PROCEEDINGS

45th Annual Meeting

WESTERN AGRICULTURAL ECONOMICS ASSOCIATION

Logan, Utah
July 23, 24, 25, 1972

Samuel H. Logan, Editor

# CHALLENGES AHEAD IN RURAL DEVELOPMENT

Chairman: Ralph A. Loomis, U.S. Department of Agriculture

## THE RURAL TOWN AND THE SCALE QUESTION*

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Interest in explicit policies to influence the location of jobs and people continues to rise, partly because a long term concern with rural area development has periodically been abetted by more sharply focused concerns, including depressed regions, large city ghetto concentrations, and urban environmental conditions. This paper is offered in the belief that economists can contribute to population distribution policy, first by providing better understanding of the future course of population distribution and second by quantifying effects on goals of policies which influence population distribution.

### City Size

City size analysis has varied from noting statistical regularities such as the rank-size rule, to city hierarchy hypotheses, to input-output and other multiplier techniques explaining effects of exogenous changes. A neglected question important to understanding the future is: how do demand and supply cause multipliers to change? In a study not reported here, John Gardner estimates simple multipliers as the ratio of total employment to that component which is judged to be export based. These multipliers reveal that larger centers have a greater complement of local services, indicating they serve the population not only of the immediate area, but of surrounding counties. The pattern is becoming more pronounced over time. Multipliers for all counties have tended to increase, and the largest increases occurred in counties with already large multipliers. The general increase in local multipliers appears to result from rising real income accompanied by high income elasticity of demand for local goods and little increase in productivity in local goods industries. The larger multiplier increase for larger centers implies further centralization of local service industries with resultant relative decline in small rural centers.

### Rural Towns

Residents of a small town may be separated into the following groups: (1) institutional residents, (2) manufacturing employees and their families, (3) town residents directly dependent on serving the farm population, and (4) the local service community. The number of institutional residents and manufacturing employees was taken to be exogenous to the town. The farm community that surrounds the rural town, also assumed to be exogenous, will demand services that differ from the usual concept employed in defining the local service industries. These townsmen receive farm produce and provide specialized services and equipment to farmers. The remaining town residents provide local goods and services to the above three groups.

The town population may be represented as:

(1) $P = INST + MANF + DFP + (LS_I)\ (INST) + (LS_M)\ (MANF) + (LS_D)\ (DFP)$ where

P = non-farm rural population (the town)

INST = institutional residents

MANF = manufacturing employees and their families

DFP = town residents dependent upon the farm population

$LS_I$ = number of local service residents added to the town per unit increase in population of sector i

A hypothesis is that the number of town residents depends on the surrounding farm

population and other farm related variables:

$$DFP = f(FP, Other)$$

where FP denotes farm population surrounding the town. Substituting a linear form into (1) gives

(2) $$P = INST + MANF + (LS_I)\ (INST) + (LS_M)\ (MANF) + (1+LS_D)\ (\alpha_F FP+\alpha_0 Other)$$

The exogenous institutional and manufacturing population of the town may be subtracted from both sides of (2) to obtain that part of the population which is endogenous or dependent on the various exogenous components:

(3) $EP = (LS_I)\ (INST) + (LS_M)\ (MANF) + \alpha_F(1+LS_D)FP + \alpha_0(1+LS_D)$ Other where EP refers to the endogenous population which is in a town as a result of the exogenous components of population.

The increase $LS_D$ in local service population per unit increase in population serving the surrounding farm population occurs in a multiplicative term with other parameters. It can be estimated by making the assumption that a good estimate is provided by the average value of the other two local service coefficients:

(4) $$LS_D = \frac{LS_I + LS_M}{2}.$$

From a regression of the form, $EP = \alpha + \beta_I$ INST + $\beta_M$ MANF + $\beta_F FP = \beta_0$Other, one can estimate the local service coefficients. The coefficient for farm population $\beta_F$ is composed of two parts as seen in equation (3). One part, $\alpha_F$, reflects the number of town residents who directly serve the farm community. A priori, it would be expected that since only a partial complement of local services is demanded by farmers, this value would be less than the value of a full local service multiplier. The second component of the farm population's coefficient, $1 + LS_D$, corresponds to the usual concept of a local multiplier. The $\beta_F$ coefficient then is the multiplicative result of $\beta_F$ and $1 + LS_D$ which may be separated as follows. Since $\beta_F = (1 +LS_D)\alpha_F$,

(5) $$\alpha_F = \frac{\beta_F}{1 + LS_D}.$$

Using the assumption of equation (4), equation (5) indicates that $\alpha_F$ may be estimated by dividing the regression coefficient of farm population by the average of the coefficients of the institutional population and manufacturing population, i.e. $\alpha_F = \beta_F/[1 + (\beta_I+\beta_M)/2]$. The $\alpha_0$ coefficients of the "Other" variables explaining the town population directly dependent on the farm population can be estimated similarly as $\alpha_0 = \beta_0/[1 = (\beta_I + \beta_M)/2]$.

Preliminary investigations were directed towards specifying the form of the relationship between DFP and farm population. Other factors which were also considered were the average distance to a large trading center and the amount of automotive transportation available to farmers. The following hypotheses were formulated:

1. Distance. The measure of distance employed was highway miles from the county seat to the nearest functional economic area (FEA).[1] The farm population demands a variety of goods, some of the usual household items and some goods specific to farming. In terms of providing household items, entertainment, and other leisure time activities, the rural towns will be in competition with larger and presumably more diverse centers. The nearer a farmer is to the large center (thereby saving transportation costs in dollars and time), the more likely the diversity (more goods available and a savings in search costs) of the larger center will occasion the bypassing of the rural town. This implies the hypothesis that the greater the distance from farmer to large center, the larger the rural town size. An opposing force may diminish the above effect. Suburbanization of an urban center may displace population into the nearby rural towns. These persons have not been included in the hypothesized

distribution of town population and therefore may be picked up in the distance coefficient. This latter effect could be tested if one assumes that the larger the center's population, the greater the suburban population. A positive relationship between urban center population and rural town size would then be found.

2. Automobiles. The measure used was the number of farmer-owned automobiles per farm. As the number of autos increases, the transportation costs in terms of time falls and hence the rural town is more likely to be bypassed. Thus the greater the number of automobiles per farm, the lower is expected to be the rural town population.

## Results

Observations used in the regressions consisted of a selection of approximately 30 counties each in Colorado, Idaho, Kansas, and North Dakota. The main criterion for inclusion of a county was that it not be part of an SMSA. The analysis was applied to the nonfarm rural population of each county. The nonfarm rural population comprises all nonfarm residents who do not live in towns of more than 2,500 farms. The variable has the disadvantage of including persons who live in places too small to be bonafide towns and also includes some open country residents. However, regressions were also run using an alternative definition that eliminated residents of unincorporated places of size less than 1,000 persons, and no significantly different results were found.

Preliminary regressions were run for each state in recent decades that included all variables suggested by the foregoing hypotheses. The results from the preliminary regressions follow.

The coefficient of farm population was positive as expected in all cases and was significant at the 5 percent level in all but one case.

Generally, the coefficient of distance to larger center was positive as expected, but not significant. Part of the distance hypothesis proposed a counter force based upon suburbanization. Since suburbanization should increase the size of nearby rural towns, an expected relation is that the rural town will be bigger. the bigger is the nearest large trading center. This was not confirmed, as the estimated coefficient of size of larger center was very insignificant and slightly negative on average.

The hypothesis about automobiles was confirmed in the testing. The automobile coefficients were negative as expected in all cases except two nonsignificant cases. Almost all of the negative coefficients were significant. A Beta coefficient test indicated that farm population made a larger contribution to the explanation of the variance in the dependent variable, suggesting that the advent of the auto while contributory has not been the major cause of the decline in rural town population.

Tests were also made concerning the effects of farmers' income, the composition of farm output, and the value of a farm, but in none of the above cases were statistically significant results found. Substituting the above mentioned variables into the general formulation (equation (3)) yielded the final regression form:

$$(6) \qquad EP = \alpha + \beta_I \, INST + \beta_M \, MANF + \beta_F \, FP + \beta_A \, AUTO + \beta_D \, DIST$$

where $\beta_I$ and $\beta_M$ are local service coefficients for institutional residents and manufacturing population. $\beta_F$ is the estimated coefficient that reflects the multiplicative effect of first, farmers on town population and second, the local goods sector which serves these townsmen. The results from final regressions of this form are presented below. The averages of the coefficients for the four states in 1950, 1960, and 1970 are as follows:

| | |
|---|---|
| Institutional Population, $\beta_I$ | 2.6 |
| Manufacturing Population, $\beta_M$ | 1.9[2/] |
| Farm Population, $\beta_F$ | .46 |

Autos per Farm, $\beta_A$ -1297.

The coefficients of institutional and manufacturing population suggest local multipliers of the general order of magnitude found in previous studies. As expected, the coefficient of farm population is smaller in view of the less direct way in which farmers affect the town. Applying the logic of equation (4), the estimate of the local service coefficient $LS_D$ for townspeople serving farmers is the average of the coefficients for the institutional and manufacturing population, or $LS_D$ is estimated as $(\beta_I + \beta_M)/2$:

$$LS_D = (2.6 + 1.9)/2 = 2.25 .$$

The estimate $\alpha_F$ of the direct effect of the farm population, as indicated in equation (5) is the regression coefficient for farm population divided by the local service multiplier or $\beta_F/ (1 = LS_D)$: $\alpha_F = \frac{.46}{1 + 2.25} = .14$ . Similarly, the direct dependence coefficient may be found for automobiles: $\alpha_A + \frac{\beta_A}{1 + LS_D} = \frac{-1297}{1 + 2.25} = -399$. This means, if every farm family obtains one more auto, 399 town people who were dependent on the farmer would not be required, and the total reduction in town population would be 1297 residents. Finally, for a decrease of 100 farm residents, the services of 14 townsmen who were dependent on the farmers would not be required, and the total town population would fall by 46 persons.

The individual equations for each state are presented in Table 1. In Colorado a dummy variable was used for the institutional population in 1960 due to a very small number of institutional residents in most counties (the median number was 17). The value 1 was given to those counties with 25 residents or more, and 0 to counties with 24 or fewer residents. The expected sign is therefore positive. The completed 1970 Censuses of Population and Agriculture were not available for use of the automobile variable for 1970.

Table 1. Regression Coefficients for State Equations

| | Farm Population | Autos Per Farm | Manufacturing Population | Institutional Population | Dummy | $R^2$ |
|---|---|---|---|---|---|---|
| Colorado | | | | | | |
| 1950 | .40* | -616 | 2.4* | | | .84 |
| 1960 | .75* | -758 | 1.3 | | 761 | .89 |
| Kansas | | | | | | |
| 1950 | .42 | -464 | 2.4* | | | .46 |
| 1960 | .47* | -4693 | 1.5* | .87* | | .80 |
| 1970 | .42 | | 1.0 | .76* | | .64 |
| N. Dakota | | | | | | |
| 1950 | .54* | -3232 | 13.6* | | | .60 |
| 1960 | .56* | -2364 | 5.4 | 1.6 | | .55 |
| 1970 | .81* | 167 | .4 | 3.6 | | .56 |
| Idaho | | | | | | |
| 1950 | .38* | -2450 | .4 | | | .56 |
| 1960 | .11 | 2734 | 1.8* | 2.3 | | .80 |
| 1970 | .24 | | 2.4* | 6.5 | | .83 |

*Coefficients significant at the 5 percent level

As a final step, the distance variable was included in the regressions. It had a positive sign in five of six cases tested but was never near significance. The estimation generally suggests that the major influences on rural town population in terms of statistical significance are manufacturing, the surrounding farm population, and institutional residents, while the automobile's influence is less strong but consistently negative.

A test was made of whether the local service multipliers have changed over time (1950-

1970). The individual sector's multipliers may be combined by a weighting scheme to yield a single multiplier that can be compared to the multipliers reported earlier. The averages of the four states for three census years are 1.7 (1950), 2.4 (1960), 1.7 (1970)[3], or excluding the 1960 North Dakota manufacturing multiplier, the averages are 1.7, 1.5, and 1.7 in the same respective years. This finding represents an independent confirmation that the local service multiplier has not increased over time for small rural towns.

What is the future of rural towns? As just noted, the results indicate stability of multipliers for small towns over time. If one assumes the recent coefficients hold and then extrapolates the trend of the independent variables, future growth rates may be projected. A trend was taken of each independent variable based on data from 1940 through 1970, and the value was extrapolated to 1980. The insertion of these values into an equation using the estimated multipliers then gives projected average rural town population for each state for 1980. The projected percentage growth for 1970 to 1980 is: North Dakota -13 percent, Colorado -8 percent , Idaho +2 percent, and Kansas +2 percent. In North Dakota and Colorado the predicted decline in farm population is great, resulting in a net decline in rural town population. In Idaho and Kansas, the increase of small town manufacturing dominates and results in the expectation of a slight increase in town population over the next 10 years. Note that the average multiplier for farm population (.46) is approximately one-fourth that of manufacturing (1.9). Therefore, a decline of four farm residents can be offset by an increase of only one person in manufacturing and a constant rural town population will then be maintained.

## Ramifications of Policies Affecting Town Sizes

The goals affected by population distribution policies include national income, the distribution of income, and integration among others. The present discussion will be limited to a group of difficult income effects, namely, economies and diseconomies of city scale.

Economies of scale are widely agreed to be the most important reason for the existence of cities, and yet they remain difficult to analyze. The total cost curve for a city is the sum of costs for locally produced outputs consumed in the city and outputs produced for export. It is commonly observed that economies of scale occur in small towns in the production of locally consumed outputs, e.g. local public services, retailing, utilities, transportation. While locally consumed outputs have been the focus of most concern with city economies of scale, economies in export goods production and their relation to economies of scale for a city are beginning to receive more attention. Individual export industries will face differing conditions of economies or diseconomies of scale.

Economies of scale are eventually offset by diseconomies at different city sizes depending on numerous cost conditions. Resource-oriented industries using heavy natural inputs are subject to diminishing returns in a location because of rising supply curves of the inputs. Market-oriented industries producing relatively heavy outputs will exhibit some tendency to go where population goes. At the same time they are likely to use heavy inputs and be drawn to suppliers also. Cost curves in a location will eventually rise due to having to reach further for markets and to bid higher for input supplies. Labor-oriented industries will seek out low cost labor pools and eventually encounter rising costs as more and more of the low cost labor in a location is hired.

Many economies and diseconomies go beyond any one industry. Incentives to save on transport costs lead to tendencies for suppliers and customers for intermediate products at all stages of production to locate together. The facts that one supplying industry has many customer industries and that customer industry has many supplying industries leads to a compounding of effects.

Eventually helping offset the economies of scale is the major diseconomy suggested by urban theory, namely, increased housing and commuting costs as city size increases. These costs make the wage necessary to attract labor rise with city size. There is a wage multiplier effect because the rise in labor costs raises prices of local goods, further raising the wage necessary to attract labor by a multiple of the original labor cost rise [2, 4]. The increase in wages with city size leads to incentives for industry to locate elsewhere.

The economies and diseconomies of scale discussed so far can be expected to be

to be reflected fairly effectively in market decisions. They involve so-called pecuniary effects. If these were the only sources of economies and diseconomies, there would be a presumption that market decisions take account of economies and diseconomies to maximize contribution to national income. Population distribution policies altering city sizes could be expected unequivocally to incur national income costs.

However, the most complex economies and diseconomies remain to be considered. Most of the economies discussed so far explain differences in the position of cost curves among locations. These reasons for cost differences should be distinguished from downward movements along a cost curve in a particular location as output expands. Utility and transportation services are examples of intermediate inputs which, due to indivisibilities, may exhibit downward slope of cost curve to extremely large city sizes. How the pricing of these outputs affects national income via city size effects, and what prices should be to give incentive to maximize national income, are not completely solved questions. A usual idea is that marginal cost pricing should be followed. Yet, with marginal cost pricing, the output could fall short of covering its total costs. The method of financing giving greatest gain may be one where the price faced by persons deciding whether to live in the town equals marginal cost, with losses covered either out of national revenues or by site taxes in the town in question. Site taxes are on land only and not on buildings, and thus are not the same as traditional property taxes. Local reliance on property taxes probably goes only a fraction of the way in meeting the suggested way of covering losses, since buildings are typically a larger component of total property value than is land. Present methods of financing local services may impart a tendency for the services to be priced above marginal cost indicating an unrealized source of gains from expanding a town which has not yet exhausted the scale economies for the services.[4/]

A similar pricing problem arises due to increasing division of labor as a city expands. Specialization in tasks can lower the costs of performing them, providing the demand is great enought to exhaust the initial economies of scale in specializing. Examples of specialization increasing with city size are found in retailing, services, and inputs for industry. There is a size of market at which a given specialization just becomes profitable, e.g. selling pianos, but at that point there is room for only one piano store. A further doubling of size of market is likely to be needed to make it profitable for a second piano store to operate. For any town or city, there are some specializing firms having little local competition and hence facing downward sloping demand curves. Their monopoly or oligopoly position is limited by nonspecializing firms or alternative supply sources out of town, e.g. one can order a piano by mail or travel to other places to buy it. Whether cities are seriously undersized as a result of the imperfect competition remains to be investigated empirically.

Another reason for slope in the aggregate cost curve of a city is that actions of one firm may shift the production functions for other firms. Technical terms for this type of effect are technological externalities or public goods and bads. As an example, an increase in density will reduce transport costs within the city, if the gains from reduced delivery distances are not offset by congestion costs. This effect is an externality. As a town grows, land prices are bid up giving incentives to increase the density of land use, and an indirect result is that delivery and pickup times involved in providing various private and public services are reduced. The change in density will act as a production shifter changing the amount of services that can be supplied for a given amount of inputs.

The disucssion has brought out three different cost curve phenomena. One is the increase in commuting costs due to greater distance to work as a city grows, mentioned above as the major reason suggested by urban theory for diseconomies of city size. In the absence of congestion, the higher wage necessary to attract workers from places where access to work is cheaper reflects the diseconomy due to greater commuting distances with no particular reason to expect any external effect of adding workers to a city not reflected in the market cost of labor.

A second cost phenomenon, mentioned above in connection with the supply of public and private services, is economies of scale due to indivisibilities. Such economies of scale result in declining costs for initial increments of output which are eventually exhausted, leading to what has been called the sideways J cost curve. Other than pricing problem already discussed, they do not appear to raise problems about market performance.

The third cost phenomenon is the one mentioned in connection with density. It leads to cost reductions with growth of a town but, rather than being an economy of scale due to indivisibilities, is an externality whereby the actions of some shift production functions of others. In the case of density, the delivery and pickup services whose costs are affected are not necessarily to and from the center of town. They are costs of any daily route activity such as transporting pupils, performing garbage pickup, and delivering goods to residences and stores scattered about the town. The economy comes from the fact that, with greater density, less travel costs are incurred between units served so that more services can be performed per unit of travel cost inputs. In an earlier paper 5/ it was estimated that growth of population of a city of one million by 1 percent would reduce costs of total output of the city by .01 percent due to the induced increase in density. An extra worker coming to the city would then add about 1 percent more to total product than indicated by his market wage. Possibly for small towns the density effect on costs is pronounced, but becomes less pronounced at larger city sizes when density is so high that travel cost between stops has fallen to a small fraction of total costs.

Another example of external economies arises from the advantages to firms of being in labor markets with a wide variety of persons to draw upon. Larger labor markets make it possible to better match people and tasks. When a person leaves a job, there is likely to be less vacancy time until a good replacement is found. A firm added to an area increases the size of the local labor market enabling more people to live and work there. The resulting labor market improvements are production function shifters for all firms The firm deciding to locate in the town will typically have little or no awareness of the benefits conferred on other firms.

Communications lead to similar external economies. In a place where there are similar firms, having many suppliers and customers, information about purchases and sales is more readily available than in isolated places. This information advantage may lead a firm to locate where there are already similar firms. The benefit is greater than it appears to the individual firm, because the information network is enlarged redounding to the benefit of firms already in the area.

Restaurants, sports, and theater are sometimes cited as reflecting advantages of cities. These can be viewed as the result of greater division of labor on the product side made possible with expanding city size. As Barton Smith indicates, the local demand curve rises as city size increases so a portion of the demand curve comes to lie above the downward sloping average cost curve for a product. The rise in demand curve makes it possible to cover costs leading firms to form to produce products previously unprofitable. New products lead to the pricing problems considered in the earlier discussion of division of labor, but as noted there, potential competition limits the effects.

A further issue is raised by variety per se: Does simply having a wider array of products to choose from increase satisfactions? If so, there is an external effect for which producers of a new product are not compensated. Usual demand analysis throws no light on the question since it assumes a fixed number of commodities available. A hypothesis is that the effect of variety per se exists but has quantitatively minor externality effects, since the products themselves and not the potential for choosing among them are most likely the major source of satisfaction.

To extend the discussion in a previous paper [5], of several unpriced effects differing between small town and city which may be characterized as general milieu (e.g., sights, friends, civic atmosphere), note that tastes are not the same among people as to whether small town over big city milieu is preferred. If growth of a city is fed by rural to urban migration, as in the United States in the past, it seems likely that a diseconomy will be involved. On the other hand, with increases in communication leading to greater homogeneity in life styles as between rural and urban areas, the extent of diseconomy is probably declining.

The externalities considered to this point all accrue locally in the town experiencing growth. A national externality is implied by the hypothesis that increased city size leads to greater innovation. A production function for innovations should contain as explanatory variables research inputs deliberately devoted to innovations allowing for research scale factors (e.g., size of universities and research projects) and considerations not specific

to the innovations. A hypothesis raised by some apparently is that production functions for innovations will be shifted by the nonspecific considerations as cities grow, so that there are external economies. The importance of this effect remains moot at the present time.

Congestion, pollution, and other environmental effects, which have a tendency to be greater in large cities, detract from income in ways not fully taken account of in market behavior. For this reason, they may lead to gains from policies directing growth away from larger centers. These effects have been the focus of rather extensive recent research. As one example of the results, it has been estimated that environmental externalities reduce the product of extra labor employed in an SMSA the size of Chicago 5 to 10 percent below the product of the labor indicated by its market wage.6/

To summarize: density, labor markets, communications, product variety, and innovations lead to external economies. General milieu appears to lead to external diseconomies at the present time. The environmental effects of cities are external diseconomies.

A hypothesis is that external economies are gradually exhaused as city size increases. Meanwhile, the environmental diseconomies are notably lacking in small towns and rise progressively with increasing city size. These indications suggest that external effects make small towns too small and large cities too large.

FOOTNOTES

*/ A longer version with full empirical results is available as Urban Economics Report No. 82, The Univeristy of Chicago.

1/ A functional economic area is an urban area that serves the surrounding area that serves the surrounding area much as an SMSA does but there is no minimum population requirement. For further information, see [1].

2/ 1.9 is the average excluding the 1950 North Dakota coefficient (13.6); inclusive of that coefficient the average is 2.9.

3/ Again, the 1950 average multiplier excludes the 1950 North Dakota coefficient; the average is 4.7 including it.

4/ Discussions with Barton Smith led to these views on financing services and contributed more generally to the analysis of economies of scale in this paper.

5/ See [3].

6/ See [3, 5]. In a forthcoming Resources for the Future study, Irving Hoch considers the environmental implications of city size in a spirit similar to the two studies just referred to. The Hoch study examines a wider variety of evidence on environmental differences between cities but is less concerned with making quantitative estimates of their effects on national income.

REFERENCES

1. Berry, Brian, Metropolitan Area Definition: A Re-Evaluation of Concept and Statistical Practice, Working Paper 28, U.S. Dept of Comm., 1969.

2. Izraeli, O., "Differentials in Nominal Income and Prices Between Cities," Urban Econ. Reot No. 71, The Un. of Chicago, 1972.

3. "National Growth Policy and the Environmental Effects of Cities" The Un. of Chicago, Urban Econ. Rept No. 73, September, 1972.

4. Tolley, G.S., "Economic Policy Toward City Bigness," Proceedings of the Comm. on Urban Econ., Cambridge, Mass., September, 1969.

5. Tolley, G.S., "Population Distribution Policy," Proceedings of Conference on Public Policy Education, Custer, South Dakota, 1971.

# THE RURAL TOWN AND THE SCALE QUESTION: DISCUSSION

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In writing either technical or popular English, the connective and is used to connect items of equal weight or items with equal capacities in qualification. This connective appears in the title of the Haurin-Tolley paper. It appears that the connective is used to inform the reader that two themes of equal importance are to be considered in the text of the paper. Unfortunately, the two are never well integrated. Haurin and Tolley have prepared two papers -- each deserving separate treatment. They will be separated in this discussion.

## The Rural Town

The rural town is a perplexing and presupposing artifact of the contemporary American economic scene. It has been written about, researched, praised, and damned. It has been the focal point of dispositions of hope and of despair. Regardless of the vantage point, one pervasive thread has wound its way around the small town: Why is it the size that it is? The answer to this question is often thought to be obvious -- perhaps so obvious that few have attempted to give the question empiric content. Haurin and Tolley are to be strongly commended for their efforts in explaining town size.

Their approach is novel: a town reaches a particular size because people depend on the town to buy and sell goods and services. If this is taken as true, the ordinary techniques used in market analysis can be applied. The present analysis uses measures of (or proxies for) income, distance, concentration, and technology as variables helping to explain the portion of nonfarm population that is directly dependent on (and exists in place because of) the farm population. The dependent farm population is then incorporated into a larger scheme including non-agricultural activities. The larger scheme is a model used to explain the nonfarm (town) population of rural counties in several states. It is possible but not fruitful to quibble over inclusion or exclusion of particular variables. It may be fruitful to examine the way in which Haurin and Tolley use employment multipliers in their model.

Since the employment multiplier was popularized by Homer Hoyt in the mid-1930's, it has become a useful tool in describing the working of a local -- small or large -- economy. Although once supposed to be relatively constant, the employment multiplier has proven to be a changing but not wildly erratic ratio describing the relationship between employment in one sector of an economy and total employment in that economy. Haurin and Tolley use a modified multiplier -- one that relates the number of local service residents to the number of basic sector residents -- through their first paper. Three somewhat serious problems surrounding these multipliers could have a bearing on the arguments presented in the paper.

1. The 1960 multipliers were larger than 1950 multipliers in most towns and the largest increases during the 1950-to-1960 period were sustained by the larger towns. This is taken as an indication of increasing centralization. An alternative explanation can be advanced. If employment in the export-based industry is dropping and, at the same time, total employment drops by less than the decrease in basic employment times the original multiplier, the employment multiplier can continue to increase even in the face of drastic reductions in total economic activity. Far from indicating centralization, this interpretation indicates inflexibility or immobility on the parts of local service-oriented job holders. The authors of the paper are to be faulted for not demonstrating change in size of towns in connection with their multipliers.

2. In small areas, large amounts of excess capacity coupled with few opportunities for people and capital in the service industries may make multipliers unresponsive to changes in the surrounding territory. As people move in, all economic indicators except the multipliers may increase while excess capacity is absorbed. As people move out,

employment multipliers may remain stable or increase because of immobilities. This problem casts doubt on the predictive capacities one can attach to this tool. This problem is particularly severe in the very small areas -- perhaps in those of less than 1,000 population which Haurin and Tolley understandably omit from their analysis.

3. The service-oriented portion of the local population was divided into sub-populations -- each related to a particular basic industry. Such a division may be appropriate, but in smaller centers one is tempted to wonder if there isn't a high degree of complementarity among clientele groups and if it is truly revealing to divide the service-related populations into those dependent upon the institutional population, those dependent upon the manufacturing population, and those dependent upon the farm population. This problem becomes particularly severe with the admission that the local resident multiplier for the surrounding farm population is assumed to be the average of the more readily ascertainable multipliers for the institutional and manufacturing sectors. The authors of the paper themselves provide arguments why this should not be so but fail to consider size of farm and composition of output per farm as ways of determining the differential that must exist among multipliers.

In spite of these problems in connection with use of employment and local service resident multipliers and in spite of some difficulties the authors experienced in fitting their regression equation, they are to be commended for getting involved in an area that might appropriately be entitled "The External Effects of Changes in the Structure of Agriculture". We have long known that the economic structures of towns related to extractive industries have had to undergo considerable change as the extractive industries themselves replaced labor with capital or as the exploitable resource base diminished in quantity or quality. This work is a suitable step in gaining real understanding of the connection.

## The Scale Question
## (Ramifications of Policies Affecting Town Sizes)

The second paper reads like an encyclopedia. Any number of themes related to causes of scale effects in cities are mentioned, but they are never integrated into a single message. Not too surprisingly, the basic causes for scale effects in cities and towns appear to be the same or at least similar to the causes of scale effects in multi-product firms. Indivisibilities, labor pools, distance, and management each have their effects.

The truly attractive parts of the second paper are four-fold. First is the problem of financing public goods. Regardless of whether a public good is being provided on the downward sloping or upward sloping portion of its cost curve, serious problems arise in connection with pricing. Marginal cost pricing -- long a goal for economists -- has its limitations since such a practice may not generate sufficient revenue to pay total costs. Average cost pricing -- which by definition will cover total costs -- may not be practical if the demand curve for the good lies below the cost curve. In this event, subsidies of one sort or another must be arranged. Haurin and Tolley correctly suggest that the choice of subsidization plans may affect city size and the distribution of population, but they incorrectly, I think, suggest that the "...unresolved issue becomes that [method of financing] that will result in the greater national income." In an era placing so much emphasis on environmental quality and in an era suggesting that some environmental ills can be solved or at least moderated by reducing our steadfast reliance on growth, the maximization of national income may not be the appropriate criterion for choice of methods of financing public goods.

A second problem opened by the authors relates to congestion costs. The argument here is cast in terms of time, distance, and transportation. Of equal interest should be the relationship between firms, industries, and congestion. Firms producing highly specialized products and services cluster together to take advantage of pools of specialized labor and so they can watch one another. Automobiles are built in Detroit, airplanes are built in Wichita, and books are published in New York, It may be in the firm's best interest to impose high costs on its employees and on others in metropolitan areas. The timeless schism between the welfare of the firm and the welfare of its employees should provide numerous lines of fruitful study. This is especially true in an economy characterized by disturbingly high levels of unemployment and highly skilled labor that, by acquir-

ing extremely sophisticated skills, has likely reduced its mobility. To be employed at all, the book editor must follow his firm to New York even though he himself despises that metropolitan area.

Third is the question of option demand. The idea of option demand crept into the literature of economics in the decade of the 1960's through investigations surrounding recreation and the natural world. Once it became embedded in the literature, the idea of paying for options or paying for maintaining a range of choice began to be applied to non-natural attributes of life and living. An everyday example is the yearning for the central place simply because "there are so many things to see and do."[1/] The conclusion that a wide array of options has quantitatively minor external effects is disturbing. It is true that the effects may be minor with respect to total employment, aggregate income, and other conventional indexes of economic performance. Option demand may, however, have rather significant effects on the distribution of people, on the distribution of economic activity, and on the cost structure of individual firms be they public or private. As the population chooses to devote substantial quantities of funds and resources to the preservation of a wide range of options, economists may find this to be an area of growing importance.

Finally, the authors' comments about migration and a community's milieu are disturbing. The comments are admittedly based on the supposition that people tend to prefer the type of place they are accustomed to. If this were so, surveys among college students would not show that nearly 100 percent of them would not return to their rural home towns even if jobs in their chosen profession were waiting for them. Similarly, the remote parts of the Pacific Northwest and Northern Lake States would not be filling with city-bred families. The Haurin-Tolley statement needs qualification. It may be true that those who are forced to make the rural-to-urban transfer will find adjustment difficult and may experience personal diseconomies while simultaneously conferring public diseconomies on the recipient area. It may also be true that in the rush toward decentralization, those employed by firms moving to small or intermediate-sized cities may allow the recipient area to enjoy some considerable reduction in the cost of existing services such as streets, sewage disposal, and city government. However, if the new reisdents wish to maintain a part of their former milieu -- if they do prefer their accustomed surroundings -- they may impose on the recipient community new requirements for social overhead capital in the form of (perhaps) libraries, higher quality schools, more police protection, and a symphony orchestra. The net effect of the opposing forces is presently unknown, but knowledge of it would be of extreme interest to towns that have succeeded in convincing a footloose industry that it should join the local economy.

Remarks on these four points are somewhat limited but do provide what may be useful and researchable questions. The other scale-related items in the original paper have equally curious themes surrounding them but can generally be approached in a fairly conventional fashion. The weakness of the second paper is in its lack of integration and lack of speculation regarding the possible net effects of the several scale-related themes. This has to become an important problem as the rather universal centripetal forces exerting pressures toward centralization begin to be offset by or begin to conflict with the growing problems of congestion, cost of public goods, and environmental quality.

In sum, the two papers are interesting and provocative. They have the capacity to tickle the fancy of researchers who want to inquire into a wide range of aggregate problems -- population distribution, migration, environmental quality, etc. -- or of researchers who want to study questions related to individual aspects of population shifts or costs of individual public functions.

It may well be, though, that the major contribution of the entire work is found in the first paragraph. In its tortured history, the small town has been hero and villian. Haurin and Tolley point out that as the mood of society changes, the actual role and the desired role of the small town must change, too. In the early 1960's, a benevolent nation sought to help depressed areas and re-constitute these areas as small industrial areas. By late in the decade, a frustrated society tried to revitalize small towns so as to shut off the century-long pattern of migration from rural areas to urban ghettos. Now in the early 1970's, an angry urban nation is seeking to disperse its populations into small towns so that many natural amenities can be recovered and so that existing man-made

amenities will not be destroyed. As the disposition of society has changed, the envisioned role of the rural town or area has changed, and any research related to rural areas must reflect these different dispositions. Any researcher directing his activities toward rural towns and areas must be a truly flexible and inventive worker if he is to make a reasonable positive contribution to a vastly growing literature.

## FOOTNOTES

1/ Because of the authors' decision to write two independent papers, they minimize the importance of income and automobiles on rural residents' desires to seek variety. The small town may be by-passed simply to gratify the rural residents' need to see high buildings and bright lights. The connection needs pursuit.