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Income Distribution in Midwestern Agriculture-Dependent Counties:
Policy Implications

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Highlights

The purpose of this report was to examine the relationship of household income distribution in agriculture-dependent counties in the North Central region with selected social policy and structural endowment variables. Data for the analysis included information on 397 non-metropolitan counties in the 13-state region for the years 1960, 1970, and 1980.

Income distribution was measured using the Gini coefficient method. Social policy variables included per capita retirement transfer payments, per capita income maintenance transfer payments, per capita unemployment transfer payments, per capita county government expenditures, and population change. Structural variables included level of education, percent of labor force employed in manufacturing, percent of the labor force employed in manufacturing, percent of labor force comprised of women, and commercial farms as a percent of all farms. Correlational and regression procedures were used to determine relationships between the structural and policy variables and the Gini coefficient. Following are highlights of the results.

* While policy variables were most influential in determining income distribution in 1960, policy and structural variables were equally influential in determining income distribution in 1970. In 1980, structural variables were considerably stronger determinants of income distribution than were policy variables.

* The most powerful and consistent structural determinant of income distribution was level of education. Education additionally served as a key determinant of other variables related to income distribution. Policymakers have long employed efforts aimed at increasing levels of education as a means of enhancing income levels.

* The strength of the relationship between income distribution and the percent of the labor force employed in manufacturing grew over time. Local development efforts during the 1970s and 1980s typically emphasized diversification of industry by encouraging new manufacturing enterprises. However, in the early stages of rural industrialization, this variable may be inversely related to level of education and directly related to the proportion of the labor force comprised of women.

* Other structural variables related to income distribution included commercial farms as a percent of all farms and percent of the labor force comprised of women. The percent of the labor force employed in services was not a consistent determinant of income distribution.

* Per capita retirement transfer payments was consistently related to income distribution as well as to other key determinants of income distribution. While retirement income, reflective of the number of retirees in a county, may provide a relatively stable flow of money into that county, policymakers need to be aware that it is typically a fixed amount.

* Per capita income transfer payments were inversely related to income distribution. These payments are likely reflective of an already existing maldistribution on income.

* No consistent relationships were found between income distribution and per capita county government expenditures, per capita unemployment transfer payments, and population change. Nevertheless, these variables were related to other key determinants of income distribution.

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Income Distribution in Midwestern Agriculture-Dependent Counties: Policy Implications

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Life in rural America is full of contrasts. Differences are especially noticeable in the way people live--their quality of life, their housing conditions, their general economic status. One notable illustration is the distribution of incomes among rural families and individuals. While 29 percent of rural families had earnings of $25,000 or more in 1980, nearly 11 percent of rural families were impoverished.

What accounts for the range in income levels found in our nation's rural areas? What policies have been effective in redistributing income? Previous studies have highlighted factors related to economic growth in rural areas that have been useful to policymakers. However, these studies did not explain how the benefits of economic growth were distributed. Furthermore, they did not provide information on how policies redistribute the benefits of economic growth over time. This report attempts to provide that information by offering a better understanding of the complex, systemic processes of social and economic change and income distribution. Specifically, our objective was to investigate the relationship of differences in the size distribution of household income in agriculture-dependent counties of the North Central region with social, demographic, and economic determinants.

Model of Income Distribution

Previous researchers exploring the determinants of income distribution have used various theoretical perspectives. These perspectives ranged from human capital approaches that focus on attributes of residents to development/economic base theories which concentrate on structural indicators of an areas, such as size, characteristics, and the type of dominant industry. Our study incorporates key elements from several of these perspectives in an attempt to evaluate their influence on distribution of personal income.

Based on previous research (Foley 1977, Gardner 1969, Thurow 1970), we believed that the distribution of income in counties dependent on agriculture would be determined by two key factors. The first is the resources and structures with which a county and its residents have been endowed. A review of the research literature helped us limit the number of structural endowment variables we initially tested to15. After examining the common influences of these indicators on income distributions, we further refined our list to five key variables. These included employment opportunities in the manufacturing and service industries, proportion of commercial farms, level of education, and labor force composition (see Figure 1).

Second, we believed that socio-economic policies both directly and indirectly result in a redistribution of income within agriculture-dependent counties. Once again by reviewing the efforts of others, we limited the initial number of policy variables to 11. Next, we eliminated those variables which empirically revealed a common influence and reduced our model to five key policy variables. These included transfer payments made to retirees, the rural poor, and the unemployed and county government expenditures on health, education, public welfare and protection, and highways. Additionally, population change was included as an indirect indicator of economic policies (see Figure 1).

Research Methods and Findings

To test this model, county-level social, demographic, and economic data from the Bureau of the Census and the Bureau of Economic Analysis for the years 1960, 1970, and 1980 were collected and analyzed. Only the 397 nonmetropolitan, agriculture-dependent counties (those with 20 percent or more of total labor and proprietor income produced from farming/ranching) in the 12

Figure 1. Determinants of Income Distribution

COUNTY ENDOWMENTS
- Commercial farms
- Education level
- Manufacturing employment
- Services employment
- Women in the labor force

SOCIOECONOMIC POLICIES
- Population change
- Retirement transfers
- Income maintenance transfers
- Unemployment transfers
- County government expenditures

INCOME DISTRIBUTION

☐ = Non-agriculture dependent counties.

■ = Agriculture-dependent counties.

Figure 2. Agriculture-Dependent Counties in the North Central Region
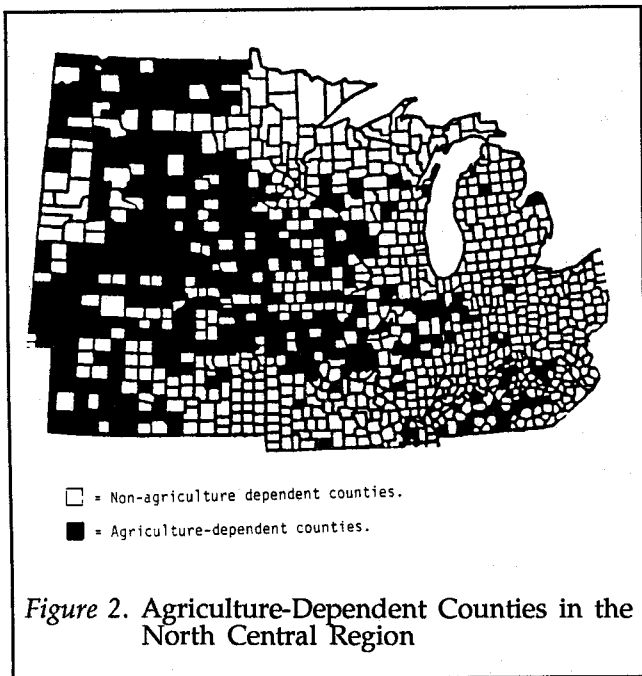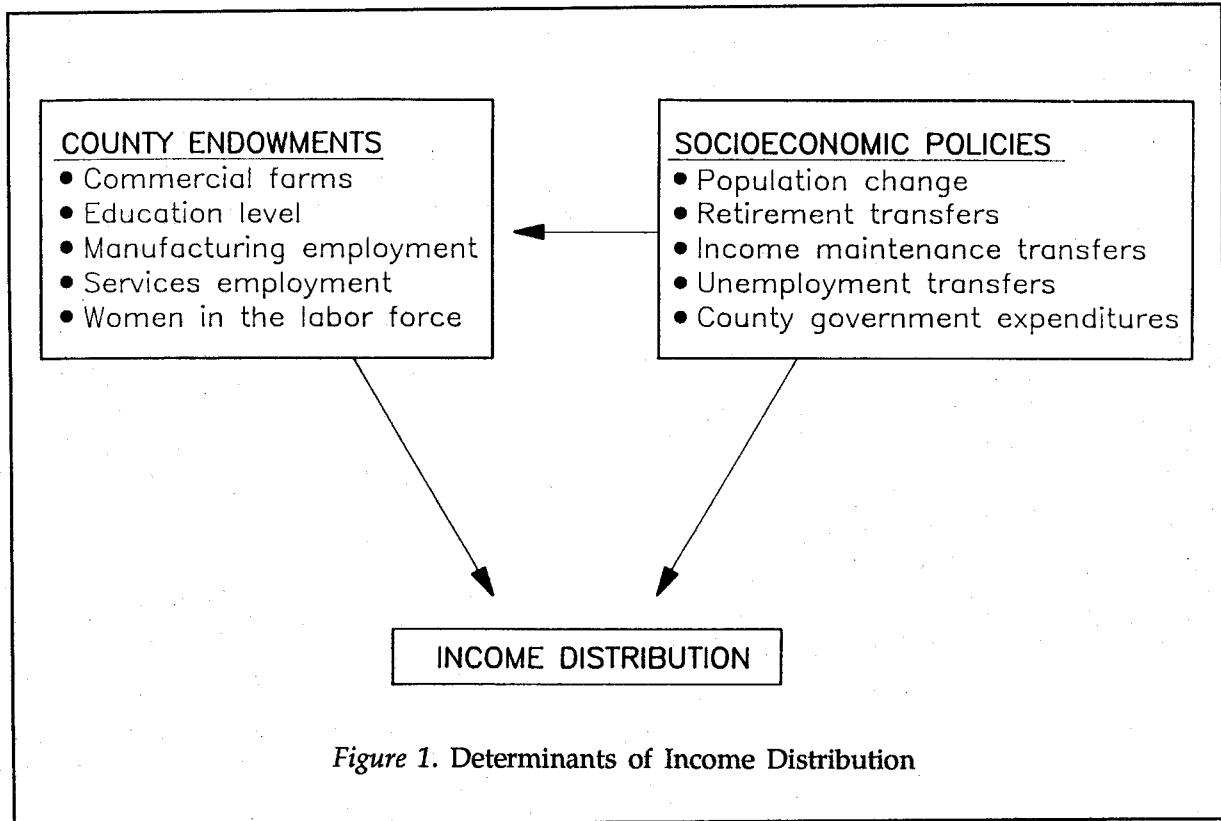
states of the North Central region were included in the analysis (see Figure 2).

Income distribution was measured by the Gini coefficient, that is, the variation between a county's actual distribution of income and an equal distribution of income. Regression procedures were used to determine the relationship between structural and policy variables and the Gini coefficient.

Important differences were found in how structural endowments and social policies related to the distribution of income in each census year. In 1960, policy vari ables were most influential in determining the distribution of income. However, an important transition occurred during the 1960s that shifted the influence of structural and policy variables on the distribution of income. This transition is reflected by the change in emphasis of these two sets of variables. In 1970, an policy variables were found to be significant in explaining county-level variations in income distribution, neither of which were more powerful. By 1980, both structural and policy variables were strong determinants of income distribution. However, structural variables were considerably more powerful.

Structural Determinants of Income Distribution
Level of Education

Slightly over 37 percent of persons age 25 and over had a high school degree in 1960. That number increased to 47.6 percent in 1970 and to 61.7 percent in 1980. Level of education was significantly related to income distribution in 1960, 1970, and 1980; however, the strength of the relationship declined over time. As level of education increased, income distribution became more equalized. Further, the amount of money expended by local governments on education was directly related to income distribution equality, although the strength of that relationship diminished appreciably over time.

Level of education was also related to other structural variables that served as determinants of income distribution. In 1970, level of education was inversely related to manufacturing employment (see Figure 3) and was directly related to proportion of commercial farms in 1980 (see Figure 4).
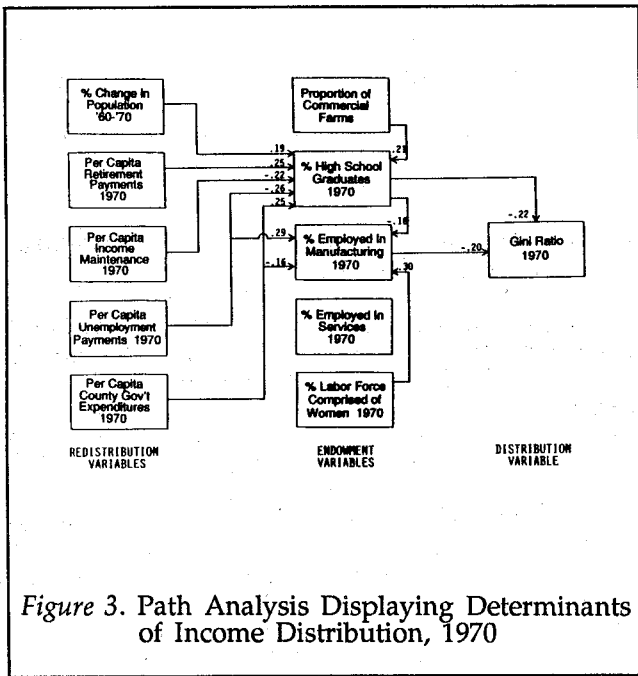

Figure 3. Path Analysis Displaying Determinants of Income Distribution, 1970

Thus, efforts aimed at increasing educational levels would be expected to have the effect of redistributing incomes more equitably. The popularity of this approach as perceived by policymakers is that increasing education leads to a measure of income redistribution without requiring any major redistribution of capital. However, while a relationship was found to exist between education and income distribution, inference of a causal link may
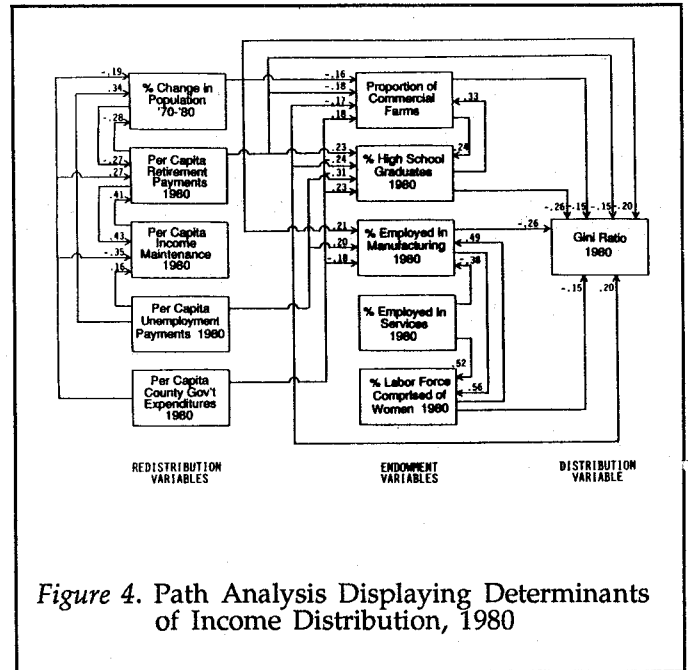

Figure 4. Path Analysis Displaying Determinants of Income Distribution, 1980

not be entirely warranted. That is, education may not determine income directly. Instead, it may determine the number of occupational opportunities from which more educated people are able to chose. Persons with higher education have greater opportunities to chose jobs with greater monetary rewards. Thurow (1975) noted that programs aimed at increasing educational levels have served only to change the supply of more-educated workers, but not necessarily the demand for them.

Programs aimed at increasing educational levels appear to have been very effective in the 1950s and 1960s, although the value diminished in the 1970s. A growing proportion of the labor force currently holds higher educational degrees compared with the number only a few decades ago. If education is to continue to serve as a means of redistributing income in agriculture-dependent counties, policies first need to be adopted that will increase occupational opportunities commensurate with educational levels.

Percent of Labor Force Employed in Manufacturing

While not significantly related to income distribution in 1960, the percent of the labor force employed in manufacturing was a significant determinant of income distribution in 1970 and 1980. That is, the greater the proportion of a county's labor force employed in manufacturing, the more equal was its distribution of income. Manufacturing employment had an indirect impact on income distribution through its relationship with

other variables that were significant determinants of income distribution. It was inversely related to level of education in 1960 (see Figure 5) and 1970 and directly related to the proportion of the labor force comprised of women in 1980.
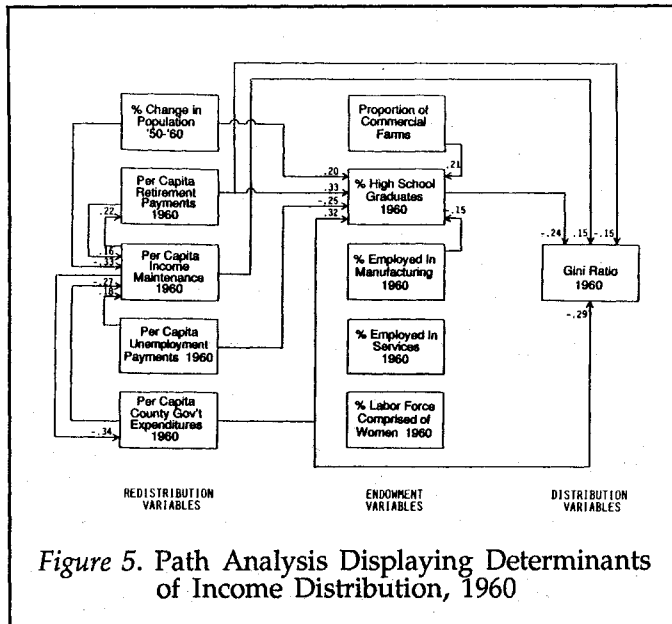

REDISTRIBUTION VARIABLES   ENDOWMENT VARIABLES   DISTRIBUTION VARIABLES

Figure 5. Path Analysis Displaying Determinants of Income Distribution, 1960

Manufacturing received heavy emphasis as a facet of community and economic development during the decades of the 1970s and 1980s. Manufacturing was found by several researchers to have an equalizing impact on income distribution. Other researchers, however, have been skeptical of the relationship between industrial development and improved incomes. That manufacturing employment was significantly related to income distribution inequality in 1970 and 1980, but not in 1960, supports the hypothesis of Kuznets (1955). He held that early periods of industrialization are associated with greater income distribution inequality while later periods are associated with greater income distribution equality. The stage of industrialization may account for the disparity found by the various researchers.

Thus, policymakers need to be aware that increasing manufacturing employment in agriculture-dependent counties may not have an immediate effect on redistributing income. It may, however, have the potential to do so over the long term. Additionally, our findings suggest that those developing their manufacturing industries may need to anticipate additional economic changes in counties. For example, our study found retirement income in counties increase with expanding manu-

facturing. This may reflect additional payments to social insurance and pension programs for employees retiring in the county. Alternatively, it may imply the loss of the young and more mobile residents of the community, which inflates the number of elderly per capita. One final noteworthy finding which community leaders should consider is the increase in unemployment payments we found associated with rising manufacturing employment. This may result from the selective nature of employment within the manufacturing industry. An excellent illustration is the high proportion of women they employ, an area which we shall elaborate on more fully.

Percent of Labor Force Comprised of Women

The percent of the labor force comprised of women was a determinant of income distribution only in 1980. The greater the percentage of the labor force comprised of women in 1980, the more equal was distribution of income. The percent of women in the labor force was directly related to both the percent of the labor force employed in manufacturing and service industries. Thus, as the proportion of the labor force comprised of women grew, so too did the number of manufacturing and service employees as a percentage of all employees.

That the percent of the labor force comprised of women was not significantly related to the income distribution until 1980 could indicate some improvement in pay schedules. More likely, however, this change may reflect the sharp increase of women's labor force participation in the 1970s. While only an average of 25 percent and 32 percent of the labor force was comprised of women in 1960 and 1970, respectively, the number reached 37 percent in 1980.

The proportion of women in the workforce will likely continue to grow. Although gains may be made in the proportion of women employed in a variety of traditionally male-dominated professions, they will continue to provide a substantial portion of the employees in the manufacturing and service sectors. Policymakers need to consider means to enhance opportunities for women's employment as well as pay schedules on par with their male counterparts.

Commercial Farms as a Percent of All Farms

While the percentage of commercial farms (those with annual farm product sales of $40,000 or more) was not a significant determinant of income distribution in 1960 or 1970, it was significant in 1980. That is, the greater the proportion of commercial farms in a county, the more equal its distribution of income. Further, the proportion of

commercial farms was directly related to level of education, a determinant of income distribution, at all three points in time.

While the total number of farms in the United States has been in decline since the mid-1930s, differences in rates of change are evident in size of farms. Additionally, large farms have been found to receive a disproportionately larger share of government commodity program payments (Cochrane, 1986; Reinsel et al., 1987). In 1980, commercial farms comprised 22.9 percent of the nation's farms, brought in 82.9 percent of the nation's farm income (see Figure 6), and accepted 73 percent of the government payments designated for the nation's farms (see Figure 7).
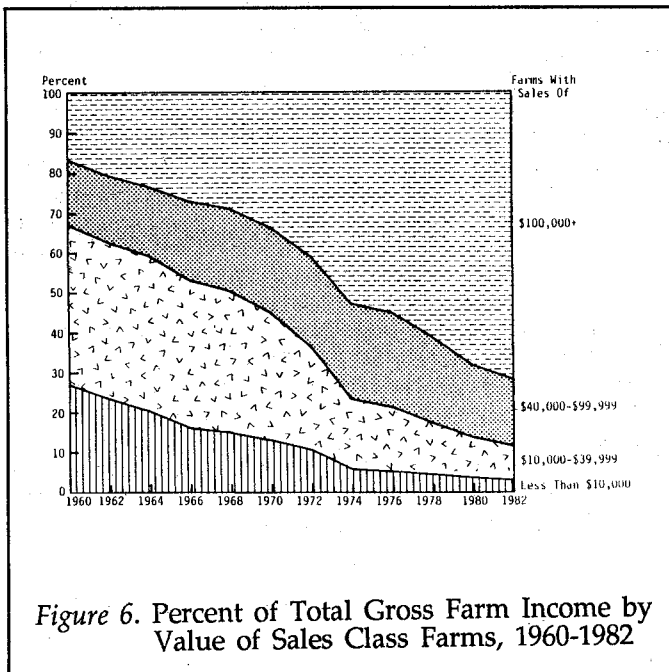

Figure 6. Percent of Total Gross Farm Income by Value of Sales Class Farms, 1960-1982

Proponents of farm program payments point to the benefit such payments have for all residents of a community or trade area as a result of a "multiplier effect." A multiplier effect occurs as the money injected into the local economy is recirculated via buying and selling goods and services. However, our data show that counties receiving larger government farm payments had less equitable income distributions.

While this finding may reflect the relationship of larger farm payments going to larger farms, it may also reflect the disparity in the amount of county-aggregated government farm payments across the North Central region. For example, counties that are predominantly ranching-based receive a
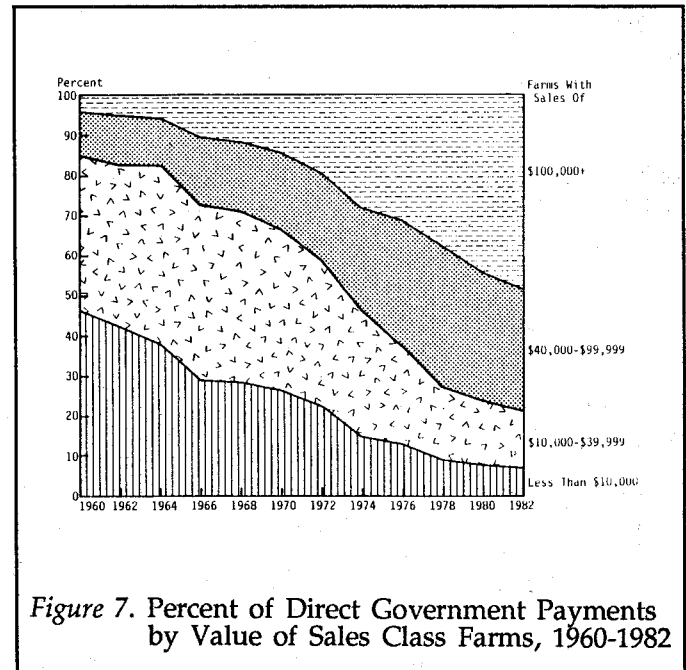

Figure 7. Percent of Direct Government Payments by Value of Sales Class Farms, 1960-1982

relatively small amount of farm payments compared with counties that are predominantly feed-grain or wheat-based. In counties with smaller proportions of commercial farms, a wider range of farm sizes exists; that is, there is greater heterogeneity. Thus, equitable income distribution may have less to do with the scale of agriculture as much as the homogeneity of farm size. The more homogeneous are a county's farms, the more equally will incomes be distributed.

Policymakers need to be aware that policies related to agriculture may impact county-level income distribution. The more their policies equalize income among farmers, the more equitable will be the county's distribution of income as a whole. One suggestion for equalizing farm incomes is to eliminate direct government payments and subsidies to large, commercial farm operations. The Office of Technology Assessment (1986) recommended that the cut off line, although arbitrary, be set at $250,000 in sales of crops and dairy products under single ownership. Farms above this size are less in need of government payments to survive and compete.

Percent of Labor Force Employed in Services

The percent of the labor force employed in services was not a significant predictor of income distribution at any of the three data points. This is not surprising in light of the relatively low wages paid to employees in this sector of a local

economy. If anything, this sector may help maintain the inequitable social and economic structures that currently exist.

Policymakers and development specialists who attempt to enhance the services industry in counties need to be aware that such efforts may not be effective in equalizing the distribution of income.

Policy Determinants of Income Distribution

Population Change

It was expected that population change in a county impacts the endowment structure in that county over time. Population change serves as an indicator of the nature of market interactions that may be taking place. It affects income distribution in terms of the income categories of those who may migrate into or out of the county. Indirect effects on income distribution may be more diverse.

Only in 1980 did population change serve as a determinant of income distribution. However, at each data point population change was related to structural variables that impacted income distribution. At all three points, population change was directly related to level of education; education levels rise with population increases and fall with population decreases. A direct relationship was found between population change and the proportion of manufacturing employment in 1980. In addition to the role it plays in affecting structural variables, population change was also found to affect other policy variables. In both 1960 and 1980, population change was inversely related to per capita income maintenance transfers.

Per Capita Retirement Transfer Payments

Retirement transfer payments are a major source of income in the economies of many counties. The input of retirement transfers was expected to impact individuals of low wealth, thus decreasing the Gini coefficient. Further, high retirement transfer payments may be an indicator of a higher number of elderly and/or elderly who are eligible to receive higher retirement transfer payments.

At all three data points, retirement transfers served as a significant predictor of income distribution, although the relationship was somewhat weaker in 1970. In addition, retirement transfers were significantly related to level of education, a structural determinant of income distribution, at all three data points. Relationships were found between retirement transfers and other policy variables that served as significant predictors of income distribution. In both 1960 and 1980, retirement transfers were directly related to per capita income

maintenance transfers. In 1980, the variable was inversely related to population change.

Policymakers need to consider the role retirement programs have on county-level income distribution. Such payments are made to those who usually have a reduced income, thus increasing their annual earnings. Further, counties with a high proportion of retirement transfer payments per capita will most likely have a high proportion of elderly residents (Green 1987). This may be beneficial to the county in that it helps stabilize the county's income. On the other hand, it can be problematic in that retirement benefits are often fixed, thus detrimental in times of volatile inflation periods.

Nevertheless, policymakers must also be aware that additional concerns and issues must also be taken into consideration with regard to shifting elderly populations. For example, increases in the number of seniors may dramatically increase the area's need for medical services and health facilities. Additionally, the critical questions of what rural delivery systems should be implemented or maintained needs to be addressed.

Per Capita Income Maintenance Transfer Payments

Income maintenance transfer payments are considered a means to provide support for low-income persons and families. By providing additional funding at the low end of the income scale, a relationship with income distribution equality is expected. Contrary to expectations, however, our data showed that higher levels of income maintenance transfers were not related to a more equitable income distribution. In 1960 and 1980, an inverse relationship was found between income distribution transfers and income distribution equality.

Per capita income maintenance transfers were not significantly related to any of the structural variables in 1960 and 1980. However, in 1970, they were inversely related to the level of education. This indicates that higher levels of income maintenance transfer payments were related to lower levels of education. In 1980, income maintenance transfers were inversely related to the proportion of commercial farms in the agriculture-dependent counties. Additionally, income maintenance transfers were also related to policy variables. In both 1960 and 1980, per capita income maintenance transfers were directly related to per capita retirement transfers. In 1960, the variable was inversely related to per capita government expenditures.

Policymakers need to be cautious in accepting a causal link between income maintenance transfers and income distribution. Due to the cross- sectional

rather than longitudinal nature of the research project, we cannot logically conclude that increases in income maintenance transfers led to a less equitable distribution of income. However, we can state that such transfers are logically correlated with income inequality. Thus, in those counties where income inequality is the highest, income maintenance transfers are the highest. That such payments are made at all reflects the already existing maldistribution of income.

The incomes of non-farm families, either white or non-white, headed by males under age 65 follow the movements of aggregate income quite closely. However, the incomes of farm families, families headed by women, and those headed by an elderly person are far more isolated from economic growth (Thurow, 1969; Treas 1983). The latter groups of families are more likely to be in need of income maintenance. While some policymakers have recommended that recipients of income maintenance transfers should be enrolled in work or training programs, such strategies have met with limited success (Rein, 1982; Congressional Budget Office, 1987). Reasons cited for the limited success include reduction in welfare benefits when recipients work, lack of consistent employment opportunities, and lack of employment marketability. These are all issues for policymakers to address.

Per Capita County Government Expenditures

County government expenditures include money spent on such items as highways, education, health, public welfare, and police protection. Since expenditures on these items are beneficial to those at the top as well as those at the lower end of the income scale, it was expected that counties with higher government expenditures would have more equitable distributions of income.

Of all the policy and structural variables in 1960, per capita government expenditures was the strongest predictor of income distribution. It was not, however, a significant predictor of income distribution in either 1970 or 1980. Its direct role on redistributing income diminished appreciably over the time period in question.

On the other hand, per capita county government expenditures increased over time in its impact on structural variables. While in 1960 it was directly related only to level of education, in 1970 it was directly related to education and inversely related to manufacturing employment. By 1980, the variable was directly related to level of education and commercial farming and inversely related to manufacturing employment.

Per capita county government expenditures was related to other policy variables as well. They were inversely related to income maintenance transfer payments in both 1960 and 1980. In 1980, per capita county government expenditures was directly related to per capita retirement transfers and inversely related to change in population.

County government expenditures can impact income distribution by either providing goods and services to the residents or by paying those who provide the goods and services. For example, as a county expends funds on public health programs, the level of health in the county would be expected to rise. This, in turn, could impact the amount of work and income lost due to illness. Furthermore, additional jobs and incomes are provided by maintaining a public health staff, highway maintenance crews, and the like.

Policymakers need to be aware that county government expenditures may not directly redistribute income. Rather, it purchases those structures and services that are related to an equitable income distribution or are needed to maintain one.

Per Capita Unemployment Transfer Payments

Per capita unemployment transfer payments were not significantly related to the distribution of income at any of the three data points. They were, however, inversely related to level of education and positively related to per capita income maintenance transfers in both 1960 and 1980. This may suggest that unemployment transfers are less a determinant of either of these variables as much as a correlational indicator. We might expect that displacement of workers through layoffs and the like would be more prevalent among lower wage earners with less education than among their more educated, salaried counterparts.

Consistently higher county government expenditures were directly related to higher levels of education among the population and to lower levels of income maintenance transfers, both of which were related to income distribution.

Summary and Conclusions

The purpose of this research was twofold. First, we sought to determine those endowment and policy variables related to the distribution of income in agriculture-dependent counties (see Table 1). Second, based on an analysis of the variables that impact income distribution, we suggested implications our findings held for policymakers.

A model was developed that included five structural variables (commercial farms, education level,

Table 1. Statistically Significant Determinants of Income Distribution, 1960-1980

YEAR	SOCIAL POLICIES	COUNTY ENDOWMENTS
1960	County Government Expenditures Income Maintenance Transfers Retirement Transfers	Education Level
1970	County Government Expenditures Retirement Transfers Unemployment Transfers	Education Level Manufacturing Employment Commerical Farming
1980	Income Maintenance Transfers Retirement Transfers Population Change Unemployment Transfers	Education Level Manufacturing Employment Women in Labor Force Commercial Farming

Note: Items in *italics* were weak, but statistically significant determinants.

manufacturing employment, services employment, and women in the labor force) and five policy variables (population change, retirement, income maintenance, and unemployment transfers, and county government expenditures). We found that policy variables impacted structural variables. Further, we found that both structural and policy variables affected income distribution.

These findings pose several important implications for policymakers, planners, and development specialists. First, the influence of social policies that redistribute income should receive greater emphasis. For example, retirement benefits were found to be significant determinants of income distribution at all three points in time. As the proportion of elderly continues to rise in rural America, greater attention needs to be focused on the impact the elderly will have on the economy of agricultural counties.

Similarly, the redistribution of income via unemployment benefits or various county government expenditures was found to reduce the inequality of income distribution during two of the three periods studied. The recent economic pressures in rural areas have severely strained many rural governments, hampering their ability to aid in the transition of displaced farmers, former business owners, and other rural residents. The growing

gap between available resources and needs may be reflected in an increasing disparity among incomes. This is illustrated by the study's finding that income maintenance payments increased in counties where less equal distributions of income existed.

Second, the growing importance of residential and county endowments on income distribution indicates that current economic and demographic changes in rural America may create serious economic consequences. For example, the shifting residential composition of agricultural counties due to outmigration may sharply alter the distribution of income as the younger, more highly educated residents and their families leave. A lower endowment of educated residents intensified the disparity of income in all three study periods analyzed.

Third, structural characteristics of the county also were found to be important determinants of income distribution. For example, growth in the manufacturing sector appeared to be effective in facilitating a more equitable distribution of income in two of the three periods investigated. However, these structural changes are not without consequence. Rural manufacturing is not noted for high wages, and therefore this industry may underutilize the skills of residents.

Finally, the number of commercial farms as a percentage of all farms was also significantly related to income distribution during two of the three periods analyzed. Farm legislation resulting in farm program payments has been particularly beneficial to operators of large, commercial farms. The effect of these programs on local, rural economies merits additional future research.

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