

**County Trade Pull Factors:
An Explanatory Model with FY 2002 Data**

C.D. Study Report #218

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TABLE OF CONTENTS

INTRODUCTION.....	1
LITERATURE REVIEW.....	1
MODEL.....	3
PULL FACTOR FORMULA.....	3
METHODOLOGY.....	4
DATA ANALYSIS.....	5
CONCLUSIONS AND SUGGESTIONS.....	6
REFERECNES.....	7
TABLE 1.....	4
TABLE 2.....	5

I. Introduction

Retailers in rural communities are facing an extremely challenging, dynamic business environment at the start of the 21st century. Understanding how this environment is changing and the forces that are driving the change are critical if retailers are to survive the concentration of retail activity in metropolitan areas (see CD Study Report # 215). Many, however, derive value from a strong retail sector in small cities and rural places in non-metropolitan counties. Besides the owners and operators of retail businesses, customers, local governments, commercial property owners, and real estate agents all are stakeholders in the success of retail activity in rural communities.

The primary and traditional role of the retail sector in a community is to provide goods and services to local customers by offering an appropriate set of products, conveniently available, and backed by good customer service at an affordable price (Darling 2000). Retaining or restoring retail services in a rural environment is an increasingly challenging task. Creation of modern communications systems and tools such as the Internet and advanced software, as well as continuing improvement to the state and federal highway systems, places an increasing burden on independent retailers in small, rural communities. At the same time, corporations with national and global reach are penetrating these small markets.

As communities struggle with these challenges, leaders must decide how to deal with these challenges. There are at least four alternatives: (1) let the market decide; (2) let the local elite control; (3) hire outside consultants and local government staff to guide community change; or (4) start a community development process that is an

inclusive, vision charged strategic planning one. This may end up being a Main Street Program.

In Kansas, various public and private organizations have provided assistance to businesses and community groups. The Kansas Department of Commerce offers assistance through their Main Street Program. In the last 20 years, K-State Research and Extension has produced market statistics that are easily accessed through the Internet. These studies, C.D. study reports, look at three dimensions of retail activity and three indices of prosperity to monitor economic development in all 105 counties. These statistical studies provide community leaders measures to monitor and evaluate their progress and prosperity.

This statistical report documents a cross sectional analysis of the variance in the relative strength of the retail business community in 93 non-metropolitan counties in fiscal year 2002. The specific measure of retail strength being analyzed is K-State's County Trade Pull Factor (CTPF).

II. Literature Review

This study of CTPFs is designed to focus on the impact a number of variables have on the balance of trade in 93 non-metropolitan counties in Kansas. There are alternative definitions of non-metropolitan areas used in the field of economic development. Flora, et al. (1992), indicate that this definition of non-metropolitan areas is constantly changing because governments and other organizations create their own definitions in order to define and recognize those that need to be part of a particular program; need to be exempt from a specific policy; make their jobs more manageable; and target resources (p. 7). This is a constantly changing definition because the population of the US and Kansas is constantly changing and moving, making it difficult for community planners, businesses

and politicians to stick to a particular definition of non-metropolitan counties.

The influence of transportation networks has been important in the development of rural economies. Transportation networks play a critical role in the distribution of raw materials and products, which lead to the economic growth and development of rural areas. Regardless of whether a community's economy was based on natural resources or a service center for rail or vehicle transportation networks, rural communities grow in response to urban markets (Flora, et al. p. 34.). This is very evident in Kansas where many rural communities, and the modern highway network are aligned with the old Santa Fe and Oregon Trail routes used by settlers in the early to mid 1800s.

While transportation networks have had an influence on development in rural communities, they do not necessarily explain why some communities thrive and others have failed (Flora, et al, p. 34). Many economists have used location theory as a way to explain why communities thrive or fail. Blakely and Bradshaw in their book, *Planning Local Economic Development: Theory and Practice*, discuss a number of early development theories used to explain the importance of location in community development. Blakely and Bradshaw, while recognizing the importance of these studies, argue that the modern technology and telecommunications have altered the significance of specific locations for the production and distribution of goods (p. 64).

They believe that the contribution of location theory to local economic development is the realistic parameters that it sets for the development process and that communities must ascertain the relative value of their locational attributes in relation to other resources that the area possesses (p. 64). This is particularly true in Kansas where agriculture, manufacturing, and mining in rural areas have, historically, been

the dominant economic activities. In the Kansas Statistical Abstract 2000, 85 percent of the landmass of Kansas was used for agricultural production. This reduces population density across Kansas and makes access to modern infrastructure difficult. Because of their location and the rural nature of these communities, if transportation was restricted or modern communications were unavailable, reduced access to market information would severely limit their ability to compete in today's economy.

Retail activity suffers in many rural communities in Kansas, in part because these communities struggle to attract the manufacturing base needed to support retailers in these areas. With 85 percent of the land area in Kansas committed to agricultural production, attracting value-added processing to these areas would appear to be a natural fit for rural communities hoping to increase their manufacturing base. A North Dakota study looked at the impact of the development of the agricultural processing industry as a source of rural employment. The results show that many rural communities have been disappointed by the expansion of this manufacturing sector (Leistritz 2000).

The infusion of these manufacturing facilities has done little to spur retail growth because the new plants offered more jobs than the local markets could fill – requiring migrant labor to be brought in to fill the positions, wages paid by these plants were lower than local workers would accept or processors discovered that distance between these facilities and major consumer markets increased the transportation costs of the finished product beyond profitable levels. The result has been a smaller than projected boost in retail activity, resulting from the high level of migrant employment and lower income, seasonal jobs created by the value-added processing of agricultural goods. Leistritz points out that while there are

constraints on such development, communities and retailers can benefit from such investments provided proper planning is done before communities make the investment needed to support large processing operations.

An article in the May 2, 2003 Wall Street Journal, "Interstates Are Secret of Some Rural Areas' Success" highlights the importance of access to at least one interstate highway for rural communities. Such access provides businesses in these rural areas the opportunity to operate in towns with friendlier regulatory environments, to develop distribution centers that are located closer to major urban centers, and that allow them to take advantage of lower cost labor. With agriculture declining, employment opportunities for rural Kansans in manufacturing improve allowing businesses to thrive.

Location theory is also supported by the idea that transporting consumers is very inexpensive - relative to other goods, that consumers do have high opportunity costs and that they must travel safely and in relative comfort (Bingham and Mier, p. 8, 1993). This supports the importance of a rural community's access to major interstates and highways. Economic development will be slow or may not occur if community planners fail to recognize and support the development of transportation infrastructure.

In this study the distinction of non-metropolitan counties will be defined as those counties in Kansas with Rural-Urban Continuum Code of 4 or higher. All these counties had populations of less than 75,000 in population. This definition is based on the Rural-Urban Continuum (RUC) codes established in CD Study Report #210: County Trade Pull Factors Annual Report

for Fiscal Year 2002 (Seitz and Darling). Under this system, counties with RUC codes 0, 1, 2 or 3 are metropolitan counties. These counties are removed from consideration in this study to allow the researchers to study non-metropolitan counties with a less complex nature of the retail activity.

A number of exceptions come into play in this study. Riley and Pottawatomie counties, with RUC codes of 4 and 5 were removed from the base of 96 non-metropolitan counties because of the complication of the county border dividing the city of Manhattan, KS. Performing a precise analysis of the Pull Factor (PF) for these two counties is difficult because separating the retail activity within Manhattan is difficult. Geary County, RUC code 5, was removed from this analysis because of the complication of a military reserve, Fort Riley. The Fort hosts several large retail businesses; however, whose retail establishments do not report sales to the state of Kansas. The large population of the military base and the retail activity has a sizeable impact on a multi-county region.

III. The Model

The authors are interested in testing this simple conceptual model:

$$\text{Retail Strength} = f(\text{CB}, \text{BP}, \text{RE})$$

Where:

CB stands for the customer base served

BP the buying power of the customer base

RE stands for the quality of the retail environment

The model was developed using the County Trade Pull Factors (CTPF) as the measure of the relative strength of the retail business community in a county. Then six independent variables were chosen to represent CB, BP, and RE (See Table 1).

$$\text{Pull Factor} = f(\text{MEDIAN INCOME}, \% \text{ MKT CAPTURE}, \text{URBAN MASS}, \text{VALUE}, \text{MAJOR HWY}, \text{CIIV}).$$

The variable descriptions and expected signs for each of the variables are listed in Table 1

Table 1 Variable Names, Predicted Values and Descriptions

Variable Name	Expected Value	Description
MKTCAPTURE	+	Percent share of the retail market that the city with the most dominant retail center captures within an individual county
MEDINCOME	+	The median household income as reported in the 2000 Census
URBANMASS	+	Population of the dominant city(s) within each county
VALUE	+	Measures the per capita value of commercial property in all its dimensions, real and personal property values
CIIV	+	The size and direction of flow of commuter income
MJRHWHY	+	An indicator of the location on a major highway

This model is used to analyze the impact each of these variables have on a given county's CTPF. The authors used the URBANMASS, CIIV, and the MJRHWHY variables to represent the customer base (CB), and chose median household income, MEDINCOME, to represent the buying power (BP) of the customer base. Finally, VALUE and MKTCAPTURE were used to represent the quality of the retail environment (RE). All the variables are predicted to have a positive impact on County Trade Pull Factors.

IV. Methodology

The analysis was performed using 93 non-metro counties in Kansas in order to identify the factors that have a significant impact on the retail activity within this economic environment.

The data for this study comes from four sources. The CTPF data are based on a report by Seitz and Darling (2002). Median household income and city population data comes from the 2000 count of the U.S. Bureau of the Census. The Value data were provided by the Kansas Department of Revenue. A dummy variable was used to establish the link between counties and their

access to major highways. Eviews regression software was used to perform the regression analysis.

CIIV is a K-State measure of the flow of commuters and their earnings. The authors hypothesize that commuters will spend part of their earnings in the county where they work. Thus, the expected sign of the coefficient is positive. The job center counties provide both jobs and attract commuters' household spending. MEDINCOME measures the medium income as reported in the 2000 Census data. The expected sign of the coefficient is positive. MJRHWHY is a variable that is an indicator (zero/one) of the proximity and service provided by a major highway. This variable is expected to have a positive coefficient. MKTCAPTURE is an indicator of the dominance of a city in its county. URBANMASS is the variable that is a test of critical mass that will support a retail community. Both are expected to have a positive coefficient. Finally, VALUE measures the quality of the retail environment by quantifying the per capita value of commercial property in each county. The expected sign of the coefficient is positive.

V. Data Analysis

Table 2 Pull Factor Regression Analyses

Dependent Variable: Pull Factor		Method: Least Squares		Included observations: 93	
Variable	Coefficient	Std. Error	t-Statistic	Probability	
CIIV	0.129454	0.067336	1.922519	0.0578	
MEDINCOME	2.89E-06	2.29E-06	1.263934	0.2096	
MJRHWHY	0.081951	0.038216	2.144413	0.0348	
MKTCAPTURE	0.316569	0.095235	3.324096	0.0013	
URBANMASS	7.72E-06	2.41E-06	3.200541	0.0019	
VALUE	0.000332	6.37E-05	5.214956	0.0000	
R-squared	0.718137	Mean dependent variable		0.610859	
Adjusted R-squared	0.701938	S.D. dependent variable		0.253845	
S.E. of regression	0.138587	Akaike info criterion		-1.052301	
Sum squared residual	1.670945	Schwarz criterion		-0.888907	
Log likelihood	54.93198	Durbin-Watson stat		1.691207	

The results in Table 2 show that there is a good fit between variables in the model, highlighted by the adjusted R-square value of 0.7019. The regression results also show that four of the six variables: MKTCAPTURE, URBANMASS, VALUE and MJRHWHY, are highly significant at the 95 percent level, while CIIV is significant at the 90 percent level. MEDINCOME is not significant. The Durbin-Watson statistic measures the level of serial correlation in the model. Any value less than two is considered to have some serial correlation while values over two have no serial correlation. The Durbin-Watson test results indicate that there is a small amount of serial correlation occurring in the model, as the value is 1.694.

The variable VALUE measures the per capita value of commercial property in a given county and is used to quantify the quality of the retail environment, usually in the dominant retail centers in each county. Low values in the data signify that the retail community is not very attractive resulting in consumers shying away from spending money in these counties. Retail centers with strong anchor stores, surrounded by complementary specialty shops, restaurants,

and busy service businesses all add up to a high quality retail experience. Better lighting, displays and variety are factors that attract customers, creating the ‘pull’ in the PF. In this analysis the VALUE variable is the most significant of all the values in the model, supporting the idea that strong retail sectors increase the retail activity in a county.

MJRHWHY is an indication of a county’s access to a major US Interstate. In Kansas these counties are directly connected to I-70, I-35, I-335 and US Hwy 75. This variable also has a high level of significance in determining the CTPF of a county. URBANMASS and MKTCAPTURE are also significant at the 95 percent level. These variables measure the size of the central city and the dominance of the city in the host county. The high level of significance proves these variables have a direct impact on the measurement of pull factors.

CIIV is a variable that is both positive and negative in the data set. A positive CIIV measures the size if the payroll earned by commuters who are coming into a county to work. A negative CIIV measure the size of the payroll earned

by commuters in bedroom counties. The positive coefficient in the regression equation shows that commuters spend payroll dollars where they work thus adding to the customer base of job centers such as Salina in Saline County. This variable is significant at the 90 percent level (0.0578).

MEDINCOME is not significant in the model. The lack of significance in the P-values is denoted by the low t-statistic value in the regression output. The lack of significance for this variable may be explained because this study is a cross sectional one. Retail sales fluctuate based on the business cycle and other analysis done at K-State has uncovered the importance of median family income over time.

The β values are the slope coefficients of the independent variables in the model. Other things being equal, for every unit increase in CIIV, the CTPF will increase by 0.13 units. The MIDINCOME variable is not significant, so a change in the 1999 income has no effect on the CTPF. The MJRHWY shifts the CTPF up by 0.08, leaving other variables unchanged. For every one percent increase in MKTCAPTURE, the CTPF will increase by 0.32 units, with out changing other variables. Though URBANMASS variable is significant, the increase in CTPF caused by one unit change in URBANMASS is very small (0.00000772). For VALUE variable, other things being equal, for \$100 per capita increase in VALUE will result in 0.03 units increase in CTPF (Table 2).

The adjusted R^2 is 0.702, indicating that model is successful at explaining the variance in the dependent variable, CTPF.

VI. Conclusions and suggestions for further research

The state of Kansas has a fine grid of counties that make it possible to do retail research based on county as compared to city data. Both are now available. The authors chose to use a county database for several reasons. The authors wanted to give the users of the CTPF data a model that addresses the question “Why”. After many years of describing and tracking retail trade with the County Trade Pull Factor measure, the authors now are able to say that retail strength, as measured by the CTPF, is a function of the size and dominance of the central city, a major highway connection, the quality of the retail environment, and the inflow of commuters. All of these five variables are shown to have a positive influence on retail sales. It is surprising that the 1999 median household income did not significantly explain the variance in the FY2002 CTPF data. Maybe, the income earned in 1999, as reported by the Census, was too disconnected from retail activity in FY2002.

Future studies may include testing this model on a new data set such as county retail data in Nebraska. Also, more research is needed to explore casual relationships at the city rather than the county level of aggregation.

VII. References

Bingham, R.D. and R. Mier, Eds. 1993. *Theories of Local Economic Development: Perspectives from Across the Disciplines*. SAGE Publications, Newbury Park, CA. p. 8.

Blakely, E.J. and T.K. Bradshaw. 2002. *Planning Local Economic Development: Theory and Practice*, Third Edition. p. 64. SAGE Publications, Newbury Park, CA.

Darling, D., 2000. "Building a Healthy Retail Community: Lessons from Two Towns". In, *Small Town and Rural Economic Development: A Case Studies Approach*. P.V. and S. Loveridge, Eds. p. 61. Westport, CT

Flora, C.B., J.L. Flora, J.D. Spears, L.E. Swanson, M.B. Lapping, and M.L. Weinberg., 1992. *Rural Communities: Legacy and Change*. p. 7. Westview Press, Boulder, CO.

Kansas Statistical Abstract 2000. 35th Edition, September 2001. Policy Research Institute, The University of Kansas.

Leistritz, F.L., 2000. "Agricultural Processing Facilities as a Source of Rural Jobs". In, *Small Town and Rural Economic Development: A Case Studies Approach*. P.V. and S. Loveridge, Eds. p. 115. Westport, CT

Seitz and Darling, 2002. *County Trade Pull Factors Annual Report for Fiscal Year 2002*. CD Study Report #210. Kansas State University Research and Extension. Department of Agriculture Economics. Manhattan, KS.