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ECONOMIC DIVERSIFICATION AND THE RURAL ECONOMY: EVIDENCE FROM CONSUMER BEHAVIOR*

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The financial crisis that stressed many farms in the 1980s brought renewed attention to and a rediscovery of concern for the overall performance of rural economies and the economies of the many small towns located in the countryside (U.S.D.A. [21]; Henry, Drabenstott, and Gibson [12]). The implications of the weakened economic conditions on farms for other sectors in the rural economy are dependent on several factors: the importance of farming in the local economy, the strength of links between farming and other sectors, the viability of the general economy in the region, and other factors (Petrulis *et al.* [17]). Significant diversification occurred during the 1960s and 1970s, decoupling the performance of many rural economies from the economics of the farm sector (Carlin [5]). Rural areas in the corn belt and the northern great plains, however, still are dominated by farm dependent economies, export sensitive grain and soybean monicultures, and heavily government-subsidized farm incomes (Bender *et al.* [2]). For example, 30 of the 82 nonmetropolitan counties in Illinois are farm dependent (Sofranko and Chicoine [19]).

Several recent studies focus on the implications of the changing economics of farming for the economies of small rural communities. Mainstreet retail businesses and agribusinesses typically are separated for analyses (e.g., Stone [21], Ginder [10], Flora and Flora [9], Beck and Herr [1], Ginder, Stone, and Otto [11]).[1] Doeksen [8] presents a more comprehensive and a more analytical approach with the application of a community simulation model. Most studies, however, are general descriptive presentations.

The results of the study of the implications of farm sector performance on rural economies presented in this paper extend the

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[1]See Walzer and Schmidt [23], Scott and Johnson [18], and Hodge [13] for earlier studies of the retail trade sector of small rural communities.

analysis of the implications of the weakened condition of rural economies on the overall economic activity of small towns by presenting more detailed descriptions of economic activity and changes in economic activity organized by size of place and type of local rural economy (i.e., agriculture, manufacturing, and diversified local economies) and analyzing factors associated with the level of overall economic activity in rural communities between 500 and 20,000 in population. For this study, the economic activity of a community is measured by the total taxable sales that occur within the community during one year.[2] Descriptive data are for Illinois for 1977 and 1986. The analysis uses 1981 expenditure data.

Theory and Method

To understand and evaluate the implications of changes in farming, manufacturing, or other rural economic sectors on the retail trade sector that dominates mainstreet business in rural towns, a conceptual framework is required. One approach is to appeal to the main theme of central place theory. Although most applications of this theory intend to present a hierarchy of places within a system, the theory provides a foundation for investigating the performance of the retail trade sector of rural places.

In particular, central place theory provides a conceptual foundation for retail trade areas and the extent of a community's potential retail market size given its competitive spatial location. The traditional Losch demand cone, as presented by Nourse [16, p. 21], illustrates the impact of distance (transportation costs) on quantity demanded of consumer goods and services and, assuming constant consumer density (linear demand), the total quantity demanded at a given price.

Assume that a group of identical consumers, endowed with identical incomes (y), are faced with a choice in the consumption of two goods: a composite good (x), purchased within the community, land (l), consumed outside the community, or some combination of the two. In the consumption of the composite good, the consumer is faced with two prices: the price of the good itself (p_x) and a price associated with travelling to the community (t). The total cost of the trip depends on the distance to the community (d) (the community is located at d = 0). Allowing the rental price of land to be equal to p_l, the consumers objective problem can be stated as

[2]By defining overall economic activity as total expenditure on taxable items, an extensive set of time series data becomes readily available: sales tax receipts by community and by type of product.

(1) maximize $U(x,l)$

Subject to $p_x x + p_l l + td = y$

Intuitively, the consumer must allocate limited income between the consumption of land and the composite good such that utility is maximized.[3] The solution to equation (1) for the quantity of the composite good consumed is expressed by the derived demand function $x(p_x, p_l, t, d, y) \equiv x^*$, while the solution for land consumption is $l(p_x, p_l, t, d, y) \equiv l^*$.

Because consumers are identical, the spatial equilibrium of the region must yield identical utility levels for all consumers. The spatial variation in d, the distance traveled to the community, provides the equalizing mechanism. Consumers located closer to the community incur a lower net cost in consuming the composite good, implying $\partial x^*/\partial d < 0$. Or the further a consumer is located from the community, the lower the quantity demanded of the composite good. In order to maintain identical levels of utility, these consumers must be compensated with increased consumption of land ($\partial l^*/\partial d > 0$). This pattern is suggested in the real world by observing spatial variation in residences (measured as land) between individuals located within the community and those located in the hinterland.[4]

This formulation of the problem results in a cone-like representation of aggregate demand for the composite good. The spatial area of the base of the cone determines the spatial size of the community's market.

Assuming a Losch world of revenue maximization, the presumed objective for any community, given individual behavior as outlined by equation (1), is to maximize the total value (price times quantity) of consumer purchases (retail sales).[5] This can be expressed formally as:

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[3]One could view this model as a hybrid version of the Muth-Mills model of urban spatial structure. Conceptually the central business district (CBD) is replaced with a central shopping district (CSD). See Brueckner [4] for a detailed discussion of the Muth-Mills model of urban spatial structure.

[4]These theoretical results concur with the Muth-Mills model.

[5]An alternative objective of the community may be the maximization of real income. Given traditional consumer theory of utility maximization, the end objective of increases in income is an increase in consumption. By using a Losch objective of revenue maximization (consumer purchase maximization), not only are increases in income captured, but also the circulation of income within the community. As discussed below, the maximization of consumer purchases, however, may be achieved best through increases in income.

$$(2)\quad \max \int_0^{d^*} 2\pi d X\,(p_X, p_I, t, d, y) F(d)\,dd,$$

$X(\cdot)$ = the aggregate demand curve that aggregates individual demands along a ray originating from the origin (i.e., center of the community) in one direction;

$F(d)$ = the population density at any given distance.[6]

In application this problem reduces to maximizing the area under the Losch demand cone of central place theory.

Rural communities are faced with several policy options when optimizing the community objective function (equation (2)). By construction of the objective function, an immediate policy option is the maximization of shopping opportunities within the community. Without a sufficient level of demand to ensure minimum revenue requirements, however, expanding shopping opportunities will not guarantee the long-run optimization of equation (2). Rather, maximizing equation (2) reduces to maximizing the level of demand for community-provided goods. Given a competitive market, increases in local demand will spur increases in local shopping opportunities, thus moving toward the maximization of the community objective function.

The promotion of job growth (hence income growth (i.e., increasing y of equation (2)) and increases in local demand) appears to be a natural policy for optimizing the community objective function. Operationalizing growth traditionally has moved along two general policy lines (Killian and Hady [15]). The first suggests specialization of the local economy in a rapidly growing, but stable industry may be the preferred approach to achieving the outlined goal. The second policy suggest job growth should accrue in a diversity of industries (Brown and Pheasant [3], Carlin [5], Conroy [6, 7]). By diversifying the economic base, job stability is implied, thus yielding higher expected incomes. Categorizing communities by the nature of their economic base (specialized versus diversified), evidence supporting the appropriate policy for maximizing the community objective function may be uncovered by analyzing total sales pattern over these categories.

[6]Note that the density function need not be linear; hence, the demand cone may be of a slightly more complex form.

Data and Descriptive Evidence

Data on state retail sales tax receipts by place (community) of retail establishment were collected from the Illinois Department of Revenue for 1977, 1981, and 1986. The tax receipts were adjusted for tax base and rate changes, and expenditures on taxable purchases were computed.[7] Consumer spending was scaled to community population. This was done for the 1977 and 1986 data. Observations from 1981 were used to estimate the empirical model. Selection of 1981 allowed closer alignment with data from secondary sources.[8]

To account for inflation, the 1977 per capita expenditure data were inflated to 1986 dollars using the Consumer Price Index. Average per capita real expenditures were calculated for communities organized by population size and type of area economy.[9] The nonmetro or rural county groups used are manufacturing, diversified, and agriculture (see Bender *et al.* [2] for classification schemes). The metropolitan counties were classed as either Chicago collar or downstate metropolitan. Cook and DuPage Counties were not included in the collar county group. Including the groups of metropolitan counties allows comparisons to be made between communities of similar population in rural and urban counties.

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[7]One limitation in the calculation of consumer spending from state sales tax receipt data is the inability to account directly for the exclusion of manufacturing and farm machinery sales from the sales tax base in the early 1980s. Accordingly, the total 1986 per capita expenditures are biased downward compared to the total 1977 per capita expenditures, as the 1986 data exclude spending on machinery while spending for these items is included in the 1977 data. This should be kept in mind when making comparisons between 1977 and 1986. Accordingly, a decline in total sales may be exacerbated because 1986 observations exclude sales of machinery that are included in 1977 observations. Similarly, an increase in average per capita real sales over this time period likely will be an understatement of actual change.

[8]The primary secondary data sources are the 1980 Census and BEA collected data.

[9]A limitation of comparing 1977 total retail spending with 1986 total spending is the inability to account for population changes over this period of time. The 1986 average for places that experienced population growth between 1977 and 1986 will be overstated and the 1986 average for places that lost population will be understated. Thus, the per capita spending in the collar county communities likely is biased upward as these areas have experienced continuous population increases. The 1986 per capita spending in communities in rural counties that lost population between 1977 and 1986 will be biased downward.

Retail Expenditure Patterns By Community Size and Type of County

The average per capita expenditures on all taxable items for communities grouped by population size and type of county economy are presented in Table 1. The data are consistent with several expectations. First, per capita spending is generally higher in larger places compared to smaller places in all types of rural counties and in urban counties. The pattern is less pronounced in the collar counties than in the other areas. The average per capita retail spending in communities in both groups of urban counties was generally greater than the average per capita spending in communities in rural counties. A third general observation is that the overall general pattern of average per capita spending across communities of different size and among communities in different type counties is similar for 1977 and 1986. A final observation notes that average per capita spending is similar in communities in rural diversified counties and in communities in rural manufacturing counties. Average spending per capita is lowest in communities in rural agricultural counties.

Expenditure Trends: 1977-1986

For rural Illinois (see Table 1), per capita real spending on taxable items was $8,435 in 1977 and $6,138 in 1986, a decrease in real terms of 27.3 percent. Only the collar counties experienced a positive rate of growth of 2.7 percent. This downward trend is strongest in counties dependent on agriculture where per capita expenditure decreased by almost 37.3 percent, from $7,905 in 1977 to $4,959 in 1986. Rural manufacturing counties fared slightly better than rural diversified--real per capita expenditure declined 23.1 percent in rural manufacturing counties, opposed to a 26.5 percent decline in rural diversified counties. Changes across these groups may be explained, in part, by shifts in spending from goods to services. Goods purchased are taxed (e.g., compact discs), but service purchases are not taxed (e.g., concert tickets). If untaxed service purchases now make up a larger percentage of consumer spending than goods purchased, real per capita expenditure on taxable items would decline.

Several general observations can be made, considering the limitations of the analysis and the data. First, in 1977 (except for places under 1,000) per capita retail spending in all sizes of communities in all types of rural areas was similar to per capita retail spending in places in the collar counties and in the downstate metro counties. For all rural communities, spending exceeded spending in communities in urban

areas. The rank ordering of the types of rural counties was rural manufacturing, rural diversified, and rural agricultural.

A second observation is the small increase in per capita total real spending in the communities in the collar counties and the real decline in spending in communities in all other types of counties. Because this pattern holds for most categories of retail sales, the uncontrolled change in tax base is not the major explanation. The third general observation is that the decline in average real per capita expenditures was greatest in smaller communities and in rural agriculture counties (typically rural manufacturing counties had smaller declines than rural diversified counties).

The changes in retail spending likely are related to both cyclical changes in the rural economy, including weak conditions in agriculture, and the secular changes within the retail sector. Whatever the reason, there have been dramatic real per capita retail spending reductions in smaller towns in rural Illinois, particularly those in farming-dominated local economies. One obvious conclusion that emerges from the descriptive evidence is that the retail trade sector (mainstreet businesses) of smaller communities in rural Illinois is scaled down considerably compared to a decade ago.

Evidence from the Empirical Model

Additional insight into the implications of economic restructuring in rural areas for the economic activity of smaller rural communities is provided by the estimation of the community economic activity model. The data used are from a sample of rural communities in Illinois between 500 and 20,000 in population (n=395). The observations on expenditures were from 1981.

The Empirical Model

The empirical specification of the community objective function (equation (2)) amounts to formulating an approximation of the aggregate demand function. This formulation of the problem defines the area under the demand cone as the dollar value of total sales. Total sales, or expenditures, are assumed in this study to be proportional to community income (INC), potential trade area captures (TAC), proximity to a metropolitan area (SMSA), the structure of the rural economy where the community is located (ECON), and a vector of socioeconomic variables.[10]

[10]The price of land is assumed to vary within, but not across, communities. If the price gradient for land is consistently lower in any one community, consumers could increase utility by migrating to that

INC is measured as the total personal income of the community. Trade area captured (TAC) measures the absolute size of the community's market in terms of customer equivalents. Both INC and TAC are hypothesized to be positively related to total sales activity.[11] SMSA is a dummy variable equal to one if the community is located in a county adjacent to metropolitan area, zero otherwise.[12] This variable is included to account for spatial competition from larger markets with diversified shopping opportunities. The presence of spatial competition should shift market activity away from the community.

Two socioeconomic variables are used in the analysis: the percentage of the community's population over 65 years of age (OLD) and the percentage of families within the community with a poverty status (POOR). The aged, as a group, tend to be less mobile and are more likely to shop in the local community (Walzer and Schmidt [23]). Thus, a higher proportion of aged should be positively related to a community's market activity. A higher proportion of community's population falling within poverty status should lower local demand, hence lower local market activity.

The measure of economic structure (ECON), which serves as an index of diversification for this study, is similar to measures frequently used in studies of industrial organization (Stigler [20]). Here, the economic structure of any given community is assumed to mirror the

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community. In equilibrium, consumers must have identical utility within and across communities. Thus, in equilibrium, the land price gradient must be identical across all communities. A similar argument applies to the price of the composite good. Because prices (gradients) are constant across communities, they fall from the reduced form of the model.

[11]TAC for the ith community is calculated as:

$$TAC_i = SALES_i / (PCST(PCINCC_i/PCINCT))$$

where

$SALES_i$ = the sales tax receipts for the ith community
PCST = per capita sales tax receipts for all rural communities contained in the study
$PCINCC_i$ = the per capita income for the ith community, and
PCINCT = the per capita income for all rural communities contained in the study.

Implicit in this formulation is the assumption that tastes and preferences are constant across all study communities.

[12]Lack of detailed data for the sample of Illinois communities prevents the construction of a more specific measure of spatial competition.

economic structure of the county where a community is located. The measure of economic structure, or diversification, is computed as

$$ECON = \sum_i (X_i * \log(1/X_i))$$

where

X_i = the ith industry's share of local income generation.

BEA income data by sector are employed, yielding a total of 14 categories, thus i=1, . . . ,14. The more evenly distributed the sources of income, the lower the index. Given 14 sectors, the index is equal to zero for a perfectly specialized economy and 2.64 for an economy that exhibits a perfect distribution of income sources (i.e., the sources of total income are evenly distributed over the 14 sectors).

Policy recommendations can be inferred from the sign of the estimated coefficient associated with the measure of diversification. For example, a positive coefficient suggests that a more even distribution of income source (i.e., a diversified economy) is associated with higher levels of total expenditure. In terms of the community objective function, a positive coefficient implies that economic diversification will move toward maximizing the objective function.

An additional variable to specifically assess the linkage between agriculture and the level of retail sales activity in rural communities is included. The variable, FARM, is the proportion of total income in the county where a community is located derived from agriculture. If the estimated coefficient on FARM is positive, then local trade activities will be enhanced and some development goals may be achieved by policies, such as farm price support programs, that increase farm income, other things equal. A negative coefficient would suggest agriculture sector policies may not be effective development tools. The model is estimated using ordinary least squares.

Empirical Results

The estimated coefficients of the empirical model are presented in Table 2. All variables are in natural logs; the individual coefficients can be interpreted as elasticities. Tests for homoscedasticity of the error structure for the complete model suggest that heteroscedasticity is present (Breusch-Pagan-Godfrey test: $\chi^2 = 65.75$ with six degrees of freedom; Harvey test: $\chi^2 = 43.73$ with six degrees of freedom). To

avoid basing policy suggestions on asymptotically invalid test statistics, White's [24] least squares covariance matrix estimator is used.

In all four specifications of the empirical model, the estimated coefficients on INC and TAC possess the signs as hypothesized. A 10 percent increase in the total income of the community results in a 3.8 percent increase in local market activity. Similarly, a 10 percent increase in the total population of the market served (TAC) results in a 7.8 percent increase in local market activity. A larger elderly population is associated with higher levels of local market activity, implying that older persons tend to spend monies locally. As expected, higher levels of poverty are associated with lower overall local market activity. Surprisingly, the dummy variable designed to capture spatial competition is not significantly different from zero. The poor performance of this variable may be due to the oversimplification of the measure.

The relative share of total income derived from farming is not related to the overall level of local market activity in a statistical sense. This result suggests that shifting the local economic base from agriculture may or may not increase local market activity.

The primary variable of interest, the measure of economic diversification (ECON), suggests that local economies that can be characterized as diversified generally are associated with higher levels of local market activity.[13] A 10 percent increase in the measure of diversification results in a 6 percent increase in market activity. This result is consistent with the descriptive evidence on economic activity in small communities in rural Illinois counties.

Summary and Policy Implications

This research examines the economic vitality of rural communities in Illinois. A simple theoretical model of economic activity in rural communities is developed and estimated. By measuring economic activity as expenditure on taxable items, conclusions may be inferred concerning the optimal structure of the local economy. Both descriptive and analytical evidence is provided.

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[13]One potential reason for diversified areas to have higher overall expenditure levels than more specialized areas, *ceteris paribus*, may be enhanced expectations on the part of the consumers in these areas. If consumers expect diversification to introduce stability into income, total expenditure may be higher in any given year via a permanent income type hypothesis. In particular, consumers may not expect their future incomes to be substantially lower than current income, due to diversification; thus, there is no need to increase current rates of savings (hence decrease expenditure levels) to support future purchases.

All rural areas appear to have performed relatively poorly compared to urban areas. For example, 1977 real expenditure per capita in all communities in rural counties was comparable to the level of expenditure in places in the collar counties and the downstate urban counties (the level of expenditure in communities in rural agriculture counties was 89 percent of the level recorded in communities in downstate metro counties). In 1986 per capita expenditure had dropped the most in smaller rural communities and in all communities in rural agriculture counties (the level of 1986 spending in communities in rural agriculture counties was 69 percent of the level in communities in downstate metro counties).

Drawing from central place theory, a theoretical model of economic activity is developed and estimated with observations from a sample of small rural Illinois communities. The results suggest economic activity is stronger in rural areas with diversified income sources. This empirical conclusion supports development policies that seek to attract and foster a diversity of economic activities and not concentrate on activities in one or two sectors. The results of the empirical model cannot address the issue of a declining farm sector on local economies. The descriptive evidence, however, suggests that farm-dependent economies may be declining at greater rate than nonfarm-dependent economies.

Two general policy recommendations can be drawn based on these analyses. The first suggests that farm support programs may not be a suitable mechanism for enhancing local economic activity, as measured by expenditure on taxable items. Income transfer schemes targeting farmers directly, however, may prove beneficial through the income effect identified by the model. The benefits of such a scheme would be realized regardless of the recipient (e.g., Social Security transfers). Second, diversification as opposed to specialization may be the optimal overall policy in terms of maximizing economic activity.

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Table 1
Average Per Capita Retail Sales Estimates for Taxable Transactions for 1977 and 1986 (in 1986 $)

Size of Place	Collar Counties	Downstate Metro	Rural Manufacturing	Rural Diversified	Rural Agriculture	All Rural
			1977 - Total Retail Sales			
< 1,000	4,454.48	6,682.55	4,536.72	4,571.34	4,734.29	4,620.36
1,000 -2,499	7,074.24	5,267.66	6,784.21	5,756.68	6,809.26	6,464.84
2,500 - 4,999	8,279.56	4,838.45	6,736.57	7,743.94	10,121.67	8,249.62
5,000 - 9,999	6,214.85	5,961.04	9,267.28	9,915.86	9,761.11	9,705.37
10,000 - 24,999	7,785.21	8,989.26	10,284.24	10,285.40	8,996.83	10,159.53
25,000 - 49,999	4,688.86	8,711.48	9,920.43	10,129.83	--	9,953.26
≥ 50,000	9,013.99	10,928.35	--	--	--	--
All Places	7,528.71	8,866.69	8,667.34	8,511.77	7,905.95	8,435.89
			1986 - Total Retail Sales			
< 1,000	4,382.19	5,748.52	2,407.78	2,599.90	1,969.68	2,342.51
1,000 - 2,499	5,077.37	4,356.18	4,256.67	3,588.67	3,535.27	3,763.81
2,500 - 4,999	10,304.36	4,184.08	5,318.96	5,004.77	6,608.92	5,694.85
5,000 - 9,999	7,400.63	4,609.35	7,603.90	7,660.49	7,392.29	7,580.92
10,000 - 24,999	9,424.52	8,085.55	8,902.15	8,130.86	6,928.27	8,312.04
25,000 - 49,999	5,974.62	7,757.95	7,441.66	8,785.49	--	7,593.50
≥ 50,000	7,086.83	8,017.85	--	--	--	--
All Places	7,734.28	7,143.14	6,668.46	6,258.47	4,959.63	6,138.25

Table 2
Estimates Coefficients of the Community Demand Model [a]

	Model A	Model B	Model C	Model D
INC	.3821 (14.11)*	.3821 (14.12)*	.3802 (22.59)*	.3801 (14.15)*
TAC	.7835 (41.12)*	.7834 (41.27)*	.7841 (65.56)*	.7839 (41.53)*
OLD	.1692 (4.74)*	.1680 (4.90)*	.1730 (5.55)*	.1710 (5.01)*
POOR	-.0634 (3.56)*	-.0643 (3.67)*	-.0674 (3.73)*	-.0694 (4.16)
ECON	.6031 (8.76)*	.6043 (8.79)*	.6115 (13.36)*	.6148 (9.09)*
SMSA	.0044 (0.20)	--	.0085 (0.41)	--
FARM	.0115 (1.12)	.0120 (1.20)	--	--
adj R2	.9834	.9835	.9834	.9835

a All variables are in logs. The numbers in parentheses are the absolute value of the t statistics
* Significant at the .05 level