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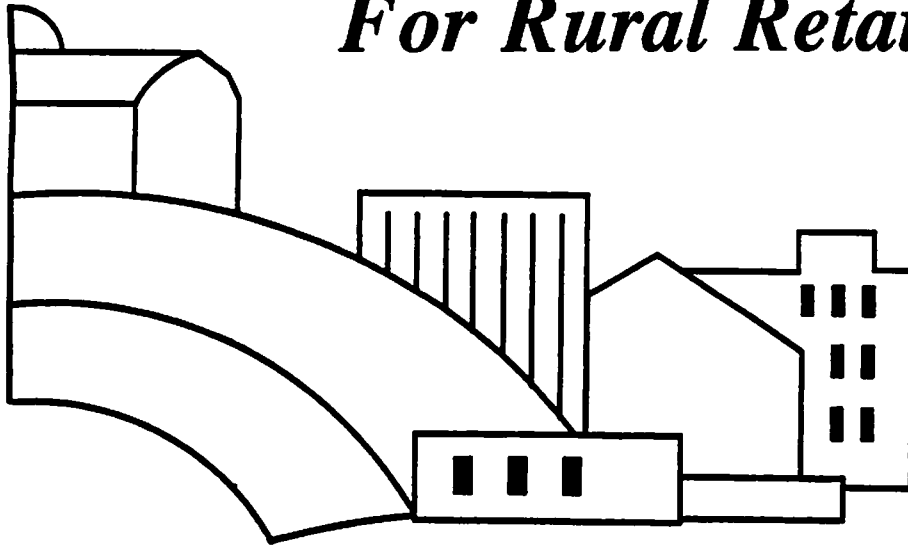
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Threshold Population Levels For Rural Retail Businesses



*In
North
Dakota*

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Substantial demands for adjustment to changing socioeconomic conditions have characterized many nonmetropolitan communities during the past decade. Changes in the shopping patterns of rural residents often exacerbated these adjustment problems. Reports indicate an increasing tendency for rural residents to bypass nearby small towns for shopping centers and discount stores in larger trade centers. As a result, main street merchants in smaller communities often discover that they are receiving a decreasing share of a declining retail sales volume.

Explanations for these changes in shopping patterns include improved transportation, changing tastes and preferences of rural residents, and the necessity to travel to larger centers to obtain specialized services, such as medical care. Whatever the causes, however, the effects of recent changes in rural retail trade patterns pose major

challenges for rural business operators and community leaders. Throughout North Dakota and other rural areas of the Midwest, nonmetropolitan communities are placing a very high priority on local economic development. While many development efforts are geared toward recruiting or developing new basic sector businesses, local development groups also attempt to enhance their local retail sectors. Some towns emphasize re-establishing a business type previously lost, such as a farm machinery dealership or a furniture store, while other local leaders perceive new market opportunities for particular business types.

Whatever the initial stimulus for attempts to revitalize or diversify the local retail sector, a major question that must be addressed relates to the adequacy of a community's population base to support a given type of business. *Population thresholds*, the minimum number of

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consumers necessary to provide an adequate sales volume for a particular type of retail business, have long been a key concept in central place theory. As community leaders evaluate their local retail sector, the threshold concept is particularly useful. This study examines the population levels associated with specified numbers of businesses of various types in nonmetropolitan communities in North Dakota.

Procedures

The data used to identify the presence of particular types of businesses in a given community were records of sales and use tax permit holders from the North Dakota State Tax Department. Sixteen business types that are relatively common in the state's nonmetropolitan trade centers were used as the basis for the analysis. These are SIC 3-digit industries except for two 4-digit industries (SIC 5812 Eating Places and SIC 5813 Drinking Places -- Alcoholic Beverages)¹. The communities included in the study are North Dakota towns with populations between 200 and 10,000 in 1980, a total of 181 communities. The number of towns by population group is summarized in Table 1, and the number of towns having different numbers of establishments of each type is shown in Table 2. Threshold population levels to support 1, 2, 3, or 4 businesses of each of the 16 types were estimated using regression analysis.²

Results

Statistical estimates of the city population required to support indicated numbers of firms in the 16 SIC categories are shown in Table 3. For example, a town of 530 people could support one farm and garden machinery establishment, while a population level of 712 would be required to support two establishments. The range

of population levels (95 percent confidence interval) to support one establishment of each business type are shown in Table 4. The estimates indicate that the population required to support various business types varies substantially. Business types with relatively low population requirements include eating and drinking places and gasoline stations (Table 3). On the other hand, variety stores and department stores have the highest levels of required population among the business types studied.

The upper and lower statistical limits for the various business types (Table 4) indicate the relative variability of the required population levels. For instance, the estimated lower limit for drinking places (108) is only 43 percent of the midpoint estimate (249) whereas the lower limit estimates for family clothing stores, florists, and drugstores, respectively, are 87, 87, and 85 percent of the corresponding midpoint estimate values.

TABLE 1. NUMBER OF NORTH DAKOTA CITIES BY POPULATION GROUP

Range in Population, 1980	Number of Cities
2,501 - 10,000	8
1,501 - 2,500	19
1,001 - 1,500	25
501 - 1,000	44
200 - 500	<u>85</u>
	181

¹SIC (Standard Industrial Classification) is a system developed by the U.S. Department of Commerce and widely used as a method of classifying businesses based on the types of goods or services they provide.

²For a more detailed discussion of the statistical methods used, contact the Department of Agricultural Economics, NDSU, and request Agr. Econ. Misc. Rpt. No. 132.

TABLE 2. NUMBER OF TOWNS IN NORTH DAKOTA WITH INDICATED NUMBER OF ESTABLISHMENTS, 1988

SIC Code Number and Industry Description	Number of Establishments								
	0	1	2	3	4	5	6-10	11-15	16 or more
508 Farm and Garden Machinery and Equipment Stores	42	48	23	27	12	11	13	5	
519 Farm Supply Stores	63	48	24	11	18	7	10		
521 Lumber and Other Building Materials	77	69	24	6	2	3			
525 Hardware Stores	77	57	28	12	4	2	1		
531 Department Stores	146	28	7						
533 Variety Stores	145	30	5	1					
541 Grocery Stores	21	100	46	11	2	1			
544 Gasoline Service Stations	13	37	43	38	14	8	23	3	
565 Family Clothing Stores	131	27	13	5	2	0	3		
571 Home Furniture and Furnishings Stores	126	31	16	2	1	4	1		
573 Radio, Television, and Electronic Stores	106	32	17	12	3	7	4		
591 Drug Stores	102	58	16	2	3				
594 Sporting Goods Stores and Bicycle Shops	89	53	19	5	4	4	4	2	1
599 Florists	115	32	22	5	1	2	3	1	
5812 Eating Places	2	66	35	17	1	15	36	5	4
5813 Drinking Places (Alcoholic Beverages)	2	37	67	20	15	13	20	4	3

Conclusions and Implications

Business and community leaders frequently question the population level necessary to provide adequate sales volume for a particular type of business. Further, these relationships may have changed in recent years as a result of changing tastes, preferences, and shopping patterns of rural residents. This study examines population levels associated with specified numbers of 16 business types in North Dakota towns with populations between 200 and 10,000 in 1988.

The estimates developed in this study must be interpreted with caution for several reasons. First, this analysis, like most other analyses of threshold population levels, is based on the number of firms offering a particular good or service in towns of different sizes. It does not necessarily follow that these population levels will yield sufficient sales volume to allow the business to be financially successful. (The ultimate criteria of financial success, of course, is the ability of the business to meet its proprietor's profit expectations, and these expectations can vary.) Second, the analysis is based on city population, whereas the population of the trade area (i.e., the city plus the surrounding rural area) should be considered in assessing the prospects for a new business. Finally, the relationships reported here represent averages across the state. The situation for an individual community may differ greatly from state norms based on differences in population composition (e.g., age and gender distribution), in per capita income, and in the strength of competing trade centers. With these limitations in mind, however, it is hoped that the information provided will be useful to decision makers in both private and public sectors.

TABLE 3. ESTIMATES OF CITY POPULATION REQUIRED TO SUPPORT AN INDICATED NUMBER OF ESTABLISHMENTS OF SELECTED BUSINESS TYPES, NORTH DAKOTA, 1988

Business Type	Number of Establishments			
	1	2	3	4
Farm and Garden Machinery and Equipment	530	712	938	1,207
Farm Supply Stores	663	927	1,235	1,587
Lumber and Other Building Material Stores	793	1,480	2,532	3,947
Hardware Stores	763	1,333	2,107	3,085
Department Stores	1,651	3,373	a	a
Variety Stores	1,806	4,614	a	a
Grocery Stores	528	1,285	2,676	4,702
Gasoline Service Stations	455	485	625	876
Family Clothing Stores	1,135	1,804	2,553	3,381
Home Furniture and Furnishings Stores	1,007	1,765	2,805	4,127
Radio, Television, and Consumer Electronics Stores	1,044	1,574	2,017	2,372
Drug Stores	1,103	2,305	3,990	6,159
Sporting Good Stores and Bicycle Shops	782	1,122	1,490	1,885
Florists	1,093	1,698	2,280	2,838
Eating Places	340	504	678	863
Drinking Places (Alcoholic Beverages)	249	506	775	1,057

*Not estimated because the data set contained insufficient numbers to support reliable estimates in these categories.

TABLE 4. ESTIMATED RANGE OF POPULATIONS (95 PERCENT CONFIDENCE INTERVAL) REQUIRED TO SUPPORT ONE ESTABLISHMENT OF SELECTED BUSINESS TYPES IN NORTH DAKOTA, 1988

Business Type	Lower Limit	Midpoint Estimate	Upper Limit
Farm and Garden Machinery and equipment	376	530	684
Farm Supply Stores	493	663	833
Lumber and Other Building Material Stores	631	793	954
Hardware Stores	630	763	896
Department Stores	1,253	1,651	2,050
Variety Stores	1,557	1,806	2,055
Grocery Stores	385	528	671
Gasoline Service Stations	318	455	592
Family Clothing Stores	987	1,135	1,283
Home Furniture and Furnishings Stores	846	1,007	1,168
Radio, Television, and Consumer Electronics Stores	853	1,044	1,235
Drug Stores	934	1,103	1,272
Sporting Good Stores and Bicycle Shops	695	782	869
Florists	946	1,093	1,240
Eating Places	230	340	450
Drinking Places (Alcoholic Beverages)	108	249	390