ENVIRONMENT DETERMINANTS OF TOTAL PER CAPITA RETAIL SALES IN SMSAS

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Introduction

An accurate assessment of the potential level of sales in a geographically delineated market should be of importance to retailers for a host of long-run and short-run reasons. Over the long-run, commitment to a specific site imposes on the retailers considerable, continuing financial expenditure.

In extreme instances this financial commitment could leave the retailers in an illiquid position, unable to respond tactically to fluid market conditions. Further, in the case of some retail establishments, the size and/or nature of the store virtually guarantees that only a rival in the same line of trade could use the physical facility. The very factors that conspire to make a site unprofitable for one retailer may make it unprofitable for its rivals since an error in site selection will constrain potential profitability to a level lower than that attainable at some alternate sites. In a short-run framework, store profitability should impact on a manager's rewards and opportunities for advancement. For chain retailers to be able to establish an equitable reward structure requires that they know the profit (or sales) potential at the store. Deviations from this estimated level can then be attributed to managerial actions[1] and rewards paid accordingly.

The purpose of this article is to investigate and extend current academic and professional knowledge of the determinants of retail sales, by line of trade, in geographically delineated markets. We are not concerned with the microanalytical issue of site selection which must be based upon primary data. Rather, we will use secondary data to explore the macroanalytical determinants of sales levels in Standard Metropolitan Statistical Areas (SMSAs).

As part of this effort, we will be concerned with both the total level of sales and the per capita level. Clearly, aggregation of the latter will yield the former. However, it is not obvious, a priori, that the determinants of aggregate and per capita sales levels will be identical. There is a statistical tendency for "bigness" to be correlated with "bigness", so, we may expect to observe total sales to be largely determined by total population in the area. At the per capita level this relationship would not obtain. Since actual sales transactions occur between stores and customers, it appears valuable for retailers to comprehend the determinants of per capita as well as total retail sales. In terms of selecting new markets to enter, SMSA sales levels may be a useful, initial screening device prior to engaging in a more exhaustive, and expensive, site selection process. Essentially, this step would involve determining a potential demand level and an existing level of competition in the market. In terms of managerial rewards, comprehending the determinants of sales in an SMSA and then making adjustments for micromarket (store specific) conditions may be more feasible than starting directly with story-by-store analyses.

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[1] William Kinney has made this point in [6].

Because the level of retail sales is regarded as an indicator of consumer confidence in the economy as well as a harbinger of economic performance, the analysis described in this paper may also be of interest to policymakers at all levels of government

Literature Review

Total Retail Sales. The investigation of retail sales and its determinants has been a periodic topic of interest in economics, marketing, and regional science at least since the work of Reilly. Writing in 1931, Reilly [12] demonstrated that the level of total retail sales in a community was a function of the distance between that community and other communities as well as their respective population levels. Converse [2], working in 1949, showed the same phenomena. Because Reilly and Converse were working with small towns, the absence of a wide range of consumer goods provided a rationale for intercommunity shopping. Ferber [4] and Tarpey and Bahl [16] extended these results by displaying a positive correlation between sales and total income in the community

More recently, Liu [8, 9, 10] re-examined this question. He obtained a statistically significant relationship between total retail sales and a host of regressor variables, including per capita income, population, local government revenues and expenditures, population density, and the age and educational distribution of the population. Liu's work is notable for two reasons. He was one of the first investigators to analyze SMSAs, where most of the population lives, rather than "rural" communities.[2] However, he examined less than 20 percent of the SMSAs, so his statistical results are of questionable validity when extended to the universe of SMSAs. Of greater importance, Liu was the first investigator to break with the statistical artifact of correlating "bigness with bigness." Specifically, much of the early empirical work in this area obtained high coefficients of determination because total retail sales were being regressed against total population or total income or both. When per capita independent variables are used, high correlations are no longer automatic.

Per Capita Retail Sales. So far as the authors are aware, there have been far fewer investigations of per capita retail sales. Russell [13], somewhat surprisingly, found no significant relationship between per capita sales and median income per family. Liu [8], by broadening the number of regressor variables, did find several determinants (mentioned above) of per capita sales as well as of total sales.

Conventional Wisdom. Perhaps a reason for the relative absence of per capita investigations is the notion that per capita demand is essentially fixed. This notion is compatible with a demand curve of unitary elasticity. The concept of fixed demand has received academic support from LaLonde [7]. In 1961 he wrote, "the absolute amount of consumer expenditures for any segment of retailing is relatively fixed within any given trading area" (p. 568). He then offered a formula for computing the attractiveness to a retailer of a geographical market: The index of retail saturation (IRS). For any given area:

$$(1) \quad IRS = \frac{C \times RE}{RF}$$

[2] Schwartzman [15] also looked at SMSAs, but in the context of service levels offered.

Table 1A: Variable Definitions

Dependent Variables		
Label	Full Title	SIC CODE
Apparel	Apparel and Accessory Stores	56
Auto	Automotive Dealers (New and Used)	551
Department	Department Stores	531
Drug	Drug Stores and Proprietary Stores	591
Eat and Drink	Eating and Drinking Places	58
Food	Food Stores except Grocery Supermarkets	54 minus 541(part)
Furniture	Furniture and Home Furnishing Stores	571
Gas	Gasoline Service Stations	554
Lumber	Building Material and Supply Stores plus Hardware Stores	521,525
Misc. Gen. Mdse.	Miscellaneous General Merchandise Stores plus Variety Stores	533,539
Supermarket	Grocery Supermarkets	541(part)
All Trade	Retail Trade, Total	5

Values for all variables come from {4}

Table 1B: Variable Definitions

Independent Variables		
Label	Full Explanation	Source
Y/POP	Effective Buying Income Per Capita	Sales Management
POP/H	Average Household Size	Estimated from Sales Management
% URB	% of SMSA Population Living in an Urbanized Area	1970 Census of Population
AUTO		County and City Data Book
AGE	% of Population Less than 18 or More than 64 Years of Age	Census of Population
REV	Local Government Revenue Per Capita	County and City Data Book
% UNEMP	Unemployment Rate	County and City Data Book
% WHITE	% of Population that is White	
POP	Total SMSA Population	Census of Population

Where C = number of consumers in the area

RE = retail expenditures per consumer

RF = retail facilities (number of stores or square footage of stores).

Since the numerator is seen as being essentially beyond managerial influence, an area is attractive or not depending on whether it is understored or not. Of course, LaLonde did not claim that RE was identical in all areas, only that it was environmentally determined.

Further support for the notion of unaffectable per capita expenditures is containing in the "chain ratio method" of forecasting demand, a technique which is widely referenced in marketing and retailing texts. Additional support on the practitioner side comes from the Buying Power Index (BPI), a statistic offered annually by the widely utilized *Survey of Buying Power* [14]. The BPI for an area is a weighted average of total population, total income, and the preceding year's total retail sales.

The Framework of Analysis

Total Sales. So far as we are aware, there has been no attempt to explain total sales in SMSAs *by major line of retail trade.* Only aggregated sales have been investigated. Thus, our first task is to ascertain if disaggregated sales can be accounted for by the same variables which explain aggregated sales.

Per Capita Sales. Our second task is to determine if per capita sales, in each line of retail trade, can be said to be largely explainable by using environmental (demographic) variables. It is noteworthy that the variation in per capita retail sales across SMSAs is not trivial. Table 2 provides the maximum, minimum, mean, standard deviation, and coefficient of variation across lines of trade. (Table 1 defines the lines of trade and the independent variables used later in the analysis.) If the demographic determinants do not account for a large proportion of the variation, then the "chain ratio" method, the BPI and the IRS may be regarded as wanting in explanatory power. Further investigation with more refined data than we possess would then be warranted.

Geographical Scope of Analysis. Our units of observation are 208 of the continental SMSAs extant in 1970. SMSAs are an appropriate unit of analyses because they are groupings of contiguous counties[3] which meet the Census Bureau's definition of being economically integrated. Most SMSA residents will do their retail shopping within the SMSA in which they live: there is little "leakage" across SMSA boundaries. It is the existence of sales leakage from smaller geographical areas which caused earlier investigators to focus on distance as a major determining factor of sales levels. The included SMSAs accounted for approximately three-fifths of the United States population in 1970. Missing data forced exclusion of the other SMSA.

The data itself is unquestionably dated. However, with the recent conducting of the 1980 census, it seems worth reporting these results so that a basis may be laid for a more current and more detailed investigation when the 1980 census is released. Importantly, the effect of the decade's dynamical changes may then be more readily assessed.

[3] In New England, townships are the building blocks of SMSAs.

Table 2: Per Capita Sales By Line of Trade

LINE OF TRADE	MAX	MEAN	MIN	STD. DEV.
Apparel	193.42	93.16	48.33	24.64
Auto	590.75	320.66	145.26	63.53
Department	387.40	240.19	111.81	62.38
Drug	153.98	67.84	27.97	20.21
Eat & Drink	270.85	133.93	49.84	34.33
Food	150.01	63.78	18.81	22.81
Furniture	150.75	85.53	46.22	14.81
Gas	252.53	136.21	75.25	26.72
Lumber	241.93	88.72	27.94	32.81
Misc. Gen. Mdse.	293.23	108.17	55.57	37.58
Supermarket	619.78	341.48	193.10	57.39
All Trade	2922.25	1822.98	1094.18	231.43

n = 208

Dependent Variables. In the first set of regressions, reported in Table 3, the dependent variables are total retail sales in the SMSA for each line of retail trade. The lines of trade are apparel stores, automotive (new and used cars), drug and proprietary stores, department stores, eating and drinking places, food stores excluding supermarkets, supermarkets, furniture stores, gasoline service stations, miscellaneous general merchandise and variety stores, lumber and hardware stores, and, finally, aggregated retail trade.

In the second set of regressions, reported in Table 4, the dependent variables are retail sales per capita for each line of trade listed above. We anticipate substantially lower predictive power for our per capita regression equations than our total regression. This is due to the absence of automatically high correlations between dependent and independent variables based on mutual "bigness" or "smallness."

Independent Variables. Average income per person (Y/POP) as measured by *Sales Management's* per capita effective buying income is our first independent variable. (Y/POP), which excludes taxes, is essentially disposable income. As in all economic models, it operates by shifting the demand curve. Except for inferior goods, which we do not anticipate any major line of retail trade as being, there should be a positive relationship between income and sales at the total or per capita level.

Table 3: Total Retail Sales by Line of Trade, Regression Results

Dependent Variable \ Independent Variable	Constant	Y/POP	POP/H	% URB	AUTO	AGE	REV	% UNEMP	% WHITE	POP	R^2
Predicted Sign	N.A.	+	-	+	+	-	0	-	0	+	N.A.
Apparel	240167 (2.98)[a]	-15.4 (-1.96)[b]	-4442 (-0.39)	-38089 (-1.61)	-1444 (-2.32)[b]	-1989 (-1.87)[c]	40 (1.37)	-735 (-0.35)	378 (1.38)	142.7 (45.06)[a]	.9507 (424.1)[a]
Auto	-502221 (-3.05)[a]	31.3 (1.95)[c]	-29711 (-1.27)	103580 (2.14)[b]	4730 (3.73)[a]	4597 (2.12)[b]	-85.9 (-1.44)	242 (0.06)	-1466 (-2.62)[a]	235.3 (36.44)[a]	.9263 (276.5)[a]
Department	-284170 (-3.41)[a]	18.5 (2.29)[b]	1639 (0.13)	34376 (1.40)	2016 (3.14)[a]	1299 (1.18)	-46.1 (-1.52)	-1286 (-0.59)	-253 (-0.89)	266.3 (81.34)[a]	.9841 (1363.6)[a]
Drug	-119385 (-2.67)[a]	6.49 (1.49)	-4042 (-0.64)	18922 (1.44)	1008 (2.93)[a]	941 (1.60)	-1.6 (-0.10)	-80 (-0.07)	-312 (-2.06)[b]	63.9 (36.42)[a]	.9263 (276.4)[a]
Eat & Drink	97228 (1.21)	-7.10 (-0.91)	-7791 (-0.68)	-30912 (-1.31)	-534 (-0.86)	-1186 (-1.12)	58.5 (2.01)[b]	-474 (0.22)	396 (1.45)	193.5 (61.48)[a]	.9727 (785.1)[a]
Food	171998 (3.04)[a]	-10.3 (-1.87)[c]	-5391 (-0.67)	-27027 (-1.63)	-1083 (-2.49)[b]	-1142 (-1.53)	34.6 (1.69)[c]	911 (0.62)	279 (1.45)	65.6 (29.57)[a]	.8941 (185.8)[a]
Furniture	-3850 (-0.15)	0.57 (0.22)	-94 (-0.03)	-3901 (-0.51)	-173 (-0.86)	110 (0.32)	20.8 (2.20)[b]	-567 (-0.83)	106 (1.19)	90.2 (87.74)[a]	.9866 (1620.4)[a]
Gas	-206808 (-3.56)[a]	14.2 (2.50)[b]	-7791 (-0.94)	37471 (2.19)[b]	1709 (3.82)[a]	1665 (2.17)[b]	-8.8 (-0.42)	513 (0.34)	-511 (-2.58)[a]	94.2 (41.27)[a]	.9425 (360.4)[a]
Lumber	-95453 (-3.31)[a]	5.8 (2.06)[b]	-3892 (-0.95)	-7751 (-0.91)	797 (3.59)[a]	956 (2.51)[b]	-4.6 (-0.44)	-263 (-0.35)	-13.1 (-0.13)	51.9 (45.85)[a]	.9502 (419.9)[a]
Misc. Gen. Mdse.	8001 (0.08)	-1.39 (-0.14)	-3948 (-0.27)	-36754 (-1.20)	124 (0.15)	800 (0.58)	-35.3 (-0.94)	-2072 (-0.77)	35.7 (0.10)	134.9 (33.07)[a]	.9087 (219.0)[a]
Supermarket	-144647 (-2.14)[b]	16.8 (2.55)[b]	-11851 (-1.23)	7395 (0.37)	709 (1.36)	1178 (1.32)	14.8 (0.60)	-76.3 (-0.04)	-13.5 (-0.06)	374.3 (140.75)[a]	.9947 (4149.3)[a]
All Trade	-503967 (-1.69)[c]	48.1 (1.65)[c]	-95417 (-2.24)[b]	-10688 (-0.12)	6388 (2.78)[a]	4171 (1.05)	50.4 (0.47)	-5731 (-0.74)	-861 (-0.85)	1888.7 (161.07)[a]	.9959 (5368.6)[a]

(t-statistics are in parentheses and are labelled a, b, or c if significant.
The parenthetical number in the R^2 column is the F-ratio for the regression.)

a Prob. < .01
b Prob. < .05
c Prob. < .10

Average household size (POP/H) is also seen as a factor which can shift the demand curve. It is predicted to have a negative effect on per capita and total sales since larger families have the possibility of sharing of goods. In short, we anticipate scale economies to household size.

The density of the SMSA population, as proxied by the percentage of SMSA residents living in urbanized areas (% URB), is regarded as having an effect on sales. Specifically, as density rises we expect stores to be located in closer proximity to one another. This should facilitate comparison shopping and assure that customers more nearly obtain their ideal bundle of goods and services. Hence, %URB should have a positive impact on sales. Of course, this argument does not hold for every retail sector. People do little comparison shopping between gasoline service stations. However, with a greater urbanized population there is correspondingly more "start-and-stop" driving, so gasoline sales should be positively related to %URB. (Our usage of %URB rather than people per square mile (PPSM) is based on the relatively large geographical expanse of Western and Midwestern SMSAs. In those SMSAs, PPSM is significantly lower than most retailers would regard as relevant.)

Another factor influencing comparison shopping is the availability of private transportation. We proxy this factor with the percentage of households owning an automobile (AUTO). While it is an imperfect measure of mobility, it is clear that

Table 4: Per Capita Sales by Line of Trade, Regression Results

Dependent Variable \ Independent Variable	Constant	Y/POP	POP/H	% URB	AUTO	AGE	REV	% UNEMP	% WHITE	R^2
Predicted Sign	N.A.	+	-	+	+	-	0	-	0	N.A.
Apparel	158 (3.18)[a]	.00 (1.02)	-7.1 (-1.03)	55.7 (3.90)[a]	-1.23 (-3.80)[a]	.25 (0.39)	.02 (0.97)	-.75 (-0.58)	-.10 (-0.59)	.2155 (6.83)[a]
Auto	206 (1.69)[c]	-.00 (0.15)	-100 (-5.95)[a]	75.8 (2.16)[b]	5.23 (6.57)[a]	1.15 (0.72)	-.07 (-1.51)	.48 (0.15)	-1.10 (-2.64)[a]	.2903 (1018)[a]
Drug	-72.8 (-1.77)[c]	.01 (1.50)	-11.5 (-2.03)[b]	35.6 (3.03)[a]	.96 (3.60)[a]	.94 (1.73)[c]	.02 (1.73)[c]	.15 (0.14)	-.00 (-0.01)	.2091 (6.58)[a]
Department	-342 (2.85)[a]	.07 (6.18)[a]	20.5 (1.24)	77.3 (2.24)[b]	1.1 (1.41)	3.57 (2.26)[b]	-.12 (-2.73)[a]	-2.59 (-0.83)	.40 (0.98)	.2888 (10.10)[a]
Eat & Drink	-166 (-2.95)[a]	.04 (8.17)[a]	8.5 (1.09)	45.0 (2.78)[a]	.07 (0.19)	1.08 (1.45)	.07 (3.88)[a]	.46 (0.31)	.27 (1.39)	.4799 (22.95)[a]
Food	255 (5.54)[a]	-0.01 (-1.90)[c]	-21.7 (-3.40)[a]	-50.6 (-3.82)[a]	-.86 (-2.84)[a]	.07 (0.12)	.00 (0.18)	2.73 (2.28)[b]	.02 (0.15)	.2110 (6.65)[a]
Furniture	15.6 (0.48)	.01 (2.76)[a]	-.02 (-0.01)	.79 (0.09)	.05 (0.24)	.75 (1.78)[c]	.02 (1.55)	-.22 (-0.27)	.03 (0.24)	.0956 (2.63)[a]
Gas	51.6 (0.98)	.00 (0.68)	-26.4 (-3.62)[a]	-8.59 (-0.56)	2.33 (6.76)[a]	-.36 (-0.51)	.02 (1.03)	.55 (0.40)	-.29 (-1.64)	.2465 (8.14)[a]
Lumber	-38.9 (-0.59)	.00 (0.63)	-6.9 (-0.76)	-87.0 (-4.60)[a]	1.07 (2.50)[b]	1.49 (1.72)[c]	.01 (0.37)	-.89 (-0.52)	.60 (2.70)[a]	.2262 (7.27)[a]
Misc. Gen. Mdse.	203 (2.54)[b]	.00 (0.48)	-17.3 -1.56	-16.43 (-0.71)	-1.34 (-2.57)[b]	2.42 (2.30)[b]	.03 (1.05)	-3.88 (-1.87)[c]	-.21 (-0.77)	.1257 (3.57)[a]
Supermarkets	-40.7 (-0.39)	.06 (5.93)[a]	-32.9 (-2.30)[b]	43.1 (1.45)	.26 (0.39)	5.0 (3.69)[a]	.05 (1.34)	-.54 (-0.20)	.26 (0.74)	.3745 (14.89)[a]
All Trade	639 (1.58)	.20 (5.51)[a]	-238 (-4.25)[a]	107.9 (0.92)	7.17 (2.71)[a]	13.76 (2.57)[b]	.12 (0.86)	-8.09 (-0.77)	.07 (0.04)	.4079 (17.14)[a]

a Prob. < .01
b Prob. < .05
c Prob. < .10

(t-statistics and F-ratio for the regression in parentheses.)

public transportation is not ideally suited to shopping trips, nor is it widely used for them. (Netzer [11] estimated that only one percent of non-journey-to-work trips were by public transportation.) As mobility (AUTO) rises, sales on a total and a per capita basis should also rise.

Following the suggestion of Liu [8], we incorporate a variable designed to capture the dependency of the population. AGE is the percentage of the population under eighteen or over sixty-five years of age. AGE is an inadvertant proxy for the distribution of income as well as for dependency. In either manifestation, we anticipate an inverse relationship between AGE and both sales variables. Liu postulated the same relationship, but did not find it to be significant.

We also include local government revenue per capita (REV). Since few local governments regularly run a surplus, this is equivalent to a lower bound on local government expenditures per capita. As an expenditure measure, we view it as reflecting the extent of local provision of social overhead capital (such as roadways), and social protection, such as police and fire services. As the quality of these services improves, the cost of doing business should decline, prices should be cut, and the change in sales should be affected by the price elasticity of demand. Schwartzman [15] estimated it to be unitary, so the effect of REV on sales would be zero. We include REV as a (weak) test of Schwartzman's price elasticity proposition. It should be noted that our definition of income — net of taxes — enables us to use REV as an expenditure proxy without having to consider the negative effects of tax collection.

We also examine the unemployment rate and the racial composition of the population. We predict no significant impact on sales of the racial distribution of the population (%WHITE), but include it to test this hypothesis. The unemployment rate (%UNEMP) is expected to have a negative impact on sales through its impact on anticipated future income. (The impact on current income is already incorporated in income per capita (Ψ/POP).)

Finally, in the total sales regression, we utilize total population (POP) as an independent variable. While POP should have no effect upon per capita sales, it clearly is a dominant influence in shifting the total demand curve.

Empirical Technique. We use ordinary least squares regression to assess the extent to which the total and per capita sales of each line of retail trade are determined by the environmental variables cited above. In doing so, we make the standard set of statistical assumptions. While there is some problem with multicollinearity between the explanatory variables, our purpose is prediction rather than explanation. As Churchill [1] has noted in his lucid discussion of ridge regression, multicollinearity does not decrease a model's accuracy for predictive purposes. Indeed, since we have included no supply side variables in our model, explanation is logically out of the question. Rather, our intent is to demonstrate that environmental variables may not do a good job of accounting for the wide cross-sectional variation in per capita sales even though they do an excellent job at the level of total sales.

Empirical Results

Total Sales. As can be seen from Table 3, our independent variables are able to account for an extremely high percentage of the cross-sectional variation in total sales by line of trade. The R^2's range from a low of .8941 (non-supermarket food stores) to a high of .9959 (aggregate retail trade.) Total population accounts for an incredibly large percentage of these amounts, witness the t-statistics on POP.

Turning to the other major variables included in the regression, Ψ/POP is significant 8 of 12 times. Its negative appearance in the "Food" regression may reflect a movement towards supermarkets and eating out. The density of population, proxied by %URB is (surprisingly) significant only twice. Mobility, as measured by AUTO, is significant eight times, six times having the correct sign.

Turning to the lesser variables, we see that contrary to our expectations, the unemployment rate (%UNEMP) is never significant. Household size is significant only once. The % WHITE and per capita local government revenue (REV) are significant three times each, REV positively and %WHITE negatively. The dependency ratio, AGE, appears four times, only once with the expected negative sign.

In summary, the environmental variables performed well in explaining the cross-sectional variation in total retail sales by line of trade. Population in the SMSA was the dominant explanatory variable in every regression. We confirmed this proposition by running the regressions with all the variables *except* population. The R^2's then fell to a low of .4048 (Misc. Gen. Mdse.) and a high of .4670 (supermarkets). A regression including only population would account for a greater than .5 R^2, of course.

Hopefully, we have demonstrated that the notion of a level of demand beyond the control of retail managers may be founded in a recognition that environmental variables account for virtually all the cross-sectional variation in total retail sales. This is (weak) statistical support for LaLonde's "Index of Retail Saturation," Sales Management's "Buying Power Index," and the "chain ratio method" of computing expected sales in a geographical market.

Per Capita Sales. Table 4 demonstrates that the independent, environmental variables do not perform well in explaining the level of per capita sales in most retail trade industries. Indeed, only supermarkets (.3745), aggregate trade (.4079) and eating and drinking establishments (.4799) perform reasonably well. At the other extreme, the coefficient of determination for furniture dealers is merely .0956.

While we could discuss and interpret the signs and magnitudes of the independent variables, as we did above for the total sales equations, such an exercise is not that fruitful. First, the results can be read from Table 4; the signs are generally in the predicted direction when they are significant. Second, and much more important, there is some multicollinearity in the data. As Churchill [1] has noted, this can cause instability in the beta coefficients.

While multicollinearity can call into question the meaning of the coefficient terms, it will not affect the R^2. (The same caveat should be applied to our comments about the independent variables in the total sales regressions.) For our purposes, this is not a severe problem. We have shown that environmental demand variables do not, in general, explain a large proportion of the cross-sectional variation in per capita retail sales by line of trade. *A fortiori,* retailers should not regard demand as beyond their influence.

Discussion and Conclusion

Since environmental factors do not explain a large percentage of the cross-sectional variation in per capita retail sales by line of trade, it is apparent that retail demand cannot be regarded as fixed. Therefore, when retailers consider new markets to enter, they may have biased expectations about their performance if they rely on such analytical techniques as the "chain ratio method," the "index of retail saturation" or the "buying power index." Further, chain retailers who base their promotional and reward strategies for managers on the fundamental assumption of fixed demand may improperly treat some talented personnel. Both types of error can be detrimental to the long-term financial health of the corporation.

While the research reported above is not conclusive, it does suggest that supply factors and competitive conditions do impact upon the level of per capita sales. Such a statement is unapt to be controversial for professional economists; it may be somewhat more so for professional retailers. Ingene and Lusch [5] have reported that the level of per capita sales in department stores is materially affected by supply and competitive factors. In particular, managerially determined actions, such as hours of operation and level of service offered to customers, shift the demand curve as well as affecting the cost curve. It seems reasonable that similar factors could impact on every line of retail trade. More detailed research is clearly needed to resolve this issue. What does seem clear is that the level of sales is not exclusively or even largely determined by factors beyond retailer control.

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