The Effect of Marketplace Factors on Private Label Penetration in Grocery Products

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MSI REPORT SUMMARY

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Raj Sethuraman is an assistant professor of marketing at the University of Iowa.

This paper identifies the marketplace factors that influence private label penetration in grocery products through a comprehensive, cross-category analysis. The premise is that those variables which account for a significant portion of the variation in private label shares across product categories are likely to influence private label penetration.

Twelve marketplace factors were identified as potential determinants of private label success and included in the empirical analysis. They are retail sales volume, number of households purchasing the product, purchase cycle (inter-purchase time), average retail price, price competition among national brands, gross retail margin, price differential between national and store brands, number of national brands, retail price promotion of national brands, retail price promotion of private labels, national brand manufacturer couponing, and national brand advertising.

Data on these marketplace factors and private label shares were obtained for the aggregate U.S. market in 1988 from multiple sources. The primary source was the supermarket scanner data of Information Resources, Inc. Data were available for all variables for 116 product categories.

Multiple regression analysis was performed with market share of private labels as the dependent variable, and all the marketplace factors as the independent variables. Those variables with significant regression coefficients were identified as factors influencing private label penetration.

MANAGERIAL IMPLICATIONS

Contrary to conventional belief, but consistent with analytical models, I find a negative relationship between private label share and price differential between national and store brands. The finding suggests that need for focusing on quality at least as much as price.

Consistent with the price-tier theory, I find a negative relationship between retail promotion of national brand and private label share and no relationship between retail promotion of store brand and its share. The theory and the empirical support, together, suggest that while retail promotion of the national brands may limit private label share, and hence may be an effective method of influence for the manufacturer and the retailer, promoting private labels may have no effect on their share.

I find a strong negative relationship between national brand manufacturer coupons and advertising with private label share, suggesting that these two instruments may be effective deterrents of private label shares.

In addition, contrary to conventional belief, I find a negative relationship between category price elasticity and private label share. This suggests the theory advanced in the literature and suggests that price competition among national brands may inhibit private label growth.

LIMITATIONS

The inferences are based on a cross-cateogry analysis. To draw explicit causal inferences regarding the effect of price and promotion factors on private label sales, and confirm and dispel the results from the cross-sectional analysis, time-series analyses at the individual product level should be performed. Time-series data is lacking for several product categories and this limits the extent to which such analysis can be generalized.

I have attempted to provide some broad generalizations based on aggregate U.S. market data. The results may vary from an individual retail outlet or market. While there are some key demand or market-side factors in the analysis, there are other potential determinants of private label success that need to be investigated. In particular, private label success also depends on supply or cost-side factors such as the fixed and variable costs of manufacturing the product.

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ABSTRACT

The objective of this paper is to understand cross-category differences in private label shares of grocery products. Specifically, it investigates how several demand-related factors (e.g., inter-purchase time, retail sales volume), price- and competition-related factors (e.g., price sensitivity, average retail price, price differential between national and store brands), and promotion-related factors (e.g., advertising and price promotions) affect the market share of private labels. Using a comprehensive database, it identifies the variables that account for a significant portion of the variation in private label shares and thus provides an understanding of the determinants of private label success.

Contrary to conventional belief, but consistent with analytical models, there is a negative relationship between private label share and price differential between national and store brands. This suggests the need for focusing on quality at least as much as price. Consistent with the price-tier theory, there is a negative relationship between retail promotion of national brand and private label share, and no relationship between retail promotion of store brand and its share. The theory and the empirical evidence suggest that while retail promotion of the national brands may limit private label share—and hence act as an effective tool for the manufacturer and retailer—promoting private labels may have no effect on their share. The strong negative relationship between national brand manufacturer coupons and advertising with private label share suggests that these two instruments may be effective deterrents of private label shares. The negative relationship between category price elasticity and private label share suggests that price competition among national brands may inhibit private label growth.

that address the relationships between marketplace factors and private label penetration have recently been developed (e.g., Blattberg and Wisniewski, 1989; Lal, 1990; Rao, 1991; Raju et al., 1992) but have not been tested comprehensively.

My objective is to understand cross-category differences in private label shares. Based on theories from analytical models, other literature, and interviews with national brand managers and retailers, I identify the marketplace factors that are likely to influence or be related to cross-category differences in private label shares. Specifically, I investigate several demand-related factors (e.g., inter-purchase time, retail sales volume), price- and competition-related factors (e.g., price sensitivity, average retail price, price differential between national and store brands), and promotion-related factors (e.g., advertising and price promotions). Using a comprehensive database, I test whether these factors correlate with private label shares. Thus, I seek to understand the determinants of private label success that will help national brand manufacturers and retailers support private labels and develop better brand strategies.

Retailers need to understand the conditions under which private labels are likely to succeed. If, for example, after accounting for other factors, greater private label shares are related to products with lower inter-purchase time, then retailers should support private label programs in the more frequently purchased product categories. By the same token, national brand manufacturers can consider dual branding (producing for private labels) in categories in which private label growth is favorable.

Understanding the relationship between price/promotion factors and private label shares would help determine appropriate brand strategies. For instance, if, after accounting for other relevant factors, the level of national brand manufacturer couponing activity explains a significant portion of the cross-category variation in private label shares, then there is reason to believe that coupons influence private label penetration. This would suggest to the manufacturer that coupons may limit private label growth. Similarly, a strong positive relationship between private label price promotion and its share across categories would suggest that it is an effective instrument for increasing private label share. In this sense, I use cross-category analysis to understand the effect of promotions in the same spirit as other studies on private labels (Cook and Schutte, 1967; Hoch and Banerji, 1992), promotions (e.g., Raju, 1992), and marketing effort (e.g., Gatignon et al., 1990).

The paper first presents the hypotheses specifying the relationship between key marketplace factors and private label share, then describes the data and procedure for testing the hypotheses. Third, the results and their implications for brand management are discussed. The paper ends with conclusions, limitations, and directions for future research.

Thus, the demand for the national brand (q_{NB}), the demand for the store brand (q_{SB}), and hence the market share of the store brand depend directly on the prices of the national and store brands, the propensity of consumers to switch from the national to the store brand for given prices (i.e., the cross-price sensitivity between the national and the store brands), and other factors (e.g., number of national brands). Mathematically,

$$\text{Market share of store brand} = \frac{q_{SB}}{q_{NB} + q_{SB}} = f(P_{NB}, P_{SB}, \theta, \Omega)$$

where θ is the cross-price sensitivity between national and store brands, and Ω represents all other factors that may affect private label share.

In general, a decrease in national brand price will increase quantity sold of the national brand, decrease quantity sold of the store brand, and decrease private label share. Hence, other things being equal, lower national brand prices will be related to smaller private label shares. By similar arguments, private label shares will be greater if its prices are lower and if the cross-price sensitivity is greater.

Using this framework, factors that influence private label share are classified as follows:

1. Factors related to prices of national and store brands. Other things being equal, market factors and actions that are related to a decrease in the price of the national brand are likely to be associated with smaller private label shares. Market factors and actions that are related to a decrease in the price of the store brand are likely to result in greater private label shares.

2. Factors related to cross-price sensitivity between the national and store brands. Market factors and actions that increase the sensitivity of consumers to price differences between the national and store brands are likely to be associated with greater private label shares.

3. Other factors.

Factors Related to Prices

First, the factors related to changes in national brand price are discussed, followed by the factors related to price of the store brand and the price differential between

growth, coupon activity should account for some variation in private label shares across categories. Hence, the following hypothesis:

H3: Other things being equal, market share of private labels will be smaller in categories with higher levels of national brand couponing.

Retail price promotion of national brands. Retailers may provide temporary shelf price reductions for the national brand because of incentives such as trade deals, cooperative advertising money provided by the manufacturer, store competition, or other considerations. This price promotion is likely to result in increased national brand sales and decreased private label shares. Blattberg and Wisniewski (1989) theorize, and show in four product categories, that when (national) brands of higher quality and in higher price tiers are promoted, they draw market share from their own price-tier competitors and from the tier below (private brands). Hence, by the same argument provided for manufacturer coupons, if retail price promotions are effective instruments, then, after accounting for other factors, national brand retail price promotion activities should explain some variation in private label shares across categories. More specifically:

H4: Other things being equal, market share of private labels will be smaller in categories with more national brand retail price promotional activity.

Retailers can make temporary changes in the prices of their private labels as well.

Retail price promotion of private labels. Retailers can attempt to switch national brand consumers and increase private label share through temporary price reductions of their store brand. If this instrument were effective, then retail price promotional activity of private labels would account for a significant portion of the variation in private label shares. Blattberg and Wisniewski (1989), however, theorize that when the lower quality, lower price-tier (private) brands are promoted, they rarely take unit sales from the (national brand) tier above. Hence, private label price promotions will not erode national brand shares. Based on this theory:

H5: Market share of private labels across categories is unlikely to be affected by levels of retail price promotional activities on private labels.

Price differential between national and store brands. Several retailers and marketers believe that price differential is the basic premise of private labels (Dowdell, 1987; Fischman, 1989). In a recent (1988) Private Label Manufacturers Association meeting, most participants stated that a higher price spread between the national and store brands will result in increased sale of private label grocery products (Natschke, 1988). This seems to indicate that greater private label shares will be achieved in categories with

Foods), reportedly concerned about private label inroads, decided to revamp and enhance their advertising campaigns (*Advertising Age*, 1975, 1986). Thus,

H8: Other things being equal, market share of private labels will be smaller in product categories with more national brand advertising.

Based on data for 12 consumer products, Cook and Schutte (1967) find that there is a tendency for greater advertising to sales ratios to be associated with a lower private brand share.

Other Factors

Retail sales volume. Retailers are more likely to introduce and support private labels in categories with greater profit potential for their store brands. Most retailers believe it is more profitable to introduce and support private brands in large dollar-volume product categories (Cook and Schutte, 1967). Other things being equal, larger dollar sales imply a potential for larger profits on the store brand, and thus the potential to offset the fixed costs of a private label program and generate greater net profits. Hence,

H9: Other things being equal, market share of private labels will be greater in product categories with larger category sales volume.

Gross retail margin. Profit opportunities are also enhanced if the gross margin obtainable from selling the products is greater. Retailers often eye the large margins obtainable from selling a store brand when supporting their private label programs (Fitzell, 1982). Thus,

H10: Other things being equal, market share of private labels will be greater in product categories with larger gross retail margin.

Number of households purchasing the product. Some retailers state that they are more inclined to introduce and support private labels in categories purchased by a large number of households for two reasons. First, a large number of category purchasers imply a large number of potential purchasers of private labels, hence greater opportunity for selling a large enough quantity of private labels to offset the fixed costs and make a net profit. Second, these products provide greater opportunity to use their store brands to improve their exposure and image among their customers. Thus,

H11: Market share of private labels will be greater in product categories that are purchased by a larger number of households.

EMPIRICAL ANALYSIS

Data and Operationalizing the Variables

The database was formed by combining information from five data sources: *Infoscan Supermarket Review*™ (1988), *Marketing Factbook*™ (1988), *Infoscan Report on Trade Promotions* (1988), *Supermarket Business Annual Consumer Expenditure Study* (1988), and *BAR/LNA Multimedia Service Report* (1988). The variables from each of these data sets are given below.

The basic data set used in the empirical analysis is the *Infoscan Supermarket Review* (1988) provided by Information Resources, Inc. The *Infoscan Supermarket Review* is a comprehensive survey of grocery store sales that provides information by brand for over 430 product subcategories in 166 broad product categories. The analysis is at the subcategory level. The information is collected from a nationally projectable sample of over 2,400 stores covering 49 metropolitan markets. As Guadagni and Little (1983, p. 205) point out, national store samples permit generalizations that might be suspect if made from a single store or market.

The data are organized by the following departments: bakery, dairy, deli, edible dry grocery, frozen foods, health and beauty aids, and non-edible grocery. Information on the following variables are directly obtained or computed from the data set for each product: dollar volume and unit volume share of private labels, total category dollar sales, and number of national brands. The price differential measure is computed from the difference between the average price of the national brands and the average price of the private label, and is expressed as a percentage of the national brand price. Level of retail promotion in a given product category is operationalized as the unit volume percent of the product category sold through retail promotion (shelf price reduction, feature, and display).[2] This operationalization is used for the following reasons: (i) As the retailer increases his promotional activities, the volume percentage sold on promotion should increase; (ii) The measure is very relevant for the retailer as the volume sold on promotion directly affects his profitability; and (iii) This measure is comparable across product categories.

Marketing Factbook (1988) contains detailed purchase information, collected via

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[2] Data are not available separately for these three types of promotions. Moreover, it is difficult to identify the effects of each of these types separately because these promotions often occur together in the marketplace.

Infoscan Report on Trade Promotions provided information on 295 products. Gross margin and advertising data were available for 152 products, 116 of which had private labels. Thus the final data set consisted of 116 product observations. The aggregate private label dollar share is 14.1%.

Dependent variable. While the hypotheses are developed for unit volume share of private labels, they hold for dollar share of private labels as well. Given that store brands are usually lower in price than an equivalent national brand, dollar volume shares of private labels are usually lower than unit volume shares. While unit volume shares reflect shelf space allocation and are a good gauge of how well store brands perform on retailer shelves, dollar shares relate directly to revenues and profitability. Hence, both are important measures, and both dollar volume and unit volume share are used as measures of private label penetration.

Method. To test the hypotheses, multiple regression analysis is performed to compute the unique effect attributable to a selected factor, after accounting for all other factors. Two separate regression analyses were run, one with dollar volume share and the other with unit volume share as the dependent variable. All the marketplace factors discussed were included as independent variables because they are all potential determinants of private label penetration. A one-tailed *t*-test was used to test the significance of the regression coefficient and assess whether the relationship between an independent variable and private label share is in the hypothesized direction. Because Hypothesis 6 deals with the observed overall relationship of the price differential between national and store brands, the appropriate statistic for testing the hypothesis is the zero-order correlation between private label share and price differential.

Robustness tests. Potential problems were identified and their extent and impact on the regression results were assessed. In particular, a large number of product observations were lost when two variables were added—gross margin and advertising. The analysis was duplicated with the larger data set (consisting of 207 observations) that excluded these two variables. The results, with respect to remaining factors, did not change. In addition, I investigated multicollinearity, heteroscedasticity, the presence of extreme, non-typical values, and exclusion of department affiliation, all potential problems that might affect the regression results. The procedures used to investigate these are outlined in the Appendix. Detailed results are available from the author. In general, the regression results are robust. The results and their managerial implications are now discussed.

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were combined to correspond to one Infoscan observation. In cases in which information (e.g., promotional price elasticity) was provided only at the category level (e.g., pastry), that value was assigned for all subcategories (e.g., donut, muffin) in that category. Where there was some uncertainty about the match, the observations were deleted.

RESULTS AND IMPLICATIONS FOR BRAND MANAGEMENT

The means of the various marketplace factors and their correlations with private level share are listed in Table 2. The regression results are presented in Table 3. The R^2 for the regression with private label dollar share is 0.57 ($F_{12,113} = 11.6, p < 0.001$; adj R^2 = 0.53) and the R^2 for unit volume share is 0.55 ($F_{12,113} = 10.6, p < 0.001$; adj R^2 = 0.50). Thus, the variables account for a substantial portion of the variation in private label shares. The results for each variable are now discussed.

TABLE 2

MEANS AND CORRELATIONS

Variable	Mean	Correlation With	
		PL Dollar Share	PL Unit Share
Demand Factors			
Retail Sales (Million $)	602.4	-.09	-.09
% Households Purchase	47.5	.07	.09
Purchase Cycle (days)	73	-.13	-.1
Price/Competition Factors			
Retail Price ($)	2	-.31[a]	-.33[a]
Price Elasticity	-2.3	-.30[a]	-.31[a]
Price Differential (%)	32.2	-.47[a]	-.32[a]
Gross Retail Margin (%)	21.5	.08	.11
Number of Brands	13.4	-.31[a]	-.32[a]
Promotion Factors			
Retail Promotion - NB (%)	25.6	-.14[b]	-.15[b]
Retail Promotion - PL (%)	24.7	.05	.07
Manufacturer Couponing (%)	11.1	-.51[a]	-.51[a]
Advertising (A/S - %)	4.2	-.61[a]	-.59[a]

[a]Significantly different from zero at the 1% level.
[b]Significantly different from zero at the 10% level.

PL = Private Label NB = National Brand

argument—higher category retail sales leads to greater revenue potential, and hence greater net profits for the store brand—is wrong. The finding implies that this argument, which holds for the introduction of store brand, does not apply to gaining greater shares of private labels. In other words, a 10% share of private labels in a $10 million category is likely to give greater net profits than a 10% share in a $1 million category. This argument does not mean that the share of private labels will be greater in the category with $10 million in retail sales, however.

The regression coefficients for purchase cycle are not significant in both regressions. Hence, there is no evidence of a significant relationship between purchase cycle and private label share (Hypothesis 7).

The regression coefficients corresponding to the number of households purchasing the product are marginally significant ($t = 1.6$, $p < 0.06$ in both regressions). Thus, there is some evidence of a positive relationship between the number of households purchasing the product, validating Hypothesis 11. This suggests that private labels probably do well for products purchased by a large number of households, and retailers may want to introduce and sell large quantities of private labels in these product categories. Tests indicated that this result is not robust, however. Hence, one should be cautious in interpreting this result.

Price- and Competition-Related Factors

Price competition among national brands. Contrary to general expectations, but consistent with Hypothesis 1, there is a significant negative relationship between category promotional price elasticity and private label share. This finding appears to support the theory that when price competition among the national brands is fierce, store brand shares are lower (Raju et al., 1992). It highlights the importance of distinguishing between two types of price competition—competition among national brands, and that between the national and store brands. The effect of price competition among the national brands is to decrease store brand share, and the effect of price competition between national and store brands is to increase store brand share. Retailers wishing to increase private brand share can curtail national brand competition by carrying fewer national brands of similar quality. In several categories, e.g., dairy products, there are only one or two national brands carried by a single store. Of course, retailers must be wary of restricting consumers' choice when adopting such a strategy particularly for products such as cereals and cosmetics in which consumers have diverse tastes or seek variety. In the 70s, when the big chains like Kroger minimized their national brand assortments,

differentials.

First, given that the market share of private labels is high even with low price differentials, when the cross price sensitivity is high, it is not necessary to increase the price differential *per se*, but it is important to increase the cross-price sensitivity. A retailer can attempt to increase the cross-price sensitivity by selling products of comparable quality and by highlighting the quality and price differential through displays such as shelf-talkers with compare and save slogans.

Second, overplaying the price difference aspect may not be profitable to the retailer for several reasons.

1. In typical commodity markets in which the quality differential across brands is not high, it is not necessary to maintain a high price differential. A high differential may lead to selling the store brands more cheaply than is necessary.
2. Greater emphasis on price differential has the potential to compromise quality which, in the long run, may lead to a deterioration of the private label image and the store selling them and an overall reduction in store brand shares. For instance, several retailers who emphasize price differential tend to sell private label food items rated below the grade A standard when the supplies are restricted. Retailers who emphasize quality sell only grade A food items even if the price differential is low.
3. If the price differential is low, consumers may not have enough of a monetary incentive to switch to the store brand. But if the price differential is large, consumers may impute low quality and opt not to buy it. Some operators report that in typical grocery products, a price differential of 10-15% is ideal (Donegan, 1989). In the interviews, marketers reported that the range may be wider in some product categories. This aspect of an acceptable price range is important for retailers attempting to gain private label shares in high-volume, high-growth markets such as cereals, frozen dinners, and cosmetics. The shares in these categories are fairly low (about 5%), though increasing, even though prices of store brands are about half the price of the leading national brand. While low prices can be an incentive for inducing consumers to try private labels, they may impute inferior quality and expect to be able to buy private labels at a very low price. Retailers should guard against these possibilities.

Other variables. Consistent with Hypothesis 12, private label shares are smaller in categories with a larger number of national brands. This finding is not surprising. If the total market is split among a larger number of participants, the share for each of the participants would be smaller. There is no consistent evidence of a direct relationship between private label shares and other variables—average retail price, and gross retail

couponing activity and private label share across categories. While firms have to evaluate the effect of coupons on private label share for individual products, broadly, the finding from the cross-category analysis suggests that couponing activity may be an effective deterrent to private label penetration. From a consumer behavior standpoint, the reasoning for the noticeable impact of manufacturer coupons because there has recently been a marked increase in purchase decisions made at the point of purchase, i.e., inside the grocery store (Miler, 1990). Since retailers control the environment in the store, they have the ability to influence consumers' in-store purchase decision and may use it to sell more store brands. Coupons represent a way to nail down buying intentions before consumers get to the store and induce consumers to buy the national brands.

National brand advertising. There is a strong and robust negative relationship between national brand advertising and private label share. While further time-series analysis of individual product data is required to make a strong causal statement, the negative relationship suggests that national brand advertising can probably limit private label growth. Advertising may help national brand manufacturers to insulate themselves from their private label competitors.

These factors should also be included in future research. Fourth, while private labels are generally seen as equal in quality or inferior to the national brands, and priced equal to or below national brands, some retailers in the U.S. have started selling premium private labels that are higher quality and more expensive than those of national brands (Shapiro, 1992). While this practice is fairly common in Europe, such instances are far and few between in the U.S. There is, however, a growing trend toward selling premium private labels and future researchers should focus on understanding this issue. Finally, non-linear effects or interaction effects of the independent variables were not considered in the analysis.

All these limitations are fruitful areas for future research. In particular, a dynamic analysis of individual consumer purchasing behavior would provide additional insights into the relationship between private label purchase and prices and promotions. The availability of sophisticated single-source scanner data that can track individual purchases and provide store environment and advertising exposure data should make such analysis feasible. Lastly, while the focus has been exclusively on the market share of private labels, future researchers could address the issue of profitability of private label programs to determine an optimal private label share for retailers.

Heteroscedasticity

The diagnostic procedure using the BPG test did not reveal problems of heteroscedasticity in the data set.

Multicollinearity

Tests for multicollinearity (condition index analysis and singular value decomposition) indicated the that problem is present but not serious. The correlations among the independent variables (Table 4) are not very high—the highest correlation is 0.66. As a further test of the multicollinearity problem, the regression coefficients were estimated removing one variable each time.

Exclusion of Department Affiliation

Questions arose about the inclusion of department affiliation (bakery, dairy, etc.) as dummy variables. The argument against inclusion would be that department dummies would confound the results because the marketplace factors would highly correlate with the departments. Thus, in effect, the explanatory variables would only capture variation within a department. The argument for including the department dummies would be that department-specific differences (such as ease of production, transportation cost, or in-house production facilities) that would not be captured by the marketplace factors already discussed should be accounted for. Regression analysis was performed by including department dummies.

Summary

In all, over 100 alternate regression models were run to test for the robustness. Results from these models indicate that the original regression results are robust except in two cases. In several models, the coefficient of number of households purchasing the product was not significant. The coefficient of gross margin was positive and significant when large and small values for the variable were excluded.

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