

Grocery Price Setting and Quantity Surcharges

Quantity surcharges occur when the unit price of a brand's larger package is higher than the unit price of the same brand's smaller package. The authors examine how price-setting practices in the grocery industry help explain the existence of quantity surcharges. Two studies support the authors' contention that common pricing practices aimed at establishing a favorable store-price image can result in quantity surcharges. First, an experiment shows that consumer demand and the importance price setters place on establishing a low store-price image have an interactive effect on price-setting behavior. Second, an examination of retail sales volume, price, and cost data suggests that such price-setting reactions can result in quantity surcharges when certain asymmetries in demand exist across package sizes. The authors also discuss managerial and public policy implications along with areas for further study.

In general, retail executives and consumers expect multiple sizes of a brand (i.e., brand-sizes) to be priced in a quantity-discount fashion, such that a brand's larger package costs less per unit than does a smaller package (Granger and Billson 1972; Manning, Sprott, and Miyazaki 1998; Nason and Della Bitta 1983; Wansink 1996; Widrick 1979b). Contrary to these expectations, quantity surcharges, which occur when the larger brand-size has a higher unit price than an otherwise identical smaller package of the same brand (Widrick 1979a, b), are common in the retail grocery market. Research has found that quantity surcharges occur in 16% to 34% of supermarket brands that are available in two or more package sizes (Agrawal, Grimm, and Srinivasan 1993; Manning, Sprott, and Miyazaki 1998; Nason and Della Bitta 1983; Walker and Cude 1984; Widrick 1979a, b; Zotos and Lysonski 1993). The most recent investigation finds a 27% incidence of quantity surcharges across two U.S. markets (Manning, Sprott, and Miyazaki 1998).

In light of the evidence that quantity discounts optimize profitability (Dolan 1987; Oren, Smith, and Wilson 1982), the high incidence of quantity surcharges in the marketplace is unexpected. A common but empirically unsupported proposition for why pricing practices result in quantity surcharges is that retail price setters use surcharges to price discriminate against consumers who expect quantity-discount pricing (Agrawal, Grimm, and Srinivasan 1993; Gupta and Rominger 1996; Nason and Della Bitta 1983; Widrick 1985; Zotos and Lysonski 1993). More specifically, this proposi-

tion holds that retailers attempt to increase profits by raising the prices of larger packages at the expense of consumers who neither expect nor notice quantity-surcharged items. Although we agree that the actions of retail price setters can lead to quantity surcharges, we contend that surcharges often occur as an unintentional by-product of common price-setting processes and that they can have a positive impact on consumer welfare.

We propose that quantity surcharges occur as retail grocery price setters, who are concerned about having a low store-price image, monitor and respond to competitors' prices associated with popular brand-sizes (i.e., stockkeeping units [SKUs] with the greatest unit sales volume). When a popular brand-size is also a smaller brand-size, we propose that a quantity surcharge is more likely to occur. In the following section, we develop hypotheses about how consumer demand and the importance of a low store-price image influence retail grocery prices. After an experimental test of the hypotheses with actual grocery price setters (Study 1), we detail how such pricing practices can lead to quantity surcharges, and we test the premise using data from a regional grocery chain (Study 2).

Grocery Price Setting

In the retail grocery industry, price is and likely will remain the predominant basis for cross-chain competition (e.g., Garry 1994; Kahn and McAlister 1997; Mathews 1997; Urbany, Dickson, and Key 1990). Accordingly, establishing a low store-price image is a common priority among grocery firms (e.g., Cox and Cox 1990; Dickson and Urbany 1994; Snyder 1993; Wellman 2000). The industry's enduring focus on price is likely exacerbated by the consistent finding that "low prices" are among the most important attributes consumers consider when selecting which supermarkets to patronize (e.g., *Progressive Grocer* 1992, 1996, 2000).

Given this strong emphasis on establishing competitive prices and the oligopolistic nature of supermarket competition (e.g., Alderson 1963; Baumol, Quandt, and Shapiro

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1964), it is not surprising that grocery retailers actively monitor competitors' prices (Hess and Gerstner 1991; Levy et al. 1997, 1998; Snyder 1993; Urbany, Dickson, and Key 1990). Much of the price monitoring occurs on a monthly or weekly basis (Levy et al. 1998; Snyder 1993) and is conducted by company personnel or external price monitoring services (Levy et al. 1997, 1998).

Instead of monitoring prices on all products, grocery retailers most actively monitor competitors' prices of top-moving items (i.e., SKUs with relatively high unit sales volume) (Snyder 1993). Retailers focus their price checks on top-moving items because consumers' store-price images depend on their price perceptions of such products. This behavior is consistent with the "price awareness hypothesis" (Cassady 1962; Holton 1957; Nagle and Novak 1988), which holds that consumers form relatively clear internal reference prices for frequently purchased items, and the reference points are influential in evaluating retail prices and forming store-price images. In support of this hypothesis, field studies have found that sales associated with "stock-up" items (i.e., frequently purchased items that can be stock-piled) are particularly responsive to supermarket price changes (Calantone et al. 1989; Litvak, Calantone, and Warshaw 1985; Meloche, Calantone, and Delene 1997).

The nature of the retail grocery industry motivates price setters to establish or maintain prices that are as low as or lower than their key competitors' prices for top-moving items (Dickson and Urbany 1994). As Dickson and Urbany (1994, p. 14) state, "industry executives firmly believe that certain high-volume products are critical bellwethers of a store's price image" and that "executives are highly sensitive to competitive differentials on these items." Researchers exploring supermarket pricing support this assertion, finding that markups are lowest on items with high unit sales volume (Nagle and Novak 1998; Preston 1963).

In addition to attempting to establish a low store-price image, the rationale for maintaining low prices on a subset of items is provided by "market basket pricing" (Preston 1963), or what has more recently been referred to as "implicit price bundling" (Mulhern and Leone 1991). As Mulhern and Leone (1991) demonstrate, it is necessary to anticipate own-price elasticities for products that are offered at a low price and cross-price elasticities between them and other items offered by the retailer to exploit interdependencies in demand and to maximize profitability.

The preceding discussion is summarized by the following:

- Establishing a low store-price image is a common positioning priority among grocery retailers.
- Grocery retailers monitor competitors' prices (through periodic price checks) with a focus on top-moving items (i.e., SKUs with high unit sales volume).
- Price setters concerned about creating a low store-price image are motivated to establish or maintain prices for top-moving items that are as low as or lower than their key competitors' prices.

These processes indicate that grocery price setters believe consumers are particularly sensitive to prices of popular (high volume) items. Thus, price setters may use volume as a surrogate measure of price elasticity; that is, the

higher the sales volume for an item, the higher are the perceived own- and cross-price elasticities. As such, when price setters encounter a situation in which key competitors' prices are lower than their own price, they are more likely to decrease the retail price if the particular item is a top-moving (rather than a slow-moving) item. We expect such price decreases to be more prominent among price setters who are highly concerned about establishing a low store-price image. Accordingly, we hypothesize the following:

- H₁: When key competitors' prices are relatively low on an item, (a) sales volume has a negative effect on price, and (b) the greater the importance of a low store-price image, the stronger is the negative influence of sales volume on price.

Study 1

Study 1 examines the interactive effects of consumer demand and store-price image on the behavior of retail grocery price setters (as hypothesized in H₁). We designed the experiment to provide evidence of the retail grocery price-setter behavior that we propose results in surcharges given certain brand-size demand asymmetries, which we discuss (and test) after Study 1.

Pretest

We conducted a pretest to determine the types of information grocery retailers most often use when evaluating and adjusting prices. The pretest participants were price setters who we asked to "consider the times that [they] conduct periodic evaluations of [their] store's regular, nonpromotional prices for various packaged-goods items" and presented with a list of 12 types of information. We instructed the price setters to check the types of information that they "normally use to decide to change any particular SKU's price," and we gave them the opportunity to provide any other information not on the list. (As we describe subsequently, we also collected additional questions to help guide Study 2 analyses.)

The sampling frame comprised all U.S. retail grocery chains as listed in the Chain Store Guide's *2001 Directory of Supermarket, Grocery, and Convenience Store Chains*; we used the same sampling frame for the main experiment. We selected grocery chains randomly and telephoned them to identify the primary price setter. We then faxed the pretest to price setters (each represented a different retail grocery chain). Of the 37 price setters who received the pretest, 20 (54.1%) completed it.

None of the open-ended responses ($n = 8$) were provided by more than one price setter, and thus we did not include them in the subsequent results. For each respondent, we weighted the types of information marked by the inverse of the total number of information types selected; we then summed the values across respondents to develop a usage rating for each informational input.

The top six informational items (starting with the most common usage) were (1) the retailer's cost of the SKU, (2) the SKU's prices at competitive stores, (3) the current regular margin for the SKU, (4) the unit sales volume for the SKU, (5) the current average margin for the SKU's product

category, and (6) the current regular price for other sizes of the brand. We included these six types of information in the experimental scenario presented subsequently. We did not use the seventh most frequently used informational item, promotional support, because of Study 1's focus on regularly priced, nonpromoted items. We did not use the eighth most frequently used type of information, competing brand prices, because Study 1 addresses cross-chain competition rather than within-store cross-brand competition. Respondents reported the other four items (i.e., sales in dollars and three price-elasticity measures) as rarely used.

H₁ Methods and Results

Experimental design and procedure. To test H₁, we used a two-level (low versus high unit sales volume) between-participants experimental design in conjunction with a measure of low store-price image importance. We replicated the design across lower and higher competitor prices. We randomly selected retail grocery chains from the same sampling frame used in the pretest. After soliciting participation by telephone, we faxed experiment materials to the main price setter for each firm or region; we sent second and third faxes as needed to increase the response rate.

Pricing scenario and manipulations. We asked price setters to assume they were conducting a periodic evaluation of their store's prices and that one of the brands encountered was a 12-ounce package of "brand X." To provide a basis for any price adjustments to brand X, we gave price setters additional information about the brand. Based on the pretest, this information included the current regular price of the item (\$1.89), its cost (\$1.65), the current margin (12.7%), the average margin for the product category (14%), an indication of the item's sales volume, and key competitors' current price levels. To assess the potential for quantity-surcharge pricing, we explained that the 24-ounce brand-size had a current regular price of \$3.69.

We manipulated sales volume within the scenario. In the low-sales-volume condition, we stated that brand X was "one of your slowest moving SKUs, with unit sales volume in the bottom 5%." In contrast, for the high-sales-volume condition we stated that brand X was "one of your fastest moving SKUs, with unit sales volume in the top 5%."

Although our hypotheses are contingent on lower competitor prices, we included a higher-competitor-prices condition for comparison. In the lower-competitor-prices condition, we stated that "key competitors' current regular prices are \$1.81 and \$1.79." In the higher-competitor-prices condition, we presented the prices as \$1.99 and \$1.97.

Measures. We assessed low store-price image importance by asking, "At the stores for which you are responsible for setting prices, how important is it to have an image of offering low prices?" This measure employed a nine-point scale anchored by "extremely unimportant" (1) and "extremely important" (9). We mean centered responses to reduce multicollinearity within the subsequently described regression models (Aiken and West 1991).

The dependent measure prompted price setters with the following: "Using the information above that you would normally use when setting prices, and based on your usual

price-setting practices, you might change the price of the 12-ounce package of brand X or you might maintain the current price of \$1.89. What would be your price for the upcoming period?" We provided two response options: (1) "Maintain the current price of \$1.89" and (2) "Change the price to \$_____."

Results. Of the 224 retail grocery price setters we contacted, 197 (87.9%) agreed to participate and 161 (71.9%) actually returned completed materials. The initial analysis involved regressing the new price on sales volume (as represented by a 0,1 dummy variable), low store-price image importance, competitor prices, and the interactions between these variables. Parameter estimates and associated statistics for this full model are shown in Table 1, Panel A.

To assess H₁, we restricted analyses to the lower-competitor-prices condition. We conducted moderated regression analysis to test the main effect of sales volume (H_{1a}) and the interaction between sales volume and low store-price image importance (H_{1b}). As such, we regressed price on sales volume, low store-price image importance, and the interaction between these two variables. The results are summarized in Table 1, Panel B. The overall model was significant ($F_{3, 78} = 32.43, p < .001; R^2 = .56$). Consistent with H_{1a}, sales volume had a negative effect on price ($\beta = -.67; t = -8.72; p < .001$). As illustrated in Figure 1, Panel A, and in accordance with H_{1b}, this main effect was qualified by a significant interaction ($\beta = -.29; t = -2.29; p < .05$) between sales volume and importance of low store-price image. A simple slope test indicated that in the high-sales-volume condition, importance of a low store-price image was negatively associated with price ($\beta = -.52; t = -3.39; p < .001$). In contrast, in the low-sales-volume condition, importance of low store-price image was not related to price ($p > .8$). Given this pattern of results and the significant interaction, H_{1b} is supported.

Although our hypothesis pertains to conditions in which price setters encounter lower competitor prices, sales volume and store-price image also influenced prices when competitor prices were high. A second moderated regression model within the higher-competitive-prices condition revealed that both sales volume ($\beta = -.32; t = -3.36; p < .001$) and store-price image ($\beta = -.50; t = -4.15; p < .001$) were negatively related to price, whereas the interaction between these two factors was not significant ($p > .1$; for model results, see Table 1, Panel C). The simple regression lines for the low- and high-sales-volume conditions are plotted in Figure 1, Panel B.

Study 1 Discussion

Study 1 results provide evidence of the price-setting behavior proposed to lead to quantity surcharges. In the lower-competitive-prices condition, price setters assigned relatively low prices to top-moving items (H_{1a}), a result moderated by the importance retail price setters place on a low store-price image. In support of H_{1b}, when competitor prices are low, responses to sales volume were stronger among those price setters concerned about establishing a low store-price image than among those who were not.

Study 1 demonstrates that in addition to price influencing consumer demand, demand can also affect price through

TABLE 1
Moderated Regression Results for Study 1

A: Full Model					
Source	Standardized Estimate	Parameter Estimate	Standard Error	t-Value	p-Value
Intercept		1.89	.008	224.61	.000
Competitor prices	.52	.0943	.012	7.99	.000
Sales volume	-.46	-.0843	.012	-7.31	.000
Price image	-.02	-.0778	.006	-.13	.894
Sales volume × price image	-.20	-.0147	.007	-2.01	.046
Competitor prices × price image	-.25	-.0161	.007	-2.34	.021
Sales volume × competitor prices	.21	.0442	.016	2.73	.007
Competitor prices × price image × sales volume	.23	.0251	.009	2.65	.009
B: Low Competitor Prices					
Source	Standardized Estimate	Parameter Estimate	Standard Error	t-Value	p-Value
Intercept		1.89	.007	254.94	.000
Sales volume	-.67	.0875	.010	-8.72	.000
Price image	-.02	.0008	.005	-.15	.879
Sales volume × price image	-.29	.0147	.006	-2.29	.025
C: High Competitor Prices					
Source	Standardized Estimate	Parameter Estimate	Standard Error	t-Value	p-Value
Intercept		1.99	.009	221.80	.000
Sales volume	-.32	.0422	.013	-3.36	.001
Price image	-.50	.0169	.004	-4.15	.000
Sales volume × price image	.19	.0104	.007	1.57	.121

Notes: For Panel A, $R^2 = .71$ (adjusted $R^2 = .70$); $F_{7, 153} = 53.27$, $p < .001$. For Panel B, $R^2 = .56$ (adjusted $R^2 = .55$); $F_{3, 78} = 32.43$, $p < .001$. For Panel C, $R^2 = .31$ (adjusted $R^2 = .29$); $F_{3, 81} = 11.86$, $p < .001$. For all panels, dependent variable is new price for brand X.

competitive price-setting behavior. This finding suggests that grocery price setters employ sales volume as a surrogate measure of elasticity. Even though price setters are expected to use volume as a pricing input, volume's negative impact on price is counterintuitive: Products with significant market shares (and therefore high sales volume) have been characterized as price inelastic (Nagle and Holden 2002). In the current study, among price setters concerned about creating a low store-price image, high sales volume appears to signal not only high elasticity for the item itself but also the significance of the item's price in achieving the desired low store-price image. Consistent with the price awareness hypothesis, Study 1 findings indicate that by maintaining relatively low prices on high-sales-volume items (for which consumers are expected to have clear internal reference prices), a portion of retailers attempt to reinforce a low-price image. Conversely, when sales volume is low, regardless of the level of low store-price image importance, price setters saw little need to lower prices to a level that would meet or beat key competitors' prices.

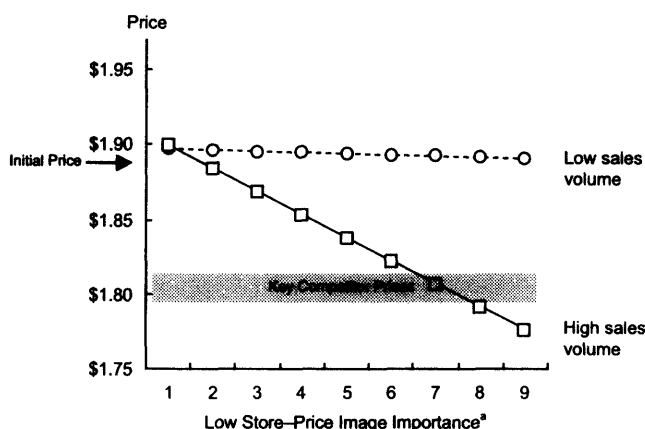
In the higher-competitive-prices condition, price setters elected to raise the price of the focal item (i.e., brand X), but they did so in a manner consistent with the process we propose. In particular, price increases were most substantial for low-sales-volume items among price setters who have little

concern about establishing a low store-price image (see Figure 1, Panel B). For high-sales-volume items, price increases were more conservative, such that price levels remained below key competitors' prices. This finding is consistent with our hypothesis that price setters attempt to maintain relatively low prices on high-sales-volume items.

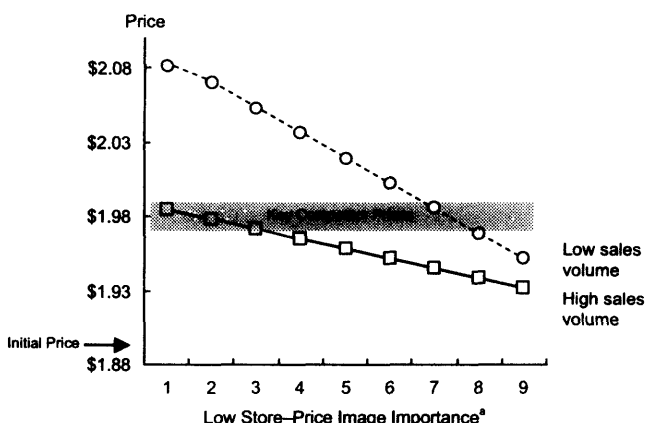
Study 1 also is useful in examining the occurrence of quantity surcharges. As we noted previously, the scenario indicated that brand X was also available in a larger 24-ounce package priced at \$3.69. As such, a quantity discount existed between the two brand-sizes because the unit price for the smaller brand-size (\$.1575 per ounce) was higher than for the larger brand-size (\$.15375 per ounce). Because we provided price setters with the price of the larger package, we could explore the extent to which surcharges arose from adjustments to the price of the smaller package. As illustrated in Figure 2, price setters in the higher-competitor-prices condition were unlikely to create surcharges. In the presence of lower competitive prices, price setters still created few quantity surcharges (8.3%) when the focal item was a slow-moving SKU; however, they created significantly more surcharges (79.1%) when the item was a top-moving SKU ($\chi^2_{d.f. = 1} = 39.38$; $p < .001$). A follow-up logistic regression model ($\chi^2_{d.f. = 1} = 10.84$; $p < .001$) indicates that within this latter condition, low store-price image

FIGURE 1
Simple Regression Lines for Study 1

A: Low Competitor Prices

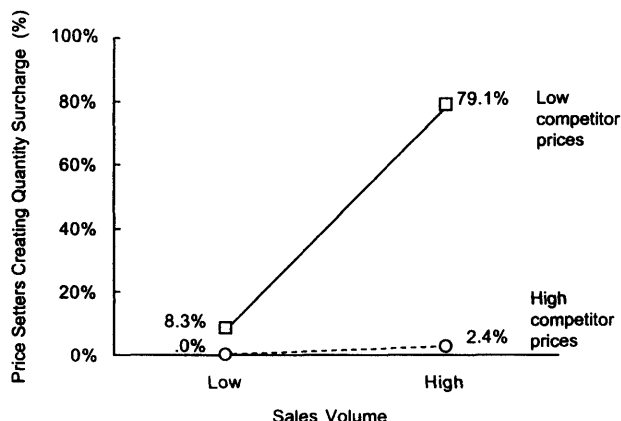


B: High Competitor Prices



^aThe x-axis represents the range of the low store-price image importance independent variable. We plotted the simple slope regression lines in accordance with the procedures provided by Aiken and West (1991).

FIGURE 2
Quantity Surcharges Created for Study 1



importance had a positive impact on surcharge (versus discount) pricing ($\beta = .73$; Wald = 8.07; $p < .01$).

The preceding results suggest that quantity surcharges are more likely to occur when a relatively small package size represents a particularly high unit sales volume and when price setters are particularly concerned about creating a low store-price image. The surcharge results are valid to the degree that grocery price setters tend to adjust prices of high-volume brand-sizes without evaluating and adjusting the prices of other brand-sizes. On the basis of our discussions with price setters, we believe that this situation often is the case. Such anecdotal evidence is consistent with Kumar and Divakar's (1999) assertion that retailers typically fail to conduct brand-size level analysis.¹

Grocery Price Setting, Brand-Size Demand, and Quantity Surcharges

The Study 1 assessment of grocery-pricing practices suggests that quantity surcharges are more likely to occur under specific patterns of demand for a portion of brands in the marketplace. Given the Study 1 findings, we propose that brands are more likely to include a surcharge when one of the smaller brand-sizes is a top-mover and substantially outsells at least one of its larger counterparts. In such cases, there is an increased likelihood that the price per unit of the more highly demanded smaller brand-size will be set lower than that of the larger brand-size, thereby creating a quantity surcharge.

For example, a retailer may identify the 28-ounce size of a ketchup brand as one of its top-moving brand-sizes (such that the item is on the firm's top-mover list and is monitored weekly). However, the larger 64-ounce brand-size may not have particularly high sales volume, and thus would not be closely monitored. Given the highly price-competitive grocery market and the common goal of creating a low store-price image, it would be expected that efforts to have an attractive price on the top-moving 28-ounce brand-size would create downward price pressure and thus result in a relatively low unit price for the item. Because of the lack of equivalent efforts to establish or maintain low prices on the 64-ounce brand-size, a quantity surcharge would be likely.

¹Given that in some cases price setters may simultaneously evaluate the pricing of multiple brand-sizes, we conducted a follow-up experiment in which we manipulated sales volume of the small brand-size in an identical manner to that in Study 1. We provided price setters ($n = 55$) with information (i.e., sales volume, cost, margin, and competitor prices) about both the 12- and 24-ounce brand-sizes and asked them to establish a price for both brand-sizes. We held the sales volume of the large brand-size constant at a low level. When the smaller brand-size was presented as having considerably higher sales volume than the larger size, 45.8% of price setters created a quantity surcharge. However, when both brand-sizes were presented as having low sales volume, a significantly lower percentage (12.9%) of the price setters created surcharges ($\chi^2_{d.f. = 1} = 7.40$; $p = .01$). This pattern of results is similar to that found in Study 1. A complete description of this follow-up study is available from the authors.

For this research, the 28- and 64-ounce brand-sizes in the previous example are considered a *brand-size pair*, that is, an intrabrand comparison between a particular smaller and larger package size of a given brand. A brand available in two sizes contains one brand-size pair (i.e., small and large), a brand available in three sizes contains three brand-size pairs (i.e., smallest and medium, smallest and largest, and medium and largest), and so on. Brand-size pair serves as the unit of analysis for Study 2, because a surcharge can be reflected in the unit prices of any brand-size pair.

We expect surcharges to be more common among brand-size pairs for which demand for the smaller brand-size is distinct in two respects. First, consumer demand for the smaller brand-size must be relatively strong (i.e., the SKU is a top-mover). As shown in Study 1, such top-moving brand-sizes are subject to considerable downward price pressure among retailers concerned about creating a low store-price image. Second, demand for the smaller brand-size must be substantially greater than that for the larger brand-size. When such demand asymmetry exists between brand-sizes, the smaller brand-size is subject to more downward price pressure than is the larger. From the preceding, we hypothesize the following:

H₂: In comparison with all other brand-size pairs, quantity surcharges are more prevalent among brand-size pairs for which the smaller brand-size is a top-moving SKU and substantially outsells the larger brand-size.

Retail Margin Implications

By definition, unit prices associated with quantity surcharges are lower for smaller (rather than larger) brand-sizes. If retail margins are considered, however, quantity surcharges may or may not result in lower margins for smaller brand-sizes. Although prior research has not explicitly considered retail margins, such an examination should provide insights into the nature of quantity surcharges and the underlying retail-pricing practices that can lead to them. Prior research in the area has suggested that retailers use quantity surcharges to increase profits by raising the price of larger brand-sizes. In line with this perspective, retail margins would be expected to be higher for larger, surcharged brand-sizes than for larger brand-sizes priced as a discount; no differences would be expected between surcharged and discounted smaller brand-sizes. Our account of quantity surcharges, however, suggests a different pattern for retail margins. In particular, the downward price pressure on smaller brand-sizes in surcharged pairs is expected to result in retail margins that are lower than those associated with smaller brand-sizes in discounted pairs. Thus, we offer the following hypothesis:

H₃: Smaller brand-sizes associated with quantity surcharges have lower retail margins than smaller brand-sizes associated with quantity discounts.

Study 2

We used data from a regional grocery chain to test the impact of brand-size demand on the prevalence of quantity surcharges (H₂) and to explore the implications of quantity surcharges on retail margins (H₃).

Description of Data

A privately held U.S. grocery chain provided the data for Study 2. The data set consists of those products and brands typically found in a grocery store and includes the following product categories: snack foods and crackers; health and beauty care; pet products; cleaners and paper products; canned goods; refrigerated foods, such as milk and cheese, and various frozen foods; condiments and jelly; tea, coffee, and juices; baking goods; and cereal, pasta, and bread.

The data set includes sales volume, retail price, and cost (i.e., wholesale price) for all brands available in two or more package sizes. Unit sales volume is reported at the brand-size (SKU) level and is based on a single year of sales for all stores in the chain. Retail price reflects the price the chain had set at the end of the 12-month sales volume collection period for a particular brand-size. Wholesale price reflects the price charged to the retailer at year-end by its supplier (one of the largest U.S. grocery wholesalers). The structure of the data (i.e., one year of sales volume data and year-end prices) is well suited for our research. Given our focus on the effect of sales volume and competitive price monitoring (and, in turn, the occurrence of surcharges), it is beneficial to have data that is temporally consistent with the proposed causal relationship.

The data did not include a promotion field; thus, it was not possible to identify the retail prices that reflected a temporary price reduction. Previous research, however, indicates that the vast majority of surcharges are not created by temporary price promotions. Field studies investigating surcharges (Nason and Della Bitta 1983; Walker and Cude 1984; Widrick 1979b; Zotos and Lysonski 1993) on average have found (weighted by the number of brands audited) that 14.6% of quantity surcharges were on temporary price promotion at the time of the study. This value actually overestimates the creation of surcharges due to price promotions, because quantity surcharges sometimes exist even before a smaller item is temporarily placed on sale.

In Study 2, brand-size pairs are the unit of analysis. For this research, it was essential that the brand-sizes constituting each brand-size pair were equivalent in all respects except package size. For example, we excluded brands with different packaging materials for various brand-sizes (e.g., a brand of juice with a plastic container for one size and a glass container for another size). The remaining data set comprised exactly 800 brands and 1247 brand-size pairs.

In the current data, the incidence of quantity surcharges at the retail level—15.8% of all brands included one or more surcharges—was similar to that reported in other research (see Manning, Sprott, and Miyazaki 1998). Quantity-surge incidence for brands at the wholesale level was lower at 11.2% ($z = 2.69$; $p < .01$). For brand-size pairs, the incidence of quantity surcharges was 11.1% at the retail level and 8.4% at the wholesale level ($z = 2.26$; $p < .05$). (Prior research has not reported the incidence of quantity surcharges at the brand-size pair level, and thus we can provide no comparison for our values.) A more detailed overview of the incidence of surcharges in the data is presented in Table 2.

TABLE 2
Incidence of Quantity Surcharges Based on Retail and Wholesale Prices for Study 2

Sizes of Brand	Quantity Surcharges at Brand Level ^{a,b}				Quantity Surcharges at Brand-Size Pair Level ^{a,b}			
	Wholesale Price		Retail Price		Wholesale Price		Retail Price	
	Brands	Surcharges	Brands	Surcharges	Brands	Surcharges	Brands	Surcharges
2	633	52	635	78	633	52	635	78
3	133	25	133	29	397	34	399	34
4	27	8	27	14	162	13	162	20
5	4	4	4	4	40	6	40	6
6	1	0	1	1	15	0	15	1
Total	798	89	800	126	1247	105	1251	139
Surcharge Percentage	11.15%		15.75%		8.42%		11.11%	

^aBrand level refers to a particular brand that includes multiple brand-sizes. Alternately, brand-size pair level refers to a particular comparison between two brand-sizes within a particular brand. The number of brand-size comparisons increases with the number of brand-sizes available for a particular brand.

^bThe frequency of brands and brand-size comparisons differs between retail and wholesale prices because four brand-size comparisons had identical unit prices at the wholesale level; we excluded these from the analysis.

H₂ Methods and Results

As we discussed previously, we expect common retail grocery price-setting practices to result in a higher prevalence of quantity surcharges when a top-moving, small brand-size substantially outsells its larger counterpart (*H₂*). We empirically examined this issue through a logistic regression model.

Dependent variable. The focal dependent variable represented the form of pricing (i.e., discount versus surcharge) at the retail level between two brand-sizes. The variable was dichotomous, based on our desire to model the focal phenomenon, namely, the existence of quantity surcharges at the retail level. This dependent variable was based on the quantity surcharge/discount index Q_{ij} , which was calculated such that

$$(1) \quad Q_{ij} = (UP_{Lij} - UP_{Sij}) / [(UP_{Lij} + UP_{Sij}) / 2],$$

where UP_{Lij} is the unit price of the larger package of the brand-size pair *i* of brand *j*, and UP_{Sij} is the unit price of the smaller package of the brand-size pair *i* of brand *j*. (This formula is slightly different from what has been used in prior research, wherein UP_{Sij} serves as the denominator; see Manning, Sprott, and Miyazaki 1998; Walden 1988). We calculated unit prices for the two focal brand-sizes in each pair using the same units (e.g., ounces, counts, gallons). A negative value for Q_{ij} indicates a quantity discount, and a positive value indicates a quantity surcharge. Accordingly, for each brand-size pair, the form of retail pricing was coded as "0" to represent quantity discounts (i.e., when $Q_{ij} < 0$) and as "1" to represent quantity surcharges (i.e., when $Q_{ij} > 0$).

Independent variables. We included a series of measures as independent variables in the logistic regression and calculated them for each brand-size pair. The dichotomous wholesale pricing variable accounted for quantity surcharges at the wholesale level. For each brand-size pair, this variable indicated whether the wholesale prices reflected a

quantity discount (coded as "0") or a quantity surcharge (coded as "1"). The variable tests an alternate explanation for surcharges, namely, that retailers apply constant margins across brand-sizes and that surcharges at the retail level simply reflect the pricing of manufacturers and/or wholesalers. Of the surcharges occurring at the retail level, 39.9% also exist at the wholesale level. In other words, approximately 60% of the retail surcharges in the current data are discounts at the wholesale level. With the addition of this wholesale pricing variable, our model focuses on explaining the existence of surcharges created at the retail level and not those in existence throughout the distribution system.

We accounted for demand asymmetry across smaller and larger brand-sizes by two dummy-coded variables representing sales volume differences within brand-size pairs. We followed a three-stage process to develop these variables.

First, we categorized each brand-size on the basis of annual sales volume as slow moving (sales volume in the bottom 80% of all brand-sizes), moderate moving (sales volume between 80% and 95% of all brand-sizes), or fast moving (sales volume greater than 95% of all brand-sizes). To ascertain the appropriate split into slow-, moderate-, and fast-moving brand-sizes, we included questions about competitor price checks in the Study 1 pretest. Specifically, we asked pretest respondents to indicate how often they check key competitors' prices for the SKUs they consider "fast moving," "moderate moving," and "slow moving." Given the pretest results indicating that both the moderate- and fast-moving items are regularly monitored, we collapsed these categories into a single "top-mover" category that consists of approximately 20% of the brand-sizes.²

²An alternative analysis in which the top-mover category encompassed items in the top 30% (in terms of unit sales volume) produced substantively equivalent results.

Second, we coded each brand-size pair to reflect the demand asymmetry existing within the pair. In particular, we coded all brand-size pairs to represent one of three demand asymmetry categories: Category 1 represents pairs in which the smaller brand-size outsold the larger brand-size, and only the smaller brand-size is a top-mover ($n = 194$); Category 2 represents pairs in which the smaller brand-size outsold the larger brand-size, and both brand-sizes are equivalent in terms of whether they are top-movers ($n = 534$); Category 3 represents brand-size pairs in which the larger brand-size outsold the smaller ($n = 519$). The greatest incidence of quantity surcharges should occur in Category 1, fewer in Category 2, and the least in Category 3. This expectation is based on our prior theorizing that demand asymmetry, such that the smaller brand-size outsells the larger, results in a higher incidence of quantity surcharges and that such an effect is stronger when the smaller brand-size also is a top-mover.

Third, using reference cell coding, we created two dummy-coded variables to represent demand asymmetry across brand-size pairs (Category 1 served as reference; see Homer and Lemeshow 2000). The first dummy-coded variable compared Category 1 with Category 2; the second variable compared Category 1 with Category 3. Significant and negative coefficients for the dummy-coded variables would support H_2 , because we expect the greatest incidence of surcharges for brand-sizes in Category 1. The strongest test of H_2 , however, is provided by the first dummy-coded variable, because Category 1 and Category 2 are similar (i.e., both contain brand-size pairs in which the smaller brand-size outsells the larger).

We accounted for product category effects in the model with a series of dummy-coded variables. Because of a desire to capture differences in the products with a small number of relatively homogeneous categories, we coded ten primary product categories. Product categories (followed by brand-size pair counts) included snack foods and crackers ($n = 109$); health and beauty care ($n = 213$); pet products ($n = 93$); cleaners and paper products ($n = 147$); canned goods ($n = 109$); condiments and jelly ($n = 133$); tea, coffee, and juice ($n = 94$); baking goods ($n = 161$); cereal, pasta, and bread ($n = 78$); and refrigerated goods ($n = 110$). Nine dummy-coded variables represented these product categories. The refrigerated-goods category served as reference for each product category dummy variable, because prior research demonstrates the importance of this category to the occurrence of surcharges. Specifically, Walden (1988) finds that refrigerated products are more likely to include a quantity surcharge than shelf-stored products; he attributes this result to the increased unit costs (e.g., per ounce) of cooling refrigerated products packaged in larger rather than smaller packages. Agrawal, Grimm, and Srinivasan (1993) find similar but weaker effects. As such, we expect product category dummy-coded variables to have negative coefficients.

A control variable represented the log of the ratio of package sizes (larger over smaller) being compared (Walden 1988; Walker and Cude 1984; Widrick 1979b). For example, if the larger brand-size is 24 ounces and the smaller is 12 ounces, the ratio is 2. The log of this ratio is included to

account for variance associated with the fundamental nature of quantity-discount pricing. Economic theory suggests that unit prices should decrease for a greater amount of a good (i.e., quantity-discount pricing) because of diminishing marginal returns offered by each additional unit. Thus, the difference in utility per ounce between a 20-ounce bag of potato chips and a 2.5-ounce bag of potato chips should be larger than the difference between a 20-ounce bag and a 12-ounce bag. Accordingly, as the percentage difference between two brand-sizes increases, there should be a greater likelihood of a quantity discount and thus a lower likelihood of a quantity surcharge (see Walden 1988).

Results. We assessed the model with regard to assumptions of logistic regression, and we did not detect any violations. Specifically, there was no evidence of multicollinearity among independent variables based on variance inflation factor and tolerance statistics. In addition, an analysis of the model's residuals (i.e., studentized residuals and $dbeta$) indicated no cases in the sample that might have an undue influence (Menard 1995). The results of the logistic regression analysis are presented in Table 3.

The overall regression model was statistically significant ($p < .001$). The wholesale variable was positive and significant, which indicates (as we expected) that wholesale pricing of a brand-size pair (i.e., whether priced as a quantity discount or a quantity surcharge) influenced whether the brand-size pair was priced as a surcharge or a discount at the retail level. The majority of product category dummy variables were not significant, yet based on the significant (and marginally significant) negative coefficients, evidence exists that refrigerated items are more prone to surcharges than are other product categories.³

Of focal interest are the dummy-coded variables representing demand asymmetries. In support of H_2 , both coefficients associated with these variables were negative and significant ($p \leq .001$). The second dummy-coded variable (labeled "volume dummy code 2" in Table 3) demonstrates that more quantity surcharges exist among brand-size pairs in which the smaller brand-size substantially outsells the larger brand-size than exist within pairs in which the larger brand-size outsells the smaller brand-size. The first dummy-coded variable examines only brand-size pairs in which the smaller brand-size outsells the larger. The significant, negative coefficient indicates that more quantity surcharges exist among brand-size pairs when the smaller brand-size is a top-mover and the larger brand-size is not than when the smaller

³To explore further the significance of this effect, we substituted a dichotomous variable indicating whether the product is stored on a shelf (coded as "0") or in some form of refrigeration (coded as "1") for the product category dummy variables, and we reestimated the logistic model. The results paralleled those reported in Table 3, and the refrigeration variable was significant and positive, which indicates that surcharges are less likely for those brands stored on shelves (Wald = 5.241; $p = .022$).

TABLE 3
Logistic Regression Results for Study 2

Dependent Variable: Form of Retail Pricing ^a				
Source	Parameter Estimate	Standard Error	Wald	p-Value
Intercept	5.800	2.713	4.57	.033
Wholesale ^b	2.751	.254	117.34	.000
Volume dummy code 1 ^c	-.912	.264	11.96	.001
Volume dummy code 2 ^c	-2.107	.310	46.29	.000
Snack foods and crackers ^d	-.749	.483	2.40	.121
Health and beauty care ^d	-.354	.411	.74	.390
Pet products ^d	-1.184	.605	3.83	.050
Cleaners and paper products ^d	-.532	.444	1.44	.231
Canned goods ^d	-.809	.463	3.05	.081
Condiments and jelly ^d	-.853	.455	3.51	.061
Tea, coffee, and juices ^d	-.314	.487	.42	.518
Baking goods ^d	-.683	.424	2.59	.107
Cereal, pasta, and bread ^d	-.019	.465	.002	.968
Size ratio ^e	2.820	.679	17.27	.000

^aForm of retail pricing is a dichotomous variable based on retail prices, where 0 = quantity-discount pricing and 1 = quantity-surcharge pricing.

^bWholesale is a dichotomous variable based on wholesale prices, where 0 = quantity-discount pricing and 1 = quantity-surcharge pricing.

^cDemand asymmetry within brand-size pairs was represented by two dummy-coded variables (with Category 1 serving as reference).

^dNine dummy-coded variables represented product categories (with refrigerated goods as reference).

^eSize ratio is a continuous control variable indicating the log of the ratio (larger brand-size over smaller brand-size) of the package sizes being compared.

Notes: Log-likelihood (intercept only = 742.10; final model = 534.57); $\chi^2_{(d.f. = 13)} = 207.54$; $p < 0.001$; $N = 1247$.

outsells the larger brand-size but both are equivalent in terms of whether they are top-movers.⁴

H₃ Methods and Results

We hypothesized that relatively high demand for small brand-sizes leads to downward price pressures and the occurrence of quantity surcharges. Thus, we expect downward price pressure on smaller brand-sizes within surcharged pairs to result in retail margins that are lower than those associated with smaller brand-sizes in discounted pairs (H₃).

We calculated margins as a percentage of the retail price for each brand-size (i.e., [retail price – wholesale price]/retail price). With retail margins as the dependent variable, we included two independent variables in an analysis of variance model. The first reflects package sizes (small versus large) contained in a particular brand-size pair, and the second indicates whether the focal brand-size pair is priced

as a quantity discount or as a quantity surcharge. To avoid double-counting a particular brand-size as both small and large, we used only brands with two brand-sizes for this analysis ($n = 635$), which represent the bulk of the data and the majority of quantity surcharges. We included wholesale price as a covariate to ensure that the model explained retail-pricing behavior.

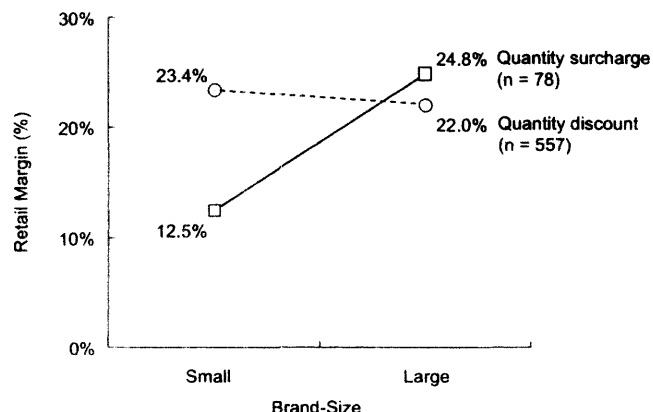
The analysis of covariance findings indicate that all effects are significant (all $ps < .01$). The main effect for brand-size shows that profit margins for small brand-sizes ($M = 17.9\%$) were less than margins for large brand-sizes ($M = 23.4\%$; $F_{1, 1265} = 24.83$, $p < .01$). The other main effect shows that profit margins for brand-size pairs priced as a surcharge ($M = 18.8\%$) were lower than margins for brand-size pairs priced as a discount ($M = 22.7\%$; $F_{1, 1265} = 13.75$, $p < .01$). These main effects, importantly, are qualified by a significant interaction ($F_{1, 1265} = 39.63$, $p < .01$) between brand-size and the form of pricing (see Figure 3).

We used a planned contrast to assess H₃. The analysis indicates that the average retail margin of small brand-sizes within surcharged pairs ($M = 12.5\%$) was less than the average margin of small brand-sizes within discounted pairs ($M = 23.4\%$; $F_{1, 632} = 45.72$, $p < .01$). Thus, H₃ is supported. Follow-up analysis indicates that the margin for small brand-sizes within surcharged pairs was less than the retail margins for all other brand-sizes ($M = 22.8\%$; including the large, surcharged brand-sizes and both brand-sizes associated with discount pricing; $F_{1, 1267} = 48.51$, $p < .01$).

Furthermore, we assessed the alternative explanation that quantity surcharges are caused by price increases of the larger, surcharged brand-size. This analysis indicates that the average retail margin of large brand-sizes within surcharged pairs ($M = 24.8\%$) was greater than the average

⁴Two additional analyses tested the robustness of the findings. First, we conducted an alternate linear regression analysis in which the dependent variable was the continuous quantity surcharge/discount index (i.e., Q_{ij}) and independent variables were the same as those in the logistic regression. This model focuses on the magnitude of discounts and surcharges, whereas the logistic regression model focuses on the likelihood of the existence of a surcharge. The second analysis ascertained the influence of relatively small surcharges and discounts on the results by excluding all brand-size pairs containing a quantity surcharge or a discount of less than 10% (as based on Q_{ij} ; $n = 333$) and then reestimating the logistic regression model. The results of both analyses are in the predicted direction and nearly identical to the logistic regression model detailed in Table 3.

FIGURE 3
Retail Margin Means (Adjusted by Wholesale Prices) by Brand-Size and Form of Pricing for Study 2



margin of large brand-sizes within discounted pairs ($M = 22.0\%$; $F_{1, 632} = 3.99$, $p = .05$). Although these results suggest that two processes create surcharges, the decrease in margins for smaller brand-sizes outweighs the increase for larger items. In particular, the effect size associated with lower margins for smaller brand-sizes ($\eta = .26$) was significantly larger than the effect size associated with the higher margins for larger brand-sizes ($\eta = .08$; $z = 3.34$, $p < .01$).

Study 2 Discussion

The Study 2 results support the proposed explanation of quantity surcharges. In particular, the logistic regression analysis demonstrates that the incidence of quantity surcharges is greater among brand-size pairs in which a top-moving smaller brand-size outsells its larger (non-top-moving) counterpart. In addition to being the first field study to assess the association between demand asymmetry and surcharges, this study is also unique in its examination of retail margins. The margin results strongly support the price-setting process we propose. Consistent with the premise that surcharges occur as top-moving small brand-sizes are subjected to downward price pressure, retail margins were lowest for small brand-sizes priced alongside large, surcharged brand-sizes.

An alternative account for the relationship between demand asymmetry and surcharge incidence is that consumers simply shift purchase behavior from larger, surcharged brand-sizes to smaller (less expensive) brand-sizes, which is a finding supported by Manning, Sprott, and Miyazaki (1998). This viewpoint suggests that the significant effect of the volume dummy-coded variables is due, at least in part, to the influence of price on volume as well as to the proposed influence of volume on price. Although such an alternative account cannot be completely ruled out, it is important to note that Study 1 provides the essential causal evidence for the prescribed effects of sales volume on price.

Finally, this study illustrates that no single explanation can account for the existence of quantity surcharges. In

addition to supporting the hypothesized role of retail price-setting processes, the results indicate that surcharges at the retail level also result when a retailer passes along surcharges reflected in wholesale prices. The wholesale variable had the strongest effect in the model. We also find support for Walden's (1988) contention that cost-related factors may play a role in determining the existence of surcharges (as indicated by a greater incidence of surcharges for refrigerated products than for some other product categories).

General Discussion

This research explores price-setting practices and the occurrence of quantity surcharges in the retail grocery marketplace and, in so doing, contributes to the pricing literature in several unique ways. First, we demonstrate empirically that sales volume can negatively influence price in a highly competitive industry. Specifically, price setters establish lower prices on top-moving items, and this effect is stronger for retailers that place greater importance on establishing a low store-price image. Second, we provide evidence in a field setting that such price-setting practices result in quantity surcharges when the smaller brand-size is a top-moving SKU and is in greater demand than its larger counterpart. Third, we find support for the predicted differences in retail margins across quantity surcharge and discount brand-sizes; in particular, we find small packages within surcharged brand-size pairs to have lower retail margins than do small packages within discounted pairs.

Managerial and Public Policy Implications

Consistent with extant research (Fader and Hardie 1996; Guadagni and Little 1983; Kumar and Divakar 1999), our results underscore the importance of incorporating brand-size into marketing decision making. As Kumar and Divakar (1999, p. 60) note, "it does not seem that retailers are taking differential brand-size level effects into account while setting pricing and promotional strategies." Retailers should consider brand-size pricing, however, if for no other reason than that the existence of surcharges is not inconsequential.

The conceptual arguments presented in the current research, combined with findings that surcharges can shift purchases to smaller brand-sizes (Manning, Sprott, and Miyazaki 1998; Miyazaki, Sprott, and Manning 2000), suggest a non-recursive relationship between consumer demand and the occurrence of surcharges. That is, certain asymmetric brand-size demand conditions lead to surcharges, and surcharges might further shift purchases to smaller brand-sizes. Of particular concern is our result indicating that such small brand-sizes (which are matched with a large, surcharged brand-size) have relatively low retail margins. It follows that retailers should exercise caution when setting prices at levels that create a surcharge, given evidence that surcharges can shift purchases to smaller, low-margin brand-sizes. For retailers that stress a low store-price image, our results support previous contentions that price setters may suffer from a myopic focus on the pricing of top-moving items (see Urbany, Dickson, and Key 1990). This focus may create a favorable store-price image, but it might also have unintended harmful effects on

store profits if it is overemphasized (see Dickson and Urbany 1994). Price setters should consider this trade-off carefully.

In addition to retailer implications, our research also applies to public policy concerns related to the existence of surcharges. The quantity-surge phenomenon is often considered a form of retail price discrimination that harms consumer welfare (Agrawal, Grimm, and Srinivasan 1993; Gupta and Rominger 1996; Nason and Della Bitta 1983; Widrick 1985; Zotos and Lysonski 1993). Gupta and Rominger (1996, p. 1309) clearly reflect this position when they state that "the retailer uses quantity surcharges to increase profit margins by relying on the consumers' mistaken belief in the volume discount heuristic." The results reported in the present article suggest that this is not the case. Study 2 indicates that any increases in margins among larger brand-sizes of quantity-surcharged pairs are largely outweighed by decreases in margins of smaller brand-sizes within quantity-surcharged pairs.

It is worth noting that only approximately 50% of consumers are sure they have encountered quantity surcharges in the marketplace (Manning, Sprott, and Miyazaki 1998; Nason and Della Bitta 1983; Whitfield, Lawson, and Martin 1985). This finding is the basis of additional concerns about consumer welfare and quantity surcharges, because consumers may use a quantity-discount heuristic (i.e., "more is always cheaper"; see Manning, Sprott, and Miyazaki 1998) when shopping and be unaware that they are in the presence of surcharged brand-sizes (e.g., Widrick 1985). The Study 2 finding that more surcharges exist when a smaller brand-size significantly outsells a larger counterpart suggests that, when in the presence of a surcharged brand-size, a large portion of consumers attend to the item's smaller (more popular) counterpart. Because consumers are unaware of information to which they have not first attended, it follows that consumers' unawareness of surcharges may be due, in part, to not attending to larger brand-sizes when the smaller brand-size is more popular. From this perspective, consumer welfare at a general level may be unharmed by the presence of quantity surcharges. Indeed, for those consumers desiring the more popular smaller brand-size (a brand-size with the lowest retail margins), consumer welfare is improved by the presence of surcharges. As quantity surcharges come under increasing media scrutiny (CNBC 2002; *Consumer Reports* 2000; McCarthy 2002), our article serves to illuminate that surcharges can occur as price setters provide consumers with lower (rather than higher) prices.

Mechanisms are available to aid consumers who prefer larger brand-sizes that are surcharged. In-store information strategies could be developed to reduce consumer information-processing costs (see Russo, Krieser, and Miyashita 1975; Russo et al. 1986) and to ease identification of surcharges. Along these lines, Miyazaki, Sprott, and Manning (2000) find that highly prominent displays of unit prices on shelf labels reduce consumers' selection of surcharged brand-sizes. Furthermore, as shown in previous studies on the processing of price information (e.g., Inman, McAlister, and Hoyer 1990; Srivastava and Lurie 2001), identification and avoidance of surcharges likely depends on consumer characteristics such as price consciousness and search costs and potentially on consumers' ability to under-

stand how to use unit price information (Manning, Sprott, and Miyazaki 2003).

Limitations and Further Research

Although Study 1 manipulated two factors key to retail price setting, further research could manipulate other factors, such as costs and category margins (which we held constant), that may play an important role in setting prices and could therefore affect surcharge pricing. In addition to exploring this possibility, further research could focus on collecting process data (e.g., verbal protocols, thought listings) to substantiate the purported explanations for price setters' responding to higher-sales-volume levels with lower prices. Such research might also explore the extent to which such pricing practices exist in other retail and nonretail contexts.

As we noted previously, a nonrecursive relationship likely exists between consumer demand and the occurrence of quantity surcharges, such that greater demand for smaller brand-sizes may result in quantity-surge pricing, and surcharges, in turn, may shift purchases to smaller brand-sizes. A question for further research is, How does this reciprocal relationship begin? When a new product is introduced to the market, average or above-average product category margins may be applied. If the new item attains "top-mover" status, managers who consider a low store-price image particularly important may then start frequently monitoring competitive prices for the item and, when necessary, lower the price to meet or beat competitors' prices. Additional research is needed to determine whether this process accurately reflects the temporal orientation of the expected reciprocal relationship between consumer demand and quantity surcharges.

In terms of quantity surcharges specifically, additional research is needed to establish the generalizability of Study 2's findings. Anecdotal evidence, however, lends support to our findings with an additional retailer serving two different markets. A post hoc analysis of Kumar and Divakar's (1999) peanut butter data (i.e., 131 weeks of Information Resources Inc. data for a major grocery chain) produced results consistent with our findings regarding asymmetric brand-size demand. Specifically, we found that each incidence of a surcharge (six surcharges in 20 brand-size pairs for Market 1; eight surcharges in 20 brand-size pairs for Market 2) occurred for brand-size pairs in which the smaller brand-size had a higher sales volume than did the larger brand-size. Ideally, replications of Study 2 would involve the use of longitudinal data such that retail prices, sales volume, and competitive prices are assessed over time. In addition, further research could examine potential moderating effects of product-level factors (e.g., store versus national brands, hedonic versus utilitarian products).

Further research also might explore other causal factors associated with the occurrence of quantity surcharges. One area ripe for inquiry is factors associated with nonretailer members of the distribution channel. Although our investigation is the first to consider the incidence and nature of quantity surcharges at the wholesale level, our data provide little indication of why surcharges exist at this level of the distribution channel. To determine the causes of surcharges at the wholesaler and manufacturer levels, further research

could explore variables focal to wholesalers and manufacturers, such as production, distribution, and storage costs. Finally, as mentioned previously, the results of our research suggest that a single, simple explanation for surcharges does

not exist. As such, there is an opportunity for additional research in identifying the relative weights of the various causal factors that determine the occurrence of quantity surcharges.

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