Understanding the Determinants of Retail Strategy: An Empirical Analysis[☆]

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Abstract

Two powerful, highly effective strategic tools that retailers possess involve pricing and store format decisions. From the several strategic choices available for each decision, a retailer can choose any combination. We focus on two gaps in the literature. First, both decisions are specific to the consumers to whom the stores cater and the environments within which they operate, yet little academic research studies them jointly. Thus, it is important to determine the joint effects of considering pricing and format decisions in a single framework. Second, do retailers, privy to findings from rich prior literature pertaining to consumer store choices related to their pricing and format preferences, actually take such information into account when making strategic choices? In this descriptive rather than prescriptive study, we determine whether a retailer that makes an initial choice about which policy to implement complies with existing understanding about consumer preferences. Using a unique data set that covers all grocery retailers in three states, we apply a multinomial logit model to study the determinants of price, format, and combination strategies for retailers. Although some combinations are more similar than others, a consideration of the pricing or format strategy in isolation fails to depict a complete picture, and the strategic implications change significantly when we study price and format strategies in combination.
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Introduction

The supermarket industry generates annual sales of about $500 billion. Competition is fierce, and retailers use every means available to survive and compete. In this context, selecting and implementing an appropriate strategy can determine the long-term success or failure of a store.

One of the most powerful and effective strategic tools in retailing is pricing (Levy et al. 2004), for which the options available to retailers range from everyday low price (EDLP) to promotional or high–low (HiLo) strategies. An EDLP retailer tends to offer lower average prices, whereas a HiLo retailer offers frequent discounts (Popkowski Leszczyc, Sinha, and Sahgal 2004). In addition, a few retailers may offer some combination (i.e., hybrid pricing).

A second critical and long-term strategic decision that retailers must make pertains to the store format. Store formats refer to competing categories of retailers that match varying customer needs and shopping situations (Gonzalez-Benito, Munoz-Gallego, and Kopalle 2005). The multiple available formats include the most popular supermarket format, which offers a wide variety of food and household merchandise; larger supercenters that carry an enormous range of products under one roof, including full lines of groceries and general merchandise; and limited assortment formats that offer little variety within the limited categories that they carry.

Understandably, considerable research centers on how pricing and format strategies affect consumers' store choice behavior, as well as which consumer profiles tend to be drawn to each strategy (e.g., Bell and Lattin 1998; Bhatnagar and Ratchford 2004; Fox, Montgomery, and Lodish 2004; Lal and Rao 1997; Messinger and Narasimhan 1997; Popkowski Leszczyc, Sinha, and Timmermans 2000; Voss and Seiders 2003). However, far less research explores the strategic selection of price and format policies from the retailer's perspective.

Strategic changes in price and/or format induce major penalties on retailers; for example, when Sears switched to an EDLP/supercenter strategy in 1988 to compete with discoun-

ters like Kmart and Wal-Mart, customers failed to perceive the retailer's offerings as competitive on price. Sears therefore had to differentiate itself further by offering additional services, even with its EDLP approach. Although this latter strategy proved more successful, Sears was bought out by Kmart. Similarly, the Bruno supermarket chain altered its pricing strategy from HiLo to EDLP in 1995, which alienated customers to the extent that the company filed for bankruptcy within just three years.

In theory, a retailer may choose any combination of pricing and format strategies, and most large retailers use a variety of combinations to occupy several niches and serve different segments in the marketplace. For example, Supervalu, which became the third-largest U.S. food retailer after it acquired Albertson's, operates in diverse markets under fifteen different brand names and follows different format/pricing strategy combinations, including an EDLP strategy in both its limited assortment Save-A-lot stores and its Shop' n Save and Cub Foods supermarkets. Food Lion, another leading supermarket chain, adopts a multiformat strategy by operating under different names that employ different formats and target different consumer segments. Such combinations of pricing and format strategies constitute the heart of this investigation.

For example, only by considering both pricing and format strategies can we differentiate between the EDLP strategies of Wal-Mart (supercenter format) and Wegman's (supermarket format). Whereas Wal-Mart delivers everyday low prices on a wide selection of items, to appeal to price-conscious consumers, Wegman's provides consistent lower prices on a smaller selection of frequently purchased goods. In addition, the supermarket focuses on increasing the number of in-store service features, such as cooking classes, freshly prepared foods, and gourmet food cafés, that enable it to appeal to a higher-income segment of consumers. That is, despite their similar pricing strategies, these very different overall strategies target unique consumer segments.

Prior research (e.g., Bhatnagar and Ratchford 2004; Fox, Montgomery, and Lodish 2004; Gonzalez-Benito, Munoz-Gallego, and Kopalle 2005; Popkowski Leszczyc, Sinha, and Sahgal 2004) demonstrates that both pricing and store format are influenced by consumer demographics (e.g., income), store factors (e.g., service), and competition. Thus, the variables that affect pricing and store format preferences overlap. Because both decisions are specific to the consumers to which the stores hope to cater, as well as the environment within which they operate, this overlap seems unsurprising. Yet past academic research has not considered these strategic decisions of pricing and format strategy of a store in a single framework. Does this gap imply that retailers focus only on one or the other strategy, rather than jointly considering both pricing and format decisions? How does the impact of the variables change in a joint framework in contrast with a purely pricing or purely format strategy framework? These questions constitute the first issue we address.

We also consider whether retailers, privy to the findings from prior research regarding consumer choices and consumer's pricing and store format preferences, actually take such information into account when making their strategic choices. Although we can only observe variables a retailer has implemented. In this descriptive research, we also can determine if the retailer actually complies with existing insights from prior literature about consumer preferences in those strategic choices. For example, if retailers that adopt a HiLo pricing strategy are located in high-income demographic region, they may be drawing on prior store choice literature that indicates high-income shoppers prefer stores with a HiLo pricing strategy. We offer empirical evidence from the retailer's perspective to complement existing consumer-based models of pricing and format strategy.

Our research questions thus are as follows: How do variables related to the area in which the store is located (e.g., market characteristics, store features, nature of competition) affect the retailer's particular combination strategy (i.e., pricing and format)? How might this impact change if the retailers choose to focus on a pricing or format strategy, exclusively? Do the strategies retailers choose match prior literature findings about consumer preferences?

In the next section, we discuss the conceptual framework and hypotheses, followed by the presentation of an empirical model. To test the hypothesized antecedents of a retailer's pricing/format strategy choice; we employ a data set that encompasses grocery retailers across three states. Finally, we conclude with some managerial implications and recommendations based on the results of our hypotheses testing.

Correlates of retail strategy

Our conceptual framework draws on research pertaining to the influence of price and format strategies on consumers' store choice behaviors (Bell and Lattin 1998; Ho, Tang, and Bell 1998; Hoch, Drèze, and Purk 1994; Lal and Rao 1997; Popkowski Leszczyc, Sinha, and Sahgal 2004; Popkowski Leszczyc, Sinha, and Timmermans 2000; Tang, Bell, and Ho 2001). Bolton and Shankar (2003), Shankar and Bolton (2004), and Voss and Seiders (2003) study retail pricing strategies and find that strategy components relate to competitor, category, store, and customer factors. Dhar and Hoch (1997), Tellis (1986), and Shankar and Bolton (2004) also note that retailers' pricing strategies and tactics likely are influenced by upstream (i.e., manufacturer/brand, category) and downstream (i.e., customer) factors.

With regard to format strategy choices, Messinger and Narasimhan (1997) show that increases in per capita disposable income increase supermarket assortments; they also suggest that the greater prevalence of one-stop shopping represents a response to the growing demand for time-saving convenience. Using a theoretical model, Bhatnagar and Ratchford (2004) demonstrate that retail formats are functions of costs (e.g., travel, inventory holding), consumption rates, and product perishability. In an empirical study, Fox, Montgomery, and Lodish (2004) reveal that consumers are more likely to substitute stores within the grocery format than across alternative formats.

Thus, the factors that affect retail strategy choices appear to consist of three general categories: store, market, and competitive characteristics (Ingene and Brown 1987). These categories in turn represent the relevant information available to potential retailers, which they may use to make a decision about the
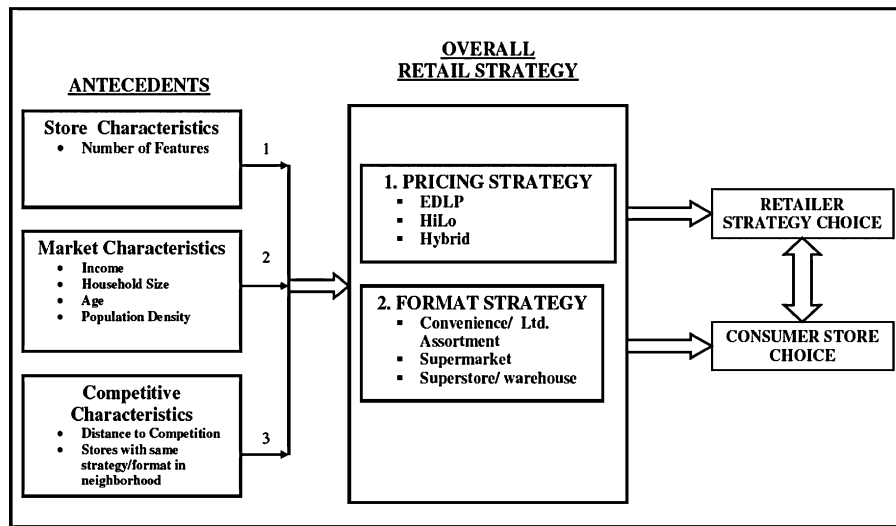
Conceptual Model

Fig. 1. Conceptual model.

appropriate pricing and format strategies to adopt. Our conceptual framework therefore focuses on three broad categories of antecedents of retailer pricing, format, and combination strategies (Fig. 1). This framework builds on previous work by Ingene and Brown (1987) that examines the antecedents of retail structure (e.g., percentage of mom-and-pop stores) in the gasoline business.

Hypotheses development

Role of store characteristics

Store characteristics may help determine consumer choice and shopping behavior. For example, research on retailer environments and atmospherics builds on environmental psychology to demonstrate that design, social setting, and ambience influence consumer service quality perceptions and shopping behavior (see Baker et al. 2002). Retail service characteristics (e.g., more checkout personnel) can provide greater convenience and enhance perceptions of service convenience (see Berry, Seiders, and Grewal 2002). Thus, store characteristics that highlight service facets – offering a bank inside the store, or providing a bakery or deli – help retailers provide value to customers and distinguish themselves from competitors (Kumar and Karande 2000; Reinartz and Kumar 1999).

Using a theoretical model to study pricing strategy, Lal and Rao (1997) suggest that HiLo stores should offer the higher levels of service desired by time-constrained shoppers to compete with EDLP retailers, which are preferred by large basket consumers (more items at lower per item costs). Iyer (1998) and Popkowski Leszczyc, Sinha, and Sahgal (2004) also find that time-constrained, service-seeking customers tend to shop at HiLo stores rather than EDLP retailers, because the greater value they place on their time value makes them willing to pay for better service. Finally, cherry pickers who search out deals at any store that offers them, prefer promotions at HiLo stores

and purchase smaller baskets with lower average costs (Bell and Lattin 1998).[2]

H1. Higher service levels are associated with (a) HiLo rather than EDLP stores and (b) supermarket rather than supercenter format stores.

Role of market characteristics

Reilly's (1931) law of gravitation proposes that the attractiveness of a retail outlet is proportional to the population of the surrounding area and varies inversely with the distance to the store (see also Fox and Hoch 2005; Gauri, Sudhir, and Talukdar 2008; Huff and Rust 1984). Various researchers (e.g., Bell and Lattin 1998; Boatwright, Dhar, and Rossi 2004; Lal and Rao 1997) also demonstrate the importance of the characteristics of a trading area, such as population density, income, distance from store, and other sociodemographic variables of interest, for the appropriate choice of a format and pricing strategy for a retailer.

Becker's (1965) theory of time may offer a common unifying conceptualization for understanding the role of various market characteristics. When consumers perceive their time as especially valuable, they will pay more to conserve time and value time-saving options more. In turn, consumers with higher wage rates or income likely value their time more (Marmorstein, Grewal, and Fishe 1992) and are less interested in traveling longer distances to shop. Hoch et al. (1995) find that households with higher income levels will pay for added convenience at a store, which helps them save time. That is, the time-constrained, service-seeking segment experiences the highest disutility for travel costs and a greater willingness to pay for services and mer-

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[2] Prior research generally is limited to two pricing strategies, EDLP and HiLo, and two format strategies, supermarket and supercenter. Therefore, our hypotheses also are limited to these strategies. Empirically, however, we also test the effects of the independent variables on hybrid pricing and limited assortment format strategies.

chandise. This segment therefore, likely shops at HiLo stores with convenient locations in residential areas closer to their households and at stores that provide a higher level of service. Following the same argument, supercenters, which occupy larger areas, should tend to be located in areas with low rents, usually outside the city limits. Because grocery purchases represent a frequent shopping activity, retailers can reduce consumer costs associated with travel time by locating supermarkets in residential areas (Solgaard and Hansen 2003). In turn, these areas likely encompass higher income levels than nonresidential commercial locations, which tend to host supercenters. Thus, the preceding discussion about the law of gravitation and value of time helps explicate the relationship between the income of an area and retail format. We posit:

H2. Higher neighborhood income levels are associated with (a) HiLo rather than EDLP stores and (b) supermarket rather than supercenter format stores.

Building again on Becker's work (1956, 1985), we suggest that the time-constrained, service-seeking segment also experiences the greatest disutility for travel and therefore shops at HiLo stores with convenient locations; these locations in turn should enjoy greater population density in the areas surrounding the stores. Hence, we posit:

H3. More populous neighborhoods are associated with (a) HiLo rather than EDLP stores and (b) supermarket rather than supercenter format stores.

Bell and Lattin (1998) further find that small basket shoppers visiting HiLo stores are older and have smaller families. In contrast, younger, large basket shoppers with larger families tend to visit EDLP stores because they can obtain savings on the total basket of goods. Thus, EDLP stores appeal to time-constrained shoppers by offering consistently low prices and one-stop shopping convenience. However, we find no existing research that links the effects of neighborhood household size and neighborhood age level to retail format. We therefore propose hypotheses regarding the effect of the size and the age of the members of households on pricing strategy, but not on format strategy:

H4. Smaller neighborhood household sizes are associated with HiLo rather than EDLP stores.

H5. Older age level neighborhoods are associated with HiLo rather than EDLP stores.

Role of competition characteristics

Previous theoretical research suggests (Lal and Villas-Boas 1998), not unexpectedly, that retail competition influences retail pricing. Chintagunta's (2002) empirical study supports this contention; competitor factors represent important determinants of retail pricing. Firms tend to be very sensitive to the activities of their competitors in the same market, as shown by Lambin, Naert, and Bultez (1975) and Hanssens (1980), among others. Competitor activities also shape a firm's pricing decisions to the extent that these activities affect its market share (Ailawadi, Lehmann, and Neslin 2001).

According to an empirical study by Gonzalez-Benito, Munoz-Gallego, and Kopalle (2005), greater spatial rivalry exists between stores within a given format, rather than between different store formats, when those stores appear in the same geographical region. All else being equal, a more competitive atmosphere – whether that competition focuses on price or format – should lead to lower competitive pricing and lower shared profits, which in turn should require greater differentiation in retailers' strategy choices.

H6. Stores within a particular geographic area differentiate themselves on either their pricing strategy or format strategy or both.

According to our previous theorization, HiLo strategy stores tend to locate in higher population density areas, and stores that adopt these strategies tend to be more conveniently accessible. It therefore seems logical to intuit that as the distance to competitors increases, these strategies start to prevail, which is what makes them more popular in high density and conveniently accessible areas. Hence, we posit:

H7. Greater distance to competitors is associated with HiLo rather than EDLP stores.

Overall then, we can compare the effects of price by format combinations. As we summarize in H1 to H3, we generally expect that superior service, neighborhoods with higher income, and more populous areas are associated with HiLo-supermarket rather than HiLo/supercenter strategies. We expect a similar pattern of associations for comparisons of EDLP-supermarket with EDLP-supercenter strategies. Fig. 2 presents a summary of the hypotheses for quick reference.

Data

To obtain the data for the model, we combine two separate databases: the Spectra Marketing database (from 2003, owned by ACNielsen) and U.S. Census Bureau data (from 2000). Spectra maintains an exhaustive database of store features, such as weekly sales, pricing strategies, and various store-specific internal features, including the presence of banking facilities or an in-store bakery. The Census data provide a list of various sociodemographic characteristics for census block groups. We therefore obtain store strategy and competitive data from the former database and demographic data from the latter.

From Spectra, we gather data pertaining to all grocery retailers in three states, namely, New York, Pennsylvania, and Ohio. These three states account for approximately 9.3 percent of total national grocery sales. Of the 6,918 grocery stores in the three states, we select those chains that own more than ten stores, which leave us with 3,315 stores that belong to 67 chains. Spectra also provides pricing (EDLP, HiLo, hybrid) and format (limited assortment, supermarket, supercenter) strategy information about each store. One chain that consists of eighteen stores provides no pricing strategy information, so we eliminate it from the analysis. The final database thus consists of 3,297 stores from 66 chains, as we display in Table 1. Most of the combined strategy types have some representation in the market, though the maxi-

	Pricing Strategy	*Format Strategy*	*Overall Retail Strategy*	
	HiLo vs. EDLP	**Supermarket vs. Supercenter**	**HiLo-Supermarket vs. EDLP-Supercenter**	**EDLP-Supermarket vs. EDLP-Supercenter**
Role of Internal Store Features				
	H1a: Greater service in HiLo　(√)	H1b: Greater service in supermarket (√)	Greater service in HiLo/supermarket (√)	Greater service in EDLP/supermarket (√)
Role of Market Characteristics				
Income	H2a: HiLo stores located in high-income neighborhoods (√)	H2b: Supermarkets located in high-income neighborhoods (X)	HiLo/supermarkets located in high-income neighborhoods	EDLP/supermarkets located in high-income neighborhoods
Population Density	H3a: HiLo stores located in populous neighborhoods (√)	H3b: Supermarkets located in populous neighborhoods (√)	HiLo/supermarkets located in populous neighborhoods (√)	EDLP/supermarkets located in populous neighborhoods (√)
HHSize	H4a: HiLo stores located in neighborhoods with smaller household sizes	Not specified.	Not specified.	Not specified.
Age	H5a: HiLo stores located in neighborhoods with older people	Not specified.	Not specified.	Not specified.
Role of Competition Characteristics				
Competitive Strategy	H6a: Stores within a neighborhood tend to adopt a different pricing strategy (X)	H6b: Stores within a neighborhood tend to adopt a different format strategy (X)	The stores in the neighborhood tend to differentiate on pricing and format strategy (M)	
Distance to Competition	H7a: As distance to competition increases, stores tend to adopt HiLo pricing strategy (√)	Not specified.	Not specified.	Not specified.

Note: √ implies support at .05 level. M implies mixed support. X implies support in opposite direction at .05 level.

Fig. 2. Summary of hypotheses, tests, and results.

mum number appears in the HiLo/supermarket cell, and we find no hybrid/limited assortment or HiLo/supercenter stores.

Using latitude and longitude information, derived from the addresses of the stores, we geocode them according to specific census block groups and use this information to obtain relevant demographic data from the U.S. Census Bureau. We identify the stores and census blocks within a three-mile radius of each store, which results in 38,268 census block groups in New York, Pennsylvania, and Ohio.

To test H1, we require data about the stores' service levels. In keeping with prior literature (Kumar and Karande 2000; Lal and Rao 1997; Reinartz and Kumar 1999), we use store feature data as a proxy for service levels and consider such features as the presence of an ATM, in-store bakery, and so forth. Because we hope to incorporate an overall service level for each store, as

well as ensure that we represent all essential independent store feature factors, without double counting any correlated features, we use the method described next to a derive variable for service.

Some of features should be correlated (e.g., presence of an ATM and presence of a bank); therefore, we factor analyze a matrix of 40 features using the principal component method. From this analysis, we obtain eight factors on which the store features load that explain 62 percent of the variance in the data set. We then select the two features within each factor that load strongly on that factor and exhibit strong communality (i.e., a significant portion of the feature is explained by that factor). Using this method, we extract fifteen features (only one feature loads on the last factor). Therefore, the service level variable consists of the sum of the number of extracted features that exist for each store. (Note that this variable may achieve a max-

Table 1
Store distribution

	Limited assortment	Supermarket	Supercenter	
HiLo	89 (2.70%)	1,724 (52.29%)	–	1,813 (54.99%)
EDLP	359 (10.89%)	608 (18.44%)	254 (7.70%)	1,221 (37.03%)
Hybrid	–	227 (6.89%)	36 (1.09%)	263 (7.98%)
	448 (13.59%)	2,559 (77.62%)	290 (8.80%)	3,297 (100.00%)

imum of two counts for any given factor, which ensures equal representation from each independent factor.)

To construct the variable representing the proportion of stores with the same pricing strategy, we select all stores within the trading area of any focal store that follow the same pricing strategy (EDLP, HiLo, or hybrid). We use a similar approach to create the variable reflecting the proportion of stores following the same format strategy (supermarket, supercenter, or limited assortment) in the trading area of the focal store.

To weight the demographic features of the block group, we use an inverse measure of distance to the store, in keeping with spatial modeling concepts (Brunsdon, Fotheringham, and Charlton 1996; Mittal, Kamakura, and Govind 2004). This step ensures that block groups closer to the store receive more weight than distant block groups. Ideally, we would consider the distance of each individual household to the store, but we lack household address information and cannot realistically obtain it because of confidentiality and response concerns. Therefore, we use block group distances determined from the distance of the centroid of each block group to the store. We list descriptive statistics for some of the relevant sociodemographic features of the block groups in the stores' trading areas in Table 2, which provides a summary of much of the data we use to study significant differences across various combination price/format strategies.

Modeling framework

To understand the determinants of a combined pricing and format strategy, as depicted by links 1–3 in our conceptual framework in Fig. 1, we employ a random utility framework and obtain the utility for the ith store derived from the jth pricing/format strategy as follows:

$$U_{ij} = V_{ij} + \varepsilon_{ij}, \tag{1}$$

where V_{ij} is the deterministic component of the utility; ε_{ij} is the error term distributed independently and identically following the Gumbel distribution; $i = 1, \ldots, I$ is the number of stores; and $j = 1, \ldots, 9$ is the number of alternative pricing/format strategies available to the retailer.

The selection of a specific pricing/format strategy is influenced by store features, market characteristics, and competitive factors, so we define the deterministic component of utility as:

$$V_{ij} = \alpha_{1j} + \gamma_{2j} * \overline{F_{ij}} + \delta_{3j} * \overline{D_{ij}} + \theta_{4j} * \overline{C_{ij}} = \overline{\beta_j} * \overline{X_{ij}}, \tag{2}$$

where $\overline{F_i}$ is the vector of features of store i, $\overline{D_i}$ is the vector of market characteristics of store i, and $\overline{C_i}$ is a vector of competitive variables for store i. The probability that the ith store will choose the jth strategy/format (assuming $j = 1$ is the base) is as follows:

$$\Pr_{i1} = \frac{1}{1 + \sum_{k=2}^{9} \exp(\overline{\beta_k} * \overline{X_k})}, \text{ and} \tag{3}$$

$$\Pr_{ij} = \frac{\exp(\overline{\beta_j} * \overline{X_j})}{1 + \sum_{k=2}^{9} \exp(\overline{\beta_k} * \overline{X_k})}, \quad j = 2, \ldots, 9. \tag{4}$$

Thus, our likelihood function can be expressed as

$$L(\beta) = \prod_{i=1}^{n} \Pi_j (\Pr_{ij})^{y_{ij}}, \tag{5}$$

where $y_{ij} = 1$ if store i chooses strategy j, and 0 otherwise. Thus, β is a vector containing parameters of the model. The log-likelihood function is:

$$\mathrm{LL}(\beta) = \sum_{i=1}^{n} \Sigma_j y_{ij} * \ln(\Pr_{ij}). \tag{6}$$

We use maximum likelihood estimation to determine the parameters of the model.

Analysis and results

Test for strategy independence and preliminary analysis

The specification of a Gumbel distribution for the error term leads to a multinomial logit model (MNL), with inherent assumptions of an unstructured market and the independence of irrelevant alternatives (IIA) assumptions that follow. If we assume a normal distribution specification, we arrive at a more flexible multinomial probit model. The IIA is a property of the MNL class; outcomes that theoretically could violate the IIA may make MNL an invalid estimator. Specifically, IIA implies that adding another alternative or changing the characteristics of a third alternative does not affect the relative odds between the two alternatives considered (McFadden 1974). To ensure that the data comply with these underlying assumptions, we perform a preliminary analysis by conducting: (1) The Hausman test for "no market Structure" or IIA assumption, (2) Spearman correlations between strategy pairs, and (3) MANOVA, showing that the variables affect each strategy combination differently.

First, we conduct a Hausman specification test (Hausman and McFadden 1984) for the null hypothesis of no market structure, which implies that the IIA assumption holds. The log-likelihood ratio index is .59 for the full model; thus, the variables explain a significant proportion of the variance in the observed choices. When we test three reduced models (from which we randomly drop a different strategy combination in each), the HST statistic (χ^2) is insignificant (11.48, 9.78 and 2.48 for $df = 7$, $\chi^2_{\text{Table}} = 18.48$ at $p = .01$), which indicates that IIA is not violated.[3]

Second, we categorize the two strategies for each store into one of three categories for pricing and format and perform a Spearman correlation test between the two. The correlation is low (.02) and insignificant; therefore, we conclude that for the purposes of this data set, these two strategies are independent of each other,[4] and the multinomial logit formulation appears to capture the variance in the data adequately without violating the assumptions of the model.

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[3] Further details of the HST and probit model results are available from the authors. We are grateful to an anonymous reviewer for suggestions about validating this model specification.

[4] We thank an anonymous reviewer for highlighting this issue and offering suggestions.

Table 2
Descriptive statistics and MANOVA comparisons

	Service level	Average income ($ per year)	Household size	Median age	Population (per sq mile)	Avg. distance to competition (miles)	Proportion of stores with same pricing	Proportion of stores with same format
Combination 1: mean	.09	54,343.45	2.78	34.09	49,033.94	2.06	.78	.14
Combination 1: SD	.39	20,831.86	.36	3.56	30,357.79	.78	.26	.09
Combination 2: mean	4.24	56,923.67	2.61	36.82	21,211.18	2.26	.51	.64
Combination 2: SD	2.99	24,676.91	.54	3.81	29,336.52	1.29	.39	.37
Combination 4: mean	.31	44,219.97	2.52	37.01	7,322.84	1.84	.38	.11
Combination 4: SD	.85	15,791.31	.25	3.22	10,848.7	1.24	.34	.17
Combination 5: mean	5.25	55,841.7	2.64	37.15	9,090.04	2.27	.39	.63
Combination 5: SD	2.76	21,148.16	.44	3.47	16,277.76	1.39	.37	.38
Combination 6: mean	2.83	52,510.91	2.6	37.79	4,444.73	1.68	.39	.11
Combination 6: SD	3.5	18,588.65	.46	3.46	6,754.47	1.26	.34	.20
Combination 8: mean	5.88	64,934.46	2.7	37.45	7,251.41	2.14	.08	.65
Combination 8: SD	2.08	22,986.02	.43	2.93	10,342.8	1.35	.15	.36
Combination 9: mean	7.33	53,176.29	2.55	35.55	3,499.15	1.56	.02	.10
Combination 9: SD	1.41	13,601.29	.22	2.86	1,705.02	.67	.08	.22

	Service level	Average income ($ per year)	Household size	Median age	Population (per sq mile)	Avg. distance to competition (miles)	Proportion of Stores with same pricing	Proportion of stores with same format	MANOVA, F-value
For stores with same pricing strategy and different formats									
Combination 1 vs.2	196.24***	1.12	10.67***	48.60***	119.56***	1.93	51.05***	187.30***	124.78***
Combination 4 vs. 5	741.18***	60.37***	13.94***	.38	1.29	24.88***	.17	532.52***	388.74***
Combination 4 vs. 6	126.6***	20.25***	3.94**	7.12***	2.25	2.28	.08	.00	12.92***
Combination 5 vs. 6	141.43***	3.94**	1.32	5.67**	7.06***	37.14***	.00	422.57***	239.6***
Combination 8 vs. 9	8.77***	8.51***	3.04*	8.76***	.8	6.27***	1.00	84.23***	24.97***
All combinations	198.26***	23.77***	5.77***	14.09***	78.09***	13.27***	73.78***	235.53***	93.73***
For stores with same format and different pricing strategy									
Combination 1 vs. 4	.48	14.47***	20.94***	46.88***	226.45***	2.14	90.60***	.75	51.64***
Combination 2 vs. 5	61.51***	1.04	1.71	3.96**	120.52***	.03	46.76***	1.38	19.0***
Combination 5 vs. 8	9.03***	27.06***	2.75*	1.17	1.02	1.71	122.10***	.90	27.91***
Combination 2 vs. 8	73.1***	25.49***	7.29***	6.35***	71.34***	1.77	280.26***	.07*	55.96***
Combination 6 vs. 9	86.21***	.03	.31	12.31***	.05	.29	33.79***	.04	32.18***
All combinations	198.26***	23.77***	5.77***	14.09***	78.09***	13.27***	73.78***	235.53***	93.73***

Combination: HiLo-limited assortment (1, $n = 89$), HiLo-supermarket (2, $n = 1,724$), EDLP-limited assortment (4, $n = 359$), EDLP-supermarket (5, $n = 608$), EDLP-supercenter (6, $n = 257$), hybrid-supermarket (8, $n = 227$), and hybrid-supercenter (9, $n = 36$). *Note.* The information in the cells pertaining to the comparison of one combination vs. another are the simple F-values. The degrees of freedom would be 1 in the numerator and $n1 + n2 - 2$ in the denominator. The n's for each cell are in Table 1 and in the legend above. The degrees of freedom for the MANOVA would be 8 in the numerator and $n1 + n2 - 8 - 1$ in the denominator for any comparison of two combinations and 3,288 for all combinations (3,297–9).

* $p < .10$.
** $p < .05$.
*** $p < .01$.

Finally, to determine any significant differences across store characteristics, individual differences, and competition, we conduct multivariate analyses of variance (MANOVA), in which we test for differences across several strategy combinations, that is, different format strategies for a given pricing policy and different pricing strategies for a given format policy (Table 2).

Service level distinguishes between the pricing strategies in both the supermarket and supercenter formats, in line with previous research (Iyer 1998; Lal and Rao 1997; Popkowski Leszczyc, Sinha, and Sahgal 2004) that demonstrates the association of pricing strategies with different levels of service. However, in Table 2, we further reveal that even when pricing remains constant, service level differs significantly across the various store formats.

This pattern exists for the five-sociodemographic variables (income, household size, age, population, distance to competitors), and 16 of the 25 comparisons differ significantly ($\alpha = .05$), according to Table 2. In comparison, it reveals slightly fewer (12) significant differences in the 25 comparisons for the different pricing strategies within a given format strategy. Thus, variation in format strategy provides a greater basis for differentiation among the sociodemographic variables than does pricing strategy.

According to Table 2, no single format stands out as particularly distinct, because the significant differences appear evenly distributed. For example, in four of the five comparisons, three variables are significantly different; in the fifth comparison, four variables are. In contrast, only one of five possible variables emerges as significantly different in the comparisons between the EDLP and hybrid pricing strategies for both supermarket and supercenter formats. That is, in these two formats, the EDLP and hybrid pricing strategies do not appear to offer any differentiation with regard to sociodemographics. For supermarkets, the only significantly different variable between HiLo and EDLP strategies is population per square mile; therefore, it appears that the supermarket format strategy can draw from all demographic segments. However, the limited assortment format attracts different segments depending on whether the retailer adopts an EDLP or HiLo strategy.

Our preliminary analysis therefore indicates that both pricing and format have a significant impact on the sociodemographic profiles of the consumers who are drawn to the retailer that chooses the particular combination strategy. Although for each pricing strategy, the formats appear generally evenly differentiated, we find different results for format strategies. One format (e.g., limited assortment) may enable particular pricing strategies to draw highly differentiated consumers; another (i.e., supermarkets) may attract almost identical consumers regardless of pricing strategy.

Model analysis

Pricing strategy

Using the pricing strategy alone to formulate the dependent variable, we ran the MNL model with store, market, and demographic factors, as identified in our conceptual framework.

The log-likelihood is -2415.85 (AIC $= 4863.7$, psuedo-R^2 or $U^2 = .18$), and the parameter estimates are those listed in Table 3. Both coefficients for service level are positive and significant, in support of H1a; namely, as the service level increases, retailers prefer to use a HiLo or hybrid pricing rather than the EDLP strategy. We also find that as the average income and density of population in the trading area increases, retailers also prefer a HiLo or hybrid pricing strategy, in support of H2a and H3a. Household size and age do not appear to play significant roles in the pricing strategy choice, so we cannot confirm H4 or H5.

To study pricing strategy differentiation (H6a), we consider the results in Table 3(a), which demonstrate that as the proportion of stores following a HiLo pricing strategy in a trading area increases, retailers continue to prefer HiLo over EDLP. However, as the proportion of hybrid pricing strategy stores increases, retailers prefer EDLP over a hybrid pricing strategy. In the former case, no differentiation in pricing strategy appears to occur, whereas in the latter scenario, differentiation exists. That is, as the pricing strategy followed in a region becomes more homogenous, retailers may or may not differentiate, depending on the common pricing strategy. Thus, we cannot support H6a. Finally, as the average distance to competitors increase, retailers tend to prefer a HiLo pricing strategy over an EDLP one, in support of H7.

Format strategy

In the model with format strategy as the dependent variable, the retailer can choose a limited assortment, supermarket, or supercenter format, and the independent variables remain the same. The log likelihood is -892.63 (AIC $= 1817.26$, psuedo-R^2 or $U^2 = .60$), and parameter estimates are those in Table 3(b). As the service level increases, retailers prefer a supermarket format rather than a supercenter format, in support of H1b. In limited assortment stores, the service level is lower than in supercenters, because limited assortment stores are smaller and provide fewer extra services, such as a deli or a photo lab. As the average income of the people in the trading area increases, retailers choose a supercenter format strategy rather than a supermarket strategy, in contrast with the expectations established by prior literature and with H2b. However, limited assortment stores appear to locate in lower income areas.

Population density generally is higher around stores that embrace a supermarket or limited assortment format, which supports H3b. Although we do not provide related hypotheses, we test the effects of household size and age on format and find no significant results.

With regard to format strategy differentiation (H6b), we study the results from Table 3(b). The proportion of stores following a limited assortment format strategy in a trading area has no significant impact on the format of additional stores. However, as the proportion of supermarkets increases, retailers continue to prefer the supermarket strategy over a supercenter strategy. This finding conflicts with expectations pertaining to using format strategy as a differentiation tool; thus, H6b clearly is not supported. Finally, as the average distance to competitors increases,

Table 3
Result of multinomial logit

| | (a) Dependent variable = pricing strategy | | | | | |
| | HiLo | | | Hybrid | | |
	Coefficient	SE	p > |z|	Coefficient	SE	p > |z|
Service level	.19	.00	.00	.28	.03	.00
Average income ($ per year)	.00	.00	.00	.00	.00	.00
Household size	.05	.10	.60	−.04	.16	.80
Median age	.02	.01	.28	−.05	.02	.05
Population (per sq mile)	.00	.00	.00	.00	.00	.00
Average distance to competition (miles)	.32	.03	.00	−.10	.05	.05
Proportion of stores with same pricing	.80	.13	.00	−4.69	.42	.00
Constant	−3.05	.67	.00	−1.46	1.15	.21
N	3,297.00	Base: EDLP				
log likelihood	−2,415.85					
AIC	4,863.70					

| | (b) Dependent variable = format strategy | | | | | |
| | Supermarket | | | Limited assortment | | |
	Coefficient	SE	p > |z|	Coefficient	SE	p > |z|
Service level	.33	.00	.00	−1.18	.10	.00
Average income ($ per year)	−.00	.00	.02	−.00	.00	.00
Household size	.22	.25	.38	.12	.34	.74
Median age	.02	.03	.48	−.02	.03	.51
Population (per sq mile)	.00	.00	.00	.00	.00	.00
Average distance to competition (miles)	1.00	.06	.00	.17	.07	.02
Proportion of stores with same format	6.55	.37	.00	−.68	.50	.17
Constant	−4.63	1.44	.00	3.51	1.86	.06
N	3,297.00	Base: supercenter				
Log likelihood	−892.63					
AIC	1,817.26					

our results indicate that retailers tend to prefer a supermarket over a supercenter format store.

Combination (pricing and format) strategy

We ran a third model in which both format and pricing strategy serve as the dependent variable. Thus, the retailer can choose from among seven different pricing/format strategies.[5] The independent variables remain the same. The log likelihood is – 2847.30 (AIC = 5802.59, psuedo-R^2 or U^2 = .39); we provide the parameter estimates in Table 4. We use the EDLP/supercenter combined strategy (combination 6) as the base case.

The analysis of combination strategies are quite revealing. For example, Table 3(a) shows that as the service level increases, retailers prefer a HiLo pricing strategy over an EDLP one, as is also suggested by prior research. Yet Table 4 reveals that this trend exists only if the HiLo store is a supermarket and the EDLP store is a supercenter. If the HiLo store has a limited assortment format, retailers prefer an EDLP/supercenter strategy as service levels increase. Furthermore, assuming an EDLP pricing strategy, retailers prefer the supermarket to the supercenter format

and supercenters to limited assortment stores as service level increases. Thus, the format strategy is vital for pricing strategy choices.

In addition, Table 4 reveals that both HiLo-supermarket and EDLP-supermarket strategies provide more service than do EDLP-supercenter combination strategy stores. Although HiLo and supercenter stores tend to be located in high-income areas (support for H2a but not for H2b), when we consider both pricing and format strategies together, the coefficient is insignificant.

Moreover, just as age of household members emerges as an insignificant factor in Table 3(a) for the HiLo strategy but is significant for preference for an EDLP strategy over a hybrid strategy, the EDLP-supercenter strategy is preferred over the hybrid/supercenter strategy, whereas the effect is insignificant for the rest of the strategies compared with EDLP-supercenter, as Table 4 reveals. The effects of household size are insignificant for preferences for HiLo-supermarket and EDLP-supermarket. As the population density of the area increases, retailers prefer to follow a HiLo-supermarket and EDLP-supermarket rather than an EDLP-supercenter strategy. Moreover, retailers prefer HiLo-limited and hybrid-supermarket strategies over an EDLP-supercenter strategy in areas with high population density.

Retailers thus appear to attempt to differentiate themselves from competitors on either pricing or format, as evidenced by the signs of coefficients of the last two variables in

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[5] Theoretically, nine combinations of format and strategy are possible, but two types – HiLo/supercenter and hybrid/limited assortment – are not observed in reality, so we drop them from the analysis.

Table 4
Results of multinomial logit

| | Dependent variable = combination strategy | | | | | | | | | | | | | | | | | |
| | Combination 1 | | | Combination 2 | | | Combination 4 | | | Combination 5 | | | Combination 8 | | | Combination 9 | | |
	Coefficient	SE	p > |z|	Coefficient	SE	p > |z|	Coefficient	SE	p > |z|	Coefficient	SE	p > |z|	Coefficient	SE	p > |z|	Coefficient	SE	p > |z|
Service level	−1.79	.39	.00	.37	.04	.00	−1.13	.10	.00	.41	.04	.00	.45	.04	.00	.49	.08	.00
Average income ($ per year)	.00	.00	.15	−.00	.00	.13	−.00	.00	.00	−.00	.00	.06	.00	.00	.17	.00	.00	.03
Household size	1.31	.57	.02	.01	.26	.98	−.11	.30	.77	.04	.26	.89	.02	.29	.94	−1.65	.82	.06
Median age	−.13	.08	.08	−.02	.03	.55	−.05	.04	.17	−.04	.03	.17	−.05	.04	.16	−.34	.07	.00
Population (per sq mile)	.00	.00	.00	.00	.00	.00	.00	.00	.24	.00	.00	.07	.00	.00	.00	.00	.00	.60
Average distance to competition (miles)	1.41	.23	.00	.91	.07	.00	.11	.08	.18	.91	.08	.00	.71	.09	.00	−.01	.14	.93
Proportion of stores with same pricing	4.56	.80	.00	−1.2	.32	.00	−.50	.32	.12	−1.78	.34	.00	−6.43	.52	.00	−8.16	2.26	.00
Proportion of stores with same format	−5.04	1.25	.00	6.87	.44	.00	−.08	.54	.89	7.51	.46	.00	7.82	.50	.00	2.71	.94	.00
Constant	−5.97	3.84	.12	−2.72	1.49	.07	5.57	1.97	.01	−2.77	1.58	.08	−3.58	1.82	.05	11.47	4.12	.01
N	3,297																	
log likelihood	−2,847.3		Base: combination 6															
AIC	5,802.59																	

Notes. Combinations are as follows: HiLo-limited assortment (1), HiLo-supermarket (2), EDLP-limited assortment (3), EDLP-limited assortment (4), EDLP-supermarket (5), EDLP-supercenter (6), hybrid-supermarket (8), and hybrid-supercenter (9).

Table 4. Consider, for example, the results of combination 1 (HiLo-limited assortment). As the proportion of stores following a HiLo pricing strategy increases, retailers come to prefer the same strategy. In contrast, as the proportion of stores following a limited assortment format increases, others retailers prefer a differentiating format, which in this case would be supercenters. These trends remain consistent across the other combinations, with the exception of combination 4. Furthermore, the finding highlights the importance of considering both pricing and format strategies when determining differentiation strategies in the presence of competition. Finally, as expected, as the distance to competitor's increases, stores tend to adopt a HiLo or EDLP-supermarket combination strategy relative to an EDLP-supercenter combination strategy.

Discussion and conclusions

As we show in Fig. 2, most of our formal hypotheses (H1a, H1b, H2a, H3a, H3b, H7a, H7b) and the additional price–format comparisons receive support, which implies that retailers should take the results from consumer store choice studies carefully into account. Improved service features, higher income neighborhoods, populous neighborhoods, and distance to competition all are more associated with HiLo than with EDLP pricing strategies. In addition, improved service features, populous neighborhoods, and distance to competition also are associated with supermarkets rather than supercenters. Thus, category managers must ensure that their attempts to expand the number of categories do not alienate their core segment. Researchers traditionally suggest using pricing strategies as a means to optimize decision making, but our analysis reveals that considering just this single element in the overall retail strategy may mask the impact of a closely related issue, that is, the formatting strategy. Retailers' interests are best served when both issues get taken into consideration. Whether investigating store choices by consumers or strategy choices by retailers, researchers must consider both format and pricing strategies, and retailers need to consider both before making locational decisions on the basis of store features or the demographic and competitive characteristics of the area.

By studying pricing and format strategies in conjunction, retailers obtain a more comprehensive picture of their potential choices. As Table 3(a) suggests, as the proportion of HiLo stores increases, retailers display an increasing preference for additional HiLo stores rather than EDLP stores. However, when we analyze the strategies in combination (Table 4), we find that this preference holds only for HiLo stores that use a limited assortment format compared with EDLP pricing in a supercenter format. The combined HiLo-supermarket strategy invokes a preference for EDLP-supercenter. Moreover, within the EDLP pricing strategy, as the proportion of supermarkets increase, preference increases for a supercenter compared with a supermarket format. These findings indicate that retailers hope to differentiate themselves from the existing market.

Furthermore, Table 3(b) reveals that as the proportion of limited assortment format stores increases, preference for the

supercenter format increases relative to that for more limited assortment stores, though the effect is significant only when the limited assortment format store also employs a HiLo pricing strategy (see Table 4). Furthermore, as the proportion of stores with a supermarket format increases, retailers display a strong preference for the same format compared with a supercenter strategy, consistent with Gonzalez-Benito, Munoz-Gallego, and Kopalle (2005) findings that greater spatial rivalry occurs within than between formats. That is, retailers try to differentiate themselves by adopting a different format in the presence of competition, across all pricing strategies, though the effect is strongest for the hybrid strategy. According to these results, retailers hope to differentiate themselves on their pricing or formatting strategy but not necessarily both.[6] Thus, any conclusions drawn using only a single aspect of a combination strategy likely are biased at best and erroneous at worst. More generally, we note that the implications for retailer strategy choices change significantly when they consider both pricing and format decisions.

Our research, which uses a unique set of data from a wide span of retailers in three states, identifies that retailers operate by using seven of the possible nine price–format combinations (Table 1). Additional cluster analysis with our seven independent variables results in a three-cluster solution: a supermarket cluster (constituting 59.18 percent stores) that includes stores that embrace both HiLo and hybrid pricing strategies, which is driven primarily by a format strategy; an EDLP cluster driven by pricing strategy; (constituting 38.12 percent stores) and the HiLo-limited assortment combination strategy, which consists of smaller, dollar store-type retailers and which we refer to as the discount cluster (constituting the least number of stores, viz., 2.70 percent). According to this clustering, existing markets may not require many different price/format strategy combinations. Consequently, retailers need to consider these variables carefully prior to developing and introducing additional new concepts.

Although our study provides useful insights, its limitations suggest interesting opportunities for future research. First, as we saw in our introduction, retailers (e.g., Sears) may sometimes change their strategies in response to other retailers. Thus, research using time-series data should explicitly examine effective strategic responses to new retail entrants. Since, we have a single period cross sectional data; we cannot delve in this issue. Second, we also acknowledge that this study lacks detailed information about retailer-specific variables, such as cost, marketing mix, and promotion information. Such data could enable investigations of additional interesting areas, such as the profitability of retailers that adopt various pricing–format strategies at different locations. Further research also might explore insights into retailer differentiation based on these variables. Third, though our data comprises the grocery stores in three states, but it would be desirable if future research could replicate the study using

multiple markets. Fourth, taking our finding of the importance of considering both pricing and format strategies in a single framework, future store choice research should also consider both these decisions. This is especially relevant in the present times when the price of gas and food has gone up considerably in the last couple of years. Studying the impact of economic factors (e.g., rise in gas prices) on switching between various combinations of pricing and format strategy would be an important avenue for research. Finally, growing evidence suggests consumers engage in shopping trips in which they combine different destinations and purposes (Dellaert et al. 1998; Popkowski Leszczyc, Sinha, and Sahgal 2004). Therefore, location in relation to complementary retail stores, recreational facilities, or workplaces may enhance retail attraction by fostering multipurpose and multidestination shopping trips and taking advantage of the population flows generated by these complementary facilities. Such multipurpose, multidestination shopping trips, which seem likely to grow in popularity as consumers try to minimize their shopping and traveling time, require further careful study to clarify consumer preferences and store choices.

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[6] This finding is supported by some game theory literature on channels, such as McGuire and Staelin (1983) and Trivedi (1998), who find that highly competitive retailers may profit from using differentiated strategies as a means of providing a buffer between competitive manufacturers or products.

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