher educational levels. Outmigration may sap the most productive workers and potential entrepeneurs from an area. To the extent that a greater amount of education contributes to emigration of the labor force, a negative relationship with employment share growth rates can be expected.

(3) Transportation facilities should be positively
associated with share growth rates. Counties containing
more facilities for transporting raw materials and proces-
sed goods can be expected to be preferred by new industry
to areas with fewer facilities. In many instances, the
presence or absence of a particular transport facility,
such as an airport or a railroad terminal, can be the
deciding factor in choosing a specific area in which to
locate after the general region has been chosen.

(4) Size of largest city should be positively asso-
ciated with share growth rates, and for percent rural farm
the relationship should be negative. An industry does not
exist alone, but requires services and markets provided by
other firms and industries. Small communities do not have
as many tie-in industries as larger communities and cannot
be expected to generate as much new and expanding industry.

Also community facilities and business services
are often cheaper when used by many firms rather than a
few. Larger communities can be expected to exhibit higher
share growth rates because of the existing complex of com-
munity facilities and business services.

All industry share growth rate

Table 16 presents the statistics calculated with
the share growth rate of all industries as the dependent
variable.

Table 16.--Regression and correlation coefficients for all
industry share growth rate, Northern Lower
Peninsula.

Overall regression R^2 = .398   Significance level = .086

Independent Variables	Regr. Coef.	Beta Weights	Sign. Level	Partial Corr. Coef.	R^2 Delete
Transportation facilities	-1.44	-.582	.030	-.462	.23
Percent rural farm	- .53	-.572	.030	-.462	.23
Per-capita education expenditures	.27	.539	.145	.321	.33
Per-capita government expenditures	- .18	-.488	.208	-.279	.35
Education completed	-2.86	-.285	.244	-.259	.35
Size of largest city	- .41	-.140	.526	-.143	.38

The six variables, as a whole, are not very success-
ful in explaining differences in share growth rates. The
overall R^2 is .398; that is, only 39.8 percent of the total
variation in share growth rates among counties is explained
by the six variables. Furthermore, the significance level
is only .086.

However, two of the individual variables, transpor-
tation facilities and percent rural farm, are of interest
because the individual coefficients are significant.

The transportation facilities variable is slightly
the more important in accounting for variation in share
growth rates. This variable does account for some of the
variation (partial correlation coefficient = -.462) in
share growth rates over that accounted for by the remainder
of the independent variables and the mean of the dependent
variable. However, the relationship is negative; that is,
high growth rates are associated with low number of trans-
portation facilities, when the effect of the other variab-
les is removed.

This relationship is not as expected and it is
somewhat difficult to explain. Perhaps the variable (num-
ber of transportation facilities) is not an appropriate
variable since it does not incorporate relative costs.[1]
Nevertheless, this relationship does suggest that trans-
portation is not important for growth in all industries
(as opposed to only manufacturing industries). Growth in
employment in activities such outdoor recreation may not
require numerous highways, railroads, and airports. In
fact, the reverse may be true--the more primitive the area,
the greater the attraction for sightseers and outdoorsmen.

The variable, percent rural farm, is the next most
important in accounting for variation. The coefficients
are negative as expected.

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[1]Also, this variable did not include port facilities
which may have had some influence in the counties bordering
the lakes.

The variable, size of largest city, is of particular interest because it is often the basis for designation of growth centers in rural areas. In the correlation analysis, this variable is the least important (i.e. lowest beta weight) in accounting for variation in share growth rate for all industries. Although not significant, the coefficient is negative. The implication is that the existing largest cities with this rural area are not the points at which comparative gains in employment are being made in all industries. However, this does not necessarily implicate revision of criteria for designation of growth centers, since the largest cities may have a greater concentration of fast growth industries even though they are not increasing their proportion of them relative to the entire nation.

Manufacturing share growth rate

The same six independent variables were used to analyze share growth rate of manufacturing industries. The six variables accounted for almost 60 percent of the variation, and the overall regression is significant at .004 (Table 17).

Only two of the variables are individually significant. They are per-capita government expenditures, which was the most important, and percent rural farm. Both relationships are positive. This indicates that manufacturing

Table 17.--Regression and correlation coefficients for
          manufacturing industries share growth rate,
          Northern Lower Peninsula.

Overall regression R^2 = .589   Significance level = .004

Independent Variables	Regr. Coef.	Beta Weights	Sign. Level	Partial Corr. Coef.	R^2 Delete
Per-capita govern- ment expenditures	1.19	.71	.032	.457	.48
Percent rural farm	1.84	.45	.044	.433	.49
Per-capita educa- tion expenditures	-1.11	-.48	.115	.346	.53
Size of largest city	-3.08	-.22	.219	-.273	.56
Education completed	-6.92	-.15	.452	-.169	.57
Transportation facilities	1.56	.14	.513	.147	.57

growth is related to expenditures for government. At the
same time manufacturing firms increased employment rela-
tively more in areas away from the regions larger cities.

The coefficient for transportation facilities,
although positive, is not significant at any reasonable
level. Two explanations are possible; first, transporta-
tion facilities were not important to the manufacturing
firms locating in the area, or, second, all counties had
a minimum number of facilities which were adequate for

the needs of the firms. The second explanation seems more likely. The manufacturing firms may find relatively unused facilities in less urbanized counties, preferable to more, but congested, facilities in urbanized areas.

Electrical and other machinery manufacturing share growth rate

The six variables account for 65 percent of the variation in share growth rate for electrical and other machinery manufacturing, and the overall regression is significant at .001 (Table 18).

Per-capita government expenditures is the most important variable in accounting for variation, and the association is positive.

The second most important variable, transportation facilities, is also positively associated with share growth rate of electrical and other machinery manufacturing. When the effect of all other variables is removed, counties with more transportation facilities had higher share growth rates.

None of the other individual variables have coefficients significantly different from zero at even the .10 level.

Table 18.--Regression and correlation coefficients for electrical and other machinery manufacturing share growth rate, Northern Lower Peninsula.

Overall regression R^2 = .655   Significance level = .001

Independent Variables	Regr. Coef.	Beta Weights	Sign. Level	Partial Corr. Coef.	R^2 Delete
Per-capita government expenditures	11.35	.752	.015	.509	.53
Transportation facilities	41.65	.404	.045	.432	.57
Percent rural farm	7.59	.199	.298	.232	.63
Education completed	-66.97	-.161	.382	-.196	.64
Size of largest city	-10.88	-.089	.595	-.120	.65
Per-capita education expenditures	1.33	.064	.814	.053	.65

Importance of the private and
public service variables

The measures of private and public services were more successful in explaining employment share growth rates for manufacturing industries than for all industries. Per-capita government expenditures was the most important variable in explaining differences in share growth rate of manufacturing industries. The strength of the relationship suggests that expenditures for public facilities did

contribute greatly to the comparative growth of counties in manufacturing industries. But not for all industries; the relationship with all industry share growth rate was negative and the test that it accounted for any variation above that accounted for by the other variables was not very significant.

Per-capita expenditures for education was the third most important variable in accounting for variation in share growth rate in both all industries and manufacturing industries. However, in neither case was the reduction in R^2 resulting from deletion of this variable very great. The association with all industries was positive, but with manufacturing industries the association was negative.

The measure of education completed was in all cases negatively associated with share growth rates, when all other variables were held constant. However, since the significance levels were very low, it is possible that education completed did not affect share growth at all.

The association of transportation facilities with share growth rates was different for the various industrial groupings. For all industries the association was negative; that is, counties with a large number of transportation facilities had small share growth rates. And, there is 97 percent probability that this observed relationship was not due to chance alone.

For manufacturing industries, the association was positive, but there is only 50 percent probability that transportation facilities accounted for any differences in share growth rates above that accounted for by the other variables.

For the single manufacturing industry, electrical and other machinery manufacturing, the association with transportation facilities was positive, and there is 96 percent probability that this variable did account for variation in addition to that of the other variables.

The variable, percent of population rural farm, was the second most important in accounting for differences in share growth rates of both all industries and manufacturing industries. However, the relationship was negative for all industries and positive for manufacturing industries. In both cases, there is greater than 95 percent probability that this variable accounted for variation above that accounted for by the other variables.

The relationship of percent rural farm with electrical and other machinery manufacturing share growth rate was also positive. But the probability that it accounted for any of the variation is very low.

Size of largest city was, on the whole, the least important of the six variables. In all cases, the degree of association was very low, even though the relationship was always negative.

Summary and Conclusions

The degree to which the variables were correlated, in most instances, was quite low. The six variables accounted for less than 40 percent of the variation in share growth rate of all industry, about 59 percent of the variation in manufacturing share growth rate, and 65 percent of the variation in electrical and other machinery manufacturing share growth rate. In no instance did a single variable account for more than 26 percent of the variation in share growth rate above that accounted for by the other variables and the mean of the dependent variable.

The relationships between the public and private service variables and share growth rates, 1950-1960, were not all as expected. For instance, the coefficients for size of largest city were always negative, even though at very low significance levels. Similarly, counties with a high proportion of rural farm population grew comparatively faster in manufacturing employment, but not in all industry employment. Transportation facilities, while very important in the single manufacturing industry of electrical and other machinery manufacturing, were insignificantly related to share growth rate of all manufacturing. Per-capita education expenditures and education completed were not significant and usually inversely related to share growth rates.

The results indicate that some public and private service levels are industry specific; that is, affect various industries differently. Counties with high per-capita government expenditures were likely to have had high share growth rates in manufacturing industries, but not in all industries.

Any conclusions from the analysis cannot necessarily be applied to development programs for other rural areas. The analysis must be understood in terms of (1) the total picture, or process of change taking place in this rural area, and (2) the spatial location of this area in relation to other areas.

These 27 counties were adjusting to a declining dependence on agriculture. Workers leaving agriculture had to find other employment or migrate out of the area. Much of the non-agricultural employment opportunities that existed were provided by manufacturing.

The area, in a very real sense, is the hinterland of heavily urbanized Southern Michigan. Location in Southern Michigan would be advantageous to those industries heavily dependent on: proximity to large home and external markets, economies of large industrial complexes, and external sources of inputs. The counties with manufacturing firms and industries, which grew more rapidly than the national average, then, were not those with the largest cities, but those with the relative advantages to be found

in the more rural counties. A large part of the additional employment in these counties was in food and related products manufacturing, lumber, wood and furniture manufacturing, electrical and other machinery manufacturing, and miscellaneous manufacturing.

Also, educational levels and expenditures were not a drawing point for these manufacturing industries. In fact, the analysis indicated that, at best, higher levels of education did not hinder comparative growth.

The level of government services, however, was associated with relative growth. Transportation facilities were similarly important for specific manufacturing industries.

The degree of association between public and private services and share growth rate of all industry was much lower. This was probably due to the various industries reacting differently to the economic stimuli produced by changes in the employment base of the area. In total the effects may have tended to cancel.

Whether or not the studied associations are strong enough or weak enough to call for changes in rural development programs cannot be answered from an understanding of the relationships alone. Something of the costs and expected benefits from public and private services has to

be known in order to form good policies and programs for
development of rural areas.[1]

Implications for designation of
rural growth centers

Growth centers are often designated on the basis of
shopping patterns, commuting patterns, etc., with the re-
sult that the largest city is usually regarded as the
growth center of the area.

However, in the areas studied, comparative gains
in employment were not registered in the largest cities,
primarily because of the changing economic base of the area.

A superior approach to designation of growth cen-
ters might involve:

(1) Determining what is likely to be the future
role, in terms of economic activity, of the entire rural
area in relation to external markets and sources of inputs.

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[1]A major step in identifying the costs and benefits
associated with new industry in a rural community has been
made in several studies, such as; H. A. Wadsworth and J. M.
Conrad, Impact of New Industry on a Rural Community, Agri-
cultural Experiment Station Research Bulletin No. 811 (Laf-
ayette, Indiana: Purdue University, 1966), and Max F.
Jordan, Rural Industrialization in the Ozarks: Case Study
of a New Shirt Plant at Gassville, Ark., U.S.D.A., Agricul-
tural Economic Report No. 123 (Washington: U. S. Govern-
ment Printing Office, 1967). In the main, these studies
concentrated on income from increased direct, business-
linked, and consumer-linked employment. More comprehensive
and detailed analyses are needed concerning long run spill-
over effects on the environment, surrounding communities,
and other sectors (especially the public sector) of the
community's economy.

(2) Identifying the particular subareas and locations within the rural area which are most likely to best serve those emerging economic activities that are likely to provide the economic base of future employment. This would involve identifying locational factors for specific industries and factor availability within subareas of the region.

This does not necessarily mean that the largest cities within the area are inappropriate as growth centers. There is the possibility that, if the largest cities in the area were large enough, then these cities might exert sufficient influence on the surrounding area to take up the slack in employment. Programs to create large cities out of the existing cities in the area may be a superior investment policy if those cities will then be able to spearhead sustained growth for the region.

More information and experience, concerning the long run effects of alternative programs for growth, is needed in order to select programs with the greatest potential for development of the region.

CHAPTER VI

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SUMMARY AND CONCLUSIONS

In recent years, there has been widespread concern
over declining employment opportunities in many areas.
National, state, county, and local groups have been ac-
tively engaged in 'promoting' industrial development for
disadvantaged areas. The Public Works and Economic Devel-
opment Act of 1965 provided for help in the economic de-
velopment of distressed areas. The Economic Development
Administration provided for low-interest long-term loans
for the purchase or development of land and facilities for
industrial usage. The Michigan Industrial Development
Revenue Bond Act of 1963 authorized municipalities to issue
revenue bonds in order to acquire industrial facilities
for the purpose of leasing to industrial firms. Many local
communities have formed industrial development corporations
for the sole purpose of contacting and procuring new
industry.

The President's National Advisory Commission on
Rural Poverty has pointed out the consequences of the lack
of employment opportunities in rural areas and has recom-
mended efforts to increase jobs in rural areas.

The purpose of this study has been to investigate three major questions. First, what locational factors have been important to firms locating in rural areas? Second, on the basis of past growth, which industries are the most likely to be attracted to rural areas in Michigan? Third, what relationships have existed between comparative employment growth and levels of public and private services?

Several surveys on locational factors of industry in rural areas were examined in order to gain some idea of the relative importance of various locational factors, with particular emphasis on those factors which can be used as inducements. The shift-share technique was used to point out those industries which demonstrated relative employment shifts favorable to rural areas in Michigan from 1950 to 1960. Statistical procedures of regression and correlation analysis were used to investigate the asso-ciation between levels of public and private services available and comparative employment growth rates in a 27 county rural area in Michigan from 1950 to 1960.

Locational Factors

Recent literature on factors influencing the loca-tion of industry in rural areas was reviewed for manager rankings of locational factors. Surveys of rural areas in Southern Indiana and in South Central Louisiana were relied on heavily with supplementary references to a survey in Michigan and a national study.

Four locational factors were revealed to be most important in making location decisions. These were markets, raw materials, labor, and transportation. The relative ranking of these four factors depended on the industry represented and on the individual firm.

The remaining factors, utilities, taxes and legislation, personal preferences, and community attitudes and inducements were of much less importance. However, they are to some degree manageable by local communities. Utilities and taxes and local legislation were the most important of these factors, but often played only a minor role in the selection of a specific site because many communities were similar with respect to these two factors.

Much evidence was found that quite often plant sites have been selected on the basis of proprietor's hometown, previous business connection, or readily available plant facilities. This was particularly true of small firms.

Community attitudes and offered inducements to new industry had very little influence on location decisions. In most instances, even actions within the community to discourage plant location there were disregarded.

Community offered inducements often used were: community financing arrangements, tax exemptions or concessions, community owned or held plant sites and buildings, and research concerning information on labor supply and general facilities available.

There was evidence that communities attached too much importance to the role that inducements play in attracting firms. Economic inducements were often extended at a cost to the community and accepted by the firm when the firm had not even considered the inducement while making the location decision.

However, many managers did think highly of industrial ambassadors who could show them specific site alternatives, provide documentation of land-use planning, and make available information on labor supply, transportation facilities, complimentary business establishments, and other general information.

The overall importance of a particular factor and the aspect of the factor emphasized was often different for each of the areas surveyed. This follows from the differing characteristics and spatial location of the areas surveyed. Firms located in an area for the relative advantage that was to be obtained in that area, and manager rankings of factors reflected this.

A study of the movement of industry in Michigan indicated that in the short run, at least, the chances of attaining additional jobs in a small community is greater for those communities which had a recent favorable movement of industry. Also, there is a resistance to establishing plants at places other than the existing facilities.

Recent industrial growth and present production patterns within a community are essential starting points for understanding the growth potential of that community.

Shifts in Industrial Employment

The shift-share technique was used to identify those industries for which employment shifted comparatively into rural areas in Michigan from 1950 to 1960. Those industries for which rural areas increased their share relative to the rest of the state were considered to have found an advantage in rural areas relative to the rest of the state. If this relative advantage persists in rural areas for the industries identified as having shifted comparatively into rural areas, then these industries are ones mostly likely to be attracted by rural community efforts.

The manufacturing industries electrical and other machinery, transportation equipment other than motor vehicles, and food and kindred products had the greatest relative shifts into rural counties in upper Michigan. Agriculture had the largest shift out of this area.

Miscellaneous manufacturing and chemicals and allied products had large relative shifts into lower Michigan counties which were not standard metropolitan statistical areas.

The dispersion among the rural counties of the additional employment provided by the various industries was usually the greatest for the industries which had the largest shifts into rural areas.

These industries should be examined first by rural communities desiring additional industrial employment.

Public and Private Services as Related to Growth

The statistical methods of regression and correlation were used to test whether some of the differences in comparative growth rates among some rural counties in Michigan can be explained by differences in the level of public and private services available. The dependent variables were generated with the shift-share technique of analysis. They were (1) share growth rate of all industries for each county (1950-1960), (2) share growth rate of manufacturing industries (1950-1960), and (3) share growth rate of electrical and other machinery manufacturing (1950-1960). The variable share growth rate was used to measure how well a particular county did in an industry (or group of industries) relative to how well all counties in this area did in this industry (or group of industries).

The six explanatory variables used were, (1) per-capita government expenditures for 1957, (2) per-capita education expenditures for 1957, (3) education completed,

(4) transportation facilities, (5) percent of county pop-
ulation rural farm, and (6) size of largest city.

The counties studied were 27 contiguous rural coun-
ties in the upper portion of Michigan's Lower Peninsula.
Only three had cities with a population over 10,000 with
the largest being 16,000.

The degree to which the variables were correlated,
in most instances, was quite low. The six explanatory
variables accounted for less than 40 percent of the varia-
tion in share growth rate of all industries, about 59 per-
cent of the variation in manufacturing share growth rate,
and 65 percent of the variation in electrical and other
machinery manufacturing share growth rate. In no instance
did a single variable account for more than 26 percent of
the variation above that accounted for by the other varia-
bles and the mean of the dependent variable.

Of the six explanatory variables, per-capita gov-
ernment expenditures was the most important variable in
explaining employment share growth rate of manufacturing
industries. But it was relatively unimportant for share
growth rate of all industries.

Per-capita expenditures for education was the third
most important variable in accounting for variation in
share growth rate in both all industries and manufacturing
industries. However, in neither case did it explain much

variation, and the association with manufacturing was negative. In all cases the coefficients for the measure of education completed were negative with very low significance levels.

A very strong negative relationship was found between number of transportation facilities and share growth rate of all industries. This unexpected result may have been a consequence of the fact that number of transportation facilities does not include quality and relative costs. However, the association with electrical and other machinery manufacturing was positive.

Size of largest city was, on the whole, the least important of the six variables studied.

The variable, percent of population rural farm, was the second most important in accounting for differences in share growth rates of both all industries and manufacturing industries. However, the relationship was negative for all industries and positive for manufacturing industries.

The relationships were not all as would be expected and the results indicated that some public and private service levels are industry specific, that is affect various industries differently.

The relationships found can be understood only in terms of the total picture or process of change taking place in this rural area, and in terms of the spatial location of this area in relation to other areas. A large

part of the 1950 employment in these 27 counties was depen-
dent on agricultural industries. The tremendous decline
in agricultural employment during the decade precipitated
both migration out of the area and occupational changes to
non-agricultural industries. Much of the additional non-
agricultural employment was found in manufacturing indus-
tries--primarily food and related products, lumber, wood
and furniture, electrical and other machinery, and miscel-
laneous manufacturing. The high share growth rates of
these industries tended to be registered in the more rural
counties.

Education of the labor force was probably not im-
portant to these industries or, more likely, was a trade-
off for the lower wages associated with less education.

Availability of transportation facilities was not
important as an explanation for all manufacturing share
growth rates, but was important for one specific manufac-
turing industry.

The level of government services was important for
the manufacturing industries.

Less success was attained in explaining the share
growth rate of all industry. This was probably due to the
various industries reacting differently to the changing
employment base of the area, and individual effects
cancelling.

This study has dealt with several aspects of how communities may induce industries to locate in a rural area. Further consideration needs to be given to actual costs and returns to a community of the additional industry. Questions of vital concern to communities making concessions to firms are; will the industry pay its way, and what are the expected returns from the location inducement offered. More detailed studies need to be done on the total costs and returns associated with industrial development in rural communities. All direct and indirect revenue-generating and expenditure-generating effects of the project, especially those for the public services sector, must be ascertained.

Similarly, continued attention at the regional level should be focused on determining appropriate policies and programs for promoting industrialization of declining rural areas. For instance, the effectiveness of "growth centers" as a policy instrument and the methods of designating growth centers in declining rural areas warrant further research. Some evidence was found in this study that the largest cities, which would normally be designated as the growth centers, may not have the potential for industrial employment growth in a declining rural area unless, perhaps, they can be brought to a possible threshold size.

These are only a few of the many unknowns concerning industrialization of declining rural areas. Hopefully, with more work and experience the problems can be dealt with effectively.

APPENDIX A

COMPUTATION OF SHIFT-SHARE ANALYSIS

APPENDIX A

COMPUTATION OF SHIFT-SHARE ANALYSIS[1]

Shift analysis is a simple analytical approach based on a study of three main components of area growth: that part attributable to state growth, that part attributable to rates of growth of the mix of industries in the area that are greater or less than the state rates of growth of all industries, and that part due to differences between rates of growth of industries within a single area and rates of growth of the same industries in other areas. Symbolically this may be expressed as:

$$d_{ij} = g_{ij} + k_{ij} + c_{ij}$$

where: g_{ij} = the state growth element for industry i in area j.

k_{ij} = the industry-mix effect for industry i in area j.

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[1]Lowell D. Ashby, Regional Change in a National Setting, U. S. Dept. Com. Off. Bus. Econ. Staff Working Paper No. 7, 1964; and Growth Patterns in Employment by County, U. S. Dept. of Com., Off. Bus. Econ., 1965, p. xii.

c_{ij} = the area competitive effect (sometimes called regional share component) for industry i in area j.

d_{ij} = the absolute change in employment between two points in time for industry i in area j (that is, $E_{1960} - E_{1950}$).

For example, considering electrical and other machinery manufacturing (industry i) in upper Michigan (area j) between 1950 and 1960, the following applies:

Year	Employment in upper Michigan
1950	2,471
1960	5,871
absolute change	3,400

Now, the state overall rate of growth between 1950 and 1960 was 0.1399. For electrical and other machinery manufacturing it was 0.4130. And for electrical and other machinery manufacturing in upper Michigan it was 1.3759.

Letting: r   = the state overall rate of growth (0.1399)

r_i = the state rate of growth in industry i (0.4130)

r_{ij} = the rate of growth of electrical and other machinery manufacturing (industry i) in upper Michigan (1.3759)

with: E_{1950} being employment in 1950 (2,471)

E_{1960} being employment in 1960 (3,400)

Then: $g_{ij} = E_{1950} \times r$

$= 2,471 \times .1399 = 345$

$k_{ij} = E_{1950} \times (r_i - r)$

$= 2,471 \times (.4130 - .1399) = 675$

$c_{ij} = E_{1950} \times (r_{ij} - r_i)$

$= 2,471 \times (1.3759 - .4130) = 2,380$

$d_{ij} = E_{1950} - E_{1960}$

$= 5,871 - 2,471 = 3,400$

Finally, we have:

$d_{ij} = g_{ij} + k_{ij} + c_{ij}$

$3,400 = 345 + 675 + 2,380$

(These figures are presented in Table A, p. 111)

This example was worked out using the state rate of growth as a base. The same procedure can be used to analyze shifts among various aggregations of space; for example, regions within the United States, using the national rate as a base.[1]

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[1]The U. S. Department of Commerce published the data generated for all regions, states, and counties in the U. S. using the national growth rate as a base. Lowell D. Ashby, Growth Patterns in Employment By County, 1940-1950 and 1950-1960, U. S. Department of Commerce (Washington: U. S. Government Printing Office, 1965).

APPENDIX B

EMPLOYMENT AND COMPONENTS OF EMPLOYMENT
CHANGE, 1950-1960, AREAS 1, 2, and 3

Table A.--Employment and components of employment change, 1950 to 1960,
  Area 1.[a]

	Employment in 1950	1960	State Growth	Industrial Mix	Regional Share	Total Change
Agriculture	34,722	14,350	4,857	-19,573	-5,656	-20,372
Forestry & fisheries	1,421	939	198	- 606	- 74	- 482
Mining	11,979	11,777	1,676	- 1,833	- 45	- 202
Contract construction	11,373	13,882	1,591	- 905	1,823	2,509
Food & kindred products mfg.	2,563	3,976	359	453	601	1,413
Textile mill products	176	137	25	- 72	8	- 39
Apparel mfg.	1,581	1,722	221	- 12	- 68	141
Lumber, wood & furn.	13,231	8,494	1,851	- 3,684	-2,904	- 4,737
Printing & publishing	1,481	2,299	207	502	109	818
Chemicals & allied	2,386	2,975	334	477	- 222	589
Electrical & other machinery mfg.	2,471	5,871	345	675	2,380	3,400
Motor vehicles & equipment mfg.	3,213	1,468	450	- 1,111	-1,084	- 1,745
Other transportation equipment mfg.	598	2,005	84	652	671	1,407
Other & misc. mfg.	10,620	12,864	1,486	1,498	- 740	2,244
Railroads & railway express	4,550	3,624	636	- 1,660	98	- 926
Trucking & warehousing	1,610	1,983	225	333	- 185	373
Other transportation	3,309	2,486	462	- 1,110	- 175	- 823
Communications	2,189	2,341	306	- 12	- 142	152
Utilities & sanitary service	2,515	2,744	352	- 238	115	229
Wholesale trade	4,196	4,859	587	322	- 246	663
Food & dairy products stores	6,794	6,171	951	- 931	- 643	- 623
Eating & drinking places	6,054	7,027	847	- 162	288	973
Other retail trade	16,403	19,763	2,295	815	250	3,360
Finance, insurance & real estate	2,880	4,301	403	720	298	1,421
Hotels & other personal services	6,455	6,771	903	- 670	83	316
Private households	3,302	5,222	462	936	522	1,920
Business & repair services	4,325	3,317	605	197	-1,810	- 1,008
Entertainment, recreation services	1,512	1,219	212	- 381	- 124	- 293
Medical & other professional services	16,307	24,087	2,281	9,551	-4,052	7,780
Public administration	7,069	8,817	989	1,026	- 267	1,748
Armed forces	846	5,932	118	134	4,834	5,086
Industry not reported	3,006	4,274	421	5,075	-4,228	1,268
Total	191,137	197,697	26,739	- 9,594	-10,585	6,560

Table A.--(Continued) Area 2.

	Employment in 1950	1960	State Growth	Industrial Mix	Regional Share	Total Change
Agriculture	83,959	50,153	11,745	-47,330	1,779	-33,806
Forestry & fisheries	417	284	58	- 178	- 13	- 133
Mining	1,888	1,785	264	- 289	- 78	- 103
Contract construction	21,571	25,238	3,018	- 1,717	2,366	3,667
Food & kindred products mfg.	15,792	18,082	2,209	2,792	-2,711	2,290
Textile mill products	1,284	954	180	- 525	15	- 330
Apparel mfg.	1,417	1,745	198	- 10	140	328
Lumber, wood & furn.	7,920	9,090	1,108	- 2,205	2,267	1,170
Printing & publishing	4,575	6,508	640	1,549	- 256	1,933
Chemicals & allied	7,312	12,234	1,023	1,461	2,438	4,922
Electrical & other machinery mfg.	30,406	43,025	4,254	8,304	61	12,619
Motor vehicles & equipment mfg.	27,676	27,115	3,872	- 9,570	5,137	- 561
Other transportation equipment mfg.	2,469	7,027	345	2,694	1,519	4,558
Other & misc. mfg.	44,719	61,390	6,256	6,310	4,105	16,671
Railroads & railway express	7,402	5,416	1,035	- 2,700	- 321	- 1,986
Trucking & warehousing	5,341	7,501	747	1,103	310	2,160
Other transportation	2,488	2,483	348	- 835	482	- 5
Communications	4,360	4,542	610	- 23	- 405	182
Utilities & sanitary service	5,137	6,042	719	- 485	671	905
Wholesale trade	9,615	11,554	1,345	738	- 144	1,939
Food & dairy products stores	12,037	13,116	1,684	- 1,649	1,044	1,079
Eating & drinking places	10,161	13,434	1,422	- 272	2,125	3,273
Other retail trade	35,455	45,565	4,960	1,761	3,389	10,110
Finance, insurance & real estate	7,480	12,002	1,047	1,869	1,606	4,522
Hotels & other personal services	9,900	11,308	1,386	- 1,028	1,050	1,408
Private households	8,484	13,273	1,187	2,405	1,197	4,789
Business & repair services	9,123	8,213	1,276	415	-2,601	- 901
Entertainment, recreation services	2,960	2,539	414	- 745	- 90	- 421
Medical & other professional services	32,126	56,303	4,494	18,816	867	24,177
Public administration	10,118	13,576	1,416	1,467	575	3,458
Armed forces	4,377	1,417	612	692	-4,264	- 2,960
Industry not reported	7,093	13,914	992	11,977	-6,148	6,821
Total	435,062	506,828	60,864	- 5,210	16,112	71,766

Table A.--(Continued) Area 3

	Employment in 1950	1960	State Growth	Industrial Mix	Regional Share	Total Change
Agriculture	41,188	27,617	5,763	-23,218	3,884	-13,571
Forestry & fisheries	324	319	45	- 138	88	- 5
Mining	1,676	1,778	234	- 255	123	102
Contract construction	85,474	86,442	11,958	- 6,803	-4,187	968
Food & kindred products mfg.	29,022	40,324	4,060	5,132	2,110	11,302
Textile mill products	3,403	2,462	476	- 1,393	- 24	- 941
Apparel mfg.	4,580	5,115	641	- 34	- 72	535
Lumber, wood & furn.	18,810	16,844	2,632	- 5,237	639	- 1,966
Printing & publishing	24,884	36,935	3,481	8,423	147	12,051
Chemicals & allied	20,838	25,700	2,915	4,163	-2,216	4,862
Electrical & other machinery mfg.	93,631	129,858	13,099	25,572	-2,444	36,227
Motor vehicles & equipment mfg.	444,074	348,580	62,126	-153,561	-4,059	-95,494
Other transportation equipment mfg.	5,576	10,249	780	6,083	-2,190	4,673
Other & misc. mfg.	151,604	190,844	21,211	21,393	-3,364	39,240
Railroads & railway express	21,517	16,902	3,010	- 7,849	224	- 4,615
Trucking & warehousing	22,340	29,956	3,125	4,615	- 124	7,616
Other transportation	20,680	16,327	2,893	- 6,940	- 306	- 4,353
Communications	21,682	25,149	3,033	- 115	549	3,467
Utilities & sanitary service	27,626	28,092	3,865	- 2,612	- 787	466
Wholesale trade	52,498	64,262	7,344	4,032	388	11,764
Food & dairy products stores	55,010	54,765	7,696	- 7,534	- 407	- 245
Eating & drinking places	50,600	53,908	7,079	- 1,356	-2,415	3,308
Other retail trade	162,424	189,594	22,722	8,071	-3,623	27,170
Finance, insurance & real estate	54,076	73,253	7,565	13,514	-1,902	19,177
Hotels & other personal services	51,522	52,247	7,208	- 5,349	-1,134	725
Private households	32,917	45,137	4,604	9,331	-1,715	12,220
Business & repair services	38,236	49,738	5,349	1,740	4,413	11,502
Entertainment, recreation services	15,434	13,923	2,160	- 3,885	214	- 1,511
Medical & other professional services	142,762	249,530	19,971	83,614	3,183	106,768
Public administration	56,615	72,444	7,920	8,215	- 306	15,829
Armed forces	5,225	6,212	731	826	- 570	987
Industry not reported	21,575	71,397	3,018	36,428	10,376	49,822
Total	1,777,823	2,035,900	248,715	14,871	-5,509	258,077

aCalculated from Lowell D. Ashby, Growth Patterns in Employment by County, 1940-1950 and 1950-1960, Vol. 3, U.S. Department of Commerce (Washington: U.S. Government Printing Office, 1965), pp. 7-1 to 7-28.

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