Implications of Trade and Market Patterns of North Dakota Farm and Ranch Operators

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Changes in the structure of agriculture have helped bring about substantial restructuring in the trade and service sectors of North Dakota's rural, agriculturally dependent communities. A steady exodus from most of the state's rural counties has been occurring since the 1940s. This outmigration has, in turn, required consolidation of both private and public services in many rural communities. The current economic situation in agriculture appears likely to lead to additional decreases in farm numbers and to even greater pressures for restructuring the trade and service sectors of nonmetropolitan communities.

Numerous studies have examined the relationship between the farm population and community vitality. These studies indicate several important relationships between changes in farm size, farm population decline, and the viability of local businesses.

First, central place theory indicates that a certain minimum population level, known as the threshold, is needed to allow a particular type of business to operate at a profitable level (Voelker et al., 1978; Borchert and Adams, 1963). Population thresholds differ for different types of businesses. For example, grocery and hardware stores require much lower population thresholds than do furniture stores. Declining farm numbers may reduce the number of customers available for a specific type of business below its threshold, thus leading to business failure.

A second effect associated with increasing farm size has also been reported. This research suggests that there is a tendency for operators of larger farms to purchase a smaller proportion of their needs in local trade centers and to instead patronize establishments in larger towns (Goldschmidt 1978). The influence of farm size on trade patterns has not been clearly shown (Korsching 1984).

The first objective of this article is to examine the purchasing and marketing behavior of North Dakota farm operators. The purpose of the analysis is to determine whether operators of larger farms and ranches display a significant pattern of bypassing local retail establishments and marketing outlets in order to patronize those located in larger and more distant places.

Study Procedures

Information concerning trade patterns of North Dakota farm and ranch operators was obtained from a random survey conducted in March and April 1985. Initial screening questions ensured that all respondents (1) were less than 65 years old, (2) considered farming to be their primary occupation, and (3) sold at least \$2,500 of farm products in 1984. Of the 1,206 operators contacted who met these criteria, 933 completed the survey yielding a response rate of 77 percent.

Farm and ranch operators were asked questions regarding the distance they usually traveled to purchase various goods and services and to market their agricultural products. The categories of goods and services included food, hardware, banking services, furniture, automobiles, and farm machinery. The two major agricultural products considered in this analysis were cattle and wheat because of the predominant and important role they play in the state's agricultural economy. Operators were asked to name the communities in which their business transactions were usually conducted. The 1980 census was used to determine the population of these communities.

Also included on the survey were several items pertaining to the operator's demographic and economic backgrounds. Gross farm income and total farm assets were selected as two measures of size that would be applicable across a wide range of farming situations. In addition, number of cattle marketed and acres of wheat harvested were identified as variables that might be particularly relevant in explaining differences in marketing patterns.

FINDINGS

Major findings of the analysis fall into four categories: (1) distance traveled to purchase goods and services, (2) population of communities where goods and services were purchased, (3) distance traveled to market agricultural products, and (4) population of communities where products were marketed.

Distance Traveled to Purchase Goods and Services

Table 1 lists the number of miles the operators reported traveling to purchase or obtain various goods and services. Generally, about one-third of the respondents traveled less than 10 miles to purchase food and hardware and to obtain banking services; another one-third traveled 10 to 19 miles; the remaining one-third traveled 20 miles or more. On the other hand, about 60 percent of the respondents traveled 20 miles or more to purchase furniture and automobiles and over 40 percent traveled over 20 miles to purchase machinery.

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Table 1. Miles traveled to purchase goods or obtain services, North Dakota 1985.

Item	Miles Traveled			
	Less Than 10	10-19	20 or More	Mean
	(percent o	(miles)		
Food	35	29	36	18.2
Hardware	34	32	34	18.1
Banking	34	35	31	16.7
Furniture	15	19	66	36.5
Automobiles	20	21	59	32.6
Machinery	25	33	42	21.1

For the purpose of analysis, the state was divided into three regions as depicted in Figure 1. The Western region contains much of the state's grazing land and most of its energy development counties (Figure 2). The Central region contains much of the wheat-growing land, and the Red River Valley region contains few cattle operations but more diverse crop enterprises.

The average number of miles driven by farm and ranch operators to purchase goods and services varied across the three regions of the state. Operators in the Red River Valley region traveled shorter distances to obtain goods or services compared with those in either the Central or Western regions. The average number of miles driven by operators to make their purchases ranged from 11.2 miles for banking services to 29.0 miles for furniture in the Red River Valley region. This compared with a range of 17.2 miles for banking to 35.7 miles for furniture in the Central region and 19.8 miles for banking to 42.9 miles for furniture in the Western region.

Even within each of the three regions, substantial variations were found in the average number of miles driven to purchase the different goods and services. To account for this variation, a number of comparisons were made using demographic and economic variables. It was hypothesized that the variables associated with the size of the farm or ranch operation (i.e., gross farm income, total farm assets, acres of wheat) would be positively correlated with the distance an operator would travel to purchase goods and services. However, the data offered no support for this hypothesis.

The only variable which was useful in accounting for the number of miles driven was the size of the community where purchases were usually made. Thus, it would appear that operators of larger farms do not travel greater distances for their purchases than do their smaller farm counterparts. These results were consistent across the three regions of the state.

Population of Communities Where Goods and Services Were Purchased

The size of the community where farm and ranch operators obtained banking services and purchased hardware and food tended to be smaller on the average than those communities where they purchased farm machinery,



Figure 1. Regions in North Dakota.



Figure 2. Percent of Total Agricultural Sales in North Dakota and in Three Regions of the State by Type of Agricultural Product, 1982.

SOURCE: 1982 Census of Agriculture.

automobiles, and furniture (Table 2). The median community population where banking services, hardware, and food were purchased was 1,496, 1,967, and 2,119, respectively. On the other hand, the median community size where farm machinery, automobiles, and furniture were purchased was 7,774, 7,442, and 15,513 people, respectively.

It was anticipated that variables used to measure the size of the farm operations would have an impact on what size of community an operator would patronize when purchasing goods and services. However, few of these variables were strongly correlated with the population size where the operator usually made purchases of various goods and services. There was, nevertheless, a strong relationship between community population where the various goods and services were purchased and distance the operator needed to travel to patronize that community. These results were consistent across the three regions of the state.

Only a mild relationship was found between total farm assets and the size of the community where food was purchased and between gross farm income and the size of community where banking services were obtained and where machinery was purchased. Operators with assets between \$200,000 and \$399,999 were more likely to purchase food in places with populations of less than 10,000 than were their counterparts with assets below \$200,000 or those with assets \$400,000 and above. Likewise, operators with gross farm income between \$40,000 and \$99,999 were more likely to bank in communities of less than 10,000 population. Thus, the notion that the operators of larger farms or ranches are more likely to trade in larger communities than do their counterparts on smaller operations cannot be supported in this instance.

Distance Traveled to Market Wheat & Cattle

Of the 895 operators who reported growing crops, 655 (or 73.2 percent) listed wheat as their primary crop. They drove an average of 12.1 miles to market their wheat. Of the 563 farmers and ranchers who raised livestock for market, 439 (or 78.0 percent) of them reported beef cattle as their primary type of livestock enterprise. They drove an average of 64.6 miles to market their cattle.

Differences were noted in the number of miles traveled to market wheat and cattle among the three regions of the state. Shorter distances were driven in the Red River Valley region and Central region than in the Western region to market wheat. The average number of miles traveled to market wheat in the Western region was over twice the number of miles driven in the Red River Valley region (16.9 miles and 8.1 miles, respectively). The driving patterns to market wheat in the three regions of the state were exactly opposite those to market livestock. Operators in the Western region traveled fewer miles to market their livestock than operators in the Red River Valley region or in the Central region.

Of the variables used to account for the range in miles traveled to market wheat, only the population of the com-

Item	Less Than 2,500	2,500-15,000	More Than 15,000	Median
	(ре	(population)		
Food	24	48	28	2,119
Hardware	27	49	24	1,967
Banking	34	48	18	1,496
Furniture	6	43	51	15,513
Automobiles	13	48	39	7,442
Machinery	26	53	21	7,774

Table 2. Community size where goods were purchased and services obtained, North Dakota, 1985.

munity where wheat was marketed was strongly correlated with the number of miles driven. On the other hand, the population of the community where cattle were marketed was not strongly correlated with the number of miles driven to market cattle.

Whereas 58 percent of those operators who reported wheat as their primary crop traveled between 10 and 19 miles to market their wheat, only 18 percent drove over 20 miles to market it; the remaining 32 percent drove less than 10 miles. A strong relationship was found between the number of miles driven to market wheat and the size of the community where it was marketed – the greater the community population, the greater the distance operators traveled to market wheat.

Populations of Communities Where Products Were Marketed

There was a marked difference between the average size of communities where wheat was sold and where beef cattle were sold. The median population was 479 people for communities where wheat was sold and was 10,099 people where cattle were marketed.

Differences were noted among the three regions of the state. The average population of communities where wheat and cattle were sold was larger in the Western region than in the Central region and the Red River Valley region.

A strong relationship was found between the populations of the communities where wheat was sold and the number of miles driven to market the product. However, the relationship between the populations of the communities where cattle were sold and the number of miles driven to sell them was surprisingly weak.

Purchasing Trade Patterns

The findings of the study indicated that trade patterns of farm and ranch operators in North Dakota were quite sensitive to community size and location, the basic premise of central place theory. Purchases of hardware and food by farmers and ranchers were typically made in the state's smaller communities. The median community size where these purchases took place in 1985 was approximately 2,000 residents. Operators traveled, on the average, 18 miles to purchase these two types of items.

The state's farmers and ranchers were more likely to obtain banking services in smaller communities located nearer to their homes. They traveled only 17 miles on average and patronized banks in smaller communities (i.e., median size under 1,500). In contrast, larger goods were usually purchased in the state's major urban centers. The median community size where furniture was purchased, for example, was over 15,000 residents. Farmers and ranchers traveled an average of 36 miles to these communities to purchase furniture.

Marketing Trade Patterns

The trade patterns for marketing agricultural products were noticeably different than those observed for obtaining goods and services. Grain elevators are located in many of the state's smaller communities. As a result, the median community size in which survey respondents reported marketing their wheat was about 500 people, and these operators indicated that they traveled an average of only 12 miles to market their grain. Distances traveled to market wheat differed substantially among regions reflecting differences in the density of marketing outlets. The Red River Valley region currently has nearly twice as many elevators per county as the Central region and over three times as many per county as the Western region. Producers surveyed in the Valley region traveled less than half as many miles to market wheat as those in the Western region.

One particular anomaly in contrasting the state's purchasing and marketing trade patterns was the finding that cattle producers in the sparsely populated Western region traveled **shorter** distances (an average of 52 miles) to market their cattle than did operators in either of the two more populous regions. Furthermore; the median size of the communities (13,300 residents) where operators in the Western region marketed their cattle was **larger** than the median community size where operators from either of the other two regions marketed their cattle. Operators from the Central and Red River Valley regions marketed their cattle in communities with median populations of 10,100 and 3,300, respectively.

These disparities are due, in part, to the distribution of livestock terminals and auction market locations. Although the number of terminals and auction markets have remained virtually unchanged over the past three decades, there are substantial regional differences. In 1986, the Red River Valley had but two marketing locations as compared with the thirteen locations in the Central region and nine locations in the Western region. This may help to explain the greater average distance traveled (mean = 81.7 miles) and the smaller variation in number of miles traveled by operators in the Red River Valley.

A second explanation is that the type of cattle marketed in the three regions differs. In the Western, northem Central, and Red River Valley regions, few cattle are finished; most are sold as feeder calves. In the southern Central region there are more feedlot operations where cattle are sold for slaughter. These animals are frequently shipped to the larger livestock markets in Sioux Falls, South Dakota, or South St. Paul, Minnesota.

Size of Operation

Little support was found for the notion that trade patterns differ by size of agricultural operation. There was little indication that operators of larger farms or ranches purchased goods and services in larger communities or drove greater distances to make their purchases than did their counterparts on smaller operations.

Although individual cases of large-farm operators bypassing small, local communities in favor of larger trade centers may be cited, this event occurs with near equal frequency for the operators of smaller farms. While the operators of larger farms may be financially **able** to travel greater distances to enjoy the competitive prices offered in larger communities, the operators of smaller farms may do so out of financial **necessity**. On the other hand, operators of both large and small farms may find with equal frequency that trading locally can be a more cost-effective means of obtaining goods and services, all things considered.

Where a relationship was observed between one of the measures of operation size and trade patterns, it was frequently in the **opposite** direction from that predicted by past studies. In other cases, a bimodal distribution was found. For example, operators of large and small operations frequented the larger communities more often than did operators of medium-sized operations. The only variables which were strongly related with each other were the number of miles traveled to purchase or market goods and services and community size where the transactions were made.

A number of policy implications may be derived from the results of this study. First, the trend in declining numbers of people on farms will probably continue into the future. As

the number of persons dwindles below the threshold of profitability for particular types of businesses, these businesses may be forced to close. The population thresholds for furniture and automobile businesses are typically higher than those for farm machinery, food, hardware, or banks. Consequently, businesses with higher population thresholds will be adversely affected sooner than will be those with lower thresholds. In other words, the furniture store in a rural community may experience financial stress before the grocery store does.

Second, as rural populations decrease and certain goods and services are no longer available to persons in rural communities, greater distances will be driven to make their needed purchases. Further, as higher order retail services (such as furniture and autos) become less available in the smaller rural communities, the ability of some of the towns to maintain a viable business sector may be impaired.

This article underscores the growing need for an agricultural state such as North Dakota to recognize patterns of trade and marketing in rural areas. As the structure of agriculture undergoes change, so too will these trade and marketing patterns.

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