Effect of a Mass Merchandiser on Traditional Food Retailers

Oral Capps, Jr. and James M. Griffin

Non-traditional retailers such as warehouse club stores, discount drug stores, and discount mass merchandisers are new competitors for traditional food retailers. It is expected that non-traditional retailers will account for roughly 14 percent of total grocery sales by the turn of the century. The impact of a particular discount mass merchandiser (Wal-Mart) on the sales of a conventional retail grocery outlet (David's Supermarket, Inc.) located in the rural areas surrounding the Dallas/Ft. Worth metroplex is analyzed. In this case study, Wal-Mart alone is responsible for about a 21 percent reduction in sales.
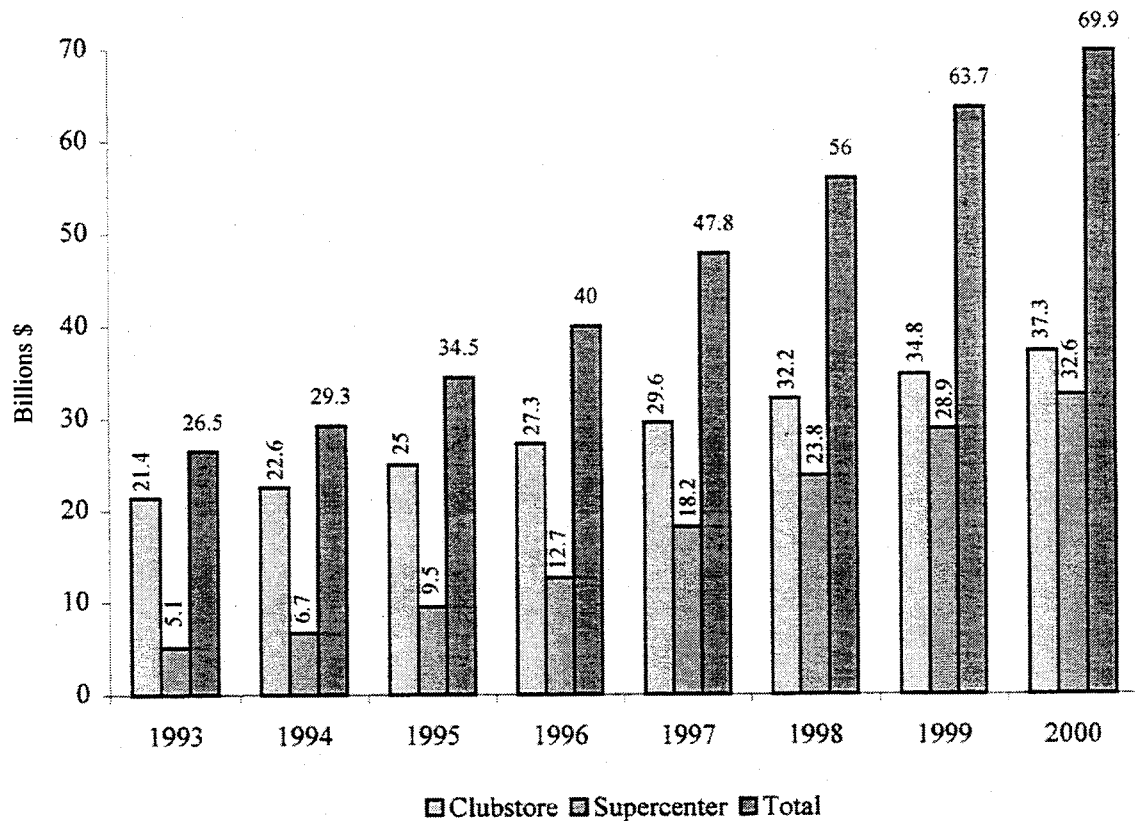
Background

Non-traditional grocery outlets have grown noticeably in the past few years. These outlets include warehouse club stores, deep discount drug stores, and discount mass merchandisers. Although these non-traditional retailers do not typically offer a comparable array of grocery food and non-food products as found in supermarkets, they do market specific high-volume categories of dry grocery products, paper products, frozen foods, limited perishable produce and meat products, health and personal care products, and general merchandise. Low-operating margins provide a low-price appeal to consumers while ensuring high-volume shipments by suppliers.

Do non-traditional grocery retailers provide a source of competition to traditional food retailers? According to a survey of 2,300 food chain store managers conducted by *Progressive Grocer* in 1992, this question is of utmost importance to food retailers. Evidence for concern on the part of the traditional food retailers is exhibited in Figure 1, a look at sales of grocery products by warehouse club stores and supercenters (Kaufman). Club stores currently account for a major share of non-traditional grocery sales, registering $21.4 billion in 1993 and $22.6 billion in 1994. Club stores are projected to reach about $37 billion by the turn of the century. Supercenter formats such as those in operation by Wal-Mart, K-Mart, and Target, had sales of $5.1 billion and $6.7 billion respectively in 1993 and 1994. Projections of sales from supercenter formats range from $9.5 billion in 1995 to $32.6 billion in 2000 (Kaufman). According to a Food Marketing Institute

(FMI) report on alternative store formats, nontraditional retail outlets accounted for 6.2 percent of all grocery related sales in 1991. The combined grocery products sales of non-traditional retailers is forecasted to reach almost $70 billion in 2000 — amounting to roughly 14 percent of total grocery product sales. Most of the growth of non-traditional outlets has occurred over the past 10 years.

Warehouse club stores primarily serve consumers who buy in bulk. A FMI study concluded that prices for grocery-related items averaged 26 percent lower in these stores than in traditional grocery stores (*Food Marketing Review*). Grocery-related products are one of the fastest growing segments of deep discount drugstores such as Phar Mor, Drug Emporium, and F&M. Mass merchandisers have extended their product lines to expand the array of food and non-food grocery products in supercenter formats. Both mass merchandisers and warehouse club stores use locational and product mix strategies to obtain greater sales volume. To illustrate, mass merchandisers have developed their formats in low-density, rural areas where large-scale competitors are essentially non-existent. Three retailers, Wal-Mart, K-Mart, and Target, account for roughly 70 percent of total sales from discount mass merchandisers (*Food Marketing Review*).

The purpose of this paper is to examine the impact of one mass merchandiser (Wal-Mart) on the sales of a traditional retail grocery outlet (David's Supermarket, Inc.) located in the rural areas surrounding the Dallas/Ft. Worth metroplex. To date, no studies have quantified the magnitude of the effect of mass merchandisers on sales of traditional grocery retailers. In this way, this paper makes a contribution to the literature. Data for this

Professor, Department of Agricultural Economics, and Professor, Department of Economics, Texas A&M University.

Figure 1. Grocery Products Sales by Non-traditional Retailers.

analysis correspond to the 30 stores from David's Supermarket, Inc. covering monthly periods from 1987 to 1994. These data indeed are proprietary and come from the accounting firm of Coopers and Lybrand, LLP.

Model Specification

This analysis rests on the development of an econometric model for retail grocery sales. As mentioned previously, sales correspond to those from David's Supermarket, Inc. over the period 1987 to 1994. This firm consists of 30 stores located on the rural/urban fringe in the Dallas/Ft. Worth area. A list of the various stores, together with their competitors, is exhibited in Table 1.

From Table 1, the principal competitor for David's Supermarket, Inc., clearly is Wal-Mart. Competition from Wal-Mart is evident in 22 of the 30 stores listed in Table 1. The first Wal-Mart supercenter opened in 1988, but it was not possi-

ble to separate regular Wal-Mart discount stores from superstores in this study. Competition also is evident from local traditional food competitors. In this analysis, attention is centered on measuring the impact of the presence of Wal-Mart on sales from David's Supermarket, Inc., after accounting for other factors.

To accomplish this task, we employ the following model specification:

$SALES_{it} = $ f(SEASONALITY, $STORE_i$, POPULATION $DENSITY_{it}$, $INCOME_{it}$, WAL-$MART_{it}$, $NMAJCOMP_{it}$, $NMINCOMP_{it}$, $SALES_{it-1}$, LBO_t),

where

$SALES_{it}$ = real grocery sales of store i in time period t;

SEASONALITY = set of dummy variables corresponding to particular months (base month, December)

STORE$_i$ = dummy variable corresponding to store i (base store, store 30);

POPULATION DENSITY$_{it}$ = population of the city in which store i is located divided by the square miles of the county in which store i is located;

INCOME$_{it}$ = real per capita income in time period t of the county in which store i is located;

WAL-MART$_{it}$ = 1 if Wal-Mart is a competitor for store i in time period t; 0 otherwise;

NMAJCOMP$_{it}$ = number of major competitors for store i in time period t;

NMINCOMP$_{it}$ = number of minor competitors for store i in time period t;

SALES$_{it-1}$ = lagged grocery sales of store i in time period t; and

LBO$_t$ = 1 if time period after January 1990; 0 otherwise.

The model links seasonality, store characteristics, population density, income, the presence of Wal-Mart, the number of major and minor competitors, lagged sales, and a structural change associated with a leveraged buyout (LBO) to retail grocery sales of David's Supermarket, Inc. The LBO took place in February 1990; a LBO is the purchase of the common stock of a company through debt-financing, while pledging with the assets of the new company as collateral.

Given the availability of monthly data, it is possible to examine whether or not seasonality is evident in sales of this retail outlet. The individual stores are in different locations, may possess different characteristics, and may cater to different clientele. To account for differences among stores, we employ dummy variables corresponding to the various stores. All other things held constant, grocery sales are likely to be higher for more densely populated areas. As well, grocery sales are likely to be positively related to per capita income. Further, sales from this firm are expected to be negatively impacted by the presence of Wal-Mart; in addition, as the number of other major or minor competitors increases, sales are expected to decline. We examine whether or not the LBO influences sales of this retail outlet. Finally, to capture

customer loyalty, we include the lag of grocery stores. The use of a lagged dependent variable typically is associated with habit persistence. As such, we expect the estimated coefficient associated with this variable to be between 0 and 1.

Data

Data for this analysis cover monthly time periods from 1987 to 1994 for 30 stores from David's Supermarket, Inc. Not all stores have complete information over the period 1987 to 1994. Several stores closed before 1994, and several stores opened after 1987. The total number of observations available for analysis is 1959. To make adjustments for inflation, sales and income figures are deflated by the Consumer Price Index for all items (1982-84=1.00).

Descriptive statistics for selected variables in the econometric specification are exhibited in Table 2. Sales in 1982-84 dollars, on average, are $217,370 per month, ranging from $69,720 to $662,130 per month. Population density is 116,280 persons per square mile on average, with a range of 8,920 to 1,418,200 people per square mile. Per capita income in 1982-84 dollars, on average, is $16,596 over this period, with a range of $11,258 to $26,805. Real per capita income, on average, is $12,443, ranging from $10,034 to $18,451. Wal-Mart is a competitor for 22 of the 30 stores in the firm. But, over this period the presence of Wal-Mart occurs just over 50 percent of the time. Besides Wal-Mart, the average number of competitors to any store in David's Supermarket, Inc. is close to 2 with a range of 0 to 7.

Empirical Results

The econometric specification corresponds to a pooled time-series cross-sectional model. Given unequal numbers of monthly time periods within each of the 30 cross-sections (stores), the model technically is an analysis of covariance model. The estimation technique is simply ordinary least squares. The estimated coefficients and t-statistics associated with each of the variables in the model are exhibited in Table 3. The level of significance chosen in this analysis is 0.10. All variables in the model are statistically significant except for per capita income.

Table 1. Competitors to David's Supermarket, Inc. in Retail Grocery Sales.

Store #	Place	County	Major Competitors	Minor Competitors
1	Grandview	Johnson	Wal-Mart (1/87 to 12/94)	Grandview Fast Stop
2	Alvarado	Johnson	Wal-Mart (1/89 to 12/94)	Level Food Center, Inc.
3	Midlothian	Ellis	Wal-Mart (1/87 to 12/94) Minyard Food Stores, Inc. Kroger	DJC Food Stores, Inc.
4	Mabank	Kaufman	Wal-Mart (1/94 to 12/94) Winn-Dixie	none
5, 10	Cleburn	Johnson	HEB Kroger Winn-Dixie	Osborne Grocery Co. Pedgos West
6	Granbury	Hood	Kroger Winn-Dixie	Circle B Circle Eight Enterprises
7	Whitney	Hill	Wal-Mart (1/87 to 12/94)	Bonanza Supermarket Randall Lee Wood
8	Clifton	Bosque	none	Thrift Mart Food Stores
9	Seven Points	Navarro	Wal-Mart (1/94 to 12/94) Winn-Dixie	Kemp-Tex Inc. Lively Grocery
11	Hamilton	Hamilton	none	Level Food Center, Inc.
12	McGregor	McLennan	Wal-Mart (1/87 to 12/94)	Triad Foods, Inc.
13	Italy	Ellis	Wal-Mart (1/87 to 12/94)	none
14	Temple	Bell	HEB Albertson's Wal-Mart (1/87 to 9/92)	Mayer's Food Mart FJR, Inc. E-Z Way Convenience Stores
15	Acton	Hood	none	none
16	Stephenville	Erath	HEB Winn-Dixie Wal-Mart (8/91 to 6/93)	Osborne Grocery Co.
17	Glen Rose	Somervell	none	Level Food Center, Inc.
18	Mineral Wells	Palo Pinto	Wal-Mart (11/87 to 12/94) Winn-Dixie	CS Food Stores Diamond Food Markets, Inc. Sam's Supermarket
19	Corsicana	Navarro	Wal-Mart (7/88 to 5/89) HEB	Fullerton Grocery & Market
20	Joshua	Johnson	none	B&W Grocery Level Food Center, Inc.
21	Little Elm	Denton	Wal-Mart (4/89 to 12/94)	none
22	Frisco	Collin	Wal-Mart (4/89 to 4/94)	none
23	Princeton	Collin	Wal-Mart (7/93 to 12/94)	Gilbert Food Store, Inc.
24	Whitesboro	Cooke	Wal-Mart (5/90 to 12/94)	Clinnons Grocery, Inc. North Town Foods
25	Gainesville	Cooke	Wal-Mart (9/90 to 6/92) Randall's Piggly Wiggly	Scivally's Grocery Dicus Cash Super Market, Inc.
26	Ferris	Ellis	Wal-Mart (10/91 to 12/94)	Averett & Associates, Inc.
27	Graham	Young	Wal-Mart (9/91 to 5/92)	United Supermarkets, Inc.
28	Celina	Collin	Wal-Mart (8/92 to 10/94)	none
29	Pottsboro	Grayson	Wal-Mart (6/93 to 12/94)	none
30	Everman	Tarrant	Wal-Mart (7/93 to 12/94) Minyard Food Stores, Inc.	none

Table 2. Descriptive Statistics of Selected Variables in the Model.

Variable	Mean	Stdrd. Dev.	Min.	Max.
SALES ($)	$217,370	$85,125	$69,720	$662,130
POPDENS (000)	116.28	151.02	8.92	1,418.2
INCOME ($)	$12,443	$1,945	$10,034	$18,451
WAL-MART	0.51	0.49	0	1
NMAJCOMP	0.71	1.07	0	4
NMINCOMP	0.97	0.79	0	3

About 86 percent of the variability in retail grocery sales is accounted for by the model. Seasonality is evident in sales. Real sales are highest in December; differences between the remaining months and December range from $2,188 (March) to $76,740 (January). In addition, differences in sales exist across stores. Differences between real sales from other stores and store 30 (base category) vary from $106,280 (store 28) to $300,640 (store 16). Relative to store 30, real sales from all remaining stores are higher.

Population density is a statistically significant factor affecting retail grocery sales. For every 1000-person change per square mile, sales change by $155 for this firm. Income, on the other hand, is not a statistically important factor affecting sales of David's Supermarket, Inc. The sign associated with this variable also is negative, implying that as per capita income of consumers increases, shoppers may switch to other grocery outlets or shoppers may increase expenditures in the away-from-home market.

The presence of Wal-Mart is a key factor affecting sales. Real sales from this firm are $46,129 per month less with Wal-Mart as a competitor than without the presence of this mass merchandiser. Given that average monthly real sales for David's Supermarket, Inc. over the time period 1987 to 1994 are $217,370, Wal-Mart alone, *ceteris paribus*, is responsible for about a 21 percent reduction in sales. Thus, the presence of Wal-Mart is a noteworthy concern to this firm. The number of other major and minor competitors also impacts sales from David's Supermarket, Inc. For every unit change in the number of other major and minor competitors besides Wal-Mart, sales change by about $35,675 and $7,508 per month, respectively, in the opposite direction. So, the number of major competitors besides Wal-Mart is responsible for a 16 percent reduction in sales, while the number of minor competitors is responsible for a 3 percent reduction in sales on average.

Table 3. Empirical Results Associated with the Econometric Specification.

variable	estimated coefficient	t-statistic	f-statistic (p-value)
Seasonality			104.15* (0.0000)
Jan	-76,740*	-20.36	
Feb	-53,573*	-14.98	
Mar	-2,188.4	-0.60	
Apr	-56,535*	-15.37	
May	-40,683*	-11.36	
Jun	-10,791*	-2.95	
Jul	-58,511*	-15.90	
Aug	-44,294*	-12.37	
Sep	-7,926.2*	-2.18	
Oct	-69,676*	-19.00	
Nov	-52,255*	-14.73	
Store			12.42* (0.0000)
1	152,1770	1.14	
2	182,450	1.33	
3	285,350*	2.01	
4	176,500	1.23	
5	152,380	1.12	
6	224,110	1.57	
7	236,570	1.59	
8	140,870	0.95	
9	192,380	1.33	
10	237,970*	1.74	
11	155,600	1.04	
12	160,590	1.21	
13	153,790	1.08	
14	299,850*	2.24	
15	127,620	0.89	
16	300,640*	2.02	
17	148,330	1.01	
18	294,740*	1.97	
19	179,950	1.22	
20	113,840	0.83	
21	122,710	1.04	
22	169,590	1.46	
23	115,780	1.01	
24	185,810	1.25	
25	298,560*	2.01	
26	162,610	1.15	
27	194,990	1.30	
28	106,280	0.94	
29	180,980	1.28	
POPDENSE	155.39*	1.44	
INCOME	-2.7951	-1.21	
LAGSALES	0.5571*	29.48	
LBO	-29,790*	-13.26	
WAL-MART	-46,129*	-9.63	
Major Competitors	-35,675*	-9.13	
Minor Competitors	-7,508.1*	-1.32	
CONSTANT	41,364	0.26	
R^2 = .8647			

* indicates statistical significance at the 0.10 level

The structural change attributed to the leveraged buyout also is a key factor affecting sales of this retail outlet. Real sales for this firm are lower by $29,790 after the LBO compared to before the LBO. The LBO, alone, thus is responsible for about a 13 percent reduction in sales on average. Finally, the coefficient associated with lagged sales is in the unit interval (0.5571). This coefficient also is statistically different from zero. Thus, all other factors held constant, there appears to be customer loyalty or habit persistence in sales.

Concluding Remarks

Non-traditional retailers such as warehouse club stores, deep discount drug stores, and mass merchandisers indeed are new competitors for traditional food retailers. It is expected that non-traditional retailers will account for roughly 14 percent of total grocery product sales by the turn of the century. According to Kinsey and Senauer, traditional supermarkets are not only facing serious competitive challenges from club stores, drug stores, and mass merchandisers at the price-conscious end of the market but also from home-meal replacement providers at the convenience-oriented end. Indeed hypermarkets and convenience stores also are formidable competitors to traditional grocery outlets.

In this paper, the impact of a discount mass merchandiser (Wal-Mart) on the sales of a conventional retail grocery outlet (David's Supermarket, Inc.) located in the rural areas surrounding the Dallas/Ft. Worth metroplex was analyzed. In this case study, it was estimated that Wal-Mart alone is responsible for about a 21 percent reduction in sales. This result supports the contention that mass merchandisers (supercenters) are a notable source of competition to traditional food retailers.

Projections of sales in the year 2000 from mass merchandisers using supercenter formats are in the $30 billion to $35 billion range, up from $10 billion currently. Supercenters are the prime retail growth vehicle, ranging in size from 100,000 to 200,000 square feet. They contain a complete discount general merchandise outlet and a large-scale, low-price supermarket under one roof. The theory that people won't shop for food and fashion merchandise at the same time apparently does not hold water.

Club stores are projected to reach about $40 billion by the turn of the century, up from about $25 billion currently. Slower growth then is expected in warehouse clubs compared to mass merchandisers. The clubs expanded so rapidly that there exists, at present, cannibalization among club stores. Due in part to the "efficient consumer response" (ECR) initiative, traditional supermarkets are now generally more competitive with warehouse clubs.

What implications can we draw from this paper? Traditional grocery outlets will face heightened competition from mass merchants like Wal-Mart, K-Mart, and Target and at the same time, but to a lesser degree, from warehouse club and discount drug stores. Notable losers in terms of share of sales as a result of this competition are the superettes and mom and pop stores. To stabilize market share, traditional grocery outlets must make full use of the ECR initiative, especially in efforts to reduce prices and yet maintain profit margins. Also, the supermarket industry is highly unionized, and consequently, labor costs are high. Most mass merchandisers, on the other hand, have a non-union labor force. In order to lower their cost structure and improve their competitive position vis-à-vis K-Mart, Wal-Mart, and Target, supermarket companies must take tougher stances in union negotiations.

Additional research in this area will be of benefit to help us predict the future direction of the food system. To illustrate, replications of this research in other geographic areas are in order. With repeated measurements, one will be in position to ascertain the average impact of mass merchandisers like Wal-Mart on traditional food retailers. Additionally, the impacts of mass merchandisers are not likely to be evenly distributed across all departments within the traditional retail food establishment. To test this hypothesis, one must obtain sales information by department. This information was not available in this study. Without question, additional research will help in the understanding of the changes that are occurring in the way retail establishments deliver food to consumers.

References

American Institute of Food Distribution, Inc. *The Food Institute Report.* Fair Lawn, New Jersey. Selected issues.

Coopers and Lybrand, LLP. Personal communication.

Food Marketing Review, 1994-95. U.S. Department of Agriculture, Economic Research Service, Agricultural Eco-

nomic Report Number 743, Washington, D.C. September 1996.

Kaufman, P.R. "What's Driving Food Distribution — Forces for Change," *Journal of Food Distribution Research* (February 1996): 25-29.

Kinsey, J. and B. Senauer. "Consumer Trends and Changing Food Retailing Formats," *American Journal of Agricultural Economics* 78,5(December 1996):1187-1191.

Progressive Grocer. Selected issues.

U.S. Department of Labor, *Bureau of Labor Statistics Consumer Price Indices*, selected issues.