CHANGING EMPLOYMENT PATTERNS IN NEW YORK*

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Although population, employment and income rose throughout the country during the 1960's, growth in New York was less rapid than in the country at large. Population in the state increased by 8.7 percent in the 1960-70 decade, compared with 10.7 percent in the nation. Per capita incomes also rose during the period but by only 65 percent in the state, compared to 78 percent nationwide; the ways in which New Yorkers were earning a living changed dramatically. Manufacturing employment by place of residence declined by 13.4 percent between 1960 and 1970, but nearly a quarter of all jobs in the state remained in manufacturing.[1/] Agriculture and agriculturally related jobs declined; the largest growth areas were trade and services. Outstripping the growth in the nation as a whole, employment in the trade and service sectors accounted for two-thirds of all jobs in New York by 1970 [3].

Understanding these changes in employment patterns at the state and substate level is increasingly important in an economy trying to pull itself out of a period of high unemployment and inflation. To help understand these changes, the employment trends in rural and urban areas across the state are examined. Special emphasis is placed on high and low wage, durable and nondurable manufacturing. In addition to the declining manufacturing sectors, emphasis is also

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1/ Employment data used throughout the study are by place of residence as reported in the 1950, 1960 and 1970 Censuses of Population [10, 11, 12]. Initial data series for 1950 and 1960 differ from those of 1970 in that 14 and 15 year old employees are included in the industrial categories. Only the total 14 and 15 year old agricultural and nonagricultural employment is listed in 1970. To make the series comparable, the 14 and 15 year old employment in 1970 was distributed among employment categories using a procedure described in [4].

placed on the growth sectors, trade and services. To help place New York, and perhaps the Northeast, into proper perspective, a comparison is made with a similar study in the Tennessee Valley Region [5].

Following Garrison [5], the concept of entropy is introduced to investigate the types of economic activity locating in various regions throughout the state. Entropy is shown to be valuable in providing a simple, yet comprehensive, index for measuring and analyzing the geographic distribution of employment.

The Entropy Measure of Dispersion

Entropy, although a concept arising in the physical sciences, has been adopted by scientists in communications theory and, more recently, by economists in the study of industrial and income concentration [5, 6, 8]. As suggested by Theil [8], an entropy measure of the concentration of income among individuals can be derived which is based on the proportion of income held by each individual. For purposes here, the entropy measure of concentration is used as an indication of the competition among counties in a region or group for attracting industry of various kinds.

To begin, assume that there is a single employment category and there are m counties in the region. Total employment in the region is equal to n and each county's share is given by $y_i = n_i/n$. Entropy can then be written

$$(1) \qquad H(y) = -\sum_{i=1}^{n} y_i \ln y_i .$$

In the case of complete concentration (i.e., one county has all the employment) $H(y) = 0$.[2/] As one moves more toward equal dispersion (i.e., each county sharing equally in employment) the value of $H(y)$ rises to a maximum of $\ln m$. Therefore, "the greater the entropy in a regional system, the greater the degree of competition among counties in the region in attracting industry; ... the more dispersed within the region are those location factors considered important..." [4, p. 53].

To analyze the changes in employment further, one can combine the counties (units of observation) into groups and disaggregate the entropy into the between-group and within-group entropy. Letting the counties be grouped into S groups

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2/ For the one county $y_i = 1$ and $\ln y_i = 0$. For the remaining counties, $y_i = 0$. Therefore, each term in the expression is zero.

$$(2) \qquad Y_s = \sum_{i \in G_s} y_i \qquad (s = 1,\ldots,S)$$

is defined as the employment share in group G_s. Disaggregating the entropy, one obtains

$$(3) \qquad H(y) = H_o(y) + \sum_{s=1}^{S} Y_s H_s(y)$$

where the first term is the between-group entropy,

$$(4) \qquad H_o(y) = - \sum_{s=1}^{S} Y_s \ln Y_s$$

and the second term is the individual group's within-group entropy,

$$(5) \qquad H_s(y) = - \sum_{i \in G_s} (y_i/y_s) \ln (y_i/y_s)$$

weighted by the group's employment share.[3/]

The entropy measure of dispersal has several important properties. It is invariant when employment in all counties changes proportionally. The measure of dispersal also increases with the number of units of observation. This increasing limit is quite natural. In a region with only two counties, the measure of dispersal reaches a maximum when each county shares equally in employment. However, if one expands the region to include more than two counties, one can argue that even though employment may be equally distributed among them, it is indeed more dispersed than when only considering two counties.[4/] In addition to

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3/ Throughout the paper when within-group entropy is mentioned, it is the weighted entropy which is being used.

4/ Theil [8] uses a similar argument for measuring income inequality. While equations (1) and (3) are measures of equality, Theil subtracts them from their maximum value to get a measure of inequality. By an argument similar to the one above, he suggests that the measure of income inequality should be greater in a society of 2 million people when one person has all the income than in a society of 2 people when one person has all the income.

Theil goes on to argue that equality of per capita and not total income between population groups is the important consideration. His inequality measure is superior to the measure of equality

providing an overall index, the decomposition property is useful in determining the nature of the dispersal among groups of counties or other units of observations [5, 8].

Because the measure of total entropy ranges from zero to the natural logarithm of m, it has no natural economic interpretation. To help provide a more meaningful interpretation of the entropy measure, one can define

(6) $f = \exp H(y)$,

a numbers-equivalent which is equal to the number of equal-sized categories needed to generate the observed entropy. In the present application, low values of "f" indicate that an industry is concentrated in a relatively few counties.

Employment Trends in New York State

Before using the entropy concept to examine employment changes in New York, the stage must be set by examining the employment changes for the state as a whole. Table 1 contains employment for 1950, 1960 and 1970 for eight general categories. One primary reason for going back to 1950 is the reversal in the trend in manufacturing employment between the decade of the 50's and decade of the 60's. Such a comparison also highlights the tremendous increases in trade and services sectors.

By disaggregating manufacturing employment important differences appear between the high and the low wage industries.[5/] Between 1950

4/ (continued) since, by subtracting the equality measure from its maximum value, one does take account of the sizes of the various groups. However, in the case of understanding the strength of the competitive forces affecting employment, total employment among groups of counties is the important consideration. Therefore, one can argue that the measure of equality, not inequality, is appropriate [8].

5/ Average weekly earnings for production workers in 1970 are greater than or less than $175 for high and low wage manufacturing industries, respectively [13]. In some sense, this cut-off point is arbitrary. However, since this distinction was made to reflect skill levels in various industries, the cut-off point was set above the average wage in 1970 by approximately 25 percent. Some attempt was made to raise it further, but the result was to eliminate most of the nondurable manufacturing. Since this would have

Table 1
New York State Employment

Category group[a]	Employment 1950	Employment 1960	Employment 1970	Change, 1950-'60 Actual	Change, 1950-'60 Percent	Change, 1960-'70 Actual	Change, 1960-'70 Percent
High wage durable goods[b]							
0- 25%	266,115	345,521	304,922	+ 79,406	+29.8	- 40,599	-11.8
26- 50%	46,203	62,431	72,280	+ 16,228	+35.1	+ 9,849	+15.8
51- 75%	36,434	67,209	85,300	+ 30,775	+84.5	+ 18,091	+26.9
76-100%	5,259	7,872	9,228	+ 2,613	+49.7	+ 1,356	+17.2
Total	354,011	483,033	471,730	+129,022	+36.5	- 11,303	- 2.3
High wage nondurable goods[b]							
0- 25%	196,958	238,556	208,245	+ 41,598	+21.1	- 30,311	-12.7
26- 50%	18,886	24,042	20,009	+ 5,156	+27.3	- 4,033	-16.8
51- 75%	10,077	14,746	15,831	+ 4,669	+46.3	+ 1,085	+ 7.4
76-100%	2,273	3,642	4,491	+ 1,369	+60.2	+ 849	+23.3
Total	228,194	280,986	248,576	+ 52,792	+23.1	- 32,410	-11.5
Low wage durable goods[b]							
0- 25%	149,690	165,308	128,818	+ 15,618	+10.4	- 36,490	-22.1
26- 50%	39,756	41,055	33,426	+ 1,299	+ 3.3	- 7,629	-18.6
51- 75%	23,952	22,572	23,093	- 1,380	- 5.8	+ 521	+ 2.3
76-100%	4,310	5,157	4,380	+ 847	+19.7	- 777	-15.1
Total	217,708	234,092	189,717	+ 16,384	+ 7.5	- 44,375	-19.0
Low wage nondurable goods[b]							
0- 25%	503,088	477,123	295,184	- 25,965	- 5.2	-181,939	-38.1
26- 50%	55,313	42,366	26,839	- 12,947	-23.4	- 15,527	-36.6
51- 75%	40,214	35,477	23,935	- 4,737	-11.8	- 11,542	-32.5
76-100%	6,844	5,927	4,611	- 917	-13.4	- 1,316	-22.2
Total	605,459	560,893	350,569	- 44,566	- 7.4	-210,324	-37.5

Table 1 (continued)

Category group	Employment 1950	Employment 1960	Employment 1970	Change, 1950-'60 Actual	Change, 1950-'60 Percent	Change 1960-'70 Acutal	Change 1960-'70 Percent
Agriculture and mining							
0- 25%	43,991	34,890	34,325	- 9,101	-20.7	- 565	- 1.6
26- 50%	33,303	23,177	17,554	- 19,126	-30.4	- 5,623	-24.3
51- 75%	87,316	59,151	40,654	- 28,165	-32.3	- 18,497	-31.3
76-100%	26,793	18,156	12,634	- 8,637	-32.2	- 5,522	-30.4
Total	191,403	135,374	105,167	- 56,029	-29.3	- 30,207	-22.3
Wholesale and retail trade							
0- 25%	1,060,081	1,058,026	1,161,320	- 2,055	- 0.2	+103,294	+ 9.8
26- 50%	88,986	92,259	110,432	+ 3,273	+ 3.7	+ 18,173	+19.7
51- 75%	89,652	100,516	126,821	+ 10,864	+12.1	+ 26,305	+26.2
76-100%	18,363	20,385	25,185	+ 2,022	+11.0	+ 4,800	+23.5
Total	1,257,082	1,271,186	1,423,758	+ 14,104	+ 1.1	+152,572	+12.0
Financial and personal services							
0- 25%	866,925	971,066	1,055,304	+104,141	+12.0	+ 84,238	+ 8.7
26- 50%	51,062	54,405	60,591	+ 3,343	+ 6.5	+ 6,186	+11.4
51- 75%	60,048	63,771	70,395	+ 3,723	+ 6.2	+ 6,624	+10.4
76-100%	15,861	16,097	17,911	+ 236	+ 1.5	+ 1,814	+11.3
Total	993,896	1,105,339	1,204,201	+111,443	+11.2	+ 98,862	+ 8.9
Health, education and public administration							
0- 25%	684,039	976,631	1,433,749	+292,592	+42.8	+457,118	+46.8
26- 50%	66,112	101,968	143,641	+ 35,856	+54.2	+ 41,673	+40.9
51- 75%	82,856	119,599	185,804	+ 36,743	+44.3	+ 66,205	+55.4
76-100%	16,191	23,621	36,075	+ 7,430	+45.9	+ 12,454	+52.7
Total	849,198	1,221,819	1,799,269	+372,621	+43.9	+577,745	+47.3

a/ County groups are based on the percentage of rural population.

b/ Weekly earnings in 1970 are greater than and less than $175 for high and low wage industries, respectively.

and 1960, employment in the low wage, nondurable goods sector declined by 7.4 percent, while other manufacturing employment was still on the rise. By the next decade, all categories of manufacturing employment had begun to decline. By far, the largest percentage reduction came in both the low wage, durable and nondurable manufacturing. Competition from the southern states with lower combined labor and land costs had much to do with the decline in the textile and other labor intensive industries, such as forest and wood products and metals. Although high wage, nondurable industries lost employment at a rate substantially less than low wage industries, the 11.5 percent reduction during the 1960's was almost 5 times as large as the percentage reduction experienced in the high wage, durable manufacturing such as electrical machinery, machinery and transportation equipment.

The trade and services sectors had quite different rates of growth in employment. Financial and personal services' employment grew by 11.2 percent during the 1950's, dropping to 8.7 percent during the 1960's. Health, education and public administration services grew at a tremendous rate, between 40 and 50 percent during both decades. The wholesale and retail trade sectors grew very little during the 1950's but grew by 12 percent during the 1960's.

The implications of these trends for economic development are better understood if one examines the changes throughout various county groups in the state. Rather than focus on contiguous regions, counties are grouped according to the percent of the county's population that is rural (persons living outside of communities of more than 2500 population). Figure 1 delineates the county groups.6/

The trends in the trade and services sectors during the 1960's showed little regional variation. For example, while there was some variation among the four county groups in the percentage increase in health, education and public administration employment, percent changes in all four groups were above 40 percent. Wholesale and retail trade showed a bit more variation. In the three county groups with more than 25 percent rural population, wholesale and retail

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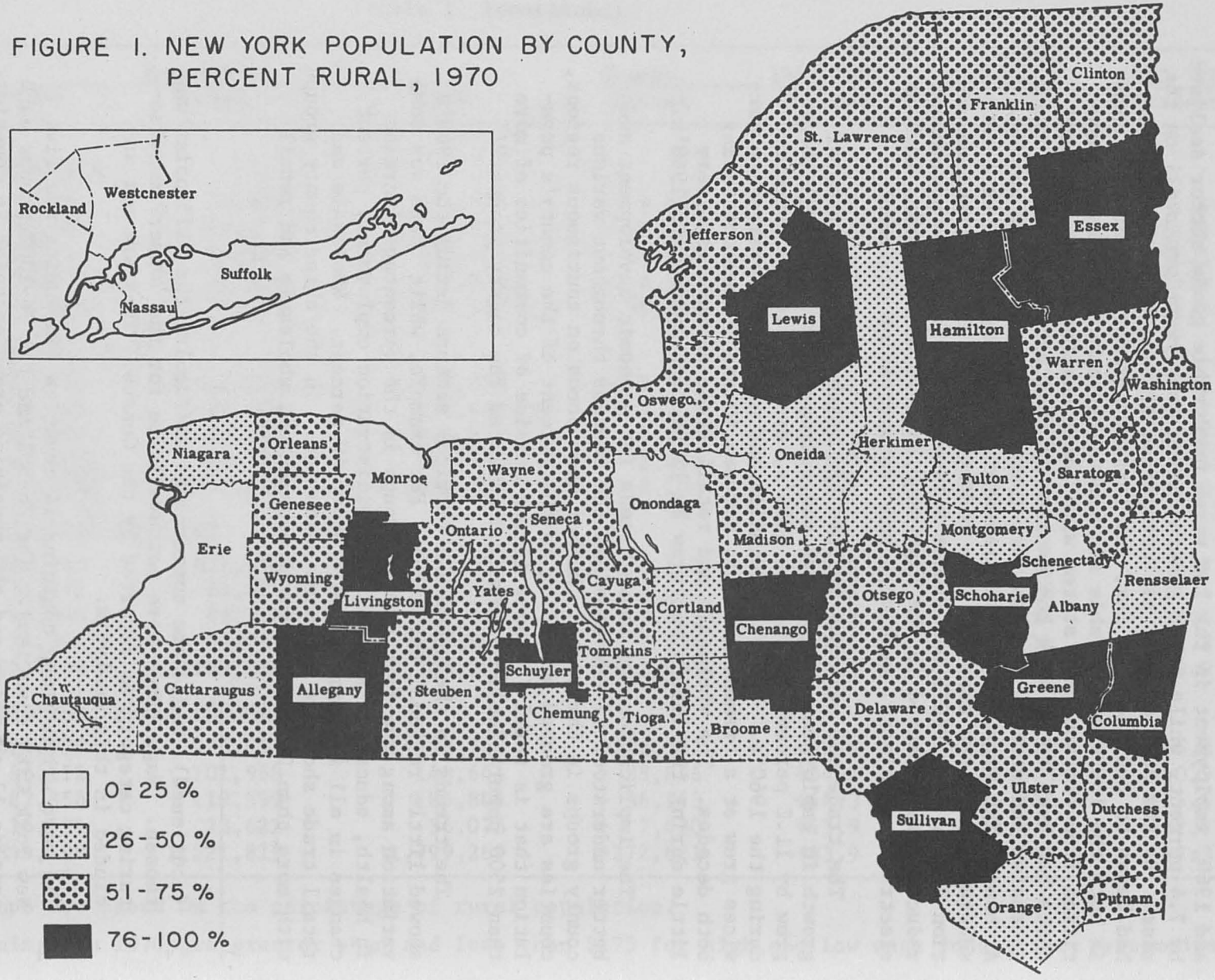
5/ (continued) made some comparisons difficult, the $175 point was chosen. Wage rates were not available for the "Other" manufacturing category as reported by the Census. They are not included in this analysis.

6/ The most urban group contains 14 counties (including the five New York City counties). The 26-50% and the 76-100% groups each contain 11 counties and the remaining group contains 26 counties.

FIGURE I. NEW YORK POPULATION BY COUNTY, PERCENT RURAL, 1970



trade employment increased by more than 20 percent. Substantial increases were also apparent in the 9 counties (excluding New York City) with rural population of 25 percent or below. A total increase of 145,933 in trade jobs was recorded in these counties but the percentage increase in the 0-25% group was reduced substantially by the 42,639 decrease in trade jobs in New York City. The net effect was a 9.8 percent increase for the group as a whole.

The most interesting changes occurred in the manufacturing sectors. Although both durable and nondurable manufacturing employment decreased on a statewide basis during the 1960's, this was not the case in each of the groups. The most urban group (rural populations between 0 and 25 percent) had the most difficulty in the nondurable goods category. These nine counties (plus New York City) lost a total of 212,250 nondurable manufacturing jobs. Over 90 percent of the decrease can be attributed directly to New York City. Next, in terms of nondurable manufacturing employment losses, come the counties with between 26 and 50 percent rural population. Their losses were over 29 percent, while counties with between 51 and 75 percent rural population lost 26 percent of their nondurable manufacturing employees. The most rural counties experienced a loss of a fraction of one percent.

Durable manufacturing employment decreased by a smaller percentage statewide from 1960 to 1970; group changes were significantly different from those in the nondurable manufacturing industries. The loss of jobs in New York City was partially offset by the increases in the other counties of the most urban group. The decrease for the group as a whole was still above 15 percent. The remaining three groups fared much better. Durable manufacturing employment increased in the group of counties with 51 to 75 percent rural population by over 21 percent while the increase was just over 4 percent and just over 2 percent in the most rural group and the group with 26 to 50 percent rural population, respectively.

Both the durable and nondurable patterns are in sharp contrast to those found by Garrison [5] in the Tennessee Valley region. The rural and semi-rural areas of both regions seem to have increased their competitive position as far as manufacturing is concerned. In New York, the largest gains are in higher wage durable manufacturing, while in the South, the advantage is becoming more pronounced in the low wage nondurable industries.7/

7/ Garrison discusses labor and capital intensive industries. That is, industries are ranked according to wages per dollar of value added. Therefore, the results are not directly comparable. The industries he classifies as labor intensive are apparel, textile, furniture and wood products. These do, however, correspond to the low wage durable and nondurable goods in this paper.

While few would argue that increasing manufacturing employment has not had some positive impact on the poverty and low-income problems in many rural areas in the North and South, some evidence suggests that the structure of the employment changes is even more important. Boisvert [2] has found high concentrations of durable manufacturing are related to low incidences of poverty throughout the Northeast. This is not too difficult to understand since in 1970, over 71 percent of the durable manufacturing employment was in the high wage category. For nondurable manufacturing, the situation was almost reversed. Only 41 percent of the nondurable manufacturing employment was classified as high wage employment.

Based on this observation and the difference in employment trends between New York and places like the Tennessee Valley, New York and other states in the Northeast may still have a better chance of dealing with their income problems through employment policies than southern states. Even though the growth rates are currently higher in the South, the industrial structure in the more developed states continues to be favorable.

Competition Among Counties Between and Within Groups

It is one thing to know that the industrial structure is favorable in some rural areas of the state but quite another to know the extent to which all counties in a group can expect to compete for new employment in high wage sectors. The entropy measure of dispersal can be used to investigate this question. Table 2 contains the entropy measures of dispersion (both weighted within and between group entropy).

With one exception, agriculture and mining, total entropy in each of the eight employment sectors increased from 1950 to 1970. However, the "f" values calculated from equation (6) highlight the fact that employment across the state is far from being evenly distributed. If it were, the numbers-equivalents would have been equal to 62, the number of counties in the state. The reason that the entropy of agriculture and mining has the highest numbers-equivalent is the fact that forestry, fisheries, and agriculturally related industries are included. Were production agriculture isolated, the numbers-equivalent would be much lower.

Occurring simultaneously with this general trend in employment was a dispersion of population. As indicated by table 3, population, as measured by numbers-equivalents, is at least as dispersed as employment in all sectors except agriculture and mining.

The most significant difference between the change in entropy occurring in population and most of the employment sectors is the relative importance of the within and between group changes. While

Table 2
Entropy Measures of Dispersion, Selected Industries, New York

Category	Entropy in			Change in entropy		Entropy in			Change in entropy	
	1950	1960	1970	1950-'60	1960-'70	1950	1960	1970	1950-'60	1960-'70
	High wage durable goods[b]					High wage nondurable goods[b]				
Within group	2.41	2.44	2.45	0.03	0.01	2.21	2.29	2.36	0.08	0.07
0- 25%[a]	1.81	1.74	1.56	-0.07	-0.18	1.91	1.95	1.98	0.04	0.03
26- 50%	0.27	0.27	0.33	0.00	0.06	0.14	0.15	0.15	0.01	0.00
51- 75%	0.30	0.40	0.52	0.10	0.12	0.14	0.16	0.19	0.02	0.03
76-100%	0.03	0.03	0.04	0.00	0.01	0.02	0.03	0.04	0.01	0.01
Between groups	0.78	0.85	0.96	0.07	0.11	0.52	0.56	0.60	0.04	0.04
Total	3.19	3.29	3.41	0.10	0.12	2.73	2.85	2.96	0.12	0.11
"f" value	24	27	30			15	17	19		
	Low wage durable goods[b]					Low wage nondurable goods[b]				
Within group	2.13	2.22	2.30	0.09	0.08	2.03	2.12	2.21	0.09	0.09
0- 25%[a]	1.43	1.55	1.52	0.12	-0.03	1.62	1.74	1.80	0.12	0.06
26- 50%	0.34	0.34	0.37	0.00	0.03	0.19	0.17	0.17	-0.02	0.00
51- 75%	0.32	0.28	0.36	-0.04	0.08	0.20	0.19	0.21	-0.01	0.02
76-100%	0.04	0.05	0.05	0.01	0.00	0.02	0.02	0.03	0.00	0.01
Between groups	0.89	0.86	0.91	-0.03	0.05	0.60	0.56	0.58	-0.04	0.02
Total	3.02	3.08	3.21	0.06	0.13	2.63	2.68	2.79	0.05	0.11
"f" value	20	22	25			14	15	16		

Table 2 (continued)

Category	Entropy in 1950	Entropy in 1960	Entropy in 1970	Change in entropy 1950-'60	Change in entropy 1960-'70	Entropy in 1950	Entropy in 1960	Entropy in 1970	Change in entropy 1950-'60	Change in entropy 1960-'70
	Agriculture and mining					Wholesale and retail trade				
Within group	2.68	2.68	2.67	0.00	-0.01	2.23	2.35	2.43	0.12	0.08
0- 25%[a/]	0.53	0.62	0.80	0.09	0.18	1.82	1.90	1.95	0.08	0.05
26- 50%	0.39	0.39	0.38	0.00	-0.01	0.16	0.16	0.17	0.00	0.01
51- 75%	1.44	1.37	1.22	-0.07	-0.15	0.22	0.25	0.27	0.03	0.02
76-100%	0.32	0.30	0.27	-0.02	-0.03	0.03	0.04	0.04	0.01	0.00
Between groups	1.28	1.28	1.29	0.00	0.01	0.58	0.61	0.65	0.03	0.04
Total	3.96	3.96	3.96	0.00	0.00	2.81	2.96	3.08	0.15	0.12
"f" value	52	52	52			17	19	22		
	Financial and personal services					Health, education and public administration				
Within group	2.18	2.24	2.30	0.06	0.06	2.35	2.41	2.48	0.06	0.07
0- 25%[a/]	1.83	1.92	1.98	0.09	0.06	1.84	1.89	1.93	0.05	0.04
26- 50%	0.12	0.11	0.11	-0.01	0.00	0.17	0.18	0.18	0.01	0.00
51- 75%	0.19	0.18	0.18	-0.01	0.00	0.30	0.30	0.32	0.00	0.02
76-100%	0.04	0.03	0.03	-0.01	0.00	0.04	0.04	0.05	0.00	0.01
Between groups	0.51	0.49	0.49	-0.02	0.00	0.67	0.69	0.70	0.02	0.01
Total	2.69	2.73	2.79	0.04	0.06	3.02	3.10	3.18	0.08	0.08
"f" value	15	15	16			21	22	24		

a/ Counties in New York grouped by percent rural population.

b/ Weekly earnings in 1970 are greater than and less than $175 for high and low wage industries, respectively.

Table 3
Entropy Measures of Population Dispersion, New York

Category	Entropy in			Change in entropy	
	1950	1960	1970	1950-'60	1960-'70
Within group	2.34	2.42	2.46	0.08	0.04
0- 25%[a/]	1.77	1.85	1.88	0.08	0.03
26- 50%	0.20	0.20	0.19	0.00	-0.01
51- 75%	0.32	0.32	0.34	0.00	0.02
76-100%	0.05	0.05	0.05	0.00	0.00
Between group	0.72	0.72	0.72	0.00	0.00
Total entropy	3.06	3.14	3.18	0.08	0.04
"f" value	21	22	24		

a/ The 62 counties in New York are grouped by percent rural population.

the entire change in entropy of population over the two decades has been due to within group changes, the between group changes for employment have been almost as important as the within group changes.

In comparing these results to those of Garrison's Tennessee Valley study [5], the importance of increasing rural populations is highlighted. In the Tennessee Valley region, population continued to become more concentrated over the decade of the 1960's. Despite the increased competitive position of rural areas in the South for attracting all kinds of industry, the pressure has not been strong enough to stop rural to urban migration. In New York State, one might conclude something quite different. As Beale [1] points out, the disenchantment with the urban lifestyle and urban problems and the increased costs of doing business in urban areas have probably both contributed to the dispersion of population and employment. His estimates of population change in the 1970's suggest that between, as well as within, group entropy in population may be on the rise.

By examining the employment changes more closely, one might conclude that the most dramatic changes have occurred in the competition for high wage durable goods. During the 1960's, the between group entropy in this sector increased tremendously. While it appears that the total within group entropy played only a minor role, the increased competition within the two middle county groups was completely offset by the increased competition in the most urban counties. That is, competition among counties within each of these middle groups (the 26-50% and the 51-75% groups) rose

substantially. By comparison, the increased competition among the counties in the most rural group was the largest; the within group entropy of the most rural group increased by 25 percent.

The overwhelming importance of the increase in between groups entropy in the high wage durable manufacturing sector is quite different from the pattern which developed in the other three manufacturing sectors. Between group entropy from 1960 to 1970 increased in these three categories, but because these industries had no propensity to concentrate within the counties of the most urban group, the overall impact of the increased within group competition was greater than for high wage, durable manufacturing. In each case, increased within group competition accounted for well over half of the total. Like in the durable manufacturing sector (high wage), the 51-75% group accounted for most of the within group increase.8/

While these changes in the concentration of manufacturing in New York are similar to the changes occurring in the South, a comparison with Garrison's [5] earlier study also points to some important differences. Like in New York, Garrison concluded that "the disaggregation of entropy indicates an increase in the strength of both rural and small-town groups at attracting low wage industries" [5, p. 56]. However, he found no evidence in the Tennessee Valley to indicate an increase in the strength of competition among counties in the rural and small-town groups for high wage durable manufacturing.

Because of the increased population dispersion in New York, the changing patterns of employment in the trade and services sectors also have important implications for future economic development. For each of the three trade and service sectors, the total within group entropy and the between group entropy have increased over time. In the decade of the 1960's, the within group entropy (added across all

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8/ In comparing these figures, one must keep in mind that the within group entropy figures are the entropy figures weighted by the group's employment share. In this sense, one can explain why the contribution of the most rural group to the total within set entropy is small. In 1970, this group of counties contained only 2.3 percent of the high wage nondurable manufacturing employment. For the other three manufacturing sectors, this percentage was even smaller (table 1). But as far as the rural counties themselves are concerned, the results are not insignificant. Due to the rather large percentage changes in within group entropy, rural counties which have previously had little chance of expanding their manufacturing employment base may be more successful if present trends continue.

4 county groups) outstripped the increase in the between group entropy. Therefore, even though these three sectors are the rapid growth sectors in New York, there is a greater tendency for a uniform distribution of employment in trade and services within the county groups than between them. That is, between group entropy averages 20 percent of the total entropy for each of the nondurable manufacturing sectors; the three trade and services sectors fared about the same. However, when compared to the between group competition for durable manufacturing, trade and services fared rather poorly.

Since these three sectors (wholesale and retail trade, financial and personal services, and health, education and public administration) are the ones in which employment is likely to continue to expand, this result is unfortunate, but is not surprising. The trade and services industries depend to a much greater extent on the people in the surrounding areas for their livelihoods than do the manufacturing industries. It follows that the change in concentration of employment in these sectors would be more similar to population movements that it would be in manufacturing.

Summary and Implications for Rural Development

The analysis above has examined the historic trends in employment in New York State to help understand the implications of past and present trends on future employment growth, particularly in the rural areas. Emphasis was placed on trying to dissaggregate the employment trends in the past two complete decades by employing an entropy measure of dispersal. Unlike other studies which deal primarily with manufacturing, the trade and services sectors were also of particular importance since these are the growth sectors of the state. While there were increases in employment in the growth sectors in the highly rural county groups, the entropy measure of dispersal indicates that rural counties have not gained a great deal in their competitive position for this kind of employment. Since they have maintained their position quite well, one should not conclude that effective efforts to promote development of these sectors in rural areas cannot be developed. What is suggested is that the competition within each county group has increased but it is easier to compete for employment from within a group of counties than between groups.

In light of population trends in the early 1970's, Beale concludes that "... the attractiveness of rural and small town communities has increased, economically and otherwise" [1, p. 5]. It is the first time in this century that nonmetropolitan population has grown faster than metropolitan population. The trend has not been confined to metropolitan sprawl; and with the propensity for

the dispersal of trade and services to follow that of population, the chance for increased competition for this type of employment between the residential country groups is likely to increase in the future.

Many of these trade and service jobs are non-basic, secondary employment induced by initial changes in basic employment. Manufacturing employment, much of it basic, however, has been decreasing statewide. In spite of these changes, the rural areas in New York have been able to capture a larger share of a shrinking pie. The competition both within each county group and between the groups of counties has been increasing steadily. For low wage, nondurable manufacturing, this is consistent with the experience of rapidly expanding manufacturing areas in the South. But unlike the South's dependence on labor intensive industries [5], the rural areas of New York State have also been able to compete effectively with other areas for high wage, durable manufacturing.

This transition to a high wage, durable manufacturing base represents a substantial improvement in the employment structure in at least one respect. As Boisvert [2] has pointed out, this changing employment structure is associated with a reduction in the number of families with poverty incomes. The changing structure of employment in an area may have stronger implications for alleviating low income problems then growth itself.

This paper has helped to demonstrate the striking difference in rural development patterns between a state in the Northeast and one in the South which has lagged behind the rest of the nation, until recently. The study has not identified specifically any causal relationship between government policies and employment patterns. It has, by taking a careful look at past trends, indicated that the variety of options open for rural areas in a state like New York is greater than that found in the South. There are some expanding sectors and as far as the rural areas are concerned, they have effectively competed for an increased share of a declining manufacturing sector. Their success is due in part to their ability to demonstrate that they can provide those traditional factors important to the firm. Furthermore, with increased competition for land in the Northeast, new environmental regulation, increased transportation costs, increased taxes, and the desire to escape the urban problems, firms now located and thinking about locating in the Northeast are continually changing the list of the most important factors. While the state and the Northeast as a whole may continue to show only moderate growth, the experience of the 1960's suggests that rural areas can continue to improve their relative position.

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