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AN INVESTIGATION OF COMMERCIAL SECTOR TRADE IN NEVADA NON-METROPOLITAN COUNTIES

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ABSTRACT

Economic development strategies have traditionally centered on the attraction of goods-producing industries, usually manufacturing firms, to a community. However, creation or attraction of a manufacturing industry is highly competitive, costly, and risky. An alternative proposed economic development strategy is the expansion of a non-metropolitan communities commercial sector. However, before such strategies can be developed, the current status of non-metropolitan community sector activity needs to be derived. For this paper, the influence of non-metropolitan population, population growth, per capita income, and other county characteristics on Nevada non-metropolitan commercial sector activity is examined.

INTRODUCTION

Economic development strategies traditionally have been concerned with the expansion of export industries. Export industries bring money into the local economy from sales of locally produced goods and services to consumers outside the local economy. Dollar inflows from export industries are used to purchase goods and services (imports) from outside the region, however, not all export earnings are spent on imports. Certain goods and services are produced locally and export earnings are also spent on these items. Thus, larger export earnings may lead to larger local expenditures, and expansion of the local economy. Export or basic industries usually include the agricultural, mining, and manufacturing sectors.

Historically, rural communities lose retail and service sales to large metropolitan

communities. These lost sales, called leakages, reduce the size of a community's export base multiplier because respending activities occur outside the community. Therefore, a community might also investigate ways to expand its own commercial sector. A development strategy to expand local commercial sector activity potentially would increase the local export multiplier effects. A community's development strategy should not be used on export manufacturing plant development and attraction alone. A development strategy which not only encourages the attraction of export industries, but also emphasizes the development of a community's commercial sector may be a better approach.

Several studies and agricultural extension programs have been developed to investigate and encourage rural commercial sector growth. Programs have been developed by Stone and McConnon at

Iowa State University and Pulver at the University of Wisconsin. These programs use trade area analysis to estimate a rural community's current and potential performance of rural commercial sector activity. Trade area analysis uses two procedures to analyze a rural community's commercial sector activity: trade area capture and pull factors.

Trade area capture estimates the number of customers served by the community's commercial sector in one year. Pull factor analysis uses the trade area capture estimate and divides it by the community's population to derive a numerical ratio. If the pull factor is greater than 1 then the community is said to be serving more people than its population or it is capturing commercial sector sales from outside its boundaries. However, if the pull factor is less than one, the community is not capturing the commercial sales of its own populace and is losing commercial sector sales to outside counties. Thus, in order to create a strategy for the development of a community's commercial sector, the current activity of the community's commercial sector must be analyzed. Therefore, the primary objective of this paper is to estimate the different factors influencing commercial sector activity in non-metropolitan counties in Nevada.

OBJECTIVES

The primary objective of this study is to investigate the different factors influencing retail sales and changes in retail sales in non-metropolitan Nevada counties. Specific objectives are:

1. To complete a trade area analysis of non-metropolitan counties in Nevada.
2. To determine the influence of population size on non-metropolitan Nevada county per capita retail sales.
3. To estimate the impacts of changes in non-metropolitan Nevada county population on changes in non-metropolitan Nevada county retail sales and per capita retail sales.
4. To determine the effects of non-metropolitan Nevada county population, per capita income, unemployment rate, and resident adjustment factor on non-metropolitan Nevada county retail sales.
5. To determine impacts of non-metropolitan Nevada county total income, resident adjustment factor, unemployment rate, married population, and retired citizens on non-metropolitan Nevada county pull factors.

STUDY AREA

The area of study for this paper will be the state of Nevada. Nevada is made up of 17 counties, 2 of which are classified as metropolitan counties (see figure 1). The metropolitan counties are Clark County (Las Vegas) and Washoe County (Reno). These two counties have most of the state's population with Clark County having approximately 60% of the total state population and Washoe County having 23% of the total state population (Nevada Statistical Abstract, 1986).

The state of Nevada's population grew rapidly from 1970 to

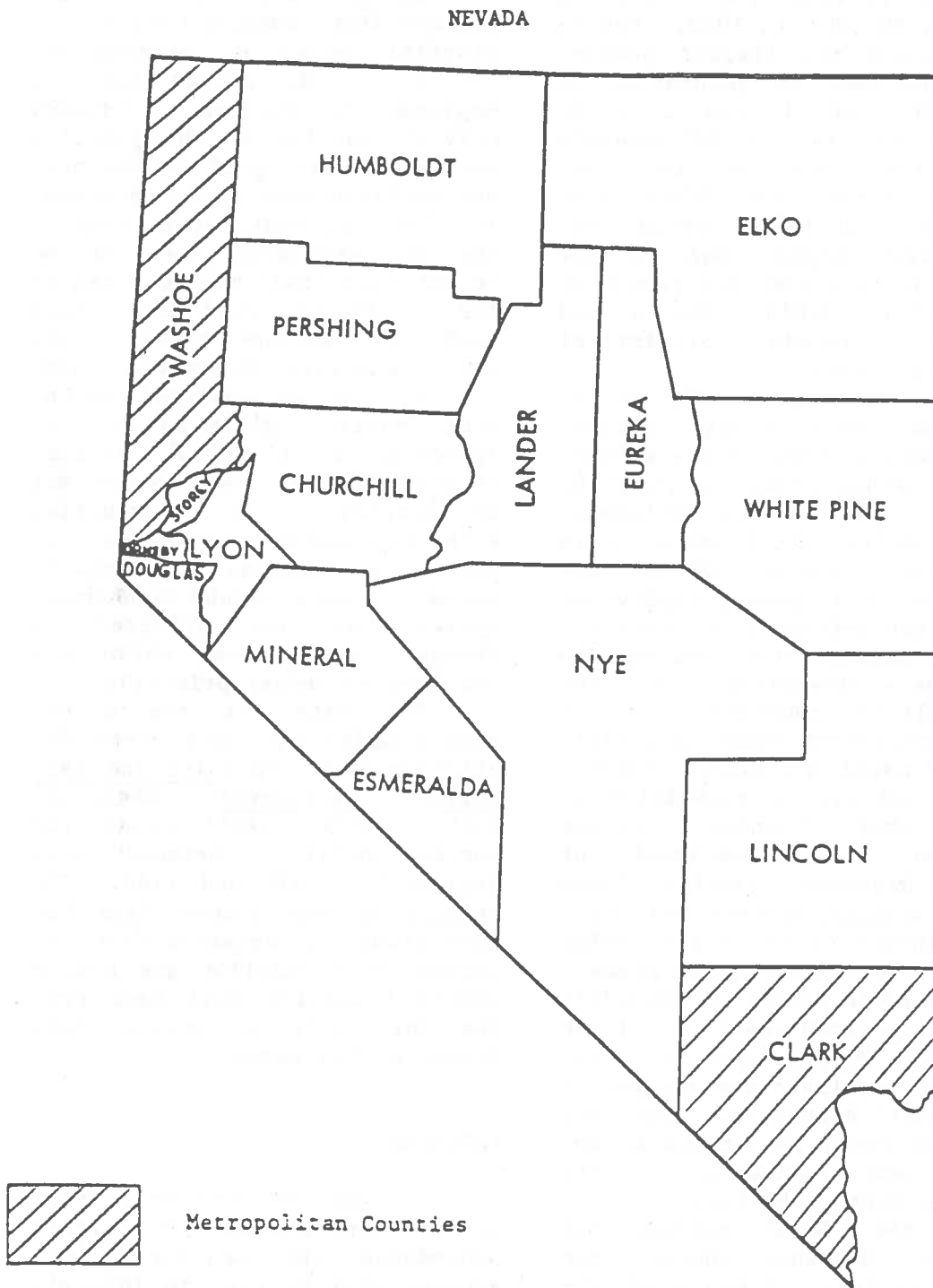


Figure 1.
State of Nevada

1980, increasing from 488,000 in 1970 to 800,000 in 1980. Nevada experienced the largest percentage increase in population in the 1970's of all states in the nation. From 1980 to 1985 Nevada's population continued to grow, however during the first five years of the 1980's Nevada was the third largest state in the nation as to percentage growth in population, behind Alaska and Arizona (Nevada Statistical Abstract, 1986).

The economy of Nevada is different from other national economies, in that it has a large service sector primarily in casino gaming. The largest employment in the metropolitan areas is in the casino gaming sector, but there is also gaming employment in the non-metropolitan counties. The non-metropolitan counties are not as diversified as the metropolitan counties. These non-metropolitan counties usually are dominated by a single economic sector and can be classified as agricultural dependent, mining dependent, or Department of Defense dependent counties. These county characteristics will have an influence on the retail sales in these non-metropolitan areas.

Characteristics of Nevada's non-metropolitan counties will be examined. Mining dependent counties are usually characterized as "boom-bust" economies. Retailers in these areas face risks of upswings and downswings in the local economy. Business thrives during the "boom" periods but business declines during the "bust" cycles. Because of the cycles of a "boom-bust" economy, retailers may not be interested in entering this market or expanding their present product line. Therefore, fewer offerings may be present in mining dependent counties.

Additionally, Nevada non-metropolitan counties have a substantial number of persons who reside in one county and are employed in another. Usually only a fraction of the salaries and wages being paid in the non-metropolitan county of employment are spent in that county because the employees spend their income to purchase goods and services in the county of residence. This tends to increase retail sales leakages in rural Nevada economies.

As for agricultural dependent counties, given the current agricultural financial crisis, retail sales in these areas may be decreasing. As for counties with substantial Department of Defense operations, these counties may be more immune to economic cycles but are affected by changes in political philosophy and federal budget priorities.

The data for the retail county sales for this study was obtained from the Sales and Marketing Management magazine. Total county retail sales for non-metropolitan Nevada were derived for 1976 and 1980. The population and income data for this study were obtained from the Census of Population and Nevada County Economics Data Base from the University of Nevada, Reno Bureau of Business.

PROCEDURES

To complete the objectives of this paper, trade area analysis procedures and ordinary least squares will be used to investigate commercial sector activity in non-metropolitan counties of Nevada. Trade area analysis will be estimated for non-metropolitan counties in Nevada for 1976 and 1980. Trade area capture and pull factor estimates will be

derived from non-metropolitan counties in Nevada. Regression analysis will be used to statistically test the impacts of population size, changes in population, and characteristics of non-metropolitan Nevada counties on retail sales, changes in retail sales, and pull factors in non-metropolitan Nevada counties.

Trade Area Analysis:

Trade area analysis is used as a tool to evaluate a community's commercial sector activity. The information obtained can then be used to develop strategies to strengthen activity in a community's commercial sector. Two measures are used for trade area analysis, trade area capture and pull factor.

Calculation of Trade Area Capture:

Trade area capture is determined by dividing the county's actual retail or service sales by the state per capita expenditures adjusted by the relative per capita income between county and state (Harris, 1985).

$$\text{Trade Area Capture} = \frac{\text{Actual Retail Sales of Merchandise Type } i \text{ in County } j}{\text{State Per Capita Expenditures for Merchandise Type } i \times \text{County } j \text{ Per Capita Income}}$$

State Per Capita Expenditures for Merchandise Type i	X	County j Per Capita Income
		State Per Capita Income

Most trade area models assume that a community's market area is solely a function of population and distance. Trade area capture explicitly incorporates income and expenditure factors which also affect the community's trade area. The underlying assumption

of trade area capture is that local tastes and preferences, regardless of income differences, are similar to the state's.

Calculation of Pull Factors:

The pull factor, for retail goods and services, is the trade area capture estimate divided by the county's population (Harris, 1985).

$$\text{Pull Factor} = \frac{\text{Trade Area Capture Estimate}}{\text{County } j \text{ Population}}$$

The division by county population removes the influence of population change within the county and focuses attention on the county's ability to draw outside customers.

Regression Analysis:

Regression analysis is used to statistically analyze data. Ordinary Least Square analysis or OLS will be used to derive relationships within data and to determine impacts of changes in retail sales in non-metropolitan counties in Nevada.

Five regression models will be estimated. The first model will determine the effect of a percentage change in population on non-metropolitan Nevada county retail sales. The hypothesis is that population has a direct positive effect on Nevada non-metropolitan retail sales; that is, as non-metropolitan Nevada county population increases, retail sales in non-metropolitan Nevada counties will also increase.

The next model examines the effect that non-metropolitan Nevada county population will have on county per capita real sales. It is hypothesized that

as non-metropolitan Nevada population increases, then county per capita real sales should also increase.

Regression equation three investigates the effect that a percentage change in non-metropolitan Nevada county population would have on the percentage change of county per capita real retail sales. It is hypothesized that a change in population would have a direct effect on the percentage change in per capita real retail sales. If a percentage change in non-metropolitan Nevada county population increases, then the percentage change in county per capita real retail sales should also increase.

In model four, the relationship of non-metropolitan Nevada county population, per capita income, county unemployment rate, and the residence adjustment factor² will be examined on their relationship to non-metropolitan Nevada county retail sales. As the population, resident adjustment, and per capita income increase then in theory the retail sales should also increase. As the unemployment rate rises then the retail sales should decline.

In regression model five, the relationship of non-metropolitan Nevada county total income, resident adjustment factor, unemployment rate, married population, and the percentage of retired citizens on Nevada non-metropolitan county pull factors will be estimated. Results of this regression analysis will help in determining factors which impact a non-metropolitan county's pull factors.

RESULTS

For the first regression equation, the relationship of

Nevada non-metropolitan county percentage change in population from 1976 to 1980 on non-metropolitan county percentage change in retail sales from 1976 and 1980 will be estimated. The estimated equation is presented below:

$$(1) \begin{array}{l} \% \text{ change in} \\ \text{retail sales} = 23.365 + \\ \text{from 1976/80} \quad (1.4453) \end{array}$$

$$\begin{array}{l} 0.12112 \quad \% \text{ change in} \\ (4.2595) \quad \text{population} \\ \text{from 1976/80} \end{array}$$

$$R^2 = 0.5826$$

$$\text{Durbin Watson} = 2.1625$$

$$F\text{-test} = 18.145$$

Equation 1 shows a direct effect in percentage change in non-metropolitan population from 1976 and 1980 and percentage in non-metropolitan retail sales. Equation 1 indicates that for a one percent increase in population in non-metropolitan Nevada counties, then non-metropolitan county retail sales would increase by 0.12112 percent. The R^2 is 0.5826 which indicates that at least 58 percent of the variation in the percentage change in retail sales was explained by the percentage change in population variable. The t-ratios in parentheses indicate confidence level and the intercept term is significant at the 90 percent confidence level.

The second relationship tested was the effect that the county population in 1980 had on the county per capita real net sales in 1980.

$$(2) \begin{array}{l} \text{County per capita} \\ \text{real net sales} = 1687.90 \\ \text{in 1980} \quad (3.6153) \end{array}$$

$$+ 0.02577 \text{ County popula-} \\ (0.74250) \text{ tion in 1980}$$

$$R^2 = 0.0407$$

$$\text{Durbin Watson} = 1.4231$$

$$\text{F-test} = 0.5515$$

Equation 2 indicates a positive relationship between Nevada non-metropolitan county population and the percentage change in non-metropolitan county retail sales. This indicates that for a one percent change in the county population, then county per capita real retail sales would change by 0.02577. The R^2 term shows that only 0.0407 or 4 percent of the change in county per capita real net sales is explained by the change in population. This indicates that there are more factors that need to be investigated. The intercept term is significant at the 99 percent confidence level and the regression coefficient falls at less than the 90 percent confidence level.

For the third regression equation, the relationships of a percentage change in Nevada non-metropolitan population and the non-metropolitan Nevada county percentage change in real per capita retail sales will be investigated.

$$(3) \text{ Per capita real retail sales \%} = 2.7941$$

$$\text{change } 1976/80 \quad (0.26587)$$

$$- 0.051305 \quad \% \text{ change in}$$

$$(-2.7755) \quad \text{population}$$

$$1976/80$$

$$R^2 = 0.3721$$

$$\text{Durbin Watson} = 2.4857$$

$$\text{F-test} = 7.7039$$

It was expected that the percentage change in Nevada non-metropolitan population and the percentage change in real per capita sales should be direct or positive. However, the regression coefficient derived shows an

inverse relationship between the percentage change in Nevada non-metropolitan county retail sales and the percentage change in the per capita retail sales. This indicates that as the percentage change in Nevada non-metropolitan population increases, the percentage change in Nevada non-metropolitan per capita retail sales decreases. This would indicate that non-metropolitan counties are losing retail sales to other counties. This may occur because the number of retail stores or retail offerings are less in non-metropolitan areas than in metropolitan communities.

$$(4) \text{ Real County POP}$$

$$\text{Retail} = 2236200 + 4372.0 -$$

$$\text{Sales} \quad (1.2135) \quad (8.0795)$$

$$1980$$

$$\text{PCI} \quad \text{UE} \quad \text{RADJ}$$

$$1959.6 - 5849500 + 138580$$

$$(-0.55252) \quad (-3.1040) \quad (1.9602)$$

$$R^2 = 0.8933$$

$$\text{Durbin Watson} = 1.3674$$

$$\text{F-test} = 20.9302$$

Where:

POP = Non-Metropolitan County Population in 1980
 PCI = Non-Metropolitan County Per Capita Income in 1980
 UE = Non-Metropolitan Unemployment Rate in 1980
 RADJ = Non-Metropolitan Resident Adjustment Factor in 1980

Regression equation 4 examines the effect of non-metropolitan county population, per capita income, unemployment rate, and resident adjustment on the real county retail sales in 1980. The equation shows that for a one person increase in population

then retail sales would increase by \$4,372; for a one dollar increase in per capita income the result would be a decrease in non-metropolitan county retail sales by \$1,959.60; for a one percent increase in the non-metropolitan county unemployment rate then the county retail sales would decrease by \$5,849,500; and with a one percent increase in the resident adjustment factor the result would be an increase in the county retail sales by \$138,580.

It was expected that as population increases then the non-metropolitan county retail sales should also increase and the equation supports this. The results of the equation were that as the non-metropolitan county per capita income increased then the county retail sales decreased. This may result because as the per capita income increases, non-metropolitan county consumers are traveling outside the county and purchasing goods and services in the metropolitan counties. As for the unemployment rate, when non-metropolitan county unemployment rate increases, retail sales decrease because fewer people are employed and earning income for purchases. It was also expected that as the resident adjustment factor increases then non-metropolitan county retail sales would also increase, this was supported by the regression results. As more people in a non-metropolitan county earn incomes outside their county of residence, then the total retail sales for that county will increase. Conversely, if a non-metropolitan county is experiencing laborers working in their county but residing outside the county of employment, total retail sales will decrease. This is a common occurrence in many of Nevada's non-metropolitan counties.

$$\begin{aligned}
 (5) \text{ Pull} & \qquad \qquad \qquad \text{TIC} \\
 \text{Factor} & = 5.9815 - .000000006249 \\
 1980 & (2.8312) \quad (-2.5430) \\
 \\
 & \qquad \qquad \text{RADJ} \qquad \qquad \text{UE} \\
 & + .0019 \quad + .073202 \quad - \\
 & (1.0241) \quad (1.0311) \\
 \\
 & \qquad \qquad \text{MR} \qquad \qquad \text{RET} \\
 & .085104 \quad + .00023191 \\
 & (-2.386) \quad (1.9381) \\
 \\
 & R^2 = 0.6326 \\
 & \text{Durbin Watson} = 2.01 \\
 & \text{F-test} = 3.0993
 \end{aligned}$$

Where:

- TIC = Non-Metropolitan County Total Income in 1980
- RACJ = Non-Metropolitan County Resident Adjustment Factor in 1980
- UE = Non-Metropolitan County Unemployment Rate in 1980
- MR = Non-Metropolitan County Married Population in 1980
- RET = Non-Metropolitan County Retired Population in 1980

The pull factor is used to estimate how a given county is capturing retail trade within and outside the county. Regression Equation 5 investigates the effect on the pull factors of non-metropolitan Nevada county income from county total income, resident adjustment factor, unemployment rate, married population, and retired population.

The equation shows that for a one dollar increase in non-metropolitan county total income, the pull factor will decrease. This means as total income for Nevada non-metropolitan counties increases, the rate of retail trade capture by a Nevada non-metropolitan county declines. As the non-metropolitan county resident adjustment increases by one

percent then the pull factor will increase by 0.0019. This means, as the number of people who earn their income from outside the county increases then the pull factor for a non-metropolitan Nevada county will increase. Also, as the unemployment rate increases by one percent then the pull factor will also increase by 0.073202. This can be explained in that those persons unemployed are not financially able to travel to metropolitan areas and increase spending activities in their county of residence. As the married population in non-metropolitan counties of Nevada increases by one percent then the pull factor decreases by 0.085104. This could be due to two earner incomes and families with higher incomes tend to purchase more retail goods in metropolitan counties. As the percent of retired population increases by one percent then the pull factor increases by 0.00023191. A direct relationship between non-metropolitan pull factor and percentage of non-metropolitan county population of retirement age is due to the less mobility of the elderly population.

CONCLUSION

Economic development strategies for many non-metropolitan counties primarily target the development or relocation of an export-base industry, usually manufacturing. However, this type of economic development strategy is very competitive and may be costly and risky. An alternative strategy would be to develop a local community's commercial sector, which would strengthen a communities multiplier effect. Results from this study has shown that development of Nevada's non-metropolitan commercial sector may be an appropriate strategy. Non-metropolitan counties in Nevada are not capturing potential retail sales from increases in non-metropolitan population and income. Results from this paper suggest that non-metropolitan counties in Nevada should incorporate commercial sector development in their counties as well as export sector development.

ENDNOTES:

¹For this paper, the term "commercial sector" covers firms in the whole-sale, retail, and service industries.

²The term "resident adjustment factor" can be defined as the percentage value of county income which comes from employment outside of the county or the percentage value of county income which is earned by people who live outside the county.

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