RURAL INDUSTRIALIZATION: A LOCAL INCOME ANALYSIS

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Rural industrial development is advocated as a means of improving the economic status of residents in lagging rural areas. A recent USDA report stated, "One of the main problems in Rural America is the lack of employment opportunities. With advances in agricultural technology, farm-related jobs are decreasing and other forms of employment must be found" [7, p. 16].

The purpose of this paper is to examine the economic impact of industrial expansion in rural areas. The specific emphasis will be the potential effect on locally disadvantaged people – the poor and underemployed. The question is not *are* jobs and income opportunities created, but *for whom* are they created. Ideally, those who benefit are the underemployed, poor and near poor; but this need not be the case.

Most prior studies of industrial impact were only somewhat suggestive about who gains and who loses from industrial expansion. The study by Kuehn, et al, [5] was unique in its focus on the impact of new and enlarging industries on the poor and unemployed. They found that approximately 61 percent of those taking the new industrial jobs had previously been in poverty. They also found that about one in four of the new jobs was filled by in-migrants and former residents returning to the area.

Bender, et al, [1] and Bryant [3] have commented that the potential benefits from industrial development to the locally underemployed and poor would be dampened by in-migration. Another study concluded that the intracommunity income schisms between families headed by females and the aged and families headed by young able-bodied males were widened by the location of a large steel plant in a rural Illinois community [4].

Four rural counties in Eastern Oklahoma, subject of an earlier study measuring the net economic impact of industrial expansion, are the study area. This paper will utilize that study and additional information to examine changes in the distribution and sources of income after industrial expansion. But, first, a short description of the study area and earlier study is needed.

THE STUDY AREA

Several decades of depressed economic conditions characterize the counties in this study area. Federal, state, and local governments are cooperating in joint efforts to promote development in the area. The four contiguous counties selected are members of an economic development district, and various local agencies and individuals expressed an interest in cooperating in a study of industrial expansion.

Agriculture has been the major sector of the local economy, but recently the economy has begun to diversify into manufacturing and recreation. During the 1960's, the counties' rate of growth in manufacturing employment exceeded that of Oklahoma and the nation (See Table 1).

In each of the four counties one or more plants, hiring at least 10 workers, located or enlarged between 1960 and 1969. These 12 plants produced a wide variety of products, e.g., canned vegetables, furniture, and steel fabrication. In 1970, annual employment at the plants averaged 46 workers; annual payroll averaged $240,842, and annual sales averaged $846,527.

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Table 1. PROPORTION OF EMPLOYMENT IN MANUFACTURING*

	1960	1970	Change
Adair	16.23%	28.13%	11.90
Cherokee	4.24	8.03	3.79
Muskogee	14.85	16.91	2.06
Sequoyah	25.42	27.7	2.28
Oklahoma	13.25	15.0	1.75
U. S.	27.1	24.4	- 2.70

*Source: U.S. Census, General Social and Economic Characteristics, 1960 and 1970.

NET ECONOMIC IMPACT

The objective of the initial study was to measure the net economic impact of industrial expansion on a community. The net economic impact on the community was the difference between community benefits and costs from industrial expansion.[1] Measurement of the economic impact was made in each of three sectors of the community: private, municipal government and school district. The private sector included the income effects from industrial expansion on the workers, local merchants, and local households. These income effects were those occurring in the community and excluded those occurring elsewhere in the region. The municipal government and school district sectors included tax revenues from new industrial and residential investment plus additional state and federal aids for new students. The public sector expenditure effects were for services provided the industry, new residents, and new students. Information collected from interviews with plant managers and municipal officials and surveys of the plants' work force were used to estimate and isolate the effects of industrial expansion from other potential sources of change.

To summarize the findings reported in detail elsewhere [6], the communities experienced a substantial net economic gain from industrial expansion. Annual net gains in the private sector averaged $3,314 per worker hired by the plants. The average net gains per worker at the various plants ranged from $2,244 to $5,691 per year. The municipal governments in the five communities experienced an annual net gain per worker ranging from a loss of $50.43 to a gain of $40.58. The school district annual net gains per worker ranged from a loss of $19.53 to a gain of $32.71, and averaged $8.68 per worker. The per worker community net gains (sum of the three sectors) averaged $3,334 per year and varied from $2,250 to $5,711 at the different plants.[2]

INCOME FOR WHOM

Despite the substantial net economic gains to the community, questions remained about how effectively industrialization helped the plight of the underemployed and the poor (the disadvantaged). The net gains reported above were an intracommunity average and did not necessarily mean that the disadvantaged have improved their economic position in the community. The above results did not measure the distribution of industrial impact among the population in the communities.

While it would have been desirable to use primary data to measure the distribution of industrial impact, it is virtually impossible to survey the recipients of the higher order effects. Because of this limitation, secondary data sources were used to draw many of the inferences about industrial impact on the underemployed and poor. The use of Census information plus the high probability that the higher order rounds of industrial impact accrue to nonresidents of the community required that, at a minimum, the county be the unit of analysis.

Income Level

The workers replied that their income had increased by an average of $568 by accepting new jobs at the plants. All four counties in the study area exhibited an absolute increase in per capita income between 1960 and 1970 (see Table 2). The per capita incomes in the study area increased relative to that of the State of Oklahoma. The closing of the local and state income gap ranged from 3.5 percent in Muskogee County to 30.3 percent in Sequoyah County. Muskogee was the only county not to gain relative to United States per capita income between 1960 and 1970.

The influx of payrolls from industrial expansion should increase local family incomes. The increase in median family income between 1960 and 1970 for all

[1] The community is defined by its political boundaries rather than by labor market or county boundaries. Industrial expansion includes the enlargement of industrial plants already existing in the community and the location of new industrial plants in the area.

[2] The plant payroll plus county income multipliers suggest that these 12 plants contribute from 1 percent, in Sequoyah County, to 12 percent, in Cherokee County, of the 1970 personal income in the counties.

Table 2. INCOME EFFECTS*
(in Constant 1967 Dollars)

	Adair Co.		Cherokee Co.		Muskogee Co.		Sequoyah Co.		Oklahoma		United States	
	1960	1970	1960	1970	1960	1970	1960	1970	1960	1970	1960	1970
Per capita income ($)	739	1432	834	1680	1716	2100	686	1557	2113	2480	2119	2859
Percent of												
Oklahoma	35.0	57.7	39.5	67.8	81.2	84.7	32.5	62.8	--	--	--	--
U.S.	34.9	50.1	39.4	58.8	81.0	73.5	32.4	54.5	--	--	--	--
Median family income ($)*	2198	3640	3044	4435	4505	5669	2855	4948	5292	7036	6483	8734
Percent of												
Oklahoma	42.2	51.7	58.7	63.0	85.1	84.8	54.8	70.3	--	--	--	--
U.S.	34.5	41.7	47.8	50.8	69.5	68.3	44.0	56.7	--	--	--	--
Size distribution of family income (%)*												
less than $1,000	18.8	7.3	11.3	5.3	7.6	4.3	18.1	5.6	6.1	3.5	4.9	2.8
$1,000 - $2,999	44.1	33.8	38.1	25.8	25.7	18.8	33.9	23.5	20.5	14.2	13.3	8.9
$3,000 - $4,999	20.3	23.1	22.5	24.4	21.6	18.5	22.1	21.6	20.4	15.5	16.7	11.4
$5,000 - $9,999	14.5	26.3	20.8	30.0	33.8	36.7	21.0	35.4	36.8	36.9	43.4	34.8
greater than $10,000	2.3	9.5	7.4	14.5	11.2	21.7	4.9	13.9	16.2	30.0	21.8	42.0
Source of personal income (%)**												
Wage and salary	31.46	27.18	46.04	50.38	63.06	63.44	35.20	46.60	62.97	65.29	70.19	71.03
Proprietor	25.35	23.68	19.74	14.47	14.47	10.96	22.44	15.52	17.57	11.10	11.58	8.37
Property	10.60	13.30	9.98	14.38	11.28	13.43	9.39	12.31	12.90	15.26	13.14	14.14
Transfers	33.84	37.28	26.09	21.75	13.72	15.00	34.37	26.60	8.99	11.56	7.38	9.96

*Source: 1960 and 1970 Census of Population. Larkin Warner "County Building Block Data."

* Excludes unrelated individuals.

** Percentages may not sum to 100 due to rounding and allocation of social security payments.

Table 3. INCOME EQUALITY*

	COUNTY			
	Adair	Cherokee	Muskogee	Sequoyah
Gini Coefficient				
1960	.467	.496	.446	.410
1970	.429	.399	.343	.295
Relative Mean Income by Quartile	(%)			
1960				
lowest quartile	10%	30%	32%	16%
second quartile	50	40	48	50
third quartile	120	86	104	105
highest quartile	220	244	215	220
1970				
lowest quartile	30	30	38	28
second quartile	50	60	82	70
third quartile	110	95	100	120
highest quartile	210	215	180	180

*Source: U.S. Census of Population, Oklahoma, General Social and Economic Characteristics, 1960 and 1970.

of the counties except Muskogee was greater than the increase for Oklahoma and the United States. Although the counties were closing the income gap, the income levels were still very low compared to the national and state average. Median family income ranged from 42 percent, in Adair County, to 68 percent, in Muskogee County, of the 1970 United States median family income.

Income Sources

Industrial development should affect the source of income in the counties. If labor were a major benefactor of industrial development, then labor's share (wages and salaries) of total income should increase relative to other income sources. Adair was the only county that labor's share of county income

did not increase between 1960 and 1970. Labor's share increased only slightly in Muskogee County, while Sequoyah County had an increase of 11 percent. Muskogee was the only county in the study area in which labor's share of personal income was comparable to the average for the United States and Oklahoma. In the other three counties labor's share was 15 to 35 percent below the United States and Oklahoma averages.

If local merchants were major recipients of industrial benefits, then proprietor income should become a relatively more important source of income. Proprietor income exhibited a downward trend as an income source in the four counties during the 1960's. The economic effects of industrial expansion on local merchants may have been dampened by local residents and industries purchasing goods and services outside the area. However, proprietor income was a less important source of personal income in the nation and Oklahoma in 1970 than 1960, suggesting that the local decline might be a reflection of state and national trends.

Owners of property resources are likely to receive substantial benefits from industrialization. These benefits may take the form of increased property values or stabilization of downward trends in property values and associated returns. During the decade of the 1960's, the importance of property income as an income source increased for the counties involved in this study. But the poor and underemployed are unlikely to own property, implying they received only limited benefits from this income source.

The hiring of the poor and underemployed either directly by the plant or in secondary rounds of hiring should lower the transfer components of personal income. Between 1960 and 1970, the importance of transfers as an income source increased in both Oklahoma and the United States. The same trend was present in Adair and Muskogee counties, but transfer payments declined as an income source in Cherokee and Sequoyah counties. These mixed results may have reflected increased transfer payment rates rather than relatively more welfare recipients. No uniform or reliable data were available to compare the number of public assistance recipients in 1960 and 1970, preventing a clear delineation of the effect of industrialization on the number of people receiving public assistance.

Income Distribution

The strongest evidence of the effects of rural industrial development on the poor and underemployed is the change in the size distribution of income in the counties. Replies by workers at the plants to a labor questionnaire indicate that approximately half had a previous income of $3,000 or less, suggesting that industrialization does directly help some low income persons.[3] Bryant [3] suggests that the major impact on the disadvantaged occurs in the secondary and higher order rounds of income change. Industrial expansion should cause an upward shift in the size distribution of income with a decline in the proportion of individuals in the lower income categories.

Between 1960 and 1970, the proportion of families with income less than $3,000 declined by 10 to 23 percent for the counties in the study area, and by 10 percent for Oklahoma and 6 percent for the nation. Muskogee and Sequoyah counties experienced a decline in the size of the $3,000-$5,000 income category similar to the Oklahoma and the United States trend.

All of the counties experienced an increase (3 to 4 percent) in the proportion of families with $5,000 to $9,999 of income, while this same income class increased slightly for Oklahoma and declined by 9 percent for the United States.

The proportion of families with income of at least $10,000 increased by four times in Adair County and three times in Sequoyah County between 1960 and 1970. This income category in Cherokee and Muskogee counties and in the state and nation doubled over the same time period.

The effects of industrial expansion on the size distribution of income are summarized by the Lorenz Curves in Figure 1. The Gini coefficients decline for all four of the counties indicating a relatively more equal income distribution in 1970 than in 1960 (see Table 3).[4] The Gini coefficient declines by 12 points in Sequoyah County, about 10 points for Cherokee and Muskogee counties and four points in Adair County.[5] The increase in median family income in

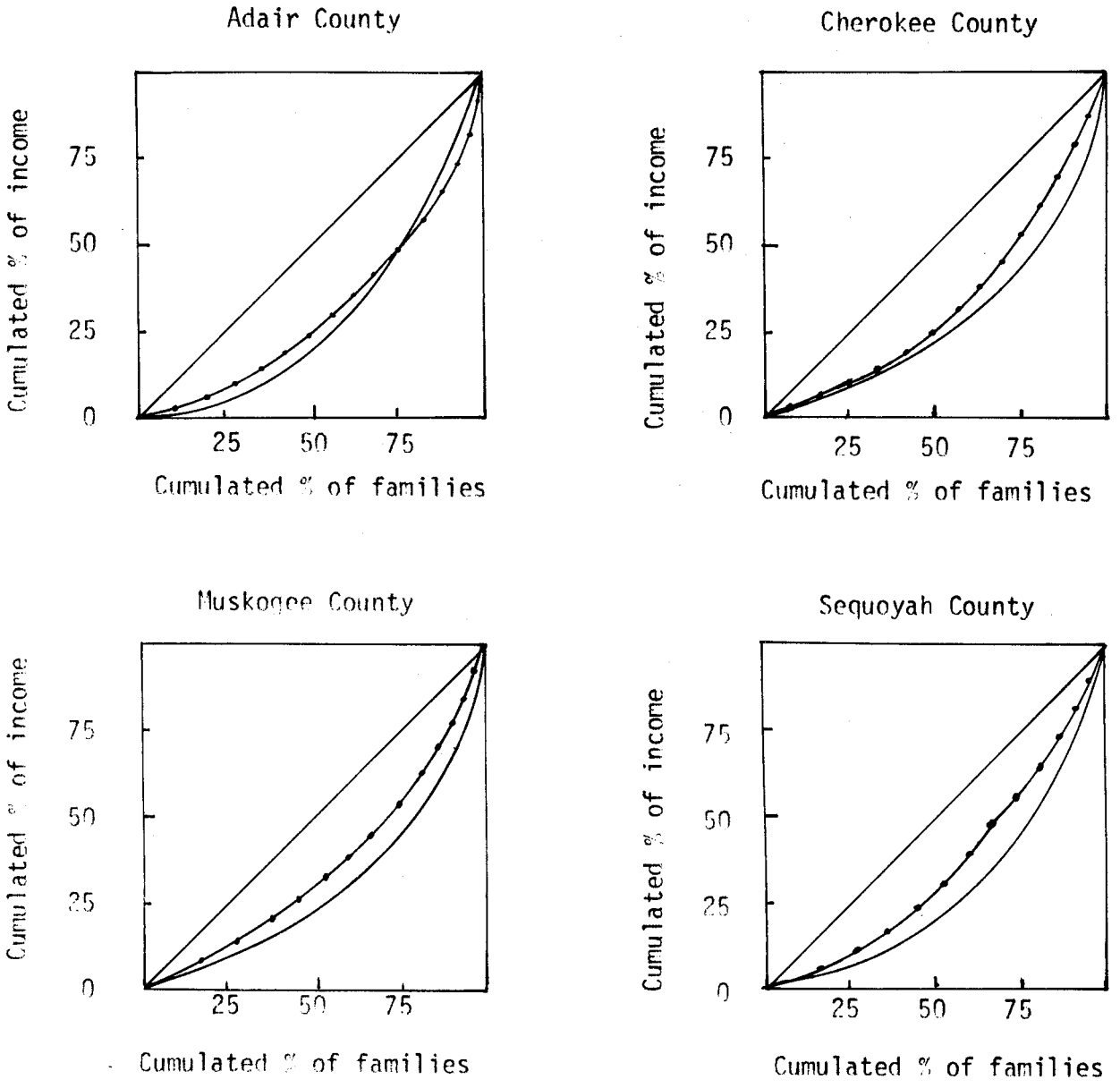
[3] The $3,000 income level is an arbitrarily selected low income threshold and does not include adjustments such as age, family size, etc., necessary to define a poverty threshold.

[4] The Lorenz Curve is the plot of the cumulated percent of families and income. The Gini coefficient is the ratio of the area between the 45 degree line and the Lorenz Curve to the total area under the 45 degree line.

[5] The 1970 Gini coefficient for rural nonfarm residents in the U.S. is .360 and for Oklahoma .382. The 1970 Gini coefficient for urban residents in the U.S. is .356 and for Oklahoma .367.

FIGURE I

LORENZ CURVES*



Sequoyah County (152 percent) over the decade is greater than for any of the other counties, and is accompanied by a decrease in the Gini coefficient indicating a more equal income distribution.

Bromley [2] suggests that the relative mean income of various quartiles, measured by the slope of the Lorenz Curve over that quartile, is an important consideration and can provide information not apparent from the Gini coefficient. The relative mean income is the relationship of the mean income for a specific quartile to the mean income of the entire population.

In 1960, the lowest quartile's mean income was 10 to 32 percent of the mean income in the counties (Table 3). By 1970, the lowest quartile's mean income had increased to 28 to 50 percent of their

respective county averages. Sequoyah County's lowest quartile exhibited a substantial relative improvement, reinforcing, in this case, the conclusions based solely on the Gini coefficient. The increased relative mean income for the second quartile coupled with the decline in the highest quartile were other contributing evidences of a more equal income distribution in the counties.

SUMMARY AND CONCLUSIONS

The expansion of industrial job opportunities in the study area had a substantial net economic impact on the communities, averaging $3,334 per worker per year.

Industrial expansion in the area had a direct impact on the disadvantaged. Approximately 50 percent of the work force at the plants had previously earned less than $3,000 per year.

All the counties experienced an absolute gain in median family and per capita income. Three of the four counties closed the income gap with the state and nation. The income gain was accompanied by a marked upward shift in the counties' size distribution of income, with dramatic declines in the proportion of the population with incomes of less than $3,000. The Gini coefficients declined for all of the counties, suggesting a more equal distribution of income. The relative mean income for the lowest quartile improved in three counties and held constant in the fourth county.

The results of this study suggest that industrial expansion does help the economic position of locally disadvantaged rural residents. Thus, a public policy of encouraging rural industrial expansion appears to be a feasible alternative to aid incomes of rural disadvantaged, especially for those who do not desire to move elsewhere to job opportunities.

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