

THE TRADE AREA PROFILING SYSTEM: A METHODOLOGY FOR MACRO-LEVEL RETAIL SITE EVALUATION

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Market evaluation and selection are among the most critical decisions facing retailers. Location choices constitute long-term financial commitments that cannot be changed without incurring substantial costs. This paper illustrates the development and use of a macro-level location analysis methodology. Extending the Sales Conversion Index developed by Brockway and Mangold (1988), the Trade Area Profiling System (TAPS) allows for a longitudinal investigation of county trade areas. A demonstration of the Trade Area Profiling System is provided, with implications for its use in retail site evaluation.

INTRODUCTION

The issue of location has long been considered to be one of the most important aspects of long term retail strategy. Because of the attendant costs, the relative permanence of the decision once made, and the implications for consumer patronage, store location is of paramount importance.

Vandell and Carter (1992) provide a review of the literature in location analysis that identifies three levels of investigation. Their model (Exhibit 1) defines the macro-level issues as being those related to market selection. Intermediate issues relate to the selection of a store site within a market. The micro-level issues are defined relative to the issue of store-choice by consumers. The Trade Area Profiling System (TAPS) is an investigative tool relevant to the macro-level decision of market area selection.

One consideration relevant to trade area evaluation has received only modest attention in the retail literature. This issue concerns the degree to which a discretely defined market area is able to convert that region's income into retail sales within the area itself. Research has conclusively demonstrated that trade areas are subject to various levels of "leakage". This "outshopping" occurs when residents leave their own trade area to make purchases. Conversely, outshopping from one

area implies that another area has benefitted from "inshopping" (Brockway and Mangold, 1988; Mangold and Brockway, 1988). In the former case, the area's retailers have not been able to capture sales dollars consistent with the aggregate buying power present in their own markets. In the latter situation, retailers in the area have captured sales in excess of what would be predicted from an analysis of area purchasing power. The issue for site analysts is how to best identify those areas which benefit disproportionately from trade inflow or outflow pressures. The TAPS method developed in the current paper illustrates a longitudinally-oriented tool that provides a visual representation of trade area flows (inshopping and outshopping leakages). A brief review of macro-level location analysis literature is provided. The TAPS method is then developed and illustrated through the use of data from a nine county area within one midwestern state. The paper concludes with a discussion of the implications of the TAPS for retail strategists.

MACRO-LEVEL LOCATION ANALYSIS

Vandell and Carter (1992) indicate that the use of location allocation models is dependent on the assumption of having already selected a market area for consideration. Market analysis is, therefore, a necessary precondition to the use of site selection tools. In their review, Vandell and Carter identify the Index of Retail Saturation as the principal measurement tool that has been developed to assist in the market area selection process.

The Index of Retail Saturation (IRS) developed by LaLonde (1961), examines the ratio between the total

dollars spent on a product class by the consumers in an area and the total square feet of retail space in the area devoted to that product class. The IRS is then examined relative to the IRS of other markets. Larger numbers are taken to be indicative of an area that has room for more competition. Smaller numbers indicate an area that is more competitively saturated. The IRS has been criticized based on the idea that a small IRS does not, in and of itself, represent a saturated market area. Ingene and Lusch (1980) point out that the area may be one in which retailers have not fully developed the marketing mix to induce or attract purchasing to its greatest potential. In other words, the consumers in the area are not spending on the product class to the same degree as their counterparts in other areas.

The inclusion of the concept of retail leakage, seemingly overlooked by Vandell and Carter (1992), provides another perspective. That is, that the consumers in the area are spending at the same level as their counterparts, but they are spending it in another trade area. By the same token, a high IRS does not necessarily imply an unsaturated area. It may be that consumers from other areas have "inshopped" that area.

The investigation of inshopping and outshopping has been approached from a variety of perspectives. Herrmann and Beik (1968) and Thompson (1971) concentrated on the issues of who outshops, why they outshop, and for what types of products they outshop. These studies determined that outshoppers have higher incomes and, in general, fewer young children. Outshoppers were found to be dissatisfied with the local retail shopping alternatives and conditions in terms of selection and service. The most often outshopped goods were those that are conspicuous in their consumption, or fashion oriented goods. Papadopoulos (1980) reports that outshopped goods are generally less bulky, do not involve a large monetary outlay, and are not subject to after-sale service.

Other authors have addressed the question of how much leakage represents in dollar terms (Papadopoulos 1980). Obviously, within the current study, this is the more critical issue. Lillis and Hawkins (1974) and Darden and Perreault (1976) both report on measurement techniques that rely on the gathering of data from the consumers themselves. From a managerial perspective, data requirements become both costly and time consuming.

Brockway and Mangold, in two articles, report on an assessment technique that makes use of readily available secondary data (Brockway and Mangold, 1988;

Mangold and Brockway, 1988). This measure, the Sales Conversion Index (SCI), is derived from data in *Sales and Marketing Management's* annual "Survey of Buying Power."

The SCI is computed using four data points from the survey: 1) Retail sales in the area(s) of interest. 2) Retail sales for a "benchmark" area. 3) Effective buying income (EBI) in the area(s) of interest. 4) EBI in the benchmark area (Brockway and Mangold 1988). The computation of the SCI is of the form :

$$\text{SCI} = \frac{\text{A market area's retail sales expressed as a percentage of its total EBI}}{\text{The benchmark area's retail sales expressed as a percentage of its total EBI}} \times 100$$

The SCI provides a measure of an area's ability to convert income into retail sales, relative to the performance of some comparable (benchmark) area. An SCI of 100 would indicate that an area is converting its income into retail sales at a rate that is, on the average, equal to the conversion rate in the benchmark area. An SCI less than 100 identifies an area that is subject to retail outflow. An SCI over 100 indicates that an area is experiencing retail inflow.

The authors explain that the strength of the SCI lies in the fact that it investigates trade areas relative to comparable areas. Other measures of trade areas, such as the Buying Power Index, are based on national level comparisons (Survey of Buying Power, 1991). The use of the national data disguises differences in both income levels and the costs of living in a region (Brockway and Mangold, 1988).

THE TAPS METHOD OF TRADE AREA ANALYSIS

The Trade Area Profiling System (TAPS) is an extension of the SCI methodology developed by Brockway and Mangold. The TAPS process begins by selecting a trade area of interest. SCI values are then computed for each region of interest. However, at this point a weakness of the SCI can be identified. This weakness lies in the fact that the SCI represents a "point-in-time" estimate of the areas' relative inflow/outflow relationships. The SCI uses only the most recent data available to evaluate the areas of interest.

This reliance on data from one point in time fails to assess the position of an area relative to itself over time. An SCI of less than 100 indicates an area that is losing

trade to other areas. However, the area may be increasing in strength. The same effect also applies to areas that are over 100 in the SCI. An area that has an SCI of 120 today might have had an SCI of 200 just three years ago. Consequently, the managerial implications of the information are more reliable when shifts and changes in relative SCI values over time are taken into account.

The TAPS methodology incorporates two measures of sales conversion: the region's current SCI and a five year SCI average. This is calculated using the same SCI formula presented above, substituting five year averages for the individual year data. The final results can then be displayed visually by identifying both positions and linking them with a directional indicator which illustrates movement over time.

A second weakness of the SCI lies in its use of effective buying income (EBI). The SCI calculation uses the EBI of the areas under investigation, relative to the total EBI of the benchmark area. The use of an area's total EBI is appropriate insofar as the issue of interest is the ability of the area to re-capture income in retail sales. Within this context, total EBI provides an absolute level of income for an area in aggregate. The SCI fails, however, to take into consideration two other relevant dimensions of income.

The first consideration is time. This deficiency in the SCI methodology is compensated for in the TAPS by using a five year average measure of income in conjunction with the most current year's data. The second consideration is more problematic. Total EBI does not take into consideration the distribution of income within an area. There is also a need to make inter-area comparisons with respect to shifts in average households' income and expenditures rather than measuring changes in aggregate EBI (Ingene and Lusch 1980). Total or aggregate EBI is much too sensitive to relative changes in regional population to be used reliably within this context.

To compensate for this deficiency in the SCI methodology, the TAPS incorporates the use of Median Household EBI (MHEBI) rather than aggregate measures of Effective Buying Income. The inclusion of MHEBI is accomplished by computing the five year percentage change in MHEBI for each area being evaluated. The resulting percentages yield an inter-area comparison of the relative buying power of households. The calculation also provides an indication of how household income has changed over time. When MHEBI percentage changes are plotted against the five year SCI

averages and SCI values for the most recent year, the analyst creates a visual tool for trade area investigation. The resulting graph contains two longitudinal estimates, one for changes in MHEBI by area, and one for changes in areas' inflow/outflow characteristics. It also identifies the areas' current inflow/outflow position. An illustration of the TAPS methodology is developed in the following sections.

DEVELOPMENT AND APPLICATION OF THE TAPS

To illustrate the application and managerial value of the TAPS, nine Wisconsin counties were selected. The identification of this "test market" for the study was based on several considerations. To provide an unbiased evaluation of the methodology, none of the counties in the region borders neighboring states. The introduction of differential state sales tax rates and tax laws would unnecessarily distort and complicate the interpretation of the model. For similar reasons, regions in which trade patterns might be radically affected by extreme geographic features were not deemed acceptable. None of these factors would, of course, preclude the use of the TAPS methodology in actual managerial applications.

The nine county region chosen for study (Exhibit 2) constitutes a relatively homogeneous trade area. None of the Metropolitan Statistical Areas (MSAs) included in this area has a population of more than 100,000. This substantially mitigates the potential for one city's retail attraction to dwarf others in the area. The demographic profiles of these counties are, by virtue of their size and proximity, relatively similar. The benchmark used in the calculation of SCI measures for each county are the comparable SCI values for the state of Wisconsin.

All of the data required to utilize the Trade Area Profiling System were taken from *Sales and Marketing Management's* Survey of Buying Power (1988-1992). The percentage change in Median Household EBI and SCI values for "All Retail Sales" are provided in Table 1. Two "All Retail Sales" SCI values are given for each county: 1991 values and the average of 1987-1991 values. Comparable SCI values for six specific product categories are provided in Table 2.

In this form, the meaningful interpretation of patterns and identification of trends is difficult at best. One of the strengths of the Trade Area Profiling System as a planning tool is visual interpretation. By virtue of plotting this data, the information created by the

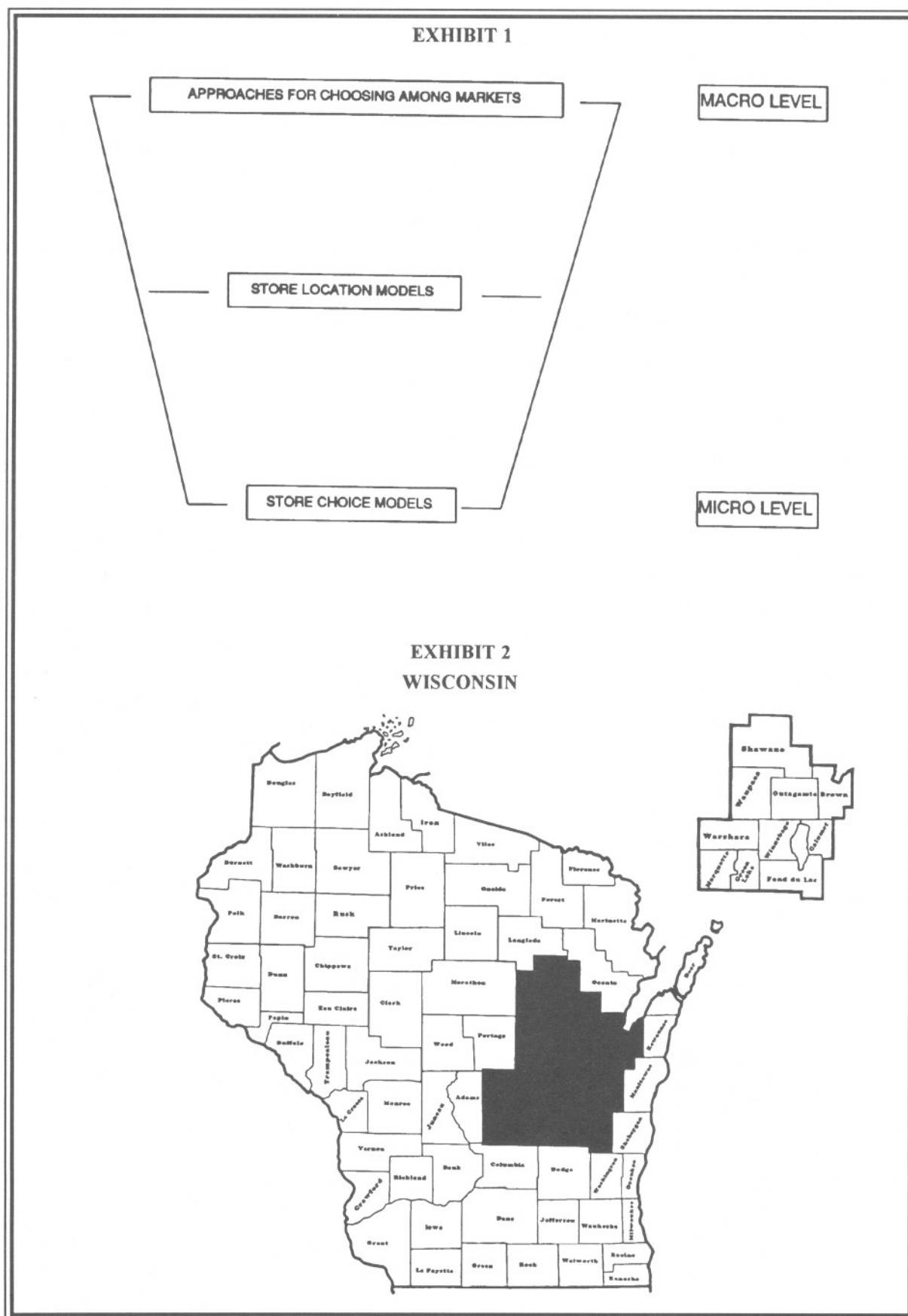


Table 1

County Name	Percentage Change in Median HH EBI: 1987-91	SCI Values For All Retail Sales	
		1991 Only	1987-91 Ave.
Brown	26.47	120.67	119.66
Calumet	14.51	65.82	72.28
Fond du Lac	15.27	98.61	101.87
Green Lake	29.27	98.93	72.89
Marquette	41.31	56.06	58.12
Outagamie	22.38	109.96	111.94
Shawano	20.64	103.54	81.45
Waupaca	35.86	85.10	83.15
Winnebago	40.80	95.02	108.19

application of the TAPS can be evaluated in more tangible terms. Illustrations of the output from TAPS analysis are provided in Figures 1 through 4. Figure 1 illustrates the application of TAPS to "All Retail Sales." Figure 2 and Figure 3 correspond to the analysis of Food Store Sales and Eating & Drinking Place Sales. Figure 4 provides a TAPS profile of Drugstore Sales. Arrows within the figures illustrate the trend from the five year average SCI values to the most recent (1991) SCI values.

The Trade Area Profiling System seeks to identify markets where the median household EBI is growing most rapidly, the SCI values for All Retail Sales in the trade area are high and the Product-Specific SCI values remain low. These areas would be attractive to prospective investors insofar as they represent a potential opportunity. This combination of features indicates that there may exist an unfilled retail niche in that market. An increase in the All Retail Sales SCI values and/or corresponding downward trend in the direction of Product-Specific SCI values *over time* for these markets would serve to reinforce this assessment. The examination of trends for All Retail Sales relative to the three product-specific profiles selected for study reveals some critical differences and opportunities.

The first screening criteria applied to the evaluation of the TAPS charts is the rate of growth in household EBI. The All Retail Sales profile indicates that five counties have exhibited higher than average rates of household EBI growth: Marquette, Winnebago, Waupaca, Green Lake and Brown counties. Of these five, only Winnebago and Brown counties have 1991 All Retail Sales SCI values greater than 100. The trend for Winnebago

County looks particularly strong. By contrast, each of the remaining three counties illustrate a net outflow of retail trade relative to the rate of growth in EBI. Green Lake in particular appears to be losing its position as a regional shopping center. Consequently, at this level of aggregation (All Retail Sales), Winnebago and Brown counties represent the most promising location opportunities.

Figures 2 and 3 provide the trade area profiles for Food Store (Grocery) Sales and Eating and Drinking Place (Restaurant) Sales. Grocery Sales SCI index values for Winnebago County would necessarily discourage potential retail entrants. The ability of that market to capture grocery sales dollars has more than matched the rapid rate of growth in household EBI. The profile suggests that it may be drawing substantial grocery sales away from Calumet County and Green Lake County, its immediate neighbors to the east and west respectively. The Grocery Sales assessment for Brown County is quite similar. A likely explanation for this effect is that shoppers have become less price sensitive and less likely to travel long distances to save money on grocery buying as median household incomes have increased. Alternatively, more price competitive grocery retail conditions may have emerged with the increase in local purchasing power. In either event, this area would not provide an attractive opportunity for grocery retailers.

The patterns observed in the analysis of Restaurant Sales (Figure 3) provide a sharp contrast to Grocery Sales. As median household EBI in Winnebago and Brown Counties have increased, the Restaurant Sales Conversion Index values have declined. Winnebago

TABLE 2

County	Grocery			Dining Out			General			Furniture			Auto Sales			Drug Sales		
	1991			1991			1991			1991			1991			1991		
	SCI	5 Year	SCI Avg	SCI	5 Year	SCI Avg	SCI	5 Year	SCI Avg	SCI	5 Year	SCI Avg	SCI	5 Year	SCI Avg	SCI	5 Year	SCI Avg
Brown	119.66	98.32		102.57	112.80		180.96	191.36		171.38	149.60		128.19	124.00		55.65	61.08	
Calumet	72.28	124.32		78.32	72.11		18.40	39.59		83.27	58.65		67.66	70.85		35.40	50.27	
Fond du Lac	101.89	100.92		105.95	89.56		153.03	132.29		55.59	71.80		119.45	112.12		142.40	121.01	
Green Lake	72.89	109.32		93.82	97.56		12.07	100.57		34.68	46.00		107.19	108.60		68.70	73.39	
Marquette	58.12	76.70		120.74	110.04		15.18	11.47		4.92	11.00		37.53	45.50		9.34	21.92	
Outagamie	111.94	88.93		99.35	97.01		167.86	166.17		102.76	118.68		138.67	112.87		55.07	62.07	
Shawano	81.45	116.47		110.17	96.27		44.20	49.48		63.89	57.04		62.50	73.60		94.62	112.08	
Waupaca	83.15	122.80		106.26	111.49		42.47	70.39		64.66	66.61		99.21	109.37		95.80	96.58	
Winnebago	108.19	86.60		95.72	100.42		118.16	104.84		147.36	125.47		114.14	108.18		117.08	108.18	

FIGURE 1
ALL RETAIL SALES

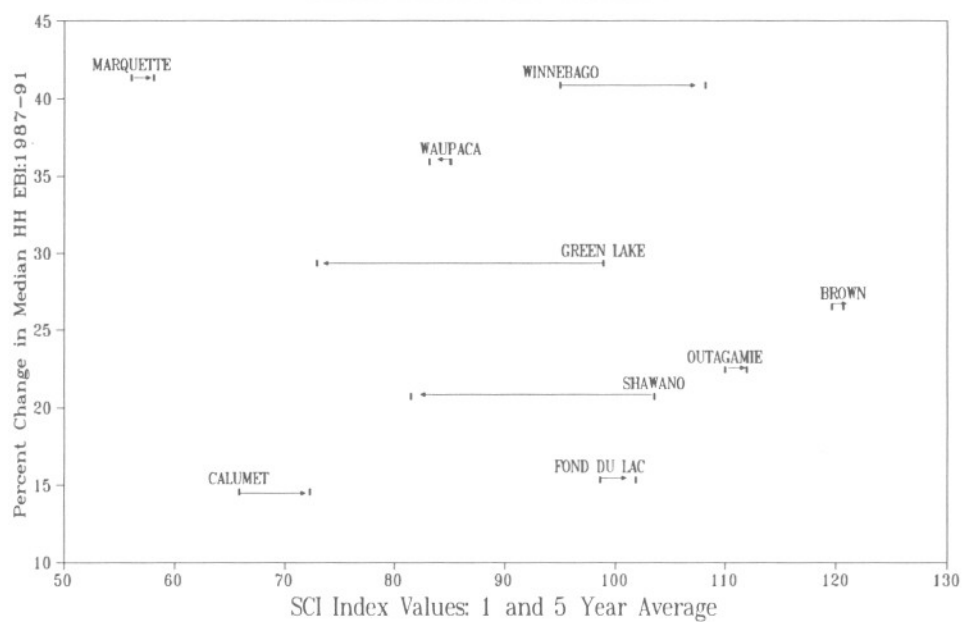
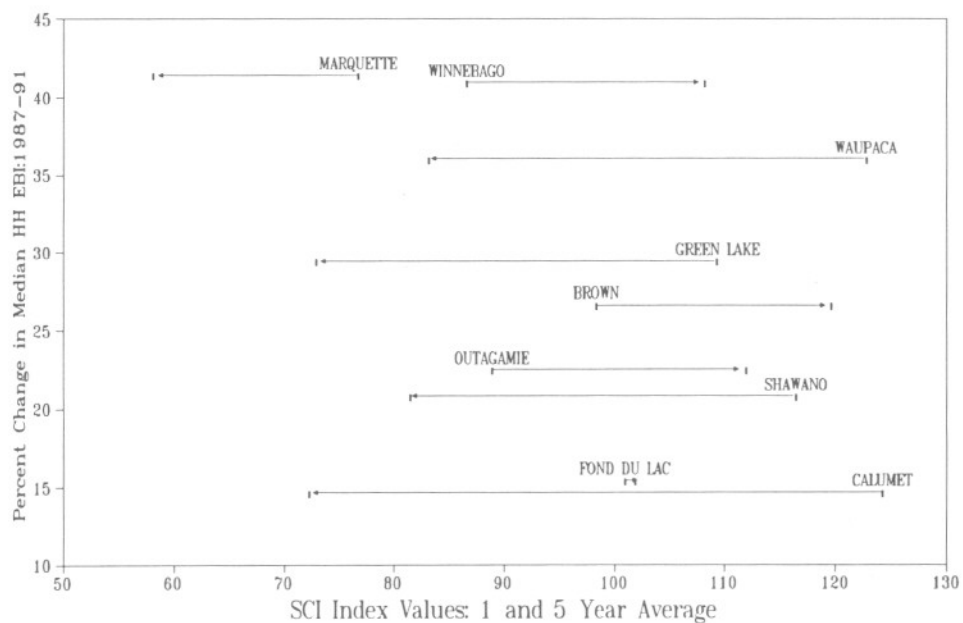
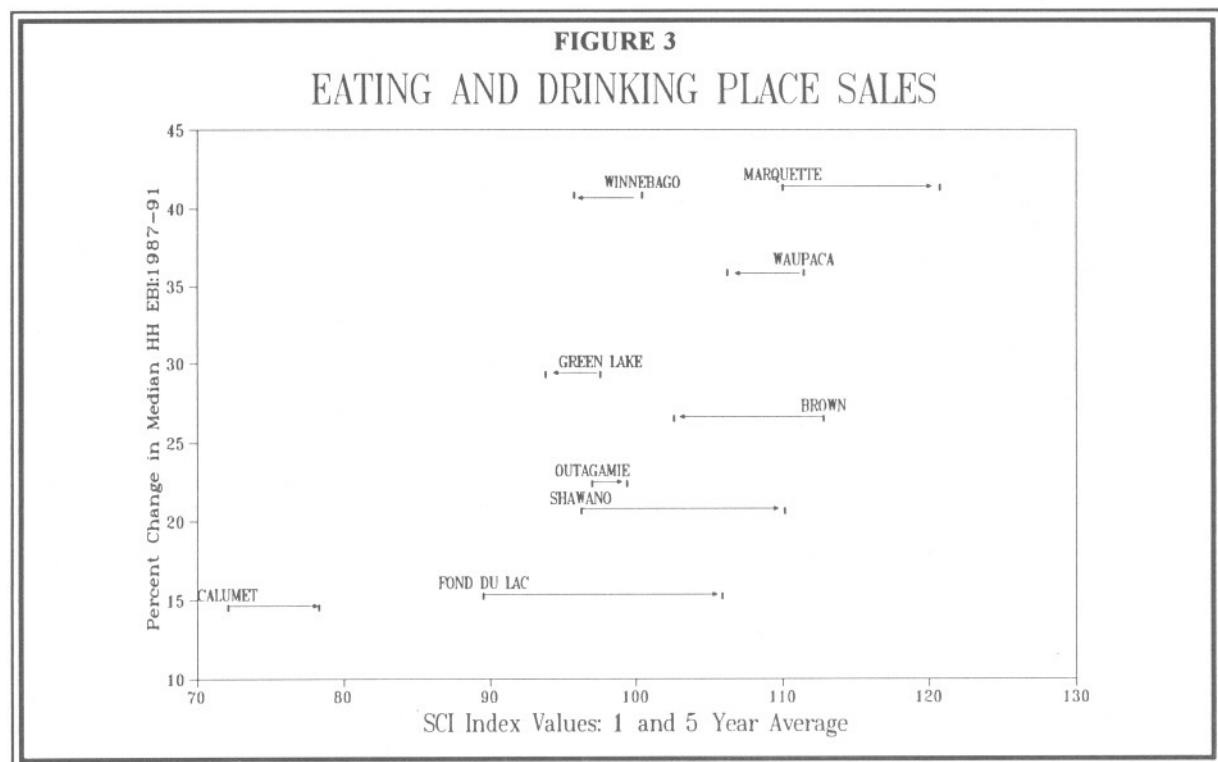


FIGURE 2
FOOD STORE SALES





clearly represents a good opportunity at this macro-level of analysis. In effect, the available supply of dining out opportunities does not appear to have kept pace with the rate of growth in median household incomes. The transition from a 5 year SCI average above 100 to the 1991 SCI value of 95.72 makes a particularly compelling case for more in-depth assessment (intermediate and micro-level evaluation) of retail sites.

The interpretation of Brown County's relative position is similar, though less positive. The rate of decline in Restaurant SCI values relative to increasing median household EBI is encouraging. Sales Conversion Index values remain, however, above 100. Relative to Winnebago County, Brown County's rate of household EBI growth is considerably lower. Consequently, Brown County would have to be regarded as an inferior opportunity. In both instances, it is apparent from the TAPS profile that adjoining counties have improved their sales conversion rates as a consequence of out-shopping by Winnebago and Brown County residents.

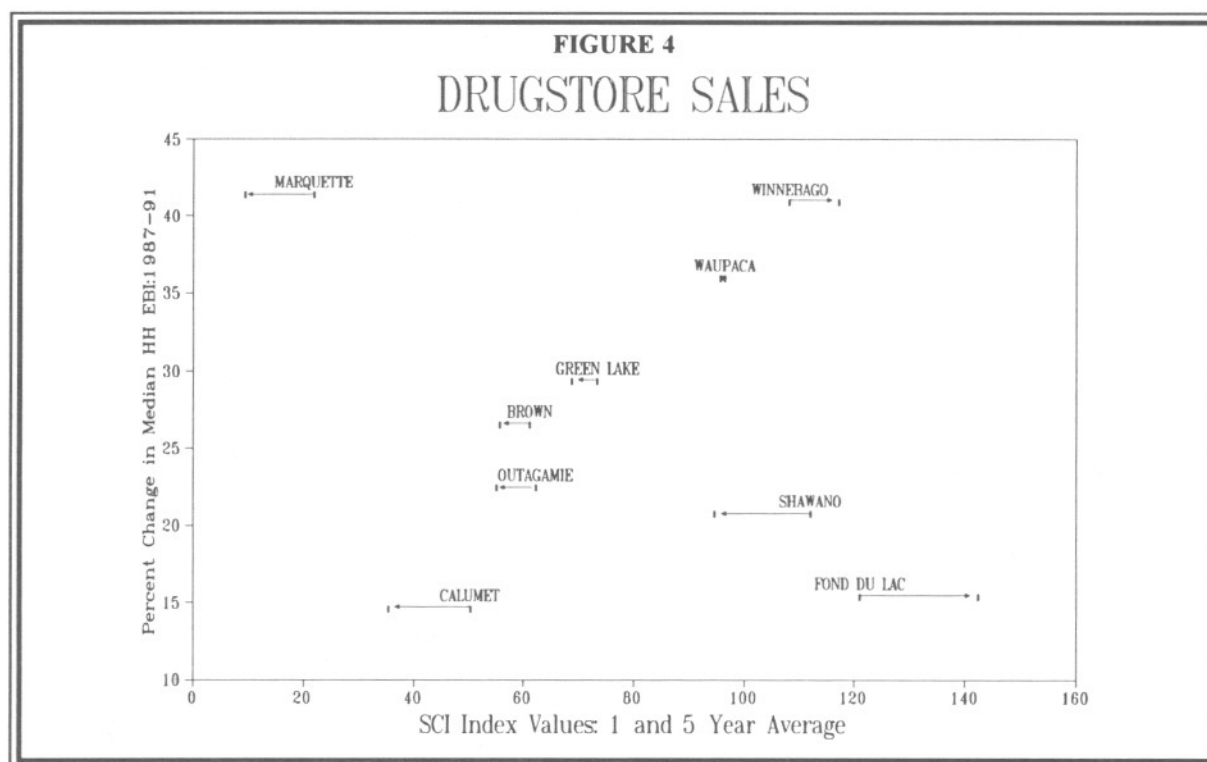
The interpretation of Drugstore Sales (Figure 4) differ for each of the two counties under study. As median household EBI in Winnebago County grew, the Drugstore Sales Conversion Index values have also increased. Since both the 5 year average and 1991 SCI

values are above 100, Winnebago County does not present a good profile for new drugstore entrants.

The Drugstore Sales TAPS profile for Brown County exhibits very favorable macro-level characteristics for new retail development. The 5 year average and 1991 SCI values are both very low (61.08 and 55.56 respectively) and the trend has been down. As noted at the outset of this analysis, the relatively strong rate of growth in median household EBI initially identified this county as potentially fertile ground for retail development. Consequently, the TAPS methodology would indicate that Brown County is a candidate for more thorough assessment at the intermediate and micro-level stages of evaluation.

CONCLUSIONS

The market selection decision is among the most important which a retailer must make. Location decisions constitute long-term financial commitments which cannot be changed without incurring substantial costs. Unfortunately, making market selections has become more difficult and complex as major U.S. markets have grown increasingly saturated. Recent trends in the decentralization of retail trade, the proliferation of retail outlets and changing consumer lifestyles have made the task of site evaluation more



difficult than ever before. Yet despite the importance of site selection, the tools available to assist managers in evaluating the potential of alternative areas at the macro-level of analysis have remained quite limited.

The TAPS methodology is a technique which permits the macro-level evaluation of net trade flows between discretely defined retail areas. It allows analysts to make a multi-dimensional assessment of each area's attractiveness to prospective retailers relative to specific alternatives. The analysis specifies a relationship between trends in an area's Sales Conversion Index

(SCI) and Median Household Effective Buying Income (MHEBI). The technique can be applied at the level of aggregate retail sales as well as specific product classifications. This will enable prospective retailers to more critically evaluate macro-level market selection decisions based on the types of products they intend to sell. The critical contribution of the TAPS methodology within this context is to provide information which is essential to understanding of the dynamics of retail trade shifts and flows. The thoughtful interpretation of TAPS profiles can provide important indicators for regional planners, business leaders and entrepreneurs.

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