Outstanding Master's Thesis for 1991

Analysis of Gravity Potential Models Used in Delineating Community Retail Market Areas: An Application of Geographic Information System Technology

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Gravity potential models have been used for decades to delineate the region from which a community may expect to attract retail trade. Such a delineation is used in the community-development process to define and describe the characteristics of a community's retail market. Understanding these characteristics assists policy makers in the formulation of effective economic-development strategies.

The most commonly used gravity potential model in market-area delineation is known as Reilly's Law. There has been much debate, however, as to the particular parameter specifications of Reilly's Law. In addition, the theoretical and practical limitations of Reilly's Law have been well documented. An alternative gravity potential model, developed by Huff, addresses these limitations, but its computational complexity limits its use by community economic-development specialists.

A geographic information system (GIS) is used in this research to operationalize Reilly's Law and Huff's technique. In order to test for similarities or differences between the various model specifications of Reilly's Law, the GIS was used to delineate community retail market areas for 30 towns in Maine. The GIS also allowed for the delineation of community retail markets using Huff's technique. A visual comparison between the Huff-type and Reilly-type delineations makes clear the theoretical and practical differences between these two gravity potential models.

The results of this research suggest that the various specifications of Reilly's Law all define identical community retail markets. The results also visually demonstrate the differences between Reilly- and Huff-type community retail market area delineations. Finally, this research demonstrates how, using a GIS, community-development practitioners will be able to conduct detailed community market area analyses in a much more efficient manner and shorter time period than in the past.

Master's Thesis Award of Merit

Economic Policies and Smallholder Agricultural Performance: The Case of Malawi

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Debate on the effects of economic policies on smallholder agricultural performance in Sub-Saharan Africa has increased over the past two decades. In the country of Malawi, this debate has centered around macroeconomic and sector-specific policies of the government of Malawi, the World Bank, and the International Monetary Fund (IMF). In general, the policy goal of the World Bank and the IMF throughout the 1980s was to increase smallholder production of non-food crops. Policy instruments designed to accomplish this goal included the liberalization of smallholder producer prices, the privatization of marketing, and the devaluation of the exchange rate.

Conversely, the smallholder policy goal of the government of Malawi for the 1980s was to increase the production of food crops. Policy instruments designed to accomplish this goal included the subsidization of food crop production via producer price subsidies. These two goals conflicted throughout the 1980s, and smallholder policy was incoherent.

In order to assess the policy effects above, time-series data were analyzed in the current study. The estimation results suggest that smallholders in Malawi are price responsive and responsive to changes in infrastructure and land use. Simulations were done using the estimated elasticities. These simulations showed that, in general, if World Bank policies had been fully implemented in the late 1970s, smallholder production of non-food crops would have increased over the period 1978–1988. Conversely, food crop production would have been less than the actual production over the period.

The results of this study suggest that a clear a priori understanding of the possible outcomes of policy changes is essential for policy makers in the developing world. Policy debate is both warranted and necessary before policy decisions can be made.