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John K. Thomas
Texas A&M University

H. L. Goodwin Jr.
Texas A&M University

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CHANGES IN INDUSTRIAL AND OCCUPATIONAL STRUCTURES OF TEXAS COUNTIES, 1960-80[1]

John K. Thomas and H. L. Goodwin, Jr.
Department of Rural Sociology, Texas A&M University

ABSTRACT This paper identifies and examines industrial and occupational changes that have accompanied population growth in Texas. According to the 1960 U.S. Census definitions for county size, Texas counties were grouped as metropolitan, urban-nonmetropolitan, and rural-nonmetropolitan. Employment in 13 industrial and 9 occupational categories was used to measure sustenance differentiation. Industrial employment (SDI) diversified in both the sixties and seventies as nonmetropolitan counties became more structurally homogeneous. Occupational employment (SDO) decreased in operative, labor, and farmer-farm worker jobs and increased in sales, crafts, clerical, and professional-technical-kindred jobs. Additionally, in 1980 SDI and SDO were markedly less correlated than in previous years, suggesting a change in previous structural relationships between industry and occupation. Migration rates were much more highly correlated with SDI than with SDO over the 20 years.

Introduction

The importance of examining population change has been demonstrated in recent literature (Frisbie and Poston 1975; Hawley 1968; Poindexter and Clifford 1983; Sly and Tayman 1977). Rogers (1982, p. 148) points out, "Rapid growth overburdens existing community facilities and programs, creates new expectations from in-migrants, and produces a lag between new service demands and the new tax base needed to pay for expansion." Moreover, it affects patterns and participants in resource utilization (land, water, etc.), housing, decisionmaking, and social mobility (Dillman and Hobbs, 1982). Conversely, population loss involves typical patterns in which "youth leave, the average age rises, the birth rate falls, and income declines" (Beale 1974; see also Rogers 1982, p. 149). While population change is known to affect these social, service, and fiscal aspects of counties and their communities, more information is needed about its implications for economic organization. This paper examines the extent of population change and its relationship to industrial and occupational changes in Texas counties from 1960 to 1980.

Texas is one of several states that have benefited most from interreginal migration and associated intrastate growth in nonmetropolitan areas.[2] Since 1960 it has experienced a

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[1] A version of this paper was presented at the 1985 meetings of the Rural Sociological Society, August 21-24, Blacksburg, Virginia.

[2] See Heaton and Fuguitt (1980), Chalmers and Greenwood (1980), Poston (1980), and Williams and McMillen (1980) for discussions of interregional migration and population change.

48.5 percent population increase. Almost 35 percent of this increase was attributed to immigration during the past 20 years (Bowles et al. 1975).[3] While some research has been conducted on intradecade migration patterns and socioeconomic characteristics of persons migrating to and within Texas (Hwang et al. 1985; Murdock 1978), little information has been reported about the corresponding changes and structural redistribution of the Texas labor force in nonmetropolitan counties, particularly counties heavily dependent on agriculture.

Nowhere is the relationship between the industrial economy and population change so delicate as in rural agricultural areas. For example, in their examination of declining farm and ranch employment in Texas, Ladewig and Albrecht (1983, p. 40) give several reasons for the decline: New and extensive energy development; increased incidence of rural residence for part-time farming, retirement, and recreation; and relocation of industries to rural areas increased off-farm employment opportunities often created competing demands for land, water, and other natural resources critical to agricultural production. They also say that while growth in other economic sectors may help small farmers remain in agriculture, by providing off-farm employment, it reduces the level of full-time farming and employment. According to the Census of Agriculture (U.S. Bureau of the Census 1982), 57 percent of all Texas farm operators were employed off the farm 100 or more days in 1978, compared with 57 percent in 1982. As such changes occur, researchers have begun to raise questions and seek influences on and consequences of off-farm employment on family farm organization (Albrecht and Ladewig, 1982; Rodefeld 1982) and community structures (Albrecht and Murdock 1984; Coughenour and Christenson 1980; Hefferman et al. 1981; Green 1985).

In our examination, we use definitions from the 1960 U.S. Census to identify three types of counties--metropolitan, urban-nonmetropolitan, and rural-nonmetropolitan--that provide the context for change. This focus on intra-nonmetropolitan change is recent in the literature and emanates from evidence that population and economic growth may be decentralized in these areas and that rural growth rates have been faster than urban rates (Bender et al. 1985; Lichter et al. 1985; Morrison 1976; Schwarzweller 1979; Zuiches and Brown 1978). For our purposes, a metropolitan county is defined as any county which has, or is contiguous to, a county having at least one city of 50,000 or more residents. Thus, metropolitan counties were those counties located in the 1960 standard metropolitan statistical areas. An urban-nonmetropolitan county has at least one city with a population of more than 2,500 but less then 50,000. Finally, a rural-nonmetropolitan county has no town with 2,500 or more population.

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[3] Estimates by the Texas Department of Health (1980) indicated that in-migration of individuals accounted for 40 percent (n = 1,818,031) of population growth.

Ecological analyses of change

Researchers in human ecology have traditionally relied on two models to explain social change. The first emphasizes population (migration) as a response to changes in sustenance organizations-functional activities directed toward the production of goods and services (Frisbie and Poston 1976). Environment and technology influence population indirectly through organizational changes. This organizational model has been used in the work of Sly (1072), Frisbie and Poston (1975), Poston (1980), and more recently by Poindexter and Clifford (1983). The second model postulates that population change and migration are a direct response to environmental conditions and that the influences of technology and organization on population operate indirectly through their effects on the environment. Accordingly, Sly and Tayman (1977) have labeled it the environmental model.

Both models share several similarities and possible limitations in research. First, most studies using these models have focused on either metropolitan (Duncan and Lieberson 1970; Sly and Tayman 1977) or nonmetropolitan areas (Frisbie and Poston 1975; Poindexter and Clifford 1983; Sly 1972). Consequently, changes in rural organization have been overlooked or have been embedded in aggregated nonmetropolitan changes. Second, most studies have emphasized regional or national levels of analyses. Such efforts have resulted in few meaningful analyses of metropolitan and nonmetropolitan areas within particular states experiencing significant shifts of population. Finally, past ecological studies have typically delineated sustenance activities according to the labor force participation in a variety of industries and occupations. Little effort has been extended beyond identifying elements comprising sustenance organizations to determine industrially and occupationally single and multi-dimensional areas and their relationship to population change (Bender et al. 1985; Tarver 1972).

Such limitations are addressed here as it is hypothesized that trends in increasing population change and redistribution are positively associated with accompanying diversification of industrial and occupational structures of human ecological organization within different types of Texas counties. Specifically, rural-nonmetropolitan counties are expected to be the least diversified organizationally and, as they experience population growth, to be the most likely to change their sustenance organization.

Data and procedures

Data used in the analysis included population, net migration rates, and employment by industries and occupations. Population and employment data for 1960, 1970, and 1980 were obtained from the U.S. Bureau of Census, and interdecade migration rates for 1960-70 and 1970-80 were obtained from Bowles et al. (1975) and Hwang et al. (1985). It should be noted that major changes in Census Bureau classifications of occupations occurred in 1980. To adjust for these changes in classification, employment in the 1980 occupational groupings was traced backward with detailed standard industrial classification codes to the 1960 classifications. Although the majority of classification differences between 1960 and 1980 have been adjusted, some minor discrepancies may still exist.

Unlike previous studies which used multiple indicators of sustenance organization, number of individuals employed was used to identify industrial and occupational sustenance organizations. Research has consistently demonstrated level of employment to be among the most significant variables in factor analyses of organizational components (Frisbie and Poston 1976; Poindexter and Clifford 1983). Employment in the following industrial groups and subgroups was examined: 1) extractive (agriculture, forestry, mining), 2) production (manufacturing, construction), 3) utility services (transportation, communications- utilities), 4) market services (retail-wholesale, finance-insurance-real estate, business repair services), 5) professional services (public administration, education, health, other professional services), and 6) personal services (Singelman and Browning 1980; Tienda and Englert 1982). In addition, we examined nine occupational groups identified by the U.S. Census Bureau: professional and technical, managerial and administrative, sales, clerical, services, crafts, operative, farmer and farm worker, and general labor.

Change in industrial and occupational sustenance organizations was measured between decades from 1960 and 1980 for the three types of counties. The year 1960 was selected as the base year for the 20-year period. By standardizing county status (metropolitan, etc.) to 1960, the status year and base year for calculating changes in industrial and occupational employment were made to coincide.

Measurement of sustenance differentiation

Differentiation of sustenance organizations has two components. "Structural differentiation" is the number and types of industries (occupations) in a county. "Distributive differentiation" is the distribution of the employed population among the categories of industries (occupations). Minimum structural differentiation occurs when there is a single source of industrial employment in a county, such as the case in many rural-nonmetropolitan counties that are extremely dependent on agriculture (Bender et al. 1985). Maximum distributive differentiation occurs when equal numbers of a county's working population are employed in numerous industries (occupations).

Sustenance differentiation values were calculated for the industrial and occupational organization of each county in the three censal years. Although many such measures exist (Clemente 1972; Frisbie and Poston 1978), we used the formula:

$$SD = 1 - [\Sigma X^2/(\Sigma X)^2]$$

where X was the number of individuals employed in any one industry (occupation). This SD measure reflected both structural and distributive differentiation, whereas all but one of the other measures did not (Gibbs and Poston 1975). Also, it was interpretable. A minimum value of zero indicated little distribution and few categories. Maximum values depended on the number of industries (occupations) in a county (Clemente 1972; Gibbs and Poston 1975; Poston 1980).[4] The possible maximum values were .923 for industrial differentiation and .889 for occupational differentiation for any given year. Counties with no employment in some industries (occupations) had fewer categories resulting in lower possible maximum values. Comparisons of the mean SD values were conducted to determine levels of variation and homogeneity. Finally industrial and occupational sustenance differentiation were correlated with size of population for each decade and percentage net migration rates between decades.

Empirical results

Results of the analysis for the three groups of counties are reported according to patterns of population change, sustenance organization, and correlational relationships.

Patterns of population change

Population growth was pervasive in Texas counties. As shown in Table 1, rural- and urban-nonmetropolitan counties had 25 and 35 percent growth, respectively, during the 20-year period. Major changes in size of population were attributed in part to changes in net migration.[5] From 1960 to 1970, only metropolitan counties had an increase in population due to in-migration, whereas rural and

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[4] Maximum SD value can be determined by the formula:

$$MAX = 1 - 1/nc$$

where nc equals the number of industrial (occupational) categories in a county. There were a total of 13 industries and 9 occupations used.

[5] Net migration estimates for 1960-70 were calculated by Bowles et al. (1975) who used the census-survival ratios forward method with age-sex-race data for each county. Rates for 1980 were calculated similarly by Hwang, et al. (1985). These rates were then averaged for each group of counties. The use of census-survival rates to calculate net migration minimizes, if not eliminates, the effects of enumeration differences between the two decades (Hamilton and Henderson 1944; Hwang et al. 1985; Price 1953). However, it does not adjust for regional variations in the quality of enumeration. Such differences were introduced by the 1980 Census which "improved" its coverage of counties with large proportions of Hispanics (legals and illegals). Currently, demographers have not agreed on an appropriate approach to estimate net migration with this enumeration difference. In this study, no adjustments to 1970-80 migration data were made. Consequently, we expect correlations involving 1970-80 migration to be somewhat on the conservative side.

urban-nonmetropolitan counties experienced net out-migration. Rural-nonmetropolitan counties had the highest net migration loss with 9.6 per 100 people leaving these counties. From 1970 to 1980, population growth in all counties greatly increased, with significant turnarounds in migration. Rural-nonmetropolitan counties had the highest average rate, 13.1, followed by metropolitan counties with 12.3 and urban-nonmetropolitan counties with 10.8 per 100 people. Among all nonmetropolitan counties, 82 of 225 increased their populations in both decades. Of the urban-nonmetropolitan counties, 38 percent continuously increased in population, whereas 47 percent experienced growth only since 1970 and 12 percent lost population in both decades. Three percent grew during the sixties, but lost population the following decade. Overall, 97 of the 153 urban-nonmetropolitan counties increased population sizes in the seventies above their 1960 levels.

Rural nonmetropolitan (n=72) counties displayed similar patterns. Thirty-two percent had continuous population growth in both decades, 39 percent grew only during the seventies, 26 percent declined in both decades, and 3 percent gained in population size from 1960 to 1970 but declined in the seventies.

Hence, when 1960 is used as the base year, population turnaround (growth) occurred in 54 (24 percent) of the 225 nonmetropolitan counties. Although this turnaround was less pervasive than expected, 36 percent of urban and rural-nonmetropolitan counties experienced a 20-year trend of continuous increases in population size.

Industrial sustenance differentiation

Sustenance differentiation values for industrial employment are reported for each group of counties in Table 2. The means indicate the average level of industrial diversity based on employment; the standard deviations indicate the amounts of variation or dispersion among counties within each group; and the minimum and maximum values indicate the least and most diversity reported by counties. Overall, growth in industrial differentiation was prevalent in each group of counties. As expected, industrial differentiation was greatest among metropolitan counties and least among rural-nonmetropolitan counties for each of the census years. Metropolitan counties were the most homogeneous group, having the least variation in industrial differentiation. In comparison, rural-nonmetropolitan counties had the most variation, widest range of differentiation values, and greatest growth in differentiation (determined by taking the difference between 1960 and 1980 means). On closer examination, rural-nonmetropolitan counties had a high degree of differentiation, peaking in 1980. Many of these counties were near metropolitan areas and appeared to have benefited from industrial growth emanating from such areas. Counties with the least diversity in employment were located mostly in West Texas, a thinly populated area of the state.

Among specific industries, extractive (including agriculture) and personal services sectors experienced a general decline and market and professional services

Table 1. Change in size of population and average net migration in metropolitan, urban-nonmetropolitan and rural-nonmetropolitan counties in Texas, 1960-80

Type of county	1960		1970		1980	Population Change
Metropolitan						
Population	6,072,706		7,550,246		9,537,213	57.1%
Migration mean		14,705		27,606		
Migration rate		0.6%		12.3%		
Urban-nonmetropolitan						
Population	3,155,728		3,301,170		4,252,670	34.8%
Migration mean		-1,326		3,673		
Migration rate		-8.2%		10.8%		
Rural-nonmetropolitan						
Population	351,243		347,239		439,308	25.1%
Migration mean		-319		1,052		
Migration rate		-9.6%		13.1%		
State						
Population	9,579,677		11,198,655		14,229,191	48.5%
Migration number		198,353		1,438,205		
Migration rate		1.8%		11.4%		

Source: Bowles et al. 1975; Hwang et al. 1984.

increased. Moreover, production and health care services had greater increases in percentages of employment in urban-nonmetropolitan and rural-nonmetropolitan counties than in metropolitan counties. Such changes were indicated also by industrial differentiation values as they increased from 1960 to 1980, representing greater diversity of industrial employment.

Occupational sustenance differentiation

Values for occupational sustenance differentiation are also presented in Table 2. Several findings paralleled patterns observed for industrial differentiation. Metropolitan counties were most like one another in their occupational structures, whereas urban-nonmetropolitan and rural-nonmetropolitan counties varied more. Nevertheless, the variability among differentiation values tended to decrease over time as county occupational structures became more similar within each group of counties. Next, rural-nonmetropolitan counties experienced the greatest increase in occupation diversification, occurring largely after 1970. Finally, several urban-nonmetropolitan and rural-nonmetropolitan counties had highly diversified occupational structures because of their proximity to metropolitan counties and increases in industrialization and population.

Among specific occupational categories, we observed major decreases for farmer-farm worker and operative occupational categories and increases in sales, clerical, crafts and professional-technical-kindred occupations. These changes suggest the gradual evolution from an agrarian dependent, or emphasis on a single dimension of sustenance organization in urban- and rural-nonmetropolitan counties, to multi-dimensional occupational structures associated with increased industrial diversification.

Population and sustenance organization: A correlation analysis

To examine the relationships between population and sustenance organization, zero-order correlations were calculated for urban-nonmetropolitan and rural-nonmetropolitan counties over the 20-year study period. As stated previously, ecological migration theory explains changes in size of population as a response (by counties) to changes in migration rates influenced by changes in sustenance organization. Although these relationships are often reciprocal, in the actual sequence of events they are positively correlated. Findings are presented in Table 3.

Urban-nonmetropolitan counties: Correlation coefficients for these Texas counties were positive. Migration rates for each decade were moderately correlated with the succeeding decennial population size, indicating that for most urban-nonmetropolitan counties a continuous pattern of growth (or decline) prevailed from 1960 to 1980. In addition, size of population and migration rates were slightly correlated with industrial organization (SDI) and to a much lesser degree with occupational organization

Table 2. Levels of industrial and occupational sustenance differentiation in Texas Counties, 1960-80

Type and county and census year	Industrial sustenance differentiation				Occupational sustenance differentiation			
	Mean	Standard deviation	Minimum value	Maximum value	Mean	Standard deviation	Minimum value	Maximum value
Metropolitan								
1960	.864	.025	.761	.884	.866	.044	.640	.885
1970	.865	.020	.808	.890	.862	.008	.843	.882
1980	.870	.014	.828	.892	.865	.006	.848	.878
Urban-nonmetropolitan								
1960	.832	.040	.664	.890	.857	.028	.701	.885
1970	.852	.031	.735	.889	.862	.017	.765	.881
1980	.862	.022	.748	.901	.868	.011	.819	.882
Rural-nonmetropolitan								
1960	.777	.080	.448	.875	.816	.060	.552	.874
1970	.812	.072	.556	.902	.830	.074	.355	.879
1980	.829	.069	.556	.895	.850	.040	.682	.881
State								
1960	.820	.060	.448	.890	.846	.046	.552	.885
1970	.842	.049	.556	.902	.852	.044	.355	.882
1980	.854	.048	.556	.901	.863	.024	.682	.883

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Table 3. Zero-order correlations between size of population (POP), migration rate (MR), and industrial (SDI) and occupational (DSO) sustenance differentiation for urban-nonmetropolitan (n = 153) and rural-nonmetropolitan (n = 72) counties in Texas

Rural-nonmetro / Urban nonmetro	POP60	SDI60	SDO60	MR70	POP70	SDI70	SDO70	MR80	POP80	SDI80	SDO80
POP60		.255	.211	.173	.976	.190	.186	.139	.924	.178	.097
SDI60	.415		.838	.458	.296	.699	.538	.300	.277	.445	.248
SDO60	.370	.896		.340	.244	.565	.594	.174	.227	.301	.337
MR70	.310	.446	.323		.319	.375	.207	.600	.386	.337	.093
POP70	.977	.426	.375	.451		.203	.177	.211	.964	.179	.068
SDI70	.486	.872	.733	.464	.484		.749	.350	.197	.751	.515
SDO70	.403	.742	.517	.372	.393	.861		.265	.170	.540	.768
MR80	.312	.495	.396	.564	.382	.518	.441		.366	.374	.158
POP80	.901	.454	.405	.529	.954	.499	.389	.602		.192	.052
SDI80	.482	.831	.648	.473	.472	.903	.836	.476	.467		.533
SDO80	.401	.830	.694	.358	.383	.872	.795	.376	.366	.932	

(SDO). The magnitudes of their association tended to decrease over time. This suggests that variations and changes in sizes of population and the numbers of in-migrants to these counties had little correspondence with different and diversifying industrial and occupational structures.

It was shown earlier for urban-nonmetropolitan counties that both industrial and occupational structures diversified from 1960 to 1980. In the case of industry, there was a gradual, steady change in structure toward diversification as reflected by high correlations between SDI60-SDI70 and SDI70-SDI80, but less correlation for SDI60-SDI80. Occupational structure also changed over the period, with SDO60 and SDO70 being highly correlated; however, the correlation between occupational structures in 1970 and 1980 were greater. These findings indicate that the major change in occupational structure occurred during the sixties.

Relationships between industrial and occupational structures within and between dicennial years varied. For both 1960 and 1970, industrial and occupational structures were highly correlated. Deviation from the previous years appears in 1980 with respect to SDI and SDO. Correlation coefficients for industrial and occupational structures were high in 1960 (.896) and 1970 (.861), but in 1980 the magnitude of the coefficient declined (.533), indicating a dissimilarity developed between the two structures during the 1970s.

Slightly weaker relationships existed between industrial structures in 1960 and 1970 and occupational structures in subsequent years of 1970 and 1980. The same is true of the relationships for the occupational structure in 1960 and 1970 and industrial structure in subsequent years of 1970 and 1980.

Although the exact cause of structural change has not been identified, adequate information exists to make some assertions regarding it. Population change and migration rates indicate generally consistent growth from 1960 to 1980, as industrial and occupational employment increased. Population size and migration were slightly associated with employment structures, particularly industrial structures. As discussed previously, large decreases in the extractive industries and increases in professional services accounted for major changes in the 1960s. Although these changes continued during the 1970s, they were less pronounced as percentages of total employment. Among occupational structures, changes appeared as major shifts from agriculture to professional and service occupations in the 1960s and to sales, clerical, and crafts occupations in the 1970s.

Rural-nonmetropolitan counties: Results of the correlation analysis for rural-nonmetropolitan Texas counties reveal that all coefficients were positive. Migration rates were moderately correlated with succeeding decennial population size, pointing to a lesser degree of in-migration for these counties. Population size and migration rates were also moderately correlated with the industrial and occupational structures, more so here than for urban-nonmetropolitan counties. Their association was stronger in the sixties than in the seventies.

An evaluation of SDI and SDO for rural counties indicates industrial structures gradually diversified but remained similar during the 20-year period, as shown by highly correlated values of SDI60-SDI70 and SDI70-SDI80. Occupations changed over the period as well, with the major shift appearing between 1960 and 1970. Nevertheless, 1980 occupational structure was moderately similar to that in 1960, differing from the finding for urban-nonmetropolitan counties.

Also, unlike other findings for urban-nonmetropolitan counties, relationships between SDI and SDO, within and between study decades, were well defined for rural-nonmetropolitan counties. For all three periods, industrial and occupational structures were highly correlated at each decade showing a tendency toward greater similarity in 1980 than in previous years. Interstructural correlations across decades indicated strong associations between current industrial and past occupational structures, and vice versa.

Overall, it appears that while both industrial and occupational diversification occurred in rural-nonmetropolitan counties from 1960 to 1980, the two become more highly correlated over the period. From this finding and background information presented elsewhere (Thomas et al. 1984), an inference as to the relative stability of rural-nonmetropolitan counties can be made. Like urban-nonmetropolitan counties, rural-nonmetropolitan counties, while becoming structurally more diverse within and more homogeneous among themselves, appeared to diversify with positive increases in population and in-migration.

Summary and discussion

Major population, industrial, and occupational changes have occurred in many Texas counties. Although it is difficult to causally specify such changes, they were associated with each other. While populations grew steadily during the past 20 years in metropolitan counties, sizes of population in nonmetropolitan counties varied more. Nonmetropolitan counties near metropolitan areas generally experienced consistent growth, whereas others grew primarily in the 1970s or had steadily lost population since 1960.

Coinciding with changes in sizes of population were several trends in changing industrial and occupational structures. One was the continued decline of agricultural employment in most urban- and rural-nonmetropolitan counties. A second finding was the gradual emergence of different, if not broader, economic spectrums of industries and jobs. Paralleling findings reported by Bender et al. (1985) in their national study of social and economic structures of nonmetropolitan growth in production, market, and service-based industries were particularly observed in Texas nonmetropolitan counties with increases in professional, sales, and clerical occupations. Third, population size and change were more positively correlated with sustenance organization in rural- than in urban-nonmetropolitan counties. Finally, population size and migration varied more with industrial than occupational structures in all nonmetropolitan counties.

These changes in population and sustenance organization have several implications. It is evident that rural growth has significantly contributed to the total growth of nonmetropolitan counties (Lichter et al. 1985). Consequently, future ecological and demographic analyses should examine intra-nonmetropolitan changes in population and sustenance organization while controlling for metropolitan-related effects. Although such changes may be related to growth of some type, they may also involve the redistribution of employment from declining sectors to new and improving ones.

The duration and nature of these changes, their potential for reversal and instability, and the characteristics of participants are also important issues to monitor (Forstall and Engels 1984; Richter 1983). For agriculture, as farm employment and the number of farms continue to decline, the necessity for off-farm employment for farm survival becomes increasingly important. It is particularly important to determine which industrial and occupational sectors are providing secondary employment, what the consequences are for commuting patterns, and how long such employment will be used to supplement farm incomes. Also, leaders in rural- and urban-nonmetropolitan communities must anticipate and plan for growth (or decline) with adjustments in their fiscal policies, deliveries of public and utility services, and use of water and land. Differences among rural- and urban-nonmetropolitan counties suggest that leaders ought to consider alternative strategies and programs appropriate for their particular county's structural conditions (Bender et al. 1985). Finally, residents can anticipate changes in the social organization of their community and in their perceptions of the quality of life as new residents bring different expectations and values to rural areas or as long-time acquaintances have to move and seek employment elsewhere (Lovejoy and Krannich 1980).

Changes not only have occurred in the industrial and occupational structural organization of Texas counties during the past 20 years, they have partly contributed to changes within specific industrial sectors (Ladewig and Albrecht 1983; Rodefeld 1982). In this and past studies, the human ecological perspective has facilitated researchers' grappling with complex and interdependent conditions of change. However, the use of this perspective in empirical research is not widespread and methodically articulated for varying levels and areas of social organization (Micklin 1983; Sly and Tayman 1977). Clearly, more elaborated applications exist for examining structural and processual conditions in agriculture, health, and business services in urban-nonmetropolitan and rural-nonmetropolitan counties of Texas.

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