HOUSING AS AN INDICATOR OF RURAL VITALITY: THE METHODOLOGY

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Theoretical Framework

Social systems theory (Deacon & Firebaugh, 1981; Jenkins, 1983; Warren, 1978) provides a framework by which economic vitality in non-metropolitan areas can be studied. The systems approach also serves as a basis for the research objectives of this study: (1) to examine the relationships between housing and household characteristics to predict rural economic community vitality, and (2) to develop a model that includes housing and household characteristics to predict rural community vitality.

Systems theory uses the components of input, throughput, and output to explain system functioning. Inputs are various characteristics and resources available to the system, throughput is how those resources are used and processed, and output is the end product that results from the processing. In this research project, the non-metropolitan community is the system under study. Inputs include goods and services that are in demand by the citizens. Throughput includes how those goods and services are used to create a physical infrastructure, human capital, and an economic base to sustain life. The outcome – or, in systems terminology, output - is community vitality. Figure 1 illustrates how systems theory was applied to the study of community vitality in this project.

Frequently omitted from discussion of factors that affect economic vitality are housing conditions and household characteristics. Housing is a community resource that contributes greatly to quality of life and does influence overall community vitality. If

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community vitality, perceived as the output, is the success or failure of programs and policies in response to the resources and demands, then providing adequate forms and amounts of housing to meet citizen demand should lead to greater community vitality in non-metropolitan counties.

The regional housing research group hypothesized that adding housing and household characteristics to a model describing rural economic vitality would enhance the model's predictive ability. Another variable included in the predictive model is prior community vitality. In the systems approach, an important component is feedback, that is, output from one time period that becomes input for future processes that lead to future output. By including community vitality from 1980 in a predictive model of 1990, that feedback loop is completed, and the outcomes of past community-related decisions (including housing and others) become a predictor for future measures of vitality.

For several reasons, the researchers operationalized the concept of community as the non-metropolitan county. Counties are active political jurisdictions and are often the unit for economic and social integration. Rural development strategies rely on various levels of government – including the county – for implementation. The housing stock and the resource base in rural localities are impacted more by networks of communities than by any one specific community. The data essential to the analysis are limited to the county as the unit of analysis and the availability of consistent nationwide data allows for comparisons over time and between regions, thus broadening the potential scope of this study to include the entire United States not just the Midwestern region.

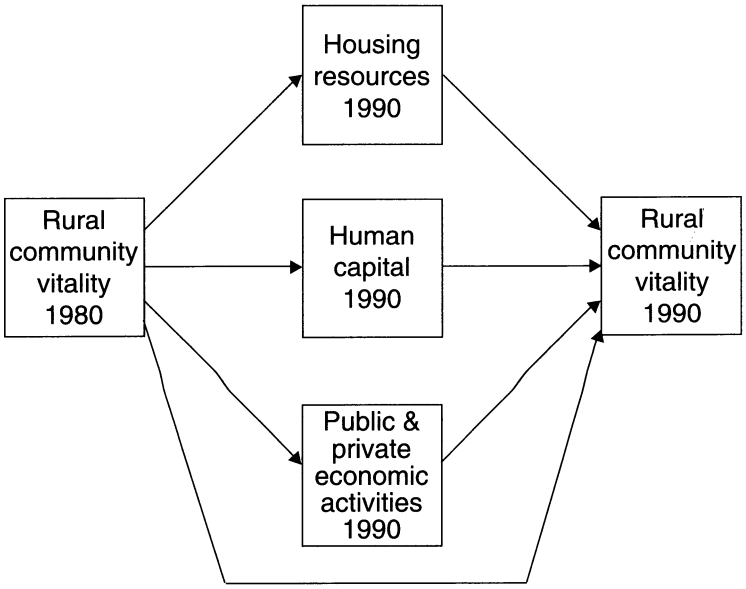

Figure 1. Systems framework model of community vitality.

Data Source

Secondary data from every non-metropolitan U.S. county were pulled from the Census Bureau's *USA Counties 1996* CD-ROM (U.S. Census Bureau, 1996). This data source was used because of the breadth of variables compiled in the data set, its ease of availability and consistency over time, and its use of a single unit of analysis, the county. The data include 5,000 variables obtained from the Census of Population, Census of Housing, County Business Patterns, County and City Data Book, and non-governmental organizations. The variables included span two decades (from before 1980 to after 1990), allowing comparisons over time both within and among counties.

The CD-ROM database is readily available from the U.S. Department of Commerce, and can be used by any county to analyze economic development needs and create rural revitalization strategies. The data are aggregate, however, and cannot be reduced to the household or town level. Because the county is the geographic unit, many rural economic development agencies favor the regional approach, basing their sub-state jurisdictions on one or more county boundaries.

Throughout the papers that follow the terms *non-metropolitan county* and *rural community* are used interchangably. Likewise, following the lead of Johnson and Beale (1994) and Meeks (1989), "rural" and "non-metropolitan" are substituted for one another, although the Census Bureau defines "rural areas" as places (incorporated or unincorporated) with fewer than 2,500 residents, as well as open country. In 1990, non-metropolitan counties contained 20.5% of the U.S. population. Of that, 24.8% lived in rural areas (U. S. Department of Agriculture, 1996).

Variable Selection

The researchers selected specific variables for this project based on a review of community revitalization and housing research literature. No one common index of community vitality was found. Vitality and how it is characterized has included various factors — retail trade (Johnson, 1982), grain delivery and diversity of services (Li & MacLean, 1989), industrial structure (Rulli & Labao, 1996), quality of life indicators including personal income, education, employment, health, and manufacturing activity (Jenkins & Konecny, 1994; Lyon, 1987; Miller, Voth, & Chapman, 1984), social network ties (O'Brien, Hassinger, Brown, & Pinkerton, 1991), distribution of public monies (Reeder, 1990), median family income (Barnes & Blevins, 1992), social, natural, and economic capital (Flower, 1997), and socioeconomic, family and health status (Jacob & Willits, 1994).

Studies have used various units of analysis as well (e.g., town, school district, county, and individual residents). Based on the variables previously found to be significant in predicting community vitality, and on housing and household characteristic variables identified from prior research, specific variables were selected from the CD-ROM for use in this study. Additionally, the research team included variables they deemed potentially significant, given the diversity of non-metropolitan counties in the states represented on the team. For example, mining industries might be operating in non-met-

Table 1. Set of 66 original variables selected to study community vitality

Variable categories and labels
Dependent variables
Rural community vitality
Economic conditions
Value of farm products sold-total-in proportion to farm and manufacturers' shipments
Per capita earnings in all industries-$000
Local government finances-direct general expenditures for education-per capita
Proportion of farm earnings-$000
Proportion of earnings in agricultural services, forestry, fisheries
Proportion of earnings in mining
Proportion of earnings in construction
Proportion of earnings in manufacturing
Proportion of earnings in transportation and public utilities
Proportion of earnings in wholesale trade
Proportion of earnings in retail trade
Proportion of earnings in finance, insurance, and real estate
Proportion of earnings in services
Proportion of earnings in government
Per capita income
Value of shipments by manufacturers in proportion to farm and manufacturers' shipments
Retail trade-sales-$000 per capita
Social conditions
Serious crimes per 100,000
Proportion of persons below poverty level
Proportion of persons 65 and over, below poverty level
Infant deaths per 1000 live births
Independent Variables
Housing resources
Housing characteristics
Proportion of vacant housing units to total housing units
Proportion of occupied housing units to total housing units
Median value of owner-occupied non-condominium housing units
Proportion of renter-occupied housing units to total occupied housing units
Median contract rent
Proportion of housing units built in previous decade to total housing units
Proportion of housing units by year built 1939 or earlier to total housing units

table 1 continued

Table 1. continued

Demographic characteristics
- Median age
- Proportion of persons less than 18 years old
- Proportion of persons 65 years and older
- Proportion of family households to total households
- Proportion of family household-female householder, no spouse present-to total households
- Proportion of nonfamily households-one person with female householder-to total households
- Persons per household
- Median family money income
- Median household money income
- Transfer payments in $000 per capita
- Dividends, interest, and rent per capita
- Population per square mile
- Proportion of non-white population
- Proportion of persons in institutional group quarters
- Proportion of persons in noninstitutional group quarters

Human capital investment

Education
- Educational attainment-high school graduate of persons 25 years old and over
- Educational attainment-bachelor's, graduate, or professional degree of persons 25 years old and over
- Local government finances-direct general expenditures for education-per capita

Health
- Nonfederal physicians active per capita
- Births per capita
- Deaths per capita

Employment
- Total labor force per capita
- Employed civilian labor force rate
- Workers who worked in county of residence per total labor force

table 1 continued

Table 1. continued

Public/private economic activities
Government investments and expenditures
Direct federal expenditures and grants per capita-$
Local government finances-general revenue per capita-$
Local government finances-direct general expenditures per capita-$
Local government finances-direct general expenditures for public welfare-$000 per capita
Economic activities
Contract construction establishments as a proportion of total establishments
Manufacturing establishments as a proportion of total establishments
Transportation and other public utilities establishments as a proportion of total establishments
Wholesale trade establishments as a proportion of total establishments
Retail trade establishments as a proportion of total establishments
Finance, insurance, and real estate establishments as a proportion of total establishments
Service establishments as a proportion of total establishments
Retail employees per total labor force

Table 2. Set of variables after factor analysis

1990 & 1980 dependent variables	1990 & 1980 independent variables
Rural community vitality	**Housing resources**
Economic conditions	**Housing characteristics**
Per capita earnings in all industries	Median value of owner-occupied housing
Proportion of farm earnings	Median contract rent
Proportion of earnings in retail trade	**Demographic characteristics**
Per capita income	Percent 65 years of age and older
Social conditions	Median household income
Proportion of persons above poverty level	**Human capital investment in education, health, and employment**
	Educational attainment
	Deaths per capita
	Total labor force per capita

ropolitan counties in one state but not in others. Finally, variables were selected only if the database included both 1990 and 1980 data for that variable.

The 66 final variables (Table 1) were grouped into seven categories; five categories were classified as inputs to community vitality (independent variables), and two were considered outputs (dependent variables). The five input categories were demographic characteristics (15 variables), housing characteristics (7 variables), human capital investment in education, health, and employment (9 variables), government investments and expenditures (4 variables), and economic activities (8 variables). The two output categories were economic conditions (17 variables) and social conditions (6 variables).

As necessary, variables were recoded into units per-capita so they could be compared across counties and over time. For example, the per-capita educational attainment level was determined by dividing the number of persons with bachelor's, graduate, or professional degrees by the number of persons 25 years and over. The total number of persons in the labor force was divided by the total population count.

Researchers then factor-analyzed four sets of data for all non-metropolitan counties in their states: 1980 input variables, 1990 input variables, 1980 output variables, and 1990 output variables. The analysis was a varimax rotation, using a minimum eigen value of 1.0, sorted at 0.5. Results from seven states were compared for those variables in each set that clustered in the first factor. The variables identified in at least four of the seven states were then compiled into a new list of variables. At this stage, the independent/input variable categories of "government investments and expenditures" and "economic activities" did not meet the criteria for inclusion.

Each state researcher then performed a reliability analysis on the four remaining sets of variables. The 24 final common variables are listed in Table 2. In the papers that follow, researchers have adapted the variable sets to reflect the special conditions and unique characteristics within their state and regional analyses. Thus, while using the same variables was tempting, it was not always prudent to do so.

Model Description

For most analyses reported in this issue, a community vitality index was developed using more than one selected dependent variable. To create an index for the dependent variable, it was necessary to convert the variables into common units. Thus, the frequency distribution of each variable was divided into deciles, with one representing the lowest rank and ten being the highest. By using more than one variable, a "score" could be used to rate the vitality of each county by summing the ranks on the variables used.

The research group's proposed index of community vitality was developed to represent the economic and social variables that were most reliable across states: (1) per capita earnings in all industries, (2) per capita income, and (3) proportion of persons above the poverty level (found in Table 2). Thus, the dependent variable, index of rural community vitality, could range from a minimum score of three to a maximum of 30.

Summary

The systems framework (Figure 1) allows for a longitudinal examination of community vitality. Today's investment in people and infrastructure will be expressed as a level of future vitality. Using variables selected from Table 2, the authors of articles in this special issue address specific considerations that officials and policy makers must consider in developing rural development and housing strategies.

References

Barnes, D., & Blevins, A. (1992). Farm structure and the economic well-being of non-metropolitan counties. *Rural Sociology, 57*(3), 333-346.

Deacon, R. E., & Firebaugh, F. M. (1981). *Family resource management*. Boston: Allyn and Bacon.

Flower, J. (1997). Beyond economics: Healthy communities and healthy economies. *National Civic Review, 86* (1), 53-59.

Jacob, S. G., & Willits, F. K. (1994). Objective and subjective indicators of community evaluation: A Pennsylvania assessment. *Social Indicators Research, 32*(2), 161-177.

Jenkins, C. (1983). Resource mobilization theory and the study of social movements. *Annual Review of Sociology, 9*, 527-553.

Jenkins, L. A., & Konecny, R. T. (1994). Creating a vitality index as an effective citizen participation tool. *Journal of the Community Development Society, 25*, 213-228.

Johnson, K. M. (1982). Organization adjustment to population change in non-metropolitan America: A longitudinal analysis of retail trade. *Social Forces, 60*, 1123-1139.

Johnson, K. M., & Beale, C. L. (1994). The recent revival of widespread population growth in non-metropolitan areas of the United States. *Rural Sociology, 59*, 655-667.

Li, P. S., & MacLean, B. D. (1989). Changes in the rural elderly population and their effects on the small town economy: The case of Saskatchewan, 1971-1986. *Rural Sociology, 54*(2), 213-226.

Lyon, L. (1987). *The community in urban society*. Chicago: Dorsey Press.

Meeks, C. B. (1989). Community development strategies for meeting rural housing needs. *Journal of the Community Development Society, 20,* 84-102.

Miller, M. K., Voth, D. E., & Chapman, D. (1984). Estimating the effects of community resource development efforts on county quality of life. *Rural Sociology, 49*(1), 37-66.

O'Brien, D. J., Hassinger, E. W., Brown, R. B., & Pinkerton, J. R. (1991). The social network of leaders in more and less viable rural communities. *Rural Sociology, 56* (4), 699-716.

Reeder, R. J. (1990). *Targeting aid to distressed rural areas: Indicators of fiscal and community well being*. (Staff Report No. AGES 9067). Washington, DC: U. S.

Department of Agriculture, Agriculture and Rural Economy Division, Economic Research Service.

Rulli, M., & Labao, L. (1996). Economic change and regional inequality. Paper presented at the American Sociological Association.

U.S. Census Bureau. (1996). *USA Counties 1996* (CD-ROM). Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration.

U.S. Department of Agriculture, Economic Research Service. (1996). What is rural? *Rural condition and trends: Rural industry issue, 7* (3), 37-39.

Warren, R. (1978). *The community in America.* Chicago: Rand McNally and Company.