REPRINTED FROM:

Agricultural Change

Consequences for Southern Farms and Rural Communities

edited by Joseph J. Molnar

Westview Press / Boulder and London

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Agricultural and Rural Community Interdependencies

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INTRODUCTION

The impact of the changing structure upon the rural community is a topic of considerable interest to rural sociologists. The interest began with the pioneering work of Goldschmidt in 1946 (1978). He found that small-scale farms supported a more viable community than did large-scale farms. Later studies have generally confirmed the basic thesis. Heffernan (1982:341-342) notes that it is significant that a dozen studies conducted across four decades, in all regions of the country, by different researchers, and using different methodologies, have all rather consistently shown that a change toward large-scale agriculture causes social conditions that reduce the quality of life in rural communities.

CRITICISMS AND LIMITATIONS

Despite the consistency of results in support of the Goldschmidt hypothesis, the studies are generally subject to a number of criticisms. The first criticism is that most of these studies have been cross-sectional and fail to provide the longitudinal evidence needed to investigate the social consequences of agricultural structural change. Rodefeld (1979:100-101) and Heffernan (1982:343) noted the lack of any careful longitudinal studies of the communities to provide a time series check on the causal connections that Goldschmidt infers from his cross-sectional observations. The results of these cross-sectional studies should be viewed in probabilistic terms or as tendencies rather than as deterministic statements.

The second criticism is the implied one-way causality (that changes in the structure of agriculture cause changes in the structure and population of rural communities). Agricultural structure and community structure are mutually interrelated (Beaulieu and Molnar, 1985), but most studies have used agricultural structure as the independent variable. The major deficiency in the literature is a consideration of how community structure affects agricultural structure (Buttel, 1980; Vail, 1980). For instance, rural industrialization may provide opportunities for farmers to engage in off-farm employment to improve farm income (Salant, 1984). Day (1981:1001) notes that, in the Goldschmidt study, the direction of causation is from large farms to reduce nonfarm employment and income without consideration of adjustment processes to the disequilibrium. Research is needed on the mutual interrelations of structural change in agriculture and rural communities.

A third criticism is that the geographic scope of the studies may be either too small or too large to document the interrelationships between agricultural and community structure. Day (1981:1001) points out that the limited geographic scope of Goldschmidt's study cannot take into consideration the great variety of conditions under which the adjustment process takes place. Hayes and Olmstead (1984) suggest that differences in the availability of natural resources and age of agricultural development largely explain the differences between Arvin and Dinuba. A related question is whether central-place theory offers additional explanation for community structural change. Flora (1974) recognized a need to conduct additional studies in communities in different locations in an intercommunity network. There is some evidence to support the contention that Goldschmidt's (1978:368) small-farms community was a higher-order central place than the large farms community. If this small-farms community was a higher order central place, and if the expansion of nonfarm export industries is related to its place in a hierarchy of communities, then doubts can be raised about Goldschmidt's generalizations (Day 1981:1001).

Studies that focus on the rural agricultural county and its associated agricultural communities (e.g., Swanson, 1980) also ignore the tendency toward regional organization and the centralization of functions in higher-order communities. Studies that take the state as a unit of analysis (e.g., Eberts, 1979; Wheelock, 1979) ignore central-place theory altogether. Not surprising,

from a central-place hierarchy, Johansen and Fuguitt 1973) found that rural trade centers' growth or decline is related to changes in the communities' supporting economic base and increased accessibility to urban market centers.

RECASTING THE GOLDSCHMIDT HYPOTHESIS

It seems axiomatic that increases in the size and scale of farms with the resulting off-farm migrations and changes in shopping patterns of large-scale farmers will result initially in reduced employment, wages and rents in the nonfarm local service sectors of some rural communities. The conditions under which this phenomenon occurs need to be specified in order to determine if it is a temporary or permanent phenomenon. These conditions depend upon changes in other basic (export) sectors of communities. Day (1981:1002) develops three alternative hypotheses based on the initial condition:

1. Lower wages, higher unemployment, and lower rents are insufficient to attract nonfarming basic industries into the community and people and businesses migrate to more urbanized areas resulting in a permanent depression of the level of economic activity in the rural community.
2. Lower wages, higher unemployment, and lower rents are sufficiently attractive to nonfarming basic industries so that they migrate to rural communities, increasing employment, and causing wages and rents in the community to increase.
3. Lower wages and higher unemployment are insufficient to attract other industries into the community, but the aggregation of these conditions in the community and surrounding communities is sufficient to attract other basic industries to locate in one or more of the surrounding communities, so that they can draw on the excess labor supply of the overall area.

Day (1981:1002) describes how different units of analysis may be used to test these hypotheses. If a satellite town (rural agricultural community) and its hinterlands are selected as the unit of analysis, then the first hypothesis of a permanently depressed level of economic activity seems most likely. On the other hand, if the central place and its surrounding hinterlands is

selected as the unit of analysis, the second alternative of industrial migration to rural communities with increased employment, wages and rents seems as a more plausible candidate. Last, if the existence of a hierarchy of central places in rural areas is recognized, then the third hypothesis of the aggregation effect is the most reasonable one.

Day's hypotheses are novel in that they put the dynamics of the process of interregional adjustment to structural change in agriculture into a central-place hierarchy. The use of functional economic areas enables one to analyze this adjustment.

THE FUNCTIONAL ECONOMIC AREA AS A UNIT OF ANALYSIS

Karl Fox and Krisha Kumar defined a functional economic area (FEA) as a home-to-work commuting field (Fox and Kumar, 1966). They found that in Iowa these FEA's are diamond shaped with a radius of approximately 50 miles. The 50 mile radius of the FEA is about one hour's driving distance from the periphery of the home-to-work commuting field to the central city. Each FEA is centered on a central city. The FEAs, their counties and their central cities are shown in Figure 12.1.

Functional independence regarding the provision of daily goods and services requirements is the major homogeneous characteristics of these regions. Fox and Kumar found that the villages and towns in a FEA form a "hierarchy of increasingly complex shopping and service centers, with the widest array of goods and services being offered by the central city" (1966:45-46). They described the

FIGURE 12.1 Typology of vitality of sector and strength of sector support

	Sector			
	Farm		Nonfarm	
Vitality	Strong	Weak	Strong	Weak
Strength of Support				
Strong	1a	3a	1b	3b
Weak	2a	4a	2b	4b

hierarchical structure of cities in an FEA as being composed of minimum convenience centers, full convenience centers, partial shopping centers, complete shopping centers, secondary wholesale-retail centers, and primary wholesale-retail centers (Fox and Kumar, 1966:49). These centers were defined by their population and their volume of sales in 1960.

The functional economic area is useful in a variety of planning contexts (Fox and Kumar, 1966; Fullerton and Prescott, 1975). These regions are homogeneous with regard to the internal organization of their residentiary activities. Because residents spend most of their weekday hours within this region, this spatial unit provides a logical basis for planning most public and private residentiary services (Fullerton and Prescott, 1975).

FARM AND NONFARM RELATIONSHIPS IN THE FEA

Day (1981) suggests that an aggregation effect occurs within a region such as an FEA in which there is development within the region as a whole, but that most of the activity occurs within the central city and one or two satellite communities. The hinterland communities benefit primarily by workers commuting to jobs in the communities with greater development activities.

Within a FEA, then, there are two interdependent sectors, the farm and the nonfarm, each supporting the other to create viable communities. Earlier research (Korsching and Stofferahn, 1985) suggested that there are four alternatives or types for each sector within any particular community in an FEA.

1. a. A strong farm sector with strong support from the nonfarm sector.
   b. A strong nonfarm sector with strong support from the farm sector.

   The sector and the support are expanding more rapidly or declining less rapidly than in other communities in the FEA. The community is central to the economic activities of the county.

2. a. A strong farm sector with weak support from the nonfarm sector.

b. A strong nonfarm sector with weak support from the farm sector.

The sector is expanding more rapidly or declining less rapidly than in other communities in the FEA, but support is expanding more rapidly or declining less rapidly than in other communities. Thus, the support to maintain the sector is obtained from outside the community.

3. a. A weak farm sector with strong support from the nonfarm sector.
   b. A weak nonfarm sector with strong support from the farm sector.

The sector is expanding less rapidly or declining more rapidly than other communities in the FEA, but support is expanding more rapidly or declining less rapidly than in other communities. There is a leakage of benefits to other communities in the FEA.

4. a. A weak farm sector with weak support from the nonfarm sector.
   b. A weak nonfarm sector with weak support from the farm sector.

The sector and the support are both declining more rapidly or expanding less rapidly than in other communities in the FEA. The community is peripheral to the economic activities within the FEA.

METHODS

Because the functional economic area (FEA) incorporates the ideas of central-place theory, and the notion of the aggregation effect, we intend to use the FEA as the primary unit to examine Day's (1981) third hypothesis. Iowa was chosen for this research for several reasons. First, agriculture has been the primary basis of the state's economy. Second, Iowa agriculture has not has the radical transformation that agriculture in many other areas had experienced; that is, although changes in structure are occurring, much of Iowa agriculture can still be

classified as traditional family farming. Third, in Iowa the organization of urban places closely approximates the hierarchial distribution predicted by central place theory. And fourth, the functional economic areas defined by Fox and Kumar (1966) provide a ready and useful division of the state into urban regions.

Data to examine the interrelationships between changes in agriculture and changes in community consist of a wide variety of indicators of population characteristics, the structure of agriculture, wholesale and retail sectors, and manufacturing. These data have been collected for all Iowa counties for the decennial years from 1940 through 1980, or the closest approximation to the decennial years. The source of the data are the various censuses.

Variables were chosen on the basis of being most central to the processes and relationships of interest. The variables related to the farm sector included in the analysis are 1) number of farms, 2) farm size in acres, 3) number of small farms (less than 180 acres), 4) number of medium-sized farms (180-499 acres), and number of large farms (500 acres or more), 6) number of farms with 100 or more days of off-farm work, and 7) rural farm population. Nonfarm sector variables include 1) number of persons in retail employment, 2) retail sales, 4) retail stores, 5) number of persons employed in manufacturing, 6) manufacturing wages, 7) manufacturing firms, 8) value added by manufacturing, and 9) unemployment.

Analysis will be based upon percentage change for each variable between 1940 and 1980. We have chosen not to examine changes in the variables for each decade, but rather the gross changes across the 40 years.

ANALYSIS

Earlier research (Korsching and Stofferahn, 1985, 1984) suggested that the aggregation effect did indeed occur in Iowa FEAs. The first step in this analysis is to examine the aggregation effect and the utility of the typology of sector vitality and support. To this end, several discriminant analyses were performed to determine whether the amount of sector support could correctly predict counties with high and low vitality for both the farm and nonfarm sectors.

Farm Sector

For the farm sector, percentage changes between 1940 and 1980 in three variables were chosen as indicators of farm vitality — number of farms, number of small farms, and average farm size. Counties were classified high or low on each indicator, depending on how they compared with the mean for all counties in an FEA on that indicator. Because the number of farms and the number of small farms declined in all counties, counties with decline less than the mean were rated on vitality. Similarly, with average farm size, counties with an increase in farm size below the mean were rated high on vitality.

Since nonfarm support for the farm sector is primarily the opportunity for additional family income through off-farm employment, the indicators chosen for nonfarm support are percentage changes, 1940 through 1980, in number of farms with 100 or more days off-farm work, manufacturing employment, manufacturing wages, manufacturing firms, value added through manufacturing, and unemployment. For these variables, counties that scored above the mean change were given a high rating on nonfarm support for the farm sector, except for the unemployment variable, which was scored the opposite. Table 12.1 presents the results of the discriminant analysis, comparing the actual classification with the classification of the discriminant function, in other words, the accuracy of the predicted classification based upon the nonfarm support variables compared with actual classification.

In all three cases, the linear combination of the farm support variables classify about 80 percent of the counties correctly on vitality. This indicates that there is a relationship between the vitality of the farm sector and the support that it receives from the nonfarm sector. Counties in which the farm sector receives strong support from the nonfarm sector tend to have a stronger farm sector, and counties in which the farm sector receives weak support have a weaker farm sector. There also are some counties that fall into the other two categories of the typology.

Nonfarm Sector

For the nonfarm sector, the three variables chosen for indicators of vitality are percentage change between 1940 and 1980 in retail employment, retail stores and

TABLE 12.1
Discriminant analysis of farm vitality by nonfarm support

a. Number of Farms (Percent Change, 1940-1980)

Actual Classification	Predicted Classification: Weak	Strong	Total
Weak	33	9	42
Strong	7	31	38

Percent classified correctly: 80%

b. Small Farms (Percent Change, 1940-1980)

Actual Classification	Predicted Classification: Weak	Strong	Total
Weak	28	9	37
Strong	7	36	43

Percent classified correctly: 80%

c. Average Farm-size (Percent Change, 1940-1980)

Actual Classification	Predicted Classification: Weak	Strong	Total
Weak	33	7	40
Strong	10	30	40

Percent classified correctly: 79%

retail sales. Counties scoring above the mean change were rated high on nonfarm sector vitality. Because much of the literature relates the vitality of rural communities

to size of farms and size of farm population, the indicators used for farm support of the nonfarm sector are rural farm population, number of farms, average farm size, number of small farms, number of medium size farms and number of large farms. Because all counties had declines in the rural farm population, number of farms, and number of small farms and an increase in average farm size, and number of medium-sized and large farms, counties scoring below the mean change were rated high on support for the nonfarm sector. Table 12.2 presents the results of the discriminant analysis, comparing the actual classification with the classification of the discriminant function.

In each case, about two-thirds of the counties are classified correctly on nonfarm vitality (retail employment, 67 percent; retail store, 68 percent; and retail sales, 69 percent). This indicates that there is also a relationship of the farm sector supporting the nonfarm sector, although not as strong. There are more counties that fall into the other categories of the typology in the nonfarm sector than in the farm sector.

Explaining Sector Vitality

To determine the significance of the discriminant functions and the amount of variation explained by the functions in classifying the farm and nonfarm vitality indicators, multiple regression analysis was used. The variables in the two discriminant functions representing support for the farm sector and support for the nonfarm sector were regressed on the respective indicators of farm and nonfarm vitality. Tables 12.3 and 12.4 present the statistics from those regressions of interest to this analysis. These are 1) the F value for the regression equation, 2) the probability of attaining an F value greater than that magnitude, and 3) the amount of variation explained in the farm or nonfarm vitality by the discriminant function (R).

Table 12.3 indicates that the discriminant functions have highly significant relationships with the farm vitality indicators. The discriminant functions are also good predictors of farm vitality. Variation explained is 32 percent for change in number of farms, 26 percent for change in average farm size and 25 percent for change in small farms.

Consistent with Table 12.2 on the classification of the counties by the discriminant function, the regressions

TABLE 12.2
Discriminant analysis of nonfarm vitality by farm support

a. Retail Employment (Percent Change, 1940-1980)

Actual Classification	Predicted Classification: Weak	Strong	Total
Weak	49	6	55
Strong	27	17	44

Percent classified correctly: 67%

b. Retail Stores (Percent Change, 1940-1980)

Actual Classification	Predicted Classification: Weak	Strong	Total
Weak	18	27	45
Strong	5	49	54

Percent classified correctly: 68%

c. Retail Sales (Percent Change, 1940-1980)

Actual Classification	Predicted Classification: Weak	Strong	Total
Weak	48	8	54
Strong	23	22	45

Percent classified correctly: 69%

of farm support on nonfarm vitality were not as significant as nonfarm support on farm vitality. The discriminant function has a significant relationship only

TABLE 12.3
Regression analysis of farm vitality by nonfarm support

Dependent Variable (Farm Vitality)	F-Value	P > F	R
Change in number of farms	5.79	.0001	.32
Change in small farms	3.98	.0017	.25
Change in average farm size	4.37	.0008	.26

TABLE 12.4
Regression analysis of nonfarm vitality by farm support

Dependent Variable (Nonfarm Vitality)	F-Value	P > F	R
Change in retail employment	1.10	.3668	.07
Change in retail sales	2.32	.0393	.13
Change in retail stores	1.55	.1710	.09

with change in retail sales, and only 13 percent of the variation was explained. One interpretation of these results is that nonfarm support is critical for maintaining the vitality of the farm sector, but farm support is not as critical in maintaining the vitality of the nonfarm sector.

Aggregation Effect

Next, to what degree is there geographic aggregation of economic activities within each FEA as suggested by Day's (1981) third hypothesis? Table 12.5 contains paired comparison t-tests between the central and noncentral counties within each FEA on the relative index of surplus workers for six basic industries for 1940 and 1980: 1) manufacturing, 2) retail and wholesale, 3) agriculture, 4) blue collar (mining, construction, and transportation), 5) service (household, domestic, recreation, and repair), and 6) white collar (finance, banking, real estate, professional and semiprofessional, and government and public services).

TABLE 12.5
T-tests of differences in means between central (C) and noncentral (NC) counties on relative surplus worker index coefficients

Industry		Mean	Min.	Max.	P
1940					
Manufacturing	C	.07	.00	.18	.00
	N/C	-.05	-.16	.00	
Retail/wholesale	C	.04	-.01	.08	.00
	N/C	-.03	-.11	.01	
Agriculture	C	-.14	-.26	.01	.00
	N/C	.12	.00	.25	
Blue collar	C	.02	-.04	.07	.00
	N/C	-.01	-.03	.04	
Service	C	.01	.00	.04	.00
	N/C	-.01	-.03	.00	
White collar	C	.00	-.13	.08	.16
	N/C	-.02	-.08	.03	
1980					
Manufacturing	C	-.09	-1.42	.09	.90
	N/C	-.11	-1.37	.04	
Retail/wholesale	C	.01	-.03	.04	.00
	N/C	-.02	-.04	.00	
Agriculture	C	-.06	-.11	-.02	.00
	N/C	.05	.00	.13	
Blue collar	C	.01	-.01	.04	.01
	N/C	-.01	-.03	.02	
Service	C	-.01	-.17	.01	.57
	N/C	-.02	-.18	.00	
White collar	C	.01	-.07	.05	.00
	N/C	-.03	-.07	.01	

The index of surplus workers measures the number of workers employed locally who are beyond what is needed to supply the goods or services of that industry to the local population (Matilla and Thompson, 1961:337). The relative

form of the index is used to allow comparisons between central and noncentral counties in each FEA. The formula for computing the relative index of surplus workers is (Matilla and Thompson, 1961:340:

$$S = \frac{e_i - \frac{e_t}{E_t} E_i}{e_t}$$

Where S represents the relative number of surplus workers in industry i; e is the local industry employment; e is the local total employment; E is the FEA industry employment; and E is the FEA total employment. The index measures the "basicness" of a particular industry to the county or group of counties. A positive coefficient indicates that the county or group of counties has a relative surplus of workers in that industry, a negative coefficient indicates that it has less than its pro-rata share of workers in that industry and a coefficient approaching zero indicates it has neither more nor less than its pro-rata share of workers in that industry. The index is a surrogate measure for "flow" data, giving some indication of providing employment for workers beyond the local community boundaries.

Table 12.5 indicates that, in 1940, there were highly significant differences in the relative number of surplus workers for all industrial categories except white-collar workers. In each significant category, the central counties had more than their share of workers and the noncentral counties had less than their share. The exception is agriculture, in which the noncentral counties had more than their share of workers and the central counties had less than their share. Thus, there is a definite aggregation effect in 1940.

Some changes occur between 1940 and 1980. The differences between central and noncentral counties in the relative surplus worker index for manufacturing and service industries are not significant in 1980, whereas the difference in white collar workers is significant. Of particular interest are the manufacturing and the agriculture categories because these are directly related to our thesis on support for the farm and nonfarm sectors. For the noncentral counties, agriculture is the only industrial activity that yields a positive coefficient and is therefore the basic industry for those counties. Although the index coefficient is larger for noncentral

counties than the central counties for manufacturing, the coefficient is negative and is significantly different. This is due primarily, not to the growth of manufacturing activity in the noncentral counties, but to the decline in manufacturing activity in some of the central counties. During the last decade, 1970-1980, some Iowa central cities actually experienced decline in the industrial sector. This is reflected in Table 12.5 by both higher maximum and lower minimum coefficients for manufacturing for the central counties. A major part of the decline is related to the old, heavy manufacturing industries that have historically been located in the central cities. Thus, the aggregation effect has been mediated somewhat by national economic trends. Never-the-less, it still is present as indicated by the significant differences in the coefficients for the other industrial sectors.

Finally, an important aspect of the Goldschmidt thesis is that there is a direct relationship between vitality of the farm sector and the quality of life of the local population, with farm vitality being defined in terms of the numbers and sizes of farms. To examine the relative contribution of farm vitality on quality of life of the local population, the three indicators of farm sector vitality (percentage change, 1940-1980, in number of farms, number of small farms, and average farm size), and the three indicators of nonfarm sector vitality (percentage change, 1940-1980, in number of retail stores, retail sales and retail employment) were regressed upon each of three indicators of quality of life--unemployment rate, median education and median income. Although these three indicators do not measure the broad spectrum of the local social fabric and institutional structure that is a part of quality of life, they do provide a general indicator of material well being.

Table 12.6 contains the three regressions. A stepwise procedure was used, forcing in a central/noncentral dummy variable first, and selecting each additional variable in turn by level of significance. The results do not support the Goldschmidt thesis. For unemployment rate the two variables significant at the .05 level that entered the equation are percentage change in number of farms and average farm size. The results indicate that counties with a greater decrease in number of farms and greater increase in average farm size had a lower level of unemployment. Similarly, the results for median education indicate that those counties with a greater decrease in the number of small farms and a greater increase in the

TABLE 12.6
Regression of farm sector and nonfarm sector vitality indicators on unemployment rate, median education, and median income

Unemployment Rate	B	F	P > F
Place	- .27	.43	.51
Number small farms	2.57	.51	.48
Number of farms	-16.06	12.94	.00
Average farm size	- 4.20	6.17	.01
Retail employment	- .57	3.42	.06

F = 3.44; df = 5,93; P > F = .01; R = .16

Median Education	B	F	P > F
Place	.15	8.16	.01
Number small farms	- .89	12.47	.00
Retail stores	1.03	19.13	.00
Retail sales	.04	.52	.47
Retail employment	.08	1.43	.23

F = 19.69; df = 5,93; P > F = .00; R = .51

Median Income	B	F	P > F
Place	- 3344.87	9.61	.00
Number small farms	12416.97	1.64	.20
Number of farms	-17766.35	2.25	.14
Average farm size	- 5646.62	1.70	.20
Retail sales	588.38	.77	.38

F = 6.04; df = 5,93; P > F = .00; R = .25

Percent change, 1940-1980
1 = Central; 0 = Noncentral

number of retail stores had a higher median education. For median income none of the vitality indicators for either sector was significant.

The regressions provide mixed results for the aggregation effect. Place (central/noncentral) is not significant as a predictor of the unemployment rate, is significant as a predictor of median level of education, and is the only significant predictor of median income, but not in the expected direction.

SUMMARY AND CONCLUSIONS

We have provided some support for the interdependence of the farm and nonfarm sectors, although the data suggest that farm sector vitality is much more dependent upon support from the nonfarm sector than nonfarm sector vitality is dependent upon support from the farm sector. This is contrary to the Goldschmidt thesis which suggests, in part, that a community of smaller farms should be supportive of the larger community and should be related to a higher quality of life in the larger community. Granted, our operationalization of the Goldschmidt thesis is not complete due primarily, to the limitations of secondary data.

Some questions might be raised about 1) the appropriateness of farm size measures as indicators of the structure of agriculture, 2) unemployment rate, median income and median education as indicators of the quality of life, and 3) Iowa as a testing ground for the Goldschmidt thesis since the structure of agriculture in Iowa is radically different from agriculture in California. In defense of our research design and analysis, application of the thesis to Iowa is appropriate. The results of Goldschmidt's research are often generalized to other geographic areas, including midwestern agriculture. But the results from this study and another study in Iowa (Korsching, 1984) indicate that we should be cautious in making generalizations from the Goldschmidt study. In relation to the indicators on the quality of life, as already discussed, they do provide some general measure of the material well-being of the population. Finally, in measuring the structure of agriculture, indicators of farm size and number of farms are useful for two reasons. First, declining farm population has been shown to be related to declining community support. Second, recent expansion in farm size

has been occurring primarily through renting or leasing of additional land rather than through purchasing land. This means a lower investment in the farm and perhaps a lower commitment to farming as an occupation and way of life, and to the local farming community.

Day's (1981) hypothesis that within a geographic area of several functional integrated communities or counties a certain degree of geographic specialization and centralization will occur, as predicted by central-place theory, received some support although the results were not all consistent. Called the aggregation effect, it suggests that, in general, a geographic area may see economic development. But whether or not any particular community or county within the area benefits depends on whether it is centrally or peripherally located relative to the economic activity within the area. The fourfold sector typology developed to classify counties on high or low sector vitality and high or low support received from the other sector proved a useful heuristic device to begin examination of the aggregation effect. Because the aggregation effect is an alternative explanation to the Goldschmidt thesis, the first step was to determine if there were differences in farm and nonfarm sector vitality across counties and to examine the factors that would explain those differences. A test for the goodness of fit between the theoretical and actual classification showed that the typology did have predictive power. But the predictive power was stronger for the farm sector than for the nonfarm sector - the first indication that the Goldschmidt thesis was not working. Farm characteristics (support) did not explain the variation in the vitality of the nonfarm sector to the degree that nonfarm characteristics (support) explained the vitality of the farm sector.

We then examined the origin of the support for the farm sector, that is, the distribution within the FEA of possible off-farm employment for the farmer and the farm family. The index of relative surplus workers was used to examine differences in industrial structures between central and noncentral counties. For the noncentral counties the predominant industrial sector was agriculture, whereas for the noncentral counties the nonagriculture industries predominated. T-tests on differences in means generally supported the differences on agricultural and nonagricultural sectors between noncentral and central counties. Nonagricultural employment tends to be available in the central counties of the FEAs, supporting the aggregation effect.

The final step was to examine the relative effects of the farm and nonfarm sector vitality indicators on the three quality of life indicators. Again, we found lack of support for the Goldschmidt thesis. As predictors of quality of life, the farm vitality indicators were as strong as the nonfarm vitality indicators, but the direction of the relationships were opposite what the Goldschmidt thesis would predict. Counties with a greater decrease in the number of farms and a greater increase in farm size were higher on the quality of life indicators.

In each of the regressions, a dummy variable was entered to control for the central/noncentral location of the county in the FEA. It was not significant for the unemployment rate, positively related to median education (central county/higher education), and negatively related to median income (central county/lower income). Although this might raise some questions about the aggregation effect, the aggregation effect does not necessarily suggest that the quality of life will be higher within the central county. All it suggests is that within an FEA, the economic activities will gravitate to and become centralized in the central place. The opportunities for a higher quality of life are also available to the surrounding counties.

Finally, from a practical standpoint, we must recognize that the factors that determine the vitality of rural communities are changing. The economic base of rural communities is becoming increasingly diversified. Even in Iowa, a state as dependent on agriculture as any state, vitality of the nonfarm sector and the quality of life of the population are not strongly related to a structure of agriculture consisting of many small farms. It may be that the many changes or adjustments in agriculture have already occurred, and that the differences that remain across communities are inconsequential in comparison with the variable impact of other sectors. In other words, with the number of farms being so small compared with 40 or 50 years ago, the few percentage point differences across counties really explain very little in the vitality of communities.

On the other hand, the role of the nonfarm sector in providing support for farming must be recognized. In Iowa, nearly 50 percent of all farm families are dependent on some financial support from off-farm work. Greater effort is needed to diversify the economies of rural communities for the well being of both the nonfarm and farm sectors.

NOTE

Journal Paper J-12321 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa, Project 2409.

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