

**REGIONAL VARIATION OF PULL FACTORS FOR RETAIL SALES
IN OREGON'S NONMETROPOLITAN COUNTIES**

1979, 1982, 1984

by

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REGIONAL VARIATION OF PULL FACTORS FOR RETAIL SALES IN OREGON'S NONMETROPOLITAN COUNTIES

1979, 1982, 1984

ABSTRACT: The performance of pull factors for total retail sales in Oregon's nonmetropolitan counties during the economic cycle of boom, bust, and recovery of the early 1980s is examined for geographic patterns. One regional pattern and several county patterns are identified and discussed. Counties having the highest and lowest pull factors, and those exhibiting the greatest growth and decline in their pull factors, are examined with regard to the percentage of total retail sales by store group relative to other counties and statewide averages. The potential of the pull factor measure is discussed with regard to its contribution to regional economic analysis.

INTRODUCTION

The natural resource based economies of Oregon's nonmetropolitan areas were especially vulnerable to the recession of the early 1980s. The combination of many factors including an overvalued dollar in international markets, high interest rates, agricultural commodity surpluses and heightened foreign and domestic competition in the wood products industry contributed to extensive layoffs within the basic industries of rural Oregon.

Many manufacturing industries surviving the recession of the early 1980s restructured their operations. Increased production and profitability returned through investments in production technology, reduction of the skilled labor force and reductions in wages, salaries and employee benefits. Employment opportunities for new and displaced workers during the early eighties were found primarily in the service and retail sectors of the economy. Although post-recession employment gains in these industries checked somewhat the overall unemployment rate, the average wage levels in these industries were significantly

lower than those in manufacturing industries (Cortright 1986, 17).

Despite lower wages, fewer benefits and limited opportunity for advancement, a strong retail sector in a rural community provides some employment, recirculates dollars within the community, preserves vital entrepreneurial linkages between wholesalers and retailers (e.g. lines of credit, delivery routes, new product information, marketing assistance), and increases the potential for economic diversification in tourism and retirement related commerce.

A robust retail sector is essential for the economic viability of a rural community. The local availability of competitively priced retail items reduces the leakage of resident dollars to other communities. Increased nonlocal income expended in the community raises the local economic multiplier and supports the formation of new local businesses. The strength and performance over time of a community's retail sector can indicate the general health and vigor of the local economy.

Purpose

The purpose of this paper is to use pull factors to assess the performance of the retail sector in Oregon's nonmetropolitan counties during the boom, bust and partial recovery phases in the economic cycle that occurred during the early 1980s. Pull factors are an index of retail trade area capture and measure the relative performance among county retail sectors. Pull factors are calculated for total retail sales in Oregon's nonmetropolitan counties for the years 1979, 1982 and 1984; these years coincide with the boom, bust and partial recovery in

Oregon's economy. Mapping techniques reveal county-level geographic changes in retail trade capture among Oregon's nonmetropolitan counties. Specific objectives of this study are to:

- 1) examine in detail the methodology and data considerations of the pull factor for total retail sales;
- 2) map and discuss the relative performance of pull factors for retail sales in Oregon's nonmetropolitan counties during the economic cycle of the early 1980s; and
- 3) identify and analyze by store group nonmetropolitan counties having high and low pull factors and those that grew or declined over the period.

The first section of this paper introduces the concept of the pull factor. Included is an examination of the pull factor methodology, data considerations and the rationale for selecting the time series for this study. The overall performance of pull factors by region and county constitutes the second section of the paper. The conclusion summarizes the findings of this research, indicates opportunities for further research and considers the value of the pull factor measure as a tool for regional analysis.

Previous Work

Central place theory helps to explain the geographical distribution of retail centers and is the foundation for the spatial aspects of this research. Central place theory has long been used by geographers and economists to evaluate the locational arrangement of economic functions. First proposed by Christaller in

1933 and added to by Losch (1954), central place theory has been further developed by a number of American geographers--especially Isard (1956) and Berry (1967), Berry, Parr et al. (1988). Central place theory simultaneously considers the behavior of consumers and producers in a spatial market and deals with primary trade functions, the ideal arrangement of central places and the size and patterns of trade hinterlands (Foust and deSouza 1978, 62).

Other literature relevant to this paper include studies by Ferber (1958), Huff (1964), Van Tassell (1966), Boehm and Pond (1976), Ingene and Lusch (1980), Stone and McConnon (1983), Bain (1984), Harris (1985), Aronson et al. (1985) and Yanagida et al. (1986). These investigations focus on retail sales and their relationship to overlapping market areas, population, income, distance to work, and employment levels and other variables. The factors influencing total retail sales are explained in the cited literature largely by local income and population levels. Other factors such as the attraction of a nearby center, store space density, and urban/rural location are found to be important on occasion. These studies focus on total retail sales data; no studies examining the regional performance of pull factors were identified in the review of the literature.

PULL FACTOR METHODOLOGY AND DATA CONSIDERATIONS

The primary analytical tool in this study is the pull factor, an index of retail trade-area capture. Pull factors indicate the vitality of a community retail sector and are especially useful in showing the spatial and temporal trends of the community's trade area capture (Stone and McConnon 1983, 2). Since pull

factors are based on trade area capture estimates, a brief description of trade area capture estimates precedes the description of the pull factor.

The nonmetropolitan trade "captured" is determined by dividing the community's retail sales by the total per capita expenditures for retail sales for the region, adjusted for the differences in per capita income between the community and the region. In this study, Oregon's nonmetropolitan counties represent the communities in the calculation of pull factors and the state of Oregon represents the region. The trade-area capture equation is stated:

$$\text{Trade Area Capture} = \frac{\text{Total Retail Sales in a Given County}}{\text{State Per Capita Expenditures for Retail Sales (j)} \times \frac{\text{County Per Capita Income}}{\text{State Per Capita Income}}}$$

Whereas most trade models assume that a county's market area is solely a function of population and distance, the trade-area capture model described here explicitly incorporates income and expenditure factors which also affect the county's trade (Harris 1985, 1).

Trade-area capture estimates are an aggregate figure made up of both local and nonlocal customer equivalents. To estimate the portion of retail customers a county draws from outside its borders a county "pull factor" is derived using the equation:

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

The division of the trade-area capture by county population adjusts for the

influence of population within the county and focuses attention on the county's ability to draw (or "pull") nonlocal customers (Hustedde et al. 1984, p.58).

Interpretation of Pull Factors

The interpretation of a pull factor is based on its value above or below 1.00. The strict interpretation of a county pull factor of 1.00 is that the retail merchants of the county sold all of their goods to a population equivalent to its county population. Thus, the county's retail sales are "as predicted" based on the pull factor model. A pull factor less than 1.00 suggests a relatively smaller amount of retail sales in the county than predicted and implies that county merchants do not "capture" the retail trade of all the potential customers within their county. The inference is that county residents leave the county to purchase certain retail items. Conversely, a pull factor greater than 1.00 suggests that a county's retail sales are greater than predicted. The inference in this case is that retail sales are made to all local customers plus a population of nonlocal customers.

The performance of a county's retail sector over time is determined by the change in the strength of the pull factor as measured in this study by pull factor index points. One index point equals 0.01 in the pull factor. Changes in pull factors over time are in this way clearly stated. For example, the statement "a county's retail sector has improved by 20 index points over a three year period" asserts precisely the magnitude increase in the pull factor.

Since pull factors were calculated for Oregon's 36 counties using the statewide income and expenditure figures as a referent, the sum of the pull

factors for the entire state equals 1.00. Thus calculated, the change among pull factors among counties is a "zero-sum game"; that is, the increase of one county's pull factor necessarily requires a decline in another with no net growth to the state as a whole. While this does not address the ability of the state of Oregon to capture retail sales from other states, it serves the intended purpose of this paper by evaluating the relative vigor of county retail sectors within the state, and more specifically, nonmetropolitan counties.

Assumptions of the Model

The validity of a pull factor depends upon the validity of three underlying assumptions: 1) that county tastes and preferences for retail goods are identical to those within the state as a whole and income elasticities are proportional to income for all retail store groups, 2) that prices for retail goods in each county are identical to the state average, and 3) that the documented per capita income for each county accurately reflects the buying power of county residents. A county's pull factor will be an accurate reflection of its ability to make sales to nonlocal customers to the extent that these assumptions are valid. Small discrepancies between the "identical" preferences and prices assumption and small inaccuracies in per capita income as a measure of buying power are not critical given the highly aggregated data used in this study; major discrepancies can cause misleading pull factors.

Basic and Nonbasic Function of Pull Factors

Pull factors can be used as a general indication of the basic or nonbasic function of total retail sales in a local economy. Although the degree to which

the pull factor is above or below 1.00 is indicative of the basic/nonbasic function of the total retail sector, the 1.00 figure is not an absolute measure of a basic retail function. That is, a county with a pull factor of 1.25 probably has a basic component to its retail sales, whereas a county with a pull factor of .75 probably does not. It is less defensible to say a county with a pull factor for retail sales of 1.02 has a basic component to its retail sales and one with a pull factor of .98 does not. Nonmetropolitan counties with pull factors well above 1.00 likely have a basic component to their pull factor and probably indicates their role as a regional retail center. Cross hauling (or cross purchasing) between counties occurs in varying degrees among all counties. Even in counties with pull factors considerably less than 1.00 there may be some store groups that sell to customers in excess of the county population and serve a basic function.

Sources of Data

County per capita income figures used in the calculation of trade area capture estimates are from the U.S. Department of Commerce, Bureau of Economic Analysis. County population and retail sales data are from the July issues of Sales and Marketing Management's Survey of Buying Power in the year following the actual study year (e.g., the 1979 data were published in the magazine's July 1980 issue). The Survey of Buying Power divides total retail sales data into six published groups: food stores, eating and drinking places, general merchandise stores, furniture/home furnishings/appliance stores, automotive and drug stores. The Survey of Buying Power uses the most recent Census of Population and Current Population Reports as benchmarks for population

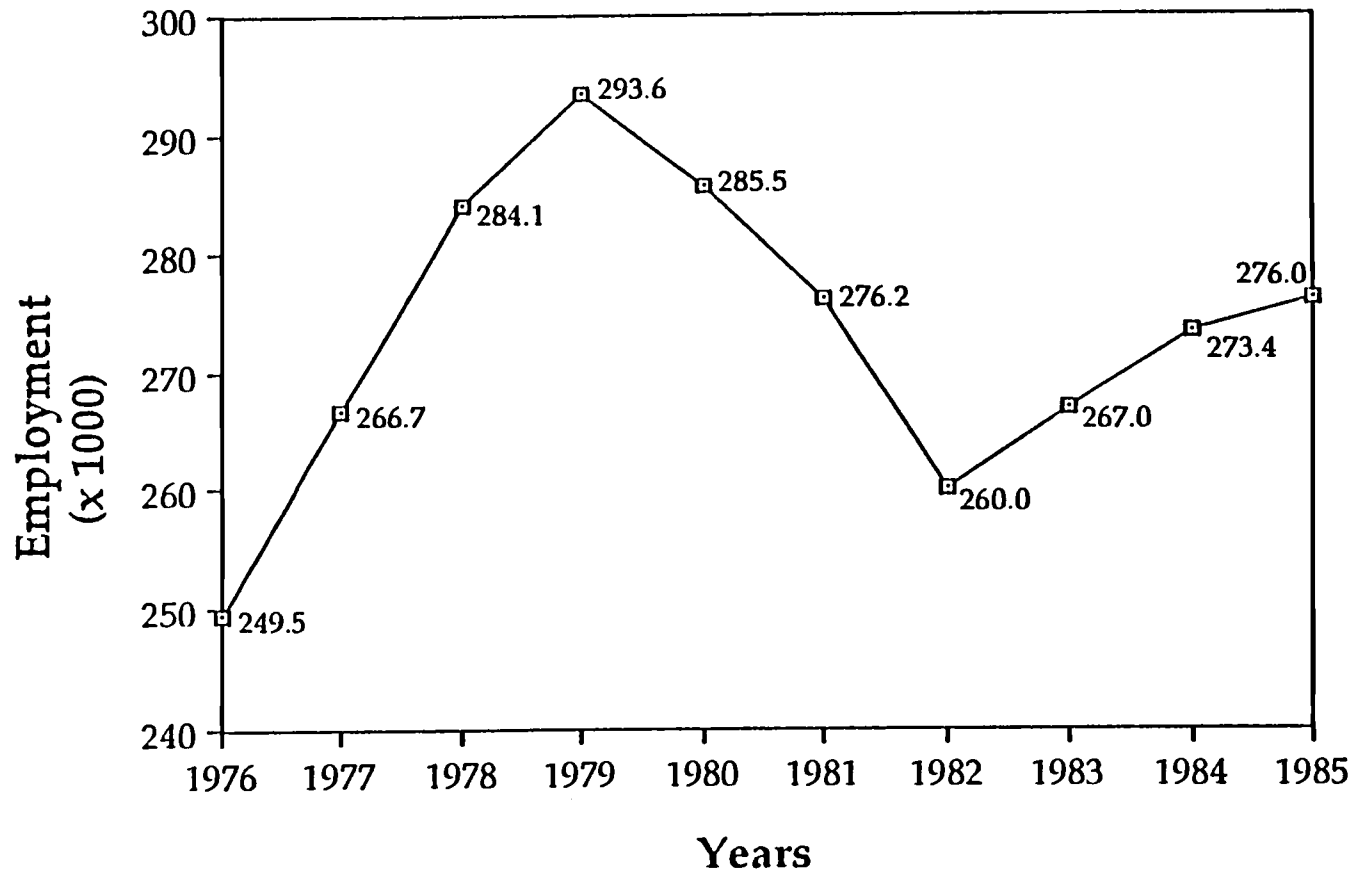
estimates, and employs the Census of Retail Trade for retail sales benchmarks.

Sales and Marketing Management (1985, 36) offers caution in interpreting its retail sales estimates of 1984 to previous years. The 1984 estimates in the 1985 Sales and Marketing Management magazine are updates from the 1982 Census of Retail Trade; estimates in the Survey of Buying Power issues from 1979 to 1984 used the 1977 Census of Retail Trade as a benchmark. When comparing trends, a rise or fall in pull factors between 1982 and 1984 may reflect an adjustment in the benchmark data. The benchmark update during the time span of this investigation and the implications of that update in interpreting the pull factor between 1982 and 1984 is the primary methodological caveat of this investigation.

Several writers have addressed the reliability of the Survey's retail sales figures. Waldo and Fuller (1977, 64) in the most recent independent analysis available compared the Survey's estimates with U.S. Census data and found that of 463 counties sampled, only three percent deviated more than ten percent from the U.S. Census figures. A 1985 report by Sales and Marketing Management compared the Survey's retail sales by store group figures with the U.S. Census Bureau's "Revised Monthly Retail Sales and Inventories." The comparison showed a variation of less than plus-or-minus one percent for seven out of nine categories. Both comparisons suggest a reasonable level of accuracy in the Survey's population and retail sales data.

Time-Series Analysis of Data

Time-series analysis of county pull factors reveals the general trend in a county's retail sector. This study examines the change in pull factors for total retail sales in Oregon's nonmetropolitan counties between the years ending 1979, 1982, and 1984. According to the State Employment Division, 293,600 persons were employed in nonmetropolitan jobs in 1979, the peak year for employment in Oregon. In 1982, the "trough" year of the economic recession, nonmetropolitan employment dropped to 260,000 jobs. By 1985, nonmetropolitan employment rebounded to 273,400 jobs (Figure 1). Examining pull factors during this period shows how the retail sector performed in nonmetropolitan counties throughout a portion of an economic cycle. It is important to remember that references in this study to the economic "boom," "bust" and "recovery" reflect statewide averages for nonmetropolitan counties between 1979-84.



Source: Oregon Department of Human Resources, Employment Division

Figure 1. Wage and Salary Employment in Oregon's Nonmetropolitan Counties 1976-85

REGIONAL VARIATION IN PULL FACTORS FOR RETAIL SALES IN OREGON'S NONMETROPOLITAN COUNTIES 1979, 1982, 1984

Defining Regions for Analysis

Oregon's diverse physical, economic and cultural geography is in this study divided into seven regions. Each region comprises contiguous counties thought to share similar characteristics in terms of their physical geography and economic base (Figure 2). A priori demarcation of regions by adjacent county groups risks false or meaningless representation; however, the regional approach to data analysis often provides a valuable perspective.

Summary of Pull Factor Performance by Region 1979, 1982, 1984

The pattern of performance among pull factors for total retail sales in Oregon's nonmetropolitan counties between 1979-84 is shown in Figures 3, 4, and 5, and Table 1. (Note: Pull factor change by region is represented using bar graphs in Appendix 1.) Probably most striking is the absence of observable patterns among the defined regions during the period (Figure 3). The only regional pattern occurred in Northeastern Oregon where all three counties increased their pull factors between 1979-84 (see below). In all other regions some counties had increasing pull factors while others declined; even among increasing and decreasing counties within a region few trends emerge. The pull factors do not appear to directly reflect changes in the economic cycle as measured by nonmetropolitan employment represented in Figure 1. A time lag may well exist between employment change and a corresponding change in retail expenditures.

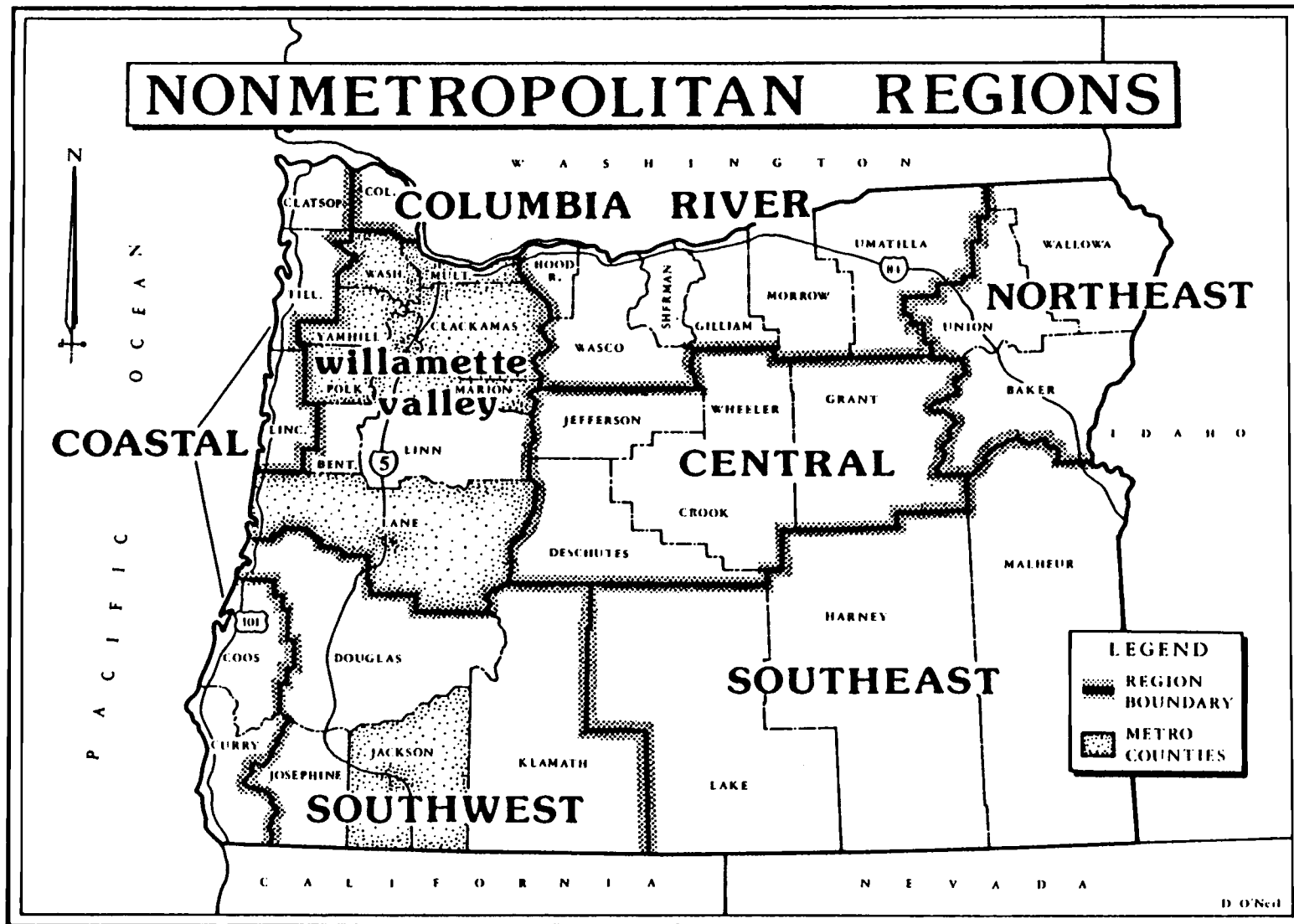


Figure 2. Oregon's Nonmetropolitan Regions

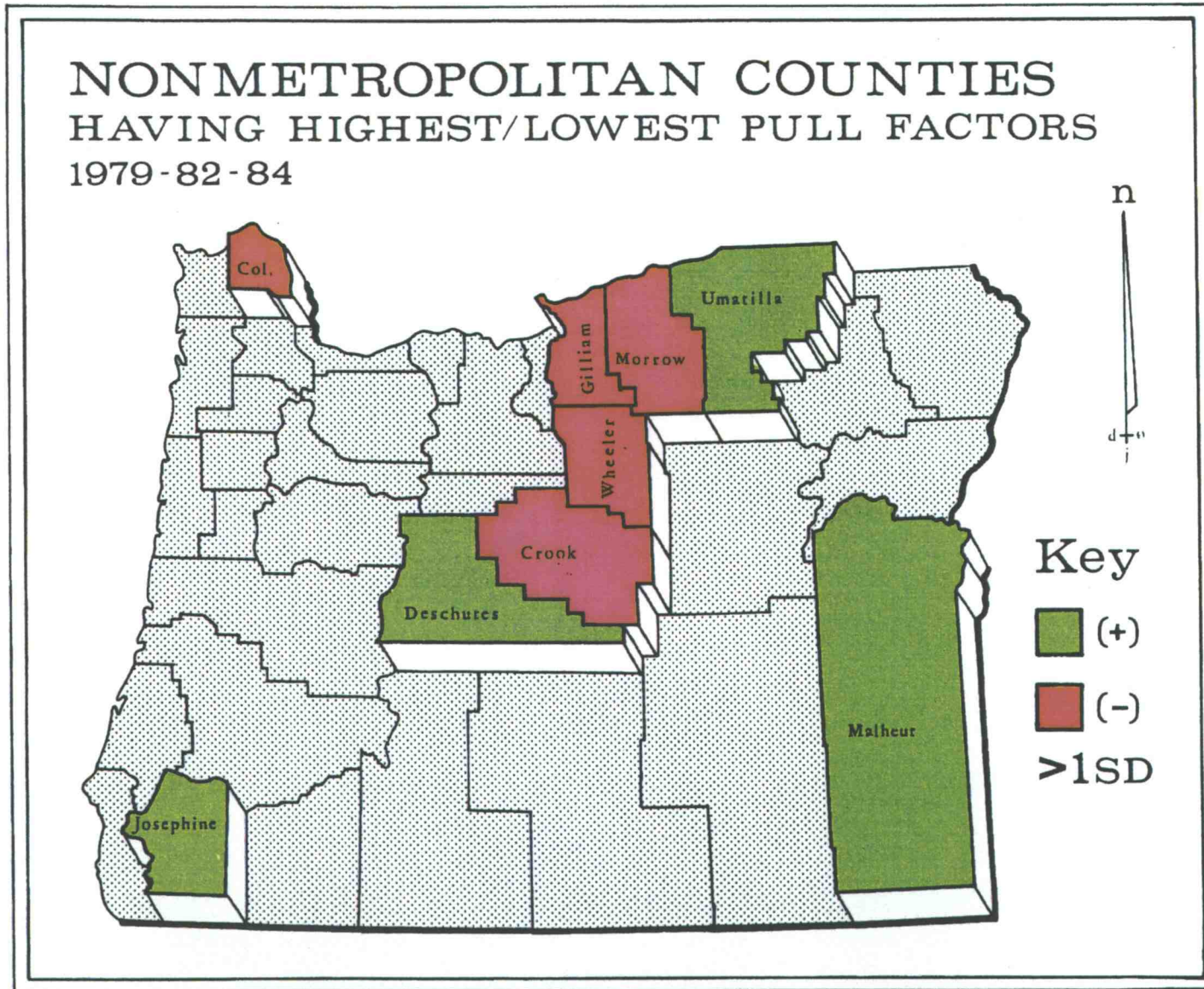


Figure 4. Highest and Lowest Nonmetropolitan Pull Factors 1979-84

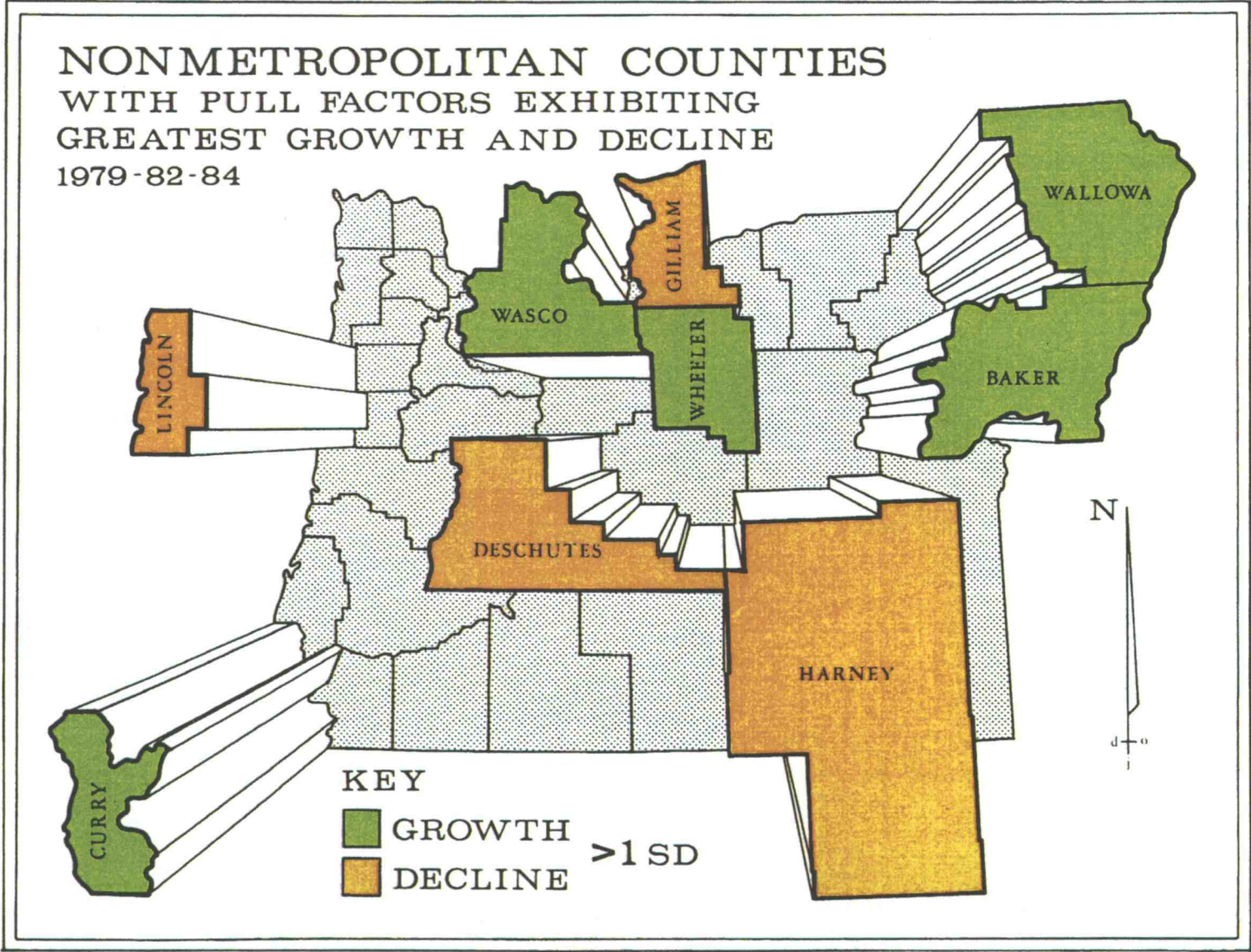


Figure 5. Greatest Increasing and Decreasing Nonmetropolitan Pull Factors 1979-84

Two patterns appear by mapping outlier counties having pull factors greater than one standard deviation above and below the mean nonmetropolitan pull factor. Figure 4 reveals apparent nodes of nonmetropolitan commerce in the northeast, southeast and southwest corners, and at the center of the state. A cluster of four very low pull factor counties are exposed in the north-central part of the state. Columbia County is conspicuous as a low pull factor county in the metropolitan northwest.

No definitive pattern is observed by mapping nonmetropolitan counties exhibiting the greatest increase and greatest decrease in their pull factor during the 1979-84 period (Figure 5). Two of the three counties in the Northeastern Oregon region had pull factors that increased more than one standard deviation above the mean. Central and Southeastern Oregon had three decreasing counties and one increasing county. In the Coastal region one county increased, and one county decreased. One county in the Columbia River region also declined.

Mapping the change in pull factors over the economic cycle by region did not result in many observable patterns of county performance. County pull factors seem to be more county specific than other demographic and economic measures. Subsequent analysis of nonmetropolitan pull factors performed at the county level reveal some natural patterns.

Without regard to regional boundaries, several patterns in pull factor performance appear (Figure 3). Generally speaking, pull factors in the northern tier of the state increased over the period relative to those elsewhere in the state. Most counties of the Portland Metropolitan Statistical Area had pull factors that

steadily increased over the period. Metropolitan counties outside of the Willamette Valley (Lane and Jackson) seemed to have no increasing pull or advantage over adjacent nonmetropolitan counties. South-central counties had pull factors that tended to counter the trends of the economic cycle.

Pull factors of 24 of the 28 nonmetropolitan counties followed two general patterns. Within the broad category of nonmetropolitan counties having consistently trending pull factors between 1979-84 eight counties had pull factors that consistently increased, and six counties had pull factors that consistently decreased. Within the broad category of nonmetropolitan counties having inconsistently trending pull factors, five counties had pull factors that followed the economic cycle, and five counties had pull factors that countered the economic cycle (Figure 3). Three counties had pull factors that stayed the same between two time periods. Linn County varied only one index point during the period (Table 1).

Average Percentage of Total Retail Expenditures by Store Group in Metropolitan and Nonmetropolitan Counties, and Change Between 1979-84

The percentage of total retail sales are disaggregated by individual store group and examined to help understand and explain the performance of county pull factors. Percentages of total retail expenditures by store group are calculated for individual counties. These percentages are compared to those in other counties and to the metropolitan and nonmetropolitan averages. Similarities and differences in the store group percentages in counties having particularly high, low, growing and declining pull factors may suggest possible explanations for the notable performance of the pull factors in those counties.

The distinction between store groups raises the central place concept of the hierarchy of central functions. The hierarchy is based on minimum threshold levels of demand that will allow a firm (a retail firm in this case) to remain profitable at a location; the range of a good refers to the distance people are willing to travel to purchase it. The order of a center is determined by the highest order good offered by the center. A review of Appendix 2 identifies the type of establishments included in the six store group categories. In this paper the higher-order store groups include Furnishings which represent big-purchase items for the home, Auto (new and used cars and campers), and the General Merchandise store group; Food, Eating and Drinking, and Drug store groups are considered lower-order store groups. The diversity of establishments in the residual Other store group weakens the value of comparisons of this store groups between counties.

On average, metropolitan counties have a relatively larger percentage of their total retail expenditures in the generally higher-order General Merchandise and Furnishings store groups, while nonmetropolitan counties have a larger percentage in the generally lower-order Food, Auto and Drug store groups (Appendix 3). One notable exception is the higher percentage in nonmetropolitan counties of Auto store group expenditures. (Possible explanations for this might be that expenditures of new and used vehicles take up a larger portion of the nonmetropolitan residents disposable income compared to metropolitan residents, or that nonmetropolitan counties specialize in automobile and camper sales.)

Expenditures in the Food and Eating and Drinking store groups in both metropolitan and nonmetropolitan counties grew between 1979-84 relative to the Furnishings and Drug store groups (Appendix 3). There was a convergence over the period between metropolitan and nonmetropolitan counties in the percentage of expenditures in the Food, General Merchandise and Auto store groups. In nonmetropolitan counties, the percentage of expenditures in Food, Eating and Drinking, and General Merchandise store groups increased on average, while the percentages in Furnishings and Drug declined.

Analysis of the composition and change among the store groups of counties in the Northeastern Oregon region help interpret that region's growth. Total retail expenditures in Wallowa County in 1984 were primarily from the Auto (35%) and Food (29%) store groups. Both store groups experienced growth in their percentage of the total since 1979 as shown in Appendix 4. These store group percentages were higher in Wallowa County than the statewide nonmetropolitan average and significantly higher than in metropolitan counties. The county had smaller percentages than both metropolitan and nonmetropolitan averages in all other store groups. This analysis suggests that the pull factor in Wallowa County grew in response to increased automobile and food sales. Baker County had a composition among its store groups similar to that in Wallowa with the exception of a smaller percentage of total retail sales in the Auto store group and a sizable increase between 1979-84 in the General Merchandise store group. The Union County retail sector was similar to that of nonmetropolitan counties on average except for comparatively fewer expenditures in the General

Merchandise and Drug store groups. The General Merchandise and Auto store groups grew more as a percentage of total expenditures in Union County than nonmetropolitan counties statewide. In sum, these observations of the change in store groups indicate that the increase in pull factors in Northeastern Oregon was due to independent factors within the individual counties rather than a change common throughout the region.

Nonmetropolitan Counties Having the Highest and Lowest Pull Factors Between 1979-84

As was shown in Figure 3, Malheur, Josephine Deschutes and Umatilla counties each had pull factors greater than one standard deviation above the mean; Morrow, Gilliam, Crook, Wheeler and Columbia had pull factors greater than one standard deviation below the mean. In 1984, Wasco and Klamath counties narrowly made it into the highest category, and Grant County fell just into the lowest category. While these counties may deserve more attention in the future, they are not examined further in this paper. The marginal entry of these counties into the highest and lowest groups between 1982-84 may be from adjustments in the data benchmark. The consistently high and low pull factor counties warrant further discussion.

Highest Nonmetropolitan Pull Factors 1979-84

Deschutes, Umatilla, Malheur and Josephine counties had the highest pull factors of any of Oregon's counties between 1979-84 (Table 1). Malheur County surpassed Josephine County in 1982 becoming the highest pull factor in the state. Relative expenditures among the individual store groups in all four counties were very similar to the nonmetropolitan average; Food and Auto made up the largest

percentage, Furnishings and Drug made up the smallest. The change among the store groups was also comparable; Food, Eating and Drinking, and General Merchandise increased while Furnishings and Drug declined (Appendix 5). Despite their high pull factors, these nonmetropolitan counties do not have percentages of total retail sales by store group more similar to metropolitan counties than other nonmetropolitan counties.

Deschutes County, and its principal city Bend, has long been an economic center in the high desert of central Oregon. Bisected by major highways (US 20 and US 97), a hub for agriculture, logging and wood products manufacturing, and the destination of recreationists year around, it is understandable that Deschutes County merchants make retail expenditures to more customers than its population and per capita income alone suggest. Although Deschutes County's store group composition was very near the nonmetropolitan average, the county had a greater percentage of sales in the Food and Drug store groups and smaller percentages in the Furnishings and Auto store groups than the other counties with high pull factors (Appendix 5). The change in the percentage of expenditures by store group over time generally reflected the nonmetropolitan pattern with increases in Food, Eating and Drinking, and General Merchandise, and decreases in the Furnishings store group.

Umatilla County (and its principle city of Pendleton) serves as a center of commerce in the northeastern part of the state. Pendleton lies on Interstate Highway 84 and other major highway routes leading north into Washington and south into the Blue Mountain counties of eastern Oregon, and enjoys a relatively

diversified economic base comprised of agriculture and food processing, wood products, tourism and manufacturing.

The percentage of total retail expenditures by store group in Umatilla County is different from the nonmetropolitan average in that Furnishings and General Merchandise store groups are comparatively low and Auto and Drug store groups comparatively high (Appendix 5). It is perplexing to find in this high pull factor county the under representation and decline over the period of the higher-order store groups Furnishings and General Merchandise. Umatilla County apparently makes up the difference in its higher percentage of expenditures in Food and Auto store groups. The decline in Umatilla County's pull factor raises questions regarding its historic role as a dominant regional center.

The most striking observation in this study is the remarkably high value of pull factors for retail sales in Malheur and Josephine Counties (Table 1). On the surface, neither county seems to have any comparative advantage for drawing significant numbers of retail customers from other counties. Upon closer examination, these anomalous counties appear to capture a disproportionate share of retail sales due to two completely different sets of circumstances: one market oriented, one based on the assumptions inherent in the calculation of pull factors.

Malheur County's large pull factor is largely explained by key locational and market factors. The largest city in the county, Ontario, is situated at the junction of US Highways 20 and 26 and Interstate 84 at the Oregon-Idaho

border; however, the key factor contributing to the county's large pull factor seems to be the number of retail sales made to residents of Idaho. Idaho has a sales tax of 5 percent and Oregon has no sales tax. Thus, it is popular (perhaps even traditional) for residents of Idaho to travel to Ontario for the purchase of retail goods. This is encouraged by businesses in Ontario, some of which advertise their tax-free merchandise on large billboards as far away as Boise, Idaho (Ontario Chamber of Commerce, 1988). Malheur County has larger percentages of total retail sales in the higher-order General Merchandise and Auto store groups; sales tax savings on these items would be substantial. Furnishings were relatively smaller as a percentage than average (Appendix 4). Malheur County's consistently high pull factor seems to be a market oriented phenomenon arising from the county's unique geographic location and differences in sales tax policies between Oregon and Idaho.

Josephine County was among the top two of all Oregon counties in its pull factor in each of the three years of this study (Table 1), yet Josephine had the lowest county per capita income in the state as reported by the Bureau of Economic Analysis. Explanations for such high pull factors in Josephine County are not as obvious as in Malheur County. The percentage of total retail sales by store group was near the nonmetropolitan average and did not experience great changes over the period. Furthermore, Josephine County has no particular locational advantage for retail sales. The county does share a border with California which has a 5 percent sales tax, but there are no adjacent cities of any size to draw significant numbers of retail customers. Interstate 5 passes through

Josephine County and the city of Grants Pass, but the importance of this location is presumably diminished by the proximity of Medford, Oregon, just 28 miles southeast of Grants Pass in metropolitan Jackson County. Tourism, as measured by the county's percentage of travel-related employment in 1985, was estimated to be somewhat lower in Josephine County (5.6%) than in Jackson County (6.3%) and the state (5.8%) (U.S. Travel Data Center, 1986 p.7) and is seemingly unrelated to Josephine County's high pull factor.

With no readily apparent explanation for such consistently high pull factors in Josephine County, the assumptions inherent in the computation of the pull factor need to be compared with the characteristics of the county to check for unusual circumstances. The three assumptions inherent in pull factor calculations are: 1) retail prices near the statewide average, 2) tastes and preferences in retail items in the county similar to those statewide, and 3) per capita income estimates that accurately reflect the purchasing power of county residents.

In Josephine County, prices for retail goods are not significantly higher or lower than the statewide average and there is little difference between the types of retail items purchased in Josephine County and those statewide according to Sales and Marketing (1985, 160). However, there is some indication that the Bureau of Economic Analysis' published per capita income figures may underestimate the purchasing power of county residents. Southwestern Oregon has a geography and climate well suited for the growing of marijuana. Large networks of marijuana plots, irrigation systems, and curing facilities have been discovered by citizens and police. Several methamphetamine laboratories have

also been discovered in the county. Thus, Josephine County's high pull factors may not reflect any advantage in its retail sector, but the validity of the assumptions inherent in the calculation of the pull factor. When undocumented income is spent on local retail goods the pull factor will be inflated.

Lowest Nonmetropolitan Pull Factors 1979-84

Gilliam, Morrow, Wheeler, Crook and Columbia counties had the lowest nonmetropolitan pull factors in Oregon between 1979-84. Comparison of the percentage of total expenditures by store group between these counties and the nonmetropolitan average reveals great differences; in some counties one or two store groups dominate retail expenditures. Great changes occurred in the percentage of expenditures by store group between 1979-84 in these low pull factor counties (Appendix 6).

Gilliam and Morrow are sparsely populated adjacent counties along the Columbia River. The cities of Arlington and Boardman are located on Interstate 84; however, few retail establishments exist to take advantage of Interstate traffic. Instead, the Interstate allows easy access for residents of north-county communities to travel to the larger Hermiston and Pendleton for retail goods. The more remote south-county communities of Condon and Heppner have limited opportunities for retail shopping.

Gilliam County's limited shopping results in a very unusual distribution of retail expenditures by store group (Appendix 5). Sales in the General Merchandise and Furnishings store groups were so small Sales and Marketing Management did not report them. The Food store group lost 27 percentage

points between 1979-84 and comprised only 11.3 percent of total retail sales in 1984. The Other store group increased 12.7 percentage points between 1979-84 and in 1984 made up fully 41.1 percent of total retail expenditures. Morrow County had slightly larger percentages of retail sales in the Eating and Drinking, and Other store groups compared to the nonmetropolitan average; all other store groups were lower than average.

Wheeler County has the fewest residents in the state (1400 in 1984); its largest town is Fossil (pop. 485). Curiously, Wheeler was one of two counties having the greatest increase in its pull factor over the period. The Auto store group constituted nearly one half (49.3%) of total retail expenditures in the county in 1984; sales in Drug and Furnishings were negligible. General Merchandise dropped 12.3 percentage points between 1979-84. The Food store group grew by 10.2 percentage points. The dominance of the Auto store group and lack of expenditures in the Furnishings and Drug store groups indicates the very limited retail opportunities in the county (Appendix 6).

Crook County's largest town, Prineville (pop. 5280) is more than three times larger than Wheeler County, however, Crook had a smaller pull factor than Wheeler County in 1984. Crook County's low pull factor is likely due in large part to the influence of adjacent Deschutes County. The majority of Crook County's retail expenditures were in the Food store group (Appendix 5). The Other store group is also large but declined over the period as a percent of total retail sales relative to expenditures the Food, Eating and Drinking and General Merchandise store groups. Crook County has a considerably smaller percentage

of its total retail sales in General Merchandise and Auto compared to the nonmetropolitan average.

Columbia County's low pull factors are very probably due to larger nearby markets. Although the county is large (pop. 36,200) compared to the north central counties, State Highway 30 directly connects communities in Columbia County to metropolitan Portland, OR to the east and Longview, WA to the north and west. This connectivity to higher-order shopping is apparently an obstacle for local retail merchants. Columbia was second only to Crook County in its percentage of total retail sales attributed to the Food store group (Appendix 5). This percentage increased by over ten percentage points between 1979-84. The county has considerably less of its total expenditures in General Merchandise and Auto than nonmetropolitan counties on average, and a greater percentage in the Eating and Drinking and Drug store groups. Thus, it can be inferred that residents of Columbia County buy food locally, but go to Longview or Portland for higher-order retail purchases.

Nonmetropolitan Counties Exhibiting the Greatest Growth and Decline in Pull Factors Between 1979-84

Baker, Wallowa, Wheeler, Wasco and Curry counties had pull factors that changed in excess of one standard deviation above the mean during the 1979-84 period. Harney, Deschutes, Gilliam, Grant and Lincoln had pull factors that changed in excess of one standard deviation below the mean (Figure 4). Four of the ten counties also were among either the highest or lowest nonmetropolitan pull factors; Baker and Wallowa counties are also in the Northeastern Oregon region. Interestingly, comparison of Figures 3 and 4 shows Wheeler County

having among the lowest but greatest growing pull factors, and Deschutes County having among the highest but greatest declining pull factors.

Nonmetropolitan Counties Exhibiting Greatest Growth

Wheeler County experienced the greatest growth in its pull factor of any county in Oregon between 1979-94. The county had a pull factor of only .42 in 1979, but it grew by 23 index points in five years to a still low .65. Wasco County's pull factor grew by 16 index points over the period and surpassed Umatilla as the county with the highest pull factor in the Columbia River region (Table 1). One possible explanation for this growth in the pull factor during this period in both Wasco and Wheeler counties could be the influx of several hundred followers of the religious leader Bagwan Shree Rajneesh. Rajneesh established a religious commune in the town of Antelope (renamed Rajneeshpuram) in Jefferson County. Wasco County's largest city, The Dalles, benefitted economically from this situation by selling goods and supplies to the commune. Wasco County had a much larger percentage of total retail expenditures in the General Merchandise and Auto store groups than average during this time period (Appendix 4). Considering the small population base of Wheeler County and the exceptionally large growth in its pull factor, a portion of that growth must have been caused by the influx of "Rajneeshees" at Rancho Rajneesh, just 30 miles west of the Wheeler County town of Fossil.

Baker County's pull factor grew from .77 in 1979 to a theoretically self-sufficient 1.00 in 1984--an increase of 23 index points (Table 1). This growth was led by increases in the Food, General Merchandise and Auto store groups.

Baker County has notably smaller, and declining, percentages of expenditures in the Furnishings and Drug store groups, and a larger, and growing, percentage in Food (Appendix 4). The growth of General Merchandise and Auto store group expenditures likely boosted the growth in the pull factor.

Wallowa County also had a pull factor of .77 in 1979. The pull factor grew by 18 index points to .95 by 1984 (Table 1). Food and Auto store groups grew considerably as a percentage of total retail expenditures over the period. Wallowa County has a much greater percentage of its total retail sales in Auto and Food store groups. Between 1979-84 the Auto store group grew by 6.8 percentage points and in 1984 comprised fully 35 percent of total expenditures (Appendix 4). This suggests that the sales of new and used vehicles contributed to the high growth of the pull factor during the period.

Curry County's pull factor grew by 15 index points from 1979 to 1984 ending the period with a nearly self-sufficient pull factor of .96 (Table 1). Auto General Merchandise and Eating and Drinking store groups grew relative to all other store groups. Curry County has a greater percentage of its total retail expenditures in the Eating and Drinking store group than either the nonmetropolitan or metropolitan average (Appendix 4). While the county has a much smaller percentage than the nonmetropolitan average in General Merchandise, that store group grew over the period and may have contributed to the county's increase in its pull factor.

Nonmetropolitan Counties Exhibiting Greatest Decline

Among the significantly declining counties, Harney County's pull factor declined the most (33 index points) during the 1979-84 period. The 1979 pull factor of 1.09 implies that the retail sector was serving a broader market than expected. The 1980 pull factor of .76 suggests that the Harney County retail sector had significantly deteriorated during the recession. Harney County has a store group composition similar to the nonmetropolitan average but lower in Drug and slightly higher in Food and Other store groups. All store groups dropped off except for General Merchandise and Other, the latter as high as 35.3 percent by 1984 (Appendix 3).

Grant County's pull factor dropped by 19 index points during the "recovery" from 1982-84. The Food store group dropped by 14.2 percentage points but still made up 32.2 percent of all retail sales in the county (Appendix 3). Auto and Drug store groups also received proportionately more expenditures than the nonmetropolitan average. Eating and Drinking and Drug store groups comprised a much smaller percentage of total expenditures than average. The dependency on expenditures in the Food store group and the significant decline in Food between 1982-84 suggests that store groups performance indicates the trend of the county pull factor.

The drop in Lincoln County's pull factor of 22 index points from 1979-84 may be due less to its economic health than the relative improvement of retail trade in nearby coastal communities. Lincoln County's pull factor of 1.18 in 1979 suggests a basic element in its retail sector. The pull factor of .96 in 1984 implies

that the county was not quite self-sufficient in retail trade. Lincoln County's major city, Newport, has historically served as the economic hub of the central Oregon coast. Lincoln County experienced drops in its percentage of total retail sales in the higher-order store groups of General Merchandise, Furnishings and Auto (Appendix 3).

Deschutes County exhibited high but declining pull factors throughout the period (Table 1). The expenditures by store group are pretty close to the nonmetropolitan average and no substantial drop occurred in any store group during this time (Appendix 6). Reasons for Deschutes County's declining pull factor and retail dominance remain uncertain.

In addition to being one of the counties having the lowest pull factor, Gilliam County also had one of the greatest declining pull factors in the state. Gilliam County's pull factor dropped by 27 index points between 1979-84 (Table 1). The decline in its pull factor from .66 in 1979 to .39 in 1984 is an obvious indication of hard times in that county. Reasons for this decline may include its small, isolated population and dependence on fluctuating world markets for wheat. The percentage of total retail expenditures in the Food store group dropped by 27.7 percentage points between 1979-84 (Appendix 6).

SUMMARY

Pull factors for total retail sales in Oregon's nonmetropolitan counties have been defined and calculated for the years 1979, 1982 and 1984. Changes in the pull factors were then mapped by geographical region during this economic cycle

of boom, bust and partial recovery. Only one regional pattern emerged as defined in this paper--all three counties of the Northeastern Oregon region had pull factors that grew during the 1979-84 economic cycle. Several patterns were recognized when pull factor performance was examined at the county level. Nonmetropolitan counties having the highest pull factors over the period were spatially distributed at the corners and center of the state outside the Willamette Valley. A clear pattern materialized for the distribution of nonmetropolitan counties having the lowest pull factors during the period. Four of the five lowest pull factor counties were clustered in the north central part of the state. Nonmetropolitan counties in the south central portion of the state tended to have pull factors that countered the cycle of economic boom, bust and partial recovery between 1979-84.

The most striking anomalies were the very high pull factors in Malheur and Josephine counties. Malheur County seemed to benefit from large numbers of Idahoan shoppers who travel to Malheur County to avoid paying the 5 percent sales tax in Idaho. Josephine County's very high pull factors were probably inflated by a false assumption inherent in the calculation of the pull factor; considerable undocumented income, possibly from illegal sources, underestimated the true purchasing power of county residents.

The pull factor for retail sales has been shown to be a useful tool for understanding regional economic health. With cognizance of the data considerations and assumptions inherent in the calculation of the pull factor and potential data constraints, the pull factor can add perspective regarding the

county's retail opportunities; this can complement specific measures of individual well being such as per capita income and employment data. For example, in a recent article Sommers (1988, 1) using 1986 personal income data describes Gilliam and Sherman counties as "centers of affluence"..."onpar with Seattle, WA Portland, OR and Boise, ID." The very low and declining pull factors in these counties between 1979-84 suggest that while there may be a proportionately high number of wealthy individuals in those counties, their retail trade opportunities are limited.

Further research into the contributions of pull factors are warranted in several areas. Market analyses can be undertaken to see if an expansion by merchants into under-represented store groups is feasible. Regression analysis between selected county characteristics and pull factors can be performed to determine significant statistical relationships between the variables. In researching this paper correlation matrices were calculated for six variables thought to be related to the pull factor. Variables based in any degree on population, employment and income data were found to be too closely related to the variables used in the calculation of the pull factor to provide valid results. The three variables that were independent of the pull factor calculation (ie. percent population greater than 65 years, commuter income and unemployment rate) did not have strong correlations (Appendix 7). Regression analysis using other variables external to the pull factor (such as a sound statistic to measure tourism) would provide a more critical examination of the the pull factor and possibly increase its use as a tool for regional economic analysis.

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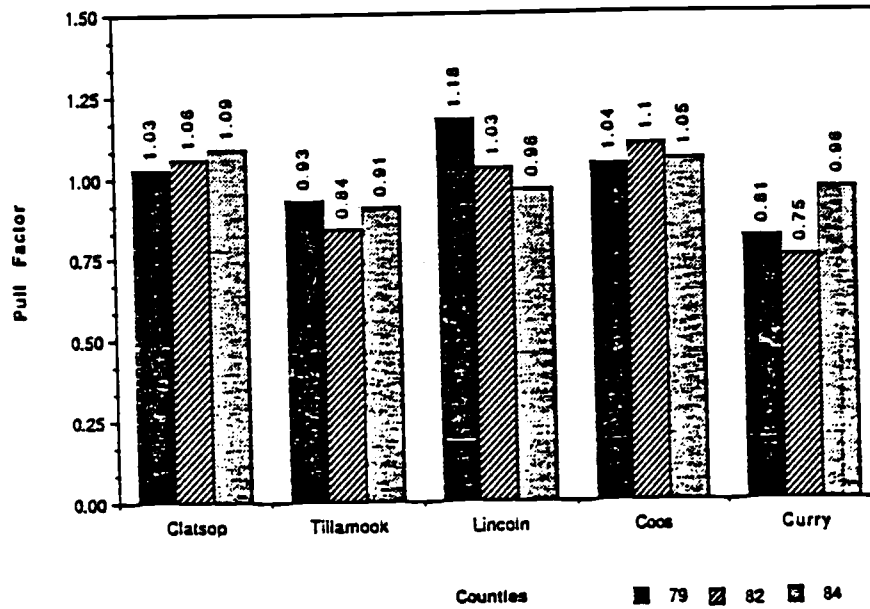
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APPENDICES

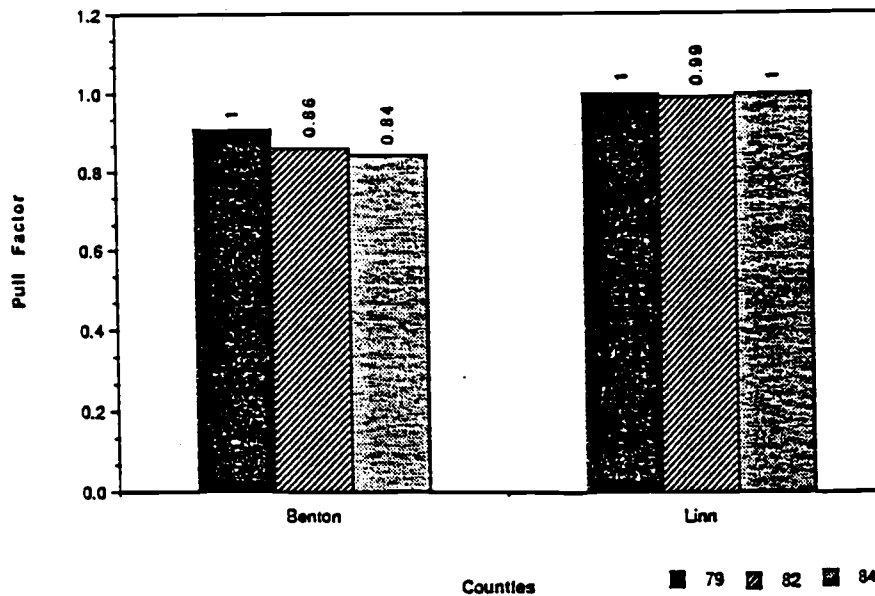
APPENDIX 1.

Performance of Pull Factors by Nonmetropolitan Region 1979, 1982, 1984

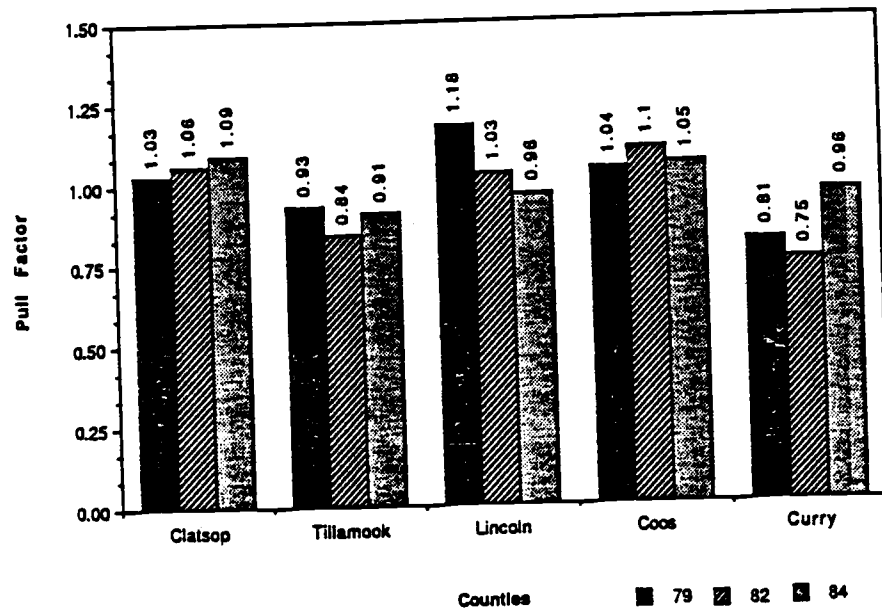
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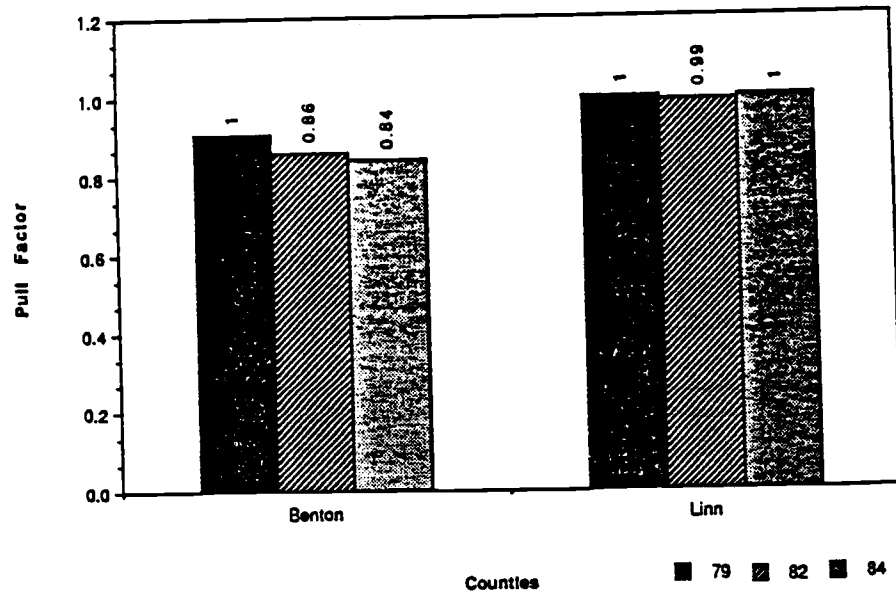
Willamette Valley



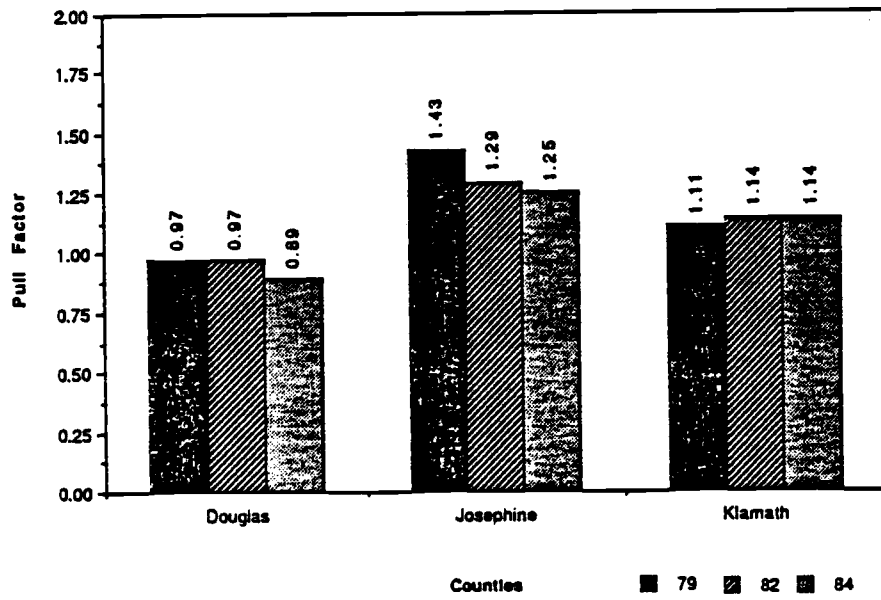
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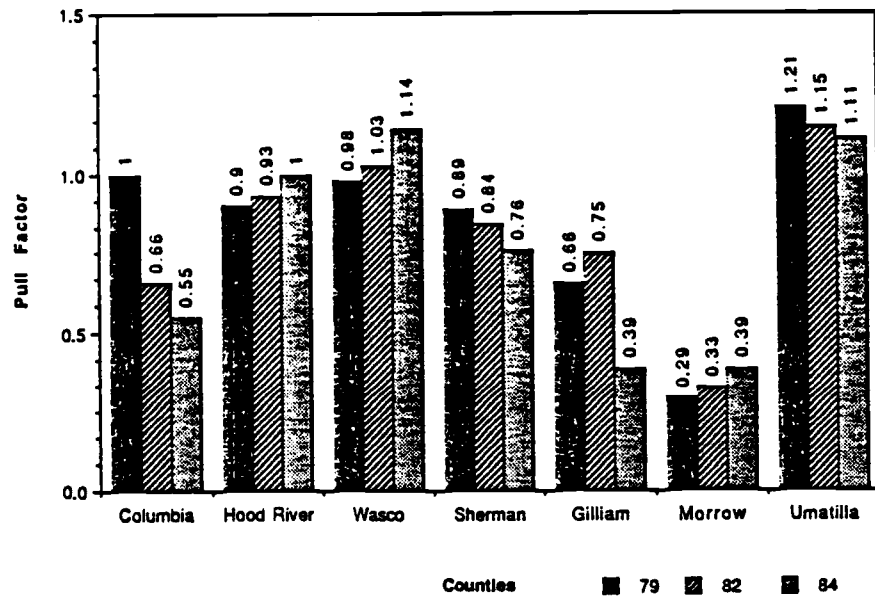
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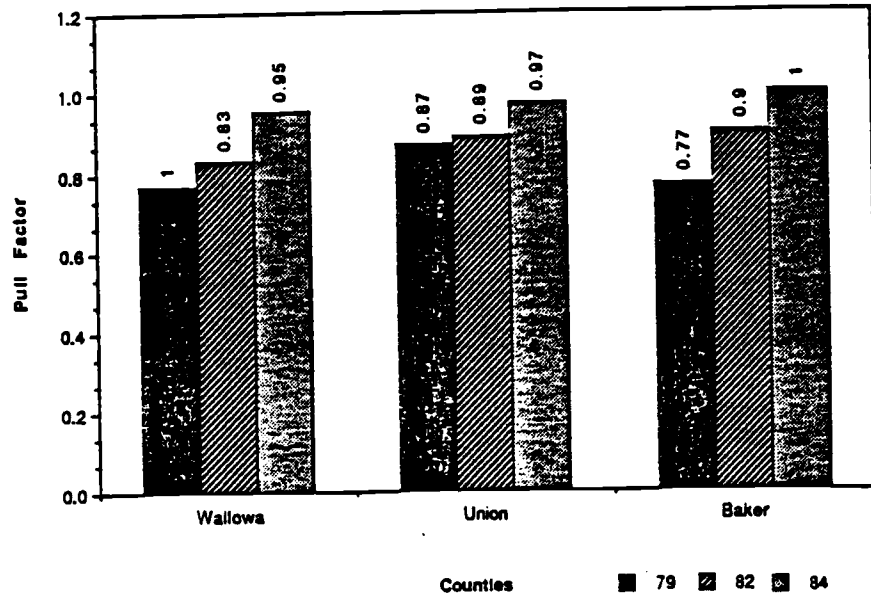
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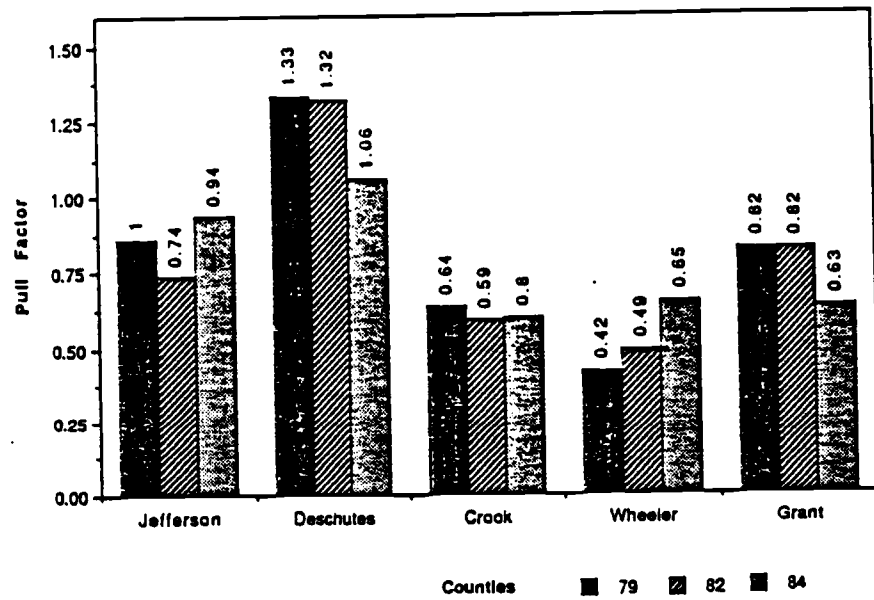
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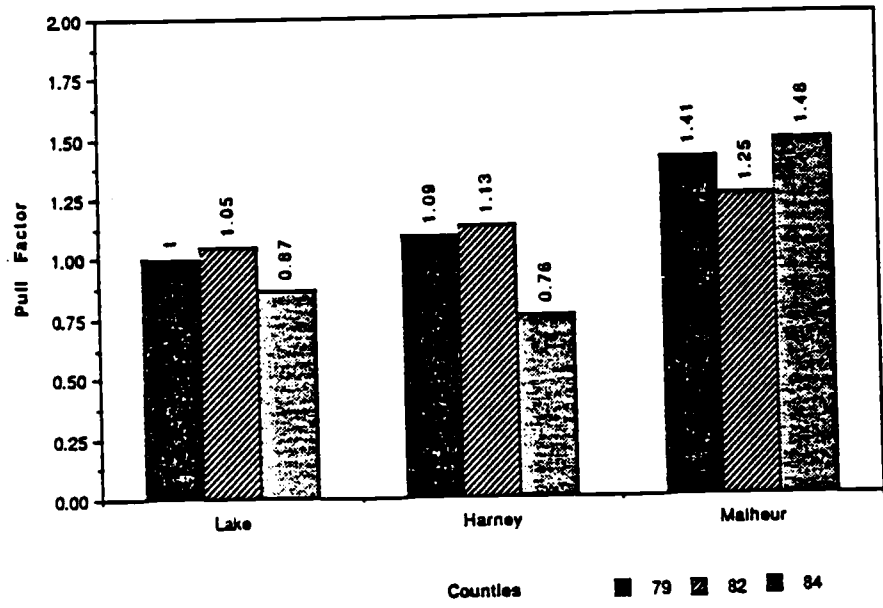
Northeastern Oregon



Central Oregon



Southeastern Oregon



APPENDIX 2.

Explanation of Data Service Terms

Retail Sales: All net sales of establishments engaged primarily in retail trade. Retail sales by such nonretailers as wholesalers and service establishments are not counted. The Total Retail Sales figure includes sales of store types not included in the Data Service. Thus the arithmetic difference between Total Retail Sales and the aggregate sales of the nine major store types represents sales of "All Other Stores."

Automotive Dealers: Included are retail outlets selling cars--domestic and imported, new and used. Motorcycle dealers, household trailer dealers, boat dealers, and "other" automotive dealers (such as tire, battery, and accessory dealers and auto and home supply stores) round out this group. Dealers selling new or used commercial vehicles, motorized industrial equipment, mobile homes, or bicycles are not included.

Drug stores: Includes both drug stores and proprietary stores. Drug stores fill and sell prescriptions; proprietary stores do not. Both sell drugs, proprietary medicines, and other health and first aid products. Both may sell a number of related lines--cosmetics, toiletries, candy, tobacco products, magazines, toys, etc.--and may operate a soda fountain or lunch counter.

Eating and Drinking Places. Includes establishments selling prepared food and drinks for consumption on or near the premises or for takeout, as well as lunch counters and refreshment stands selling prepared food and drinks for immediate consumption. Also included are caterers and in-plant food contractors, as well as leased eating and/or drinking concessions in theaters, hotels, amusement parks, etc. Excluded are restaurants and lunch counters operated by department stores and hotels.

Food Stores: Establishments selling food primarily for home consumption. This definition embraces grocery stores, meat markets, fish markets, fruit and vegetable markets, candy, nut and confectionery stores, dairy product stores, retail bakeries, and egg and poultry dealers. Although food store sales include revenue from sales of nongrocery items, they still are most useful in determining how much people spend for food products.

Furniture, Home Furnishings, and Appliance Stores: Stores selling goods used for furnishing the home, other than antiques and secondhand items. The principal subgroup, Furniture and Home Furnishing Stores, includes establishments carrying furniture, floor coverings, draperies, curtains, upholstery, bedding, housewares, and miscellaneous home furnishings. The other subgroups contain household appliance stores, radio-TV and audio equipment stores, record shops, and musical instrument and sheet-music stores.

General Merchandise Stores: Includes department stores, limited-price variety stores, general merchandise stores, and general stores (with less than one-half of their volume in food sales). Excludes non-store retailers (mail-order houses, vending machine operators, and direct-selling establishments).

"All Other Stores": Includes liquor, sporting goods, book, stationary, jewelry, hobby and toy, photographic, and gift stores, as well as nonstore retailers.

Source: Sales and Marketing Management Magazine, 1986. "Survey of Buying Power Data Service" p.A-7

APPENDIX 3.

Percentage of Total Retail Sales by Store Group 1984, (and Change Since 1979) for Nonmetropolitan Counties Exhibiting the Greatest Decrease in Pull Factors 1979-84.

County	Food	Eat	G.M.	Furn.	Auto	Drug	Other
Harney	26.9 (-2.0)	9.3 (-3.0)	4.1 (+2.7)	2.6 (-0.2)	21.1 (-2.6)	.007 (-1.7)	35.3 (+6.1)
Grant	32.2 (-14.2)	5.9 (0.0)	4.2 (+1.8)	4.6 (-0.8)	24.5 (+10.0)	5.6 (-0.4)	23.0 (+2.5)
Lincoln	21.0 (-4.2)	19.8 (+5.0)	3.5 (-1.4)	2.1 (-0.4)	14.8 (-3.7)	6.2 (+1.4)	32.5 (+3.2)
Deschutes	23.3 (+1.6)	10.1 (+2.3)	9.7 (+4.8)	2.6 (-2.0)	19.2 (-2.1)	5.0 (0.0)	30.2 (-4.5)
Gilliam	11.3 (-27.7)	18.8 (+6.4)	0.0 (-1.3)	0.0 (0.0)	27.3 (+10.8)	1.5 (-0.5)	41.1 (+12.7)

Nonmetro	24.1 (+1.8)	10.7 (+1.5)	8.0 (+0.1)	3.3 (-1.4)	22.2 (0.0)	4.5 (-0.1)	27.2 (-1.9)
Metro	18.0 (+2.4)	10.8 (+1.0)	17.6 (-0.9)	4.6 (-1.3)	20.8 (-0.02)	1.8 (-1.0)	26.3 (-0.4)

APPENDIX 4.

Percentage of Total Retail Sales by Store Group 1984, (and Change Since 1979) for Nonmetropolitan Counties Exhibiting the Greatest Increase in Pull Factors 1979-84.

County	Food	Eat	G.M.	Furn.	Auto	Drug	Other
Wheeler	21.2 (+10.2)	12.2 (+6.9)	8.4 (-12.3)	0.0 (+1.2)	49.3 (-0.2)	0.0 (0.0)	9.0 (-3.3)
Wasco	15.0 (-1.4)	10.9 (+2.0)	12.6 (+9.2)	3.1 (-1.6)	26.2 (-2.4)	7.9 (+0.5)	24.2 (-6.5)
Wallowa	29.9 (+10.2)	6.3 (-2.8)	2.7 (-1.8)	2.4 (+0.8)	35.0 (+6.8)	3.5 (-3.0)	20.2 (-10.3)
Baker	28.9 (+4.2)	11.5 (-0.5)	5.8 (+1.8)	2.1 *-0.4)	23.1 (+1.1)	2.3 (-2.4)	26.3 (-3.3)
Curry	27.8 (-0.1)	12.2 (+0.4)	3.8 (+2.4)	3.6 (-0.5)	18.9 (+4.2)	4.6 (-2.1)	29.1 (-4.3)
Union	24.1 (+.02)	10.0 (+0.4)	2.3 (+2.3)	4.3 (-1.6)	23.9 (+3.1)	8.4 (-0.5)	27.0 (-3.0)

Nonmetro	24.1 (+1.8)	10.7 (+1.5)	8.0 (+0.1)	3.3 (-1.4)	22.2 (0.0)	4.5 (-0.1)	27.2 (-1.9)
Metro	18.0 (+2.4)	10.8 (+1.0)	17.6 (-0.9)	4.6 (-1.3)	20.8 (+0.2)	1.8 (-1.0)	26.3 (+0.4)

APPENDIX 5.

Percentage of Total Retail Sales by Store group (and Change Since 1979) for Nonmetropolitan Counties Having the Highest Pull Factors 1979-84.

County	Food		Eat		G.M.		Furn.		Auto		Drug		Other	
Deschutes	23.3	(+1.6)	10.1	(+2.3)	9.7	(+4.8)	2.6	(-2.0)	19.2	(-1.8)	5.0	(0.0)	30.2	(-4.5)
Umatilla	25.5	(-4.2)	9.0	(+.01)	4.0	(-0.2)	2.7	(-1.6)	27.4	(+3.7)	5.0	(+.01)	26.3	(-4.)
Malheur	21.0	(-4.2)	10.3	(+1.8)	11.6	(+7.4)	2.7	(-0.6)	23.5	(+0.3)	3.5	(-1.4)	27.5	(-3.0)
Josephine	20.1	(+0.3)	8.7	(+1.1)	8.4	(+1.1)	3.5	(+1.9)	26.2	(-2.0)	3.3	(-0.7)	29.1	(+1.5)

Nonmetro	24.1	(+1.8)	10.7	(+1.5)	8.0	(+0.1)	3.3	(-1.4)	22.0	(0.0)	4.5	(-0.1)	27.2	(-1.9)
Metro	18.0	(+2.4)	10.8	(+1.0)	17.6	(-0.9)	4.6	(-1.3)	20.8	(+0.2)	1.8	(-1.0)	26.3	(+0.4)

APPENDIX 6.

Percentage of Total Retail Sales by Store Group (and Change Since 1979) for Nonmetropolitan Counties Having the Lowest Pull Factors 1979-84.

County	Food	Eat	G.M.	Furn.	Auto	Drug	Other
Gilliam	11.3 (-27.7)	18.8 (+6.4)	0.0 (-1.3)	0.0 (0.0)	3 (+10.8)	1.5 (0.5)	41.1 (+12.7)
Morrow	21.0 (-0.5)	13.4 (+2.7)	3.6 (+3.6)	1.5 (-1.2)	18.3 (+2.7)	2.8 (-4.8)	39.4 (-2.1)
Wheeler	21.2 (+10.2)	12.2 (+6.9)	8.4 (-12.3)	0.0 (-1.2)	49.3 (-0.2)	0.0 (0.0)	9.0 (-3.3)
Crook	41.6 (+16.2)	8.2 (+2.2)	4.4 (+1.8)	1.4 (-2.1)	14.9 (-4.2)	2.5 (-2.7)	2.7 (-11.3)
Columbia	35.9 (+10.6)	12.0 (+3.5)	1.6 (-1.2)	6.2 (-2.4)	14.1 (-5.7)	8.0 (+1.7)	22.3 (-6.4)

Nonmetro	24.1 (+1.8)	10.7 (+1.5)	8.0 (+0.1)	3.3 (-1.4)	22.2 (0)	4.5 (-0.1)	27.2 (-1.9)
Metro	18.0 (+2.4)	10.8 (+1.0)	17.6 (-0.9)	4.6 (-1.3)	20.8 (+0.2)	1.8 (-1.0)	26.3 (+0.4)

APPENDIX 7.

Correlation Coefficients for Pull Factors and Independent Variables

Correlation Matrix, 1979

	1.	2.	3.	4.	5.	6.	7.
1. Pull Factor	1.00						
2. Pop. >65 Years	.589**	1.00					
3. % Pop. >65 Years	.185	-.00	1.00				
4. MHEBI#	.216	.260	-.36	1.00			
5. Commuter Income	-.04	-.08	-.05	.008	1.00		
6. Employment	.494**	.944	-.28	.369	-.03	1.00	
7. Unemployment	-.03	.069	.177	-.49	-.08	-.01	1.00

Correlation Matrix, 1982

	1.	2.	3.	4.	5.	6.	7.
1. Pull Factor	1.00						
2. Pop. >65 Years	.554**	1.00					
3. % Pop. >65 Years	-.11	-.13	1.00				
4. MHEBI#	-.14	.081	-.57	1.00			
5. Commuter Income	-.12	-.08	-.17	.258	1.00		
6. Employment	.489**	.930	-.39	.274	.011	1.00	
7. Unemployment	.173	.237	.154	-.41	-.20	.064	1.00

Correlation Matrix, 1984

	1.	2.	3.	4.	5.	6.	7.
1. Pull Factor	1.00						
2. Pop. >65 Years	.513**	1.00					
3. % Pop. >65 Years	.080	-.06	1.00				
4. MHEBI#	-.28	.072	-.58	1.00			
5. Commuter Income	-.15	-.11	-.16	.185	1.00		
6. Employment	.411**	.932	-.31	.291	-.04	1.00	
7. Unemployment	.391*	.155	.124	-.43	-.27	-.02	1.00

** Significant at the 0.01 level of confidence

* Significant at the 0.05 level of confidence

Median Household Effective Buying Income

APPENDIX 8.

Data Sources for Independent Variables

Independent Variable	Data Source
Population Over 65 Years	Center for Population Research and Census, Portland State University. 1988.
Percent of Population Over 65 Years	Center for Population Research and Census, Portland State University. 1988.
Median Household Effective Buying Income	Survey of Buying Power, Sales and Marketing Magazine. 1980, 1983, 1985.
Commuter Income	U.S. Department of Commerce, Bureau of Economic Analysis. 1986.
Employment	State of Oregon, Employment Division. 1979, 1982, 1984.
Unemployment	State of Oregon, Employment Division 1979, 1982, 1984.