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NATURAL AMENITIES, TOURISM AND INCOME DISTRIBUTION

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Abstract: Understanding the distributional mechanisms of aggregate amenity-led economic growth is a necessary prerequisite to informed rural tourism planning. This applied study develops an empirical county-level model for the US lake states that incorporates five alternative natural amenity types and other growth variables to explain the distribution of income as measured by Gini coefficients. Results suggest that certain types of natural amenities are clearly related to the distribution of income. This extends earlier work which hypothesized that amenity-based development creates a "hollowing out" of the income classes. Analyses of tourism impacts from the sole standpoint of employment and income growth neglect to account for key components of rural development structure. **Keywords:** income distribution, new growth theory, amenity-led development, tourism planning. © 2004 Elsevier Ltd. All rights reserved.

Résumé: Agréments naturels, tourisme et la distribution des revenus. Il faut d'abord comprendre les mécanismes de distribution de la croissance économique totale dérivant des agréments naturels avant de procéder à la planification bien informée du tourisme rural. Cette étude appliquée développe un modèle empirique au niveau du comté pour les états de la région des grands lacs nord-américains. Ce modèle comprend cinq sortes d'agréments naturels et d'autres variables de croissance pour expliquer la distribution des revenus mesurée par des coefficients de Gini. Les résultats indiquent que certaines sortes d'agréments naturels sont clairement liées à la distribution des revenus. Cela porte plus loin les recherches précédentes qui avançaient l'hypothèse que le développement basé sur des agréments crée un « creusage » des classes économiques. Les analyses des impacts du tourisme du seul point de vue des emplois et de la croissance des revenus ne tiennent pas compte des éléments-clés de la structure du développement rural. **Mots-clés:** distribution des revenus, théorie de la croissance nouvelle, développement basé sur des agréments, planification du tourisme. © 2004 Elsevier Ltd. All rights reserved.

INTRODUCTION

While many rural communities are experiencing depopulation and economic decline, others are experiencing rapid in-migration and

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significant economic growth. The importance of natural amenities in explaining rural growth patterns is becoming widely accepted within the rural development literature (Isserman 2001; OECD 1999; Power 1988). Both descriptive analysis (McGranahan 1999) and more advanced statistical modeling approaches (Deller, Tsai, Marcouiller and English 2001) have consistently found that rural areas endowed with natural and built amenities—such as scenic beauty, recreational sites, and tourism attributes—experience higher rates of economic growth than the US average.

These findings of economic growth differentials reflect important transitional stages of rural economies. Taken at face value, the empirical work suggests that amenity-rich communities without extensive development should strategically pursue mass tourism for rapid aggregate economic growth. For planning and public policy, this boosterism inference runs counter to those who argue that tourism development is inferior to traditional modes of economic growth, because of the predominance of low-wage employment opportunities in these businesses and because of class issues associated with service type jobs (Ashworth 1992; Hall 2000; Marcouiller 1997; Rothman 1998; Smith 1989; Williams and Shaw 1988). In sum, growing concern over such reliance focuses on the unequal distribution of benefits and on the tendency for tourism to create a "hollowing out" of the income distribution (Leatherman and Marcouiller 1996, 1999; Wagner 1997). The policy analysis dilemma is that aggregate measures of economic growth mask key development characteristics of rural regions.

There is a strong need for empirical work that focuses on specific indicators of development rather than on simplistic and myopic measures of economic growth, such as changes in employment and aggregate income levels. Studies that address issues of distributional implications, transitions in economic structure, and the role of technology offer a clearer focus on regional development indicators. In particular, looking at growth without assessing distributional effects of change overlooks the strong developmental trend of increased intraregional income inequality. Indeed, assessing the distributional aspects of economic growth provides the real-world problem set of how tourism and other amenity-driven developments affect the lives and livelihoods of rural populations.

Rising American income inequality has been widely reported in two general dimensions. The first dimension of inequality is disparity among regions, especially the persistent income gaps between urban and rural economies (Hansen 1995; Renkow 1996). The second dimension is a trend of an aggregate increase in family income inequality regardless of geographic location. The long-term trend of income inequality (as measured using a Gini coefficient) in the United States is shown in Figure 1. The Gini coefficient is based on the Lorenz curve that shows the relationship between the cumulative percentage of total income within an economy and the cumulative percentage of income received when units are arranged in ascending order according to income. The Gini coefficient ranges from 0, indi-

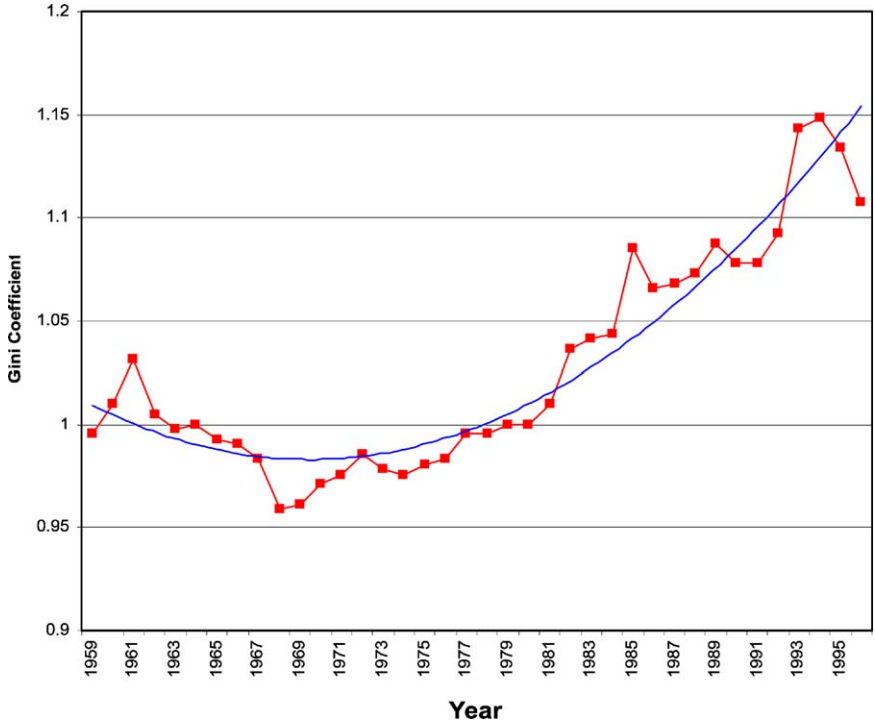

Figure 1. Family Income Distribution in the United States (indexed 1979 = 1)

cating perfect equality, to 1, indicating perfect inequality. In reference to Figure 1, it is important to note that income inequality for US family income, measured by the Gini coefficient, has persistently risen from 0.35 in 1970 to 0.365 in 1980, and from 0.396 in 1990 to 0.44 in 1997 (Cline 1997; Karoly 1996; Morrill 2000; Weicher 1997; Weiner and Monto 1998).

Several factors help explain income distribution both among and within regions. The research reported here explores two thematic areas relevant to the distribution of income: the distributional role of tourism development and its closely related basis in natural amenity resources. Other studies have suggested and applied several methods to measure the distributional consequences of development alternatives, including tourism (Alavalapati and Adamowicz 2000; Kottke 1988; Wagner 1997; Zhou, Yanagida, Chakravorty and Leung 1997). Studies to date, however, have yet to address the explanatory elements of income distribution that involve spatial relationships between natural and built amenities supporting tourism.

Although significant work has helped to understand the elements associated with developmental impacts in their aggregate, tourism remains rather ill-defined and non-standardized. This is particularly true in rural regions. This general dearth of usable definitions limits regional analysis. Given its poorly defined nature, a more generic and

concisely tractable set of regional characteristics is needed. One critical component that serves as the basis for producing tourism is a region's natural and built amenity base.

Theoretically, natural (and other forms of) amenities can be thought of as motivators for regional migration, tourism demand structure, and a foundation for regional quality-of-life attributes (Power 1988). From the standpoint of economic growth theory, amenities can be considered as latent regional factor inputs to the local production of goods and services (Marcouiller 1998). Growth theory, (according to the latter source) suggests that the extent and distribution of wealth are dependent upon a region's endowment of both tangible factor inputs (land, labor and capital; also commonly referred to as primary factor resources) and more latent factor inputs (such as an amenity base and publicly provided goods and services). Within rural areas, traditional growth engines have focused on allocating tangible factor inputs in such a way that output from resource extraction and from forward linked manufacturing processes are maximized. Increasingly, the joint resource production dilemma focuses on use of the more latent amenity aspects of natural resources for their role in producing tourism.

Although economically latent, the regional incidence of amenities as a factor input can be measured and incorporated within explanatory models. Standardized definitions of natural amenities vary widely, offered mostly in an ad-hoc fashion. For example, Nord and Cromartie (1997) focused on climatic characteristics; McGranahan (1999) referred to climate, topography, and water area; and Isserman (2001) included natural areas, outdoor recreation, broad vistas, and peaceful sunsets. Natural amenities can be region-specific characteristics directly associated with land and water resources. Typically, they involve aesthetics associated with forests and open space, water (lakes, rivers, and coastline), topography (mountains, canyons, and hills), and climate (Marcouiller, Clendenning and Kedzior 2002).

Only recently have efforts been made to evaluate empirically the effects of natural amenities on economic development. Early studies examined their location-specific effects on housing location decisions and individual welfare. Graves (1979, 1980, 1983) and Knapp and Graves (1989) found these effects (such as climate) were significant in explaining population migration. Roback (1982) showed that local amenities affected land prices as well as local wages and housing rents. Roback (1988) also noted that differences in them generated both wage and rent differentials across regions, and that these differences implied that some people might enjoy local amenities at the expense of higher rents and lower wages. Porell (1982) showed that both economic and amenity factors were important determinants of migration. Hoehn, Berger and Blomquist (1987) discovered statistical differences in housing prices and wages due to location-specific effects. These early studies, however, measured amenities mainly as factors of climate (sunshine, precipitation, humidity, or heating/cooling days), urban conditions (crime rates, school quality, or congestion), and environmental qualities (the level of particulates, visibility,

water pollution discharges, landfill waste amounts, or the number of hazardous waste sites). Again, and of importance to this research, there is a general dearth of literature that makes the connection between natural and built amenities, tourism, and the distribution of income.

Understanding the relationship between amenities, tourism, and income distribution in rural planning has relevance in economic, social, and environmental dimensions. As infrastructure and technology reduce the economic effects of geographic distance, sense of place with respect to work and pleasure increasingly focuses on the presence of amenities and on the reliance on tourism as an economic mainstay of local communities. The economic transformation of traditional rural communities represents key challenges to development planning. As rural development takes place, amenities are transformed, tourism grows, community structure is altered, and social class is affected by both the generation of wealth and its distribution.

NATURAL AMENITIES AND INCOME DISTRIBUTION

Acknowledging the importance of economic growth is a precursor to more comprehensive assessments of development. Indeed, many consider economic growth to be a necessary, but insufficient determinant of development. The distributional aspects of growth are meaningful in assessing the developmental impacts of change. This is particularly true for strategies like tourism and amenity-based migration that some studies suggest present hollowing-out effects on income distribution. Thus, the empirical problem addressed is quite straightforward: how are regional amenities and tourism structure related to the distribution of income?

Study Methods

Analytically, the models developed for this research have been built upon new growth theory (sometimes referred to as endogenous growth theory). This focuses on the importance of economies of scale, agglomeration effects, and knowledge spillovers and suggests that "economic growth tends to be faster in areas that have a relatively large stock of capital, a highly educated population, and an economic environment favorable to the accumulation of knowledge" (Button 1998:146). A contribution of the research reported in this article is the extension of Button's notion of regional "capital" stock to include natural amenity endowments. Extensions of new growth theory suggest that cumulative causation effects of market forces cause the concentration of capital, labor, and outputs in some regions at the expense of other regions, so that unbalanced regional development is self-reinforcing rather than self-correcting.

Concepts of growth theory are not new. Myrdal was among the first to suggest cumulative causation as a hypothesis to predict regional income divergence in the 50s. He argued that "the play of forces in

the market normally tends to increase, rather than to decrease, the inequality between regions" (1957:26). Others have argued that the principle of cumulative causation refers to increasing returns to scale that may favor the rich regions and restrain development in the poor regions (Kaldor 1970; Richardson 1973), with new growth theory indicating the possibility of divergent regional development patterns and income inequalities (Button 1998; Krugman 1991, 1999; Martin and Sunley 1998). It explains long-term regional growth rates and suggests that income distribution is determined by ownership and return to factor resources.

A key feature of new growth theory is technological innovation that is the outcome of purposive and profit-seeking behavior on the part of firms. By allowing for incompletely competitive markets and increasing returns to scale in technology, innovators can and do earn short-term monopolistic rents. Because firms can capture these by investing in new technologies or innovation, the depreciation of capital accumulation can be offset, and steady-state economic growth can be internalized in the economy (Aghion and Howitt 1998; Barro 2000; Grossman and Helpman 1994). According to new growth theory, the role of government is rather limited. In addition to providing public goods (among which amenities are often classified), government is responsible for clearly delineating and enforcing private property rights. In the situation of common-pool resources, government develops rules for allocating use. The theory rests upon clearly stated "rules of the game". But once specified, market mechanisms are encouraged to drive allocation of scarce resources.

One of the major themes of new growth models is their emphasis on human capital (Ehrlich 1990). However, there is agreement that investment in human capital (accumulation) alone is not a sufficient condition to induce local economic development (Stough 1998; Temple 1999). New growth models tend to underestimate the potentials of lagging regions and communities to produce growth through their lower cost advantages or through their specific endowments of natural resources. It is widely recognized that the so-called "rural renaissance" of the 70s was possible due to cheap land, low-cost infrastructure, and low-cost labor in rural regions (Flora and Christenson 1991). In addition, new discoveries of coal or oil reserves have historically led lagging areas to economic growth (Suarez-Villa and Cuadrado Roura 1993).

Natural resources have been a source of both raw material and value added in many regions. Increasingly, the amenity characteristics of natural resources are being accepted as important growth determinants for regions well-endowed with such amenities (Deller et al 2001; English, Marcouiller and Cordell 2000; McGranahan 1999). Isserman (2001) viewed natural amenities in rural America as a source of competitive advantages that could create new economic opportunities in the 21st century.

In this applied study, natural amenities are assumed to serve as an alternative and additional growth engine providing substantial economic opportunities for some regions. Specifically, these can play a

role as a latent primary factor input to the tourism and recreation sector. Although they can contribute to generating jobs, these may be seasonal, temporary, part-time, and low skilled. Newly generated income is supplemental and may not be equitably distributed. In addition to stimulating tourism development, natural assets act to provide an attraction for amenity-based migrants, many of whom are highly educated, mobile, and dependent on technology.

These models seek to explain growth rates as a function of human capital formation and other significant engines while controlling for economic structure. The focus of the research reported here is an analogous variant of this logic with primary interest focused on changes in the distribution of income. Specifically, the study used this model to construct tests for the extent to which growth engines (natural amenities and sociodemographic components) explain the change in income distribution (as measured by the Gini coefficient). A decline in the Gini coefficient over time represents a flattening of the income distribution (evenly spread). Specifically, the model can be represented as follows:

$$\text{Change Model}: \ \Delta\text{Gini}_i = \beta_0 + \beta_1 \Delta E_i^k + \beta_2 \Delta G_i^m + \beta_3 A_i^n + \varepsilon_i \tag{1}$$

where β represents the coefficients to be estimated, Δ is change between 1980 and 1990. Control is maintained by E which represents a vector (k) of economic structure variables that include the index of manufacturing employment, retail/service employment, tourism employment, and diversity indices, respectively or together. Growth engines (G) are shown by a vector (m) of new growth variables that include the index of population density, education, and expenditure variables, respectively or together. The amenity-based growth engine (A) is represented by a vector (n) of natural amenity group variables that include land, river, lake, warm-weather-based, and cold-weather-based amenity variables. Given the biophysical nature of most natural amenities, the model relies on a static amenity base. The sample consists of 242 counties ($i = 1, \ldots, 242$) located in the US lake states of Minnesota, Wisconsin, and Michigan. The error term ε is treated as both well-behaved and as spatially autocorrelated.

The latter element of spatially autocorrelated errors requires a brief discussion. Natural amenity attributes are not randomly located; they are usually clustered and as such should not be treated as random variables in classical linear models. The spatial autocorrelation of natural amenities is implicit. The spatial error model (SEM) is suggested as a technique to incorporate the spatial autocorrelation of natural amenities through the error term (Anselin and Bera 1998; Doreian 1980; LeSage 1997; Loftin and Ward 1983). An SEM can be formulated in matrix notation as follows:

$$y = X\beta + u \tag{2}$$

$$u = \rho W u + \varepsilon \tag{3}$$

where the $(n \times 1)$ vector y contains cross-sectional observations on the dependent variable, the $(n \times p)$ matrix X contains observations

on a set of $(p-1)$ explanatory variables β, u is a $(n \times 1)$ vector of error terms that are spatially autocorrelated, ε is the uncorrelated $(n \times 1)$ error vector with $N(0, \sigma^2 I)$, and the scalar ρ is the $(n \times 1)$ vector of the spatial autoregressive coefficient to be estimated. An SEM includes a $(n \times n)$ positive and symmetric spatial weights matrix W. The spatial weight matrix is often expressed as a first-order contiguity matrix for incorporating the values of variables in adjacent geographic areas. The elements w_{ij} of W are 1 when county i and j are defined as neighbors and 0 when they are not neighbors (for a discussion of an alternative weights matrix, see Anselin and Bera 1998; Bailey and Gatrell 1995; Cliff and Ord 1973; LeSage 1997).

When errors are spatially autocorrelated, the problem with using ordinary least squares (OLS) is that the usual standard estimator tends to underestimate the true standard error. The inefficient variance estimators affect levels of statistical significance and lead to incorrect policy implications (Anselin and Bera 1998; Griffith 1996; Rey and Montouri 1999). An SEM controlling for spatial autocorrelation in the error term produces more efficient estimators than does an OLS method.

Natural amenities exist in many different forms. Thus, it is important to distinguish among their several alternative types and to incorporate the notion that different types may exhibit different distributional effects. The amenity data were drawn from the county-level National Outdoor Recreational Supply Information System data set developed and maintained by the USDA Forest Service's Wilderness Assessment Unit, Southern Research Station at Athens, Georgia.

In current research studies, two approaches to measuring regional natural amenity attributes are evolving: a composite single index and an aggregate factor. The former, an effort to define natural amenities as a summary index of different attributes, is not free from criticism. Among other things, using a single index to represent the heterogeneous attributes is ad hoc; also, decisions about which attributes are selected can be quite subjective; and, too, the approach lacks strong theoretical support for the methods of producing a single index.

The aggregate factor approach is an effort to reduce a wide array of natural amenity attributes and to combine them into similar groups. Principal components analysis was employed to produce smaller sets of factors (or principal components) that are later used in regression analysis. This factor analysis approach is less subjective than single index, but the problem is that the final measurements (factor scores or principal components) may not be easy to interpret. The approach is still useful because it allows examination of multidimensional aspects of natural amenity attributes. The principal components approach to distinguish amenity types was used in this empirical work, while data on county-level socioeconomic characteristics was obtained from several sources including US Bureau of Census products, the Bureau of Economic Analysis, and other standardized secondary data sources.

Study Results

As outlined in the previous section, for this study, data were gathered from several sources, compiled, indexed, and (in the case of amenity variables) standardized to a mean of zero and a standard deviation of one. These data elements represent county-level attributes for socioeconomic condition, economic structure (including tourism), and amenities.

Spatial patterns were evident in the dependent variable that represents income distribution. The change in Gini coefficient between 1980 and 1990 at the county level is shown in Figure 2. The map shows that the most rapid change in income distribution occurred in the suburban fringe of cities and throughout many rural counties of the lake states. Of particular note are the counties on the outskirts of Minneapolis—St. Paul metropolitan area in Minnesota and the suburban and rural counties surrounding Madison in Wisconsin.

This study grouped amenity variables using the aggregate factor approach in measuring natural attributes of each county. To capture these characteristics, five amenity indices were calculated using a principal component analysis method that transformed a given set of related variables into a single measure. The final single measure represented the characteristics of the original variables. Although there are several rules for selecting a specific principal component,

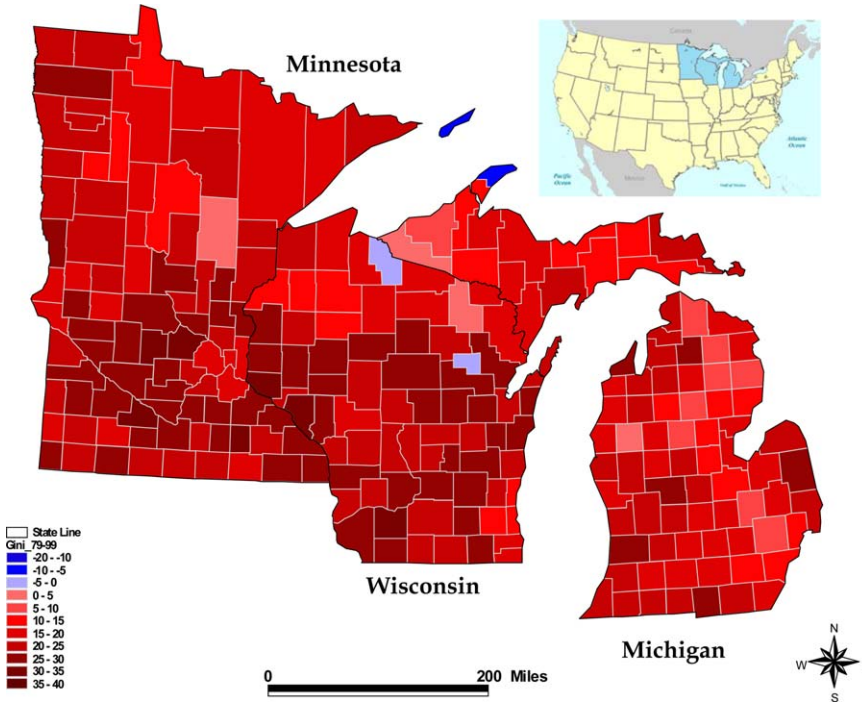

Figure 2. Change in Gini Coefficient and Income Inequality between (1979–1999)

this research used the first principal component method, because it is the best summary of the entire data that accounts for the most total variance in the correlation matrix across all the variables (Table 1).

The five amenity indices were based on land, river, lake, and warm and cold weather attributes. Land-based natural amenities were the terrain and open spaces within a county that may be available for outdoor recreation; the final measure accounted for 26% of variance in the land amenity group. River-based natural amenities were river miles eligible for recreational uses or with recreational, scenic, or wildlife values within a county; 35.4% of variance in the river amenity groups was explained by the final measure. Lake-based amenities consisted of small or big lakes and streams that could be devoted to lake-related recreational activities; the final factor score explained 38% of variance in the lake amenity group. This study selected warm-weather-related natural amenities to capture summer recreational opportunities, including swimming pools, playgrounds, tennis courts, golf courses, amusement parks, and campsites; only 21% of this cumulative variance was explained. Cold-weather-related natural amenities captured winter recreational opportunities and consisted mainly of cross-country skiing- or downhill skiing-related facilities; the final measure explained 39% of variation. According to the cumulative variance explained for the five natural amenity groups, the final measures of river-based, lake-based, and cold-weather-based amenity groups showed relatively higher performance as compared to the other two groups.

Results of this analysis suggest that there are complex socioeconomic factors at work in the rural Great Lakes region and that significant heterogeneity exists. In the model presented in Table 2, change in Gini coefficients between 1980 and 1990 were assessed in relation to manufacturing, retail/service, tourism-related employment, tourism-related firms, and firm diversity variables to represent economic structure. The employment diversity index variable was dropped because of its high correlation ($r = -0.67$) with the tourism-related firm variable. Both the OLS regression and the SEM models had consistent signs with the exception of the retail/service sector structure variable. Of the five structural variables, only tourism-related employment showed statistically significant association with the change in income inequality. This employment, however, was not statistically significant in the SEM. Thus, this research failed to find any robust and consistent statistical association between economic structure and income distribution in the three states during the 80s.

Many studies hypothesize that certain types of economic restructuring can cause income inequality, because manufacturing employment equalizes income distribution while service-sector jobs increase income inequality (Chevan and Stokes 2000; Leatherman and Marcouiller 1996, 1999; Lobao, Rulli and Brown 1999; Morris and Western 1999; Nielsen and Alderson 1997). The change in tourism-related employment was negative and marginally significant ($p < 0.1$) only in the OLS regression model. However, such changes were not significant in the SEM even though the indicators were positive in

Table 1. Attributes Derived using Principal Component Analysis

Amenity Variables	Variable Description	Eigen-vectors
Land-based	Cumulative variance explained	.2598
	Acres of crop/pasture/range land (%)	−.5548
	USDA-FS forest and grassland acres (%)	.4235
	NRI non-federal forest acres (%)	.5121
	NRI non-federal wildlife-reserved land acres in the county (%)	−.1010
	Rural land open to public for outdoor recreation	.1895
	RTC total rail-trail miles (%)	.2577
	State park acres (%)	.1235
	Local or county parks per 1K pop	.2355
	State parks per 1K pop	.2562
	ISTEA funded greenway trails per 1K pop	.0417
River-based	Cumulative variance explained	.3536
	Canoe/raft outfit/trip firms per 1K pop	.1805
	AWA white-water river miles per 1K acres	.3404
	Wild and scenic river miles per 1K acres	.0549
	River and stream acres (%)	−.0192
	NRI river miles, outstanding value (per 1K acres)	.5996
	NRI river miles eligible for recreation status (per 1K acres)	.3555
	NRI river miles w/recreation + scenic + wildlife value (per 1K acres)	.6019
Lake-based	Cumulative variance explained	.3806
	Marinas per 1K pop	.3797
	Fish camps/lakes/piers/ponds per 1K pop	.2934
	Other water acres of reservoir + bay/gulf + estuary per (%)	−.0302
	NRI acres of lake >= 40 in size (%)	.6085
	SUM of small streams and water bodies (%)	.2008
	NRI acres devoted to water-based recreation (%)	.5986
Warm Weather-based	Cumulative variance explained	.2116
	Parks and recreation departments per 1K pop	−.0830
	Tour and sightseeing operators per 1K pop	.3843
	Playgrounds and recreation centers per 1K pop	−.0804
	Private and public swim pools per 1K pop	.0850
	Private and public tennis courts per 1K pop	−.1031
	Organized camps per 1K pop	.4871
	Private and public golf courses per 1K pop	.3312
	Amusement places per 1K pop	.3202
	Fairgrounds per 1K pop	−.0284
	WOODALLS private + public campground sites per 1K pop	.4821
	Tourist attractions/historic places per 1K pop	.3721
Cold Weather-based	Cumulative variance explained	.3944
	XC ski firms and public centers (#/1K pop)	.4148
	ISS skiable acreage (%)	.2146
	Federal acres in county w/>24 in snow (%)	.3229
	Agricultural acres in county w/>24 in snow (%)	−.3386
	Forest acres in county w/>24 snow (%)	.2664
	ABI # skiing centers/resorts + tours + rentals per 1K pop	.4577
	ISS # downhill skiing areas per 1K pop	.4186
	Rail line miles converted to trails for winter recreation (%)	.0988
	NPS # units + state park # w/snowmobiling available per 1K pop	.3123

both the OLS regression and the SEM. The SEM analysis suggests that the statistical significance of tourism-related employment resulted from the inability of the OLS regression to take into account spatial dependence in the residuals. Thus, the policy implication of tourism-related employment growth from the OLS regression is questionable. This reinforces the importance of accounting for spatial autocorrelated errors in policy analyses. Results of the SEM failed to suggest that economic restructuring had statistical association with changes in income distribution in this region.

Three variable groups were employed to represent new growth engines: market size and structure, human capital, and public investment. These variables were tested extensively with different model specifications. Overall, the selected new growth variables were consistent across different model specifications.

Employment density was used as a proxy for market size to capture economies of scale, agglomeration effects, or knowledge spillovers of economic activities, including technical innovation. The coefficient of change in employment density had consistently positive association with income inequality in the OLS regression. This OLS result suggested that the rapid growth in employment density might have had a disequalizing effect on income distribution in the region during the 80s. These results were not confirmed by the SEM.

The change in high school graduates was always negative and significant throughout different model specifications and across two estimation methods, but the change in college graduates was not significant. Thus, results suggest that a rapid increase in the number of high school graduates may demonstrate an equalizing factor in regional income distribution. Change in the number of college graduates was not statistically significant.

The change coefficients of educational expenditure were positively associated with change in income distribution from both estimation methods. These findings imply that rapid increases in the expenditure in a local government may have had a disequalizing effect on income distribution in the region during the 80s. The disequalizing effect of expenditure growth suggests that a county with greater spending on education may have been in a better position to effectively create or retain high-paying jobs than other counties with less spending, leading to income inequality in the region. Furthermore, a county spending more on education can provide a better environment for higher income families who may be more interested in this as a regional quality-of-life attribute.

The change coefficients of highway expenditure were consistently significant and negative in the OLS regression specification. The coefficients, however, were not significant in the SEM specifications. Although the highway expenditure variable did not have consistent significance across model specifications and time periods, it seemed to be negatively associated with income inequality. The modeling reported here suggests that indirect productive investment of local governments might increase income inequality, while direct pro-

Table 2. Model of Change in Level of Income Inequality in the Lake States

Independent Variable	Change in Gini Coefficient between 1980 and 1990[a]			
	Ordinary Least Squares		Spatial Error Model	
	$\hat{\beta}$	*p*-value	$\hat{\beta}$	*p*-value
Intercept	24.262	.000	24.353	.000
Manufacturing employment	−.023	.113	−.014	.257
Retail-service employment	.042	.536	−.003	.965
Tourism employment	−.027	**.085**	−.018	.167
Tourism firms (#)	.006	.900	.051	.279
Employment diversity index				
Firm diversity index	.323	.100	.018	.928
Employment density	.061	**.019**	.037	.137
High school graduates (%)	−.220	**.002**	−.323	**.000**
College graduates (%)	−.020	.702	−.010	.828
Educational expenditure	.103	**.001**	.066	**.016**
Highway expenditure	−.009	**.001**	−.004	.119
Amenity: land-based	−1.944	**.001**	−.386	.585
Amenity: river-based	−2.345	**.000**	−1.414	**.005**
Amenity: lake-based	−1.332	**.007**	−.857	**.073**
Amenity: warm sites	−.835	.120	−.114	.817
Amenity: cold sites	.003	.995	.189	.671
F-value	8.910	**.000**		
Adjusted R^2	.332			
White test	119.21	.832		
Moran's I	.225	**.000**	−.028	.542

[a] Bold *p*-values indicate that their corresponding variables are significant at $p < 0.1$.

ductive investment through highway expenditures did not have statistical association with income distribution.

In the model, the coefficients of only three amenity variables (land, river, and lake-based) were negatively associated with income inequality in the OLS regression specifications. In the SEM of the 1980–90 change, only the river-based and the lake-based variables were negatively associated with the change in income inequality. This result suggests that a county with more river- or lake-related natural amenities tended to equalize income distribution more rapidly than those with less.

The SEM confirmed the conventional perception that among alternative natural amenities types in the lake states, water is an important resource that has a relationship with income distribution. Region-specific river and lake-related amenities tended to contribute to decreasing income inequality. Implications for policy prescriptions are rather

nebulous, but it is important to point out the obvious interesting relationships. Specifically, if more equalized income distribution is a policy objective, it may indeed be effective to develop polices which improve accessibility to water-related natural amenities, which promote the availability of those amenities, and which attract investment capital from outside sources to develop water-related recreational facilities.

Results of this applied research suggest that different types of natural amenities indeed exhibit different distributional effects. This finding suggests that single index approaches may be inappropriate as a measure for investigating the effects of various natural amenities. Furthermore, these results also suggest that only water-related amenities had evident effects on income distribution in the lake states. This result suggests that certain types of natural amenities have growth and distributional effects. Both effects must be carefully considered when policymakers intend to adapt natural amenities as a strategy for economic development.

The results of the SEM differed from those of the traditional OLS analysis. This difference highlights the need to account for the spatial characteristics of natural amenities in order to generate accurate inferences from policy analysis models of this type. Given that the traditional regression estimation and the relatively new spatial econometric approach provided clearly different results, this research demonstrated that if spatial processes were not appropriately controlled, modeling results could lead to incorrect policy inferences. This has important implications for policy analysts who deal with spatial data and its underlying regional characteristics. Regional policy analysis cautions against ignoring the assumption violations of traditional regression analysis, especially the non-zero spatial autocorrelation assumption violation.

Following Deller et al (2001), Graves (1979, 1980, 1983), Knapp and Graves (1989), McGranahan (1999), and Roback (1982), this work confirms and substantiates the notion that location-specific amenities are positively associated with economic growth. This is particularly true for natural and built amenities. Yet, the argument to focus on more disaggregated assessments of distributional issues remains valid, particularly given strong trends toward increased regional income inequality and given the general dearth of existing literature on the topic. Certainly, new and creative approaches to modeling regional economic change resulting from tourism must account for the critical development components associated with income distribution.

In many respects, this study can be viewed as an exploratory approach to develop both an appreciation for the complexity of the developmental context within which tourism operates and initial estimates of the key relationships. It is clear that further research is warranted to develop a better theoretical basis for the interface between tourism and community development and to develop a more consistent empirical approach to analyzing tourism impacts. Results of this analysis suggest that the distribution of regional income is clearly tied

to several growth engines, including (but certainly not limited to) the amenity base. The traditionally defined growth engines associated with education, infrastructure, and public spending appear to be equally as important as the amenity base, in explaining changes in the distribution of income.

With respect to tourism itself, results of this assessment are either mixed or insignificant. In answering the class arguments of Ashworth (1992), Smith (1989), and Williams and Shaw (1988), this study finds that a more thorough breakdown by sociodemographic characteristics (such as gender, age, and race) would be needed; indeed, further research is required to empirically evaluate these important developmental issues. With respect to the suggestion by English et al 2000, Leatherman and Marcouiller (1996, 1999), Rothman (1998), and Wagner (1997), on the tendency of tourism to "hollow out" the distribution of regional income, this work offers contradictory evidence for several aspects of amenities, indeed suggesting the possibility that certain types of water-based amenities are associated with trends toward more equal income distribution. Results for the effect of tourism structure on distribution, particularly after accounting for spatial autocorrelation in the models, were insignificant and provided an insufficient basis from which to draw useful conclusions.

CONCLUSION

Academic arguments examining the course of contemporary rural development and the increasing reliance on tourism focus on the importance of natural amenities in concert with infrastructure, technology, and the transition in use of rural lands. A presentation of the explanatory factors leading to rural development, regional migration, and the development of rural tourism is analytically complex yet critically important in promulgating contemporary and innovative policies that affect the rural condition and serve as the basis for 21st century rural planning practice.

Much of the existing theory and empirical literature on rural economic change can be easily criticized as overly aggregate in its conceptualization, overly reliant on aggregate measures of growth, and generally devoid of developmental indicators. Indeed, aggregate measures of economic growth are insufficient mechanisms upon which to assess the efficacy of rural economic change. There is a strong need for theoretically consistent empirical analysis that goes beyond aggregate measures of economic growth to understand more fully key developmental attributes of regional change. Income distribution is one of these more comprehensive metrics of development.

The applied research presented in this manuscript provides a conceptual construct within which the developmental aspects of natural amenities and tourism can be better understood through a review of the relevant literature and an empirical assessment of the changing distributional patterns of income across the US lake states. Results suggest that natural amenities (in particular water-based resources) provide key explanatory factors related to the distribution of income.

In this study, a variant of new growth theory was applied to test the hypothesis that natural amenities were key explanatory variables involved in the distribution of economic growth. As technology transforms economic distance, sense-of-place with respect to work and pleasure increasingly focuses on the presence of natural amenities and the reliance on tourism as an economic mainstay. The economic transformation of traditionally rural communities represents key challenges to development planning.

As a result of economic restructuring and general increases in leisure tourism, many rural regions have employed this industry as an important component of their overall economic development strategy without thorough assessment (Frederick 1993; Marcouiller 1997). Tourism is often preconceived as a viable economic development alternative for rural regions that have limited economic bases (Brown and Hall 2000; Marcouiller and Deller 1996). Development policy based solely on aggregate growth is naïve and overlooks important distributional attributes associated with amenities and touristic activity.

From a public policy perspective, it is important to recognize that distributional issues have taken a back seat to issues of growth and a more "hands off" approach to government intervention during the past two decades (Leigh 1995:94). Contemporary politics has emphasized market-based solutions as approaches to improving individual welfare; and, more responsibility has shifted to state, provincial, and local governments to provide social services.

Public policy with respect to tourism reflects these changes with the widespread use of a "boosterism" approach to planning that overlooks key community attributes required for more integrative and collaborative planning approaches (Getz and Jamal 1994; Hall 2000; Hall and Jenkins 1995; Marcouiller 1997; Murphy 1985). The contemporary American public policy fascination with promoting regions for increased tourism rests on a preconception that this industry is automatically beneficial to the economic development of communities it affects; the preconception that it is a developmental panacea rules. It is suggested that this preconception is better viewed as an empirical question that is indeed significant, complex, and rarely addressed in contemporary public policy analysis.

In addition to continued empirical work on the distributional implications of amenities and tourism, there is clearly a need for further research on several related fronts. First, there is a need for more creative theoretical justifications of the role of amenities in affecting regional economic change and for research that more clearly specifies the latent input structure characterizing tourism's supply-side. Second, there is a need for better policy analysis research to internalize more fully key amenity-related externalities. It is important to note that the provision of amenities is not a costless endeavor and typically rests on public agencies and local units of government for management inputs. The incorporation of costs involved in providing common-pool resources into private market-based decision-making can allow more socially efficient outcomes to be generated and can

alleviate the private free-riding that currently characterizes tourism's production process.

Finally, there is a continual need for further research into community-oriented and integrative tourism planning; this takes on both thematic and process elements. Incorporating wider stakeholder involvement in the planning process while developing a more complete understanding of the implications of tourism on local communities will inevitably lead to developing a research-based planning approach that addresses key people-oriented needs—relevant not only for the US lake states but also for regional planning efforts worldwide. A

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