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Does Store Brand Patronage Improve Store Patronage?

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Abstract. We investigate the relationship between a household's store brand patronage and store patronage through its impact on store revenues and profits. The nature of the relationship will help answer the question: Do store brands contribute to greater store differentiation or to greater price sensitivity in the market? Our results show support for the store differentiation argument.

Key words: Differentiation, loyalty, retail competition, store brands, store loyalty, store patronage

I. Introduction

Over the past decade, retail grocery markets in the U.S. and Europe have experienced significant growth of store brands (also commonly referred to as private label brands), which are owned and marketed by retailers themselves. Between 1996 and 2000, the dollar sales of store brands in the U.S grew at twice the rate of national brands to reach a 15% dollar sales share by the end of 2000 (Sethuraman, 2003). The current unit volume share of store brands in the U.S. is about 20% and it is even higher in several European countries such as the United Kingdom (*Private Label Manufacturers Association*'s website: www.plma.org). Business press reports and surveys continue to show that store brands are consistently a top priority for grocery retailers (Alaimo, 2003; Wellman, 1997).

Not surprisingly, the impressive growth and penetration of store brands in grocery retail markets have attracted attention and triggered discussion in both the business and academic press. The discussion at the practitioner level in the business press has predominantly focused on *sales* or *market share* (Sethuraman, 2003). A casual online subject search reveals scores of practitioner articles, mostly discussing how well store brands are doing or what retailers can do to increase sales of their store brands (e.g., Alaimo, 2003; Karolefski, 2003). On the academic research front, the predominant focus of initial studies was on "profiling" the characteristics of store brand consumers (e.g., Dick et al., 1995). The focus of recent studies in this area – consistent with that in the business press – has shifted to estimating the

effect of marketing actions on national brand and store brand *sales* or *market share*, and specifying "optimal" store brand marketing strategies for retailers (Mills, 1995; Raju et al., 1995; Sethuraman, 2003).

Part of the reason for the focus on sales or market shares by both the business and academic press has to do with the implicit belief that increasing the market share of store brands would automatically lead to increased profits since store brands are more profitable than national brands. Ailawadi and Harlam (2004) question this assumption on the grounds that while the percentage profit margins for store brands tend to be higher, the per unit profits are not necessarily always higher for store brands. Hence an increase in store brand shares can in fact lead to lower total profits overall, if the increase in store brand share is not accompanied by greater spending at the store. Interestingly, as store brand prices tend to be lower, the possibility of revenue declines is even greater than profit declines. Whether an increase in store brand share leads to increase in store revenues and profits critically depends on whether there will be an increase in overall spending at the store. This of course is an empirical question.

Why would one expect greater store brand share to lead to greater spending at the store, when store brands themselves cost less than national brands. One important argument that has been advanced in the literature is that store brands provide a point of differentiation with respect to retail competition and thus can improve the store loyalty of its customers (Ailawadi et al., 2001; Corstjens and Lal, 2000; Steenkamp and Dekimpe, 1997). Thus if store brands serve as a differentiator, it is possible that a consumer who likes the store brand will shift more of its purchases to the store and thus expand the overall share of spending in the category to the focal store.

However an equally plausible argument that greater store brand spending may be related to lower store loyalty has been presented in the literature. Store brands are often positioned to highlight its "value" (quality adjusted for price) to appeal to price conscious consumers. Researchers have indeed found that store brand customers are more price sensitive than average consumers (Dick et al., 1995). Thus if store brand purchases are correlated with price sensitivity and deal proneness, it could cause a negative relationship between store brand patronage and store revenues and profits due to potential for cherry picking behavior across stores and over time by deal prone customers. Thus a high propensity to buy store brands could lead to lower share of overall spending at the store.

Our goal in this paper is to shed empirical light on two research questions: (1) Does store brand patronage improve overall store revenues and (2) Does store brand patronage improve store profit? The answers to these questions depend on which of the two effects of store brands dominate: increased price sensitivity or greater store differentiation?

Gaining insight into these research questions is important for both strategic and tactical reasons. The strategic reasons are obvious because a "yes" answer to the above questions is critical to justify the ongoing investment in store brands. From

a tactical point of view, support for the dominance of the "differentiation effect" implies that retailers can target promotions to consumers based on their store brand patronage to further increase their loyalty and profitability. From a managerial point of view, store brand purchase behavior then becomes a particularly useful segmentation and targeting variable. Unlike targeting based on price sensitivity, which could potentially intensify competition because the competition could potentially match such targeting, store brand patronage can reduce the intensity of competition due to its ability to differentiate the store.

The paper is organized as follows: Section 2 discusses the relevant literature and the how this research fits in the context of existing research. Section 3 describes the data and variables we use in our empirical analysis. Section 4 describes the results. Section 5 concludes.

II. Relevant Literature

Some of the initial studies on store brands can be traced all the way to the mid-1960s. As part of a comprehensive review of past research on store brands, Sethuraman (2003) notes that three studies (Cook and Schutte, 1967; Food Commission Report, 1966; Stern, 1966) were among the first to highlight the importance of store brands and the strategic implications of store brands from a retailer perspective. Till the mid-eighties, the primary focus of studies was on identifying the characteristics of consumers who patronized store brands. Specifically, the goal was to identify the demographic, psychographic, and behavioral characteristics of store brand consumers (e.g., Myers, 1967; Coe, 1971; Bellizzi et al., 1981). Since the mid-eighties, with the advent of scanner data and the increased application of analytical models in marketing, there has been a spurt in the number of studies dealing with store brands. These studies especially focus on (i) estimating the impact of national brand and store brand marketing actions on brand sales or market share (e.g., Blattberg and Wisniewski, 1989; Sethuraman, 1995), and (ii) developing optimal marketing strategies for national and store brands (e.g., Rao, 1991; Raju et al., 1995).

From the perspective of this paper, the relevant studies are those that focus on (1) which consumers buy store brands and why, and (2) the impact of store brand purchases on store performance. In general, store brand consumers tend to be more price sensitive. For instance, 19 of 23 studies reviewed by Sethuraman (2003) present three types of evidence to support the importance of price in influencing store brand sales. The first type of evidence comes from general consumer surveys that measure the importance of price in store brand purchase. For example, a 1990 Gallup survey found that 74% cite price as a very important factor in store brand purchase. The second type of evidence comes from consumer surveys investigating the strength of relationship between price sensitivity and store brand purchase intention and/or attitude (e.g., Richardson et al., 1996; Batra and Sinha, 2000; Ailawadi et al., 2001). Finally, a third line of evidence comes from a

number of scanner data studies that have found a much stronger own price effect for store brands than for national brands (e.g., Cotterill et al., 2000; Sethuraman, 1996). Consistent with such findings about the importance of price in store brand purchase, few of the past studies suggest that brand image is not an important factor for store brand patronage (Sethuraman, 2000).

Sethuraman (2003) also finds that past studies show a positive relationship between quality perception or quality consistency of store brands and store brand purchase intention or market share. Again, as with the role of price sensitivity, the evidence comes along three different lines. The first line of evidence comes from general consumer surveys like the 1990 Gallup survey that found 83% of respondents citing quality as a very important factor in store brand purchase. The second type of evidence comes from consumer surveys and panel data linking perceived store brand quality to store brand purchase intention and/or attitude (e.g., Richardson et al., 1996; Batra and Sinha, 2000; Ailawadi et al., 2001). The final line of evidence is based on insights from cross-category analyses that looked into the influence of quality or quality uncertainty in explaining cross-category, cross-retailer variation in store brand shares (e.g., Hoch and Banerji, 1993; Dhar and Hoch, 1997).

Sethuraman (2003) concludes that store brand consumers are those who: "(i) value price as an important criterion for purchase, and (ii) do not value brand image as important, but (iii) may consider quality as an important determinant when choosing among brands". However, since psychographic characteristics like the price, image and quality sensitivity are not easily observable for market segmentation purposes, past studies have also tried to identify relatively easy to observe demographic characteristics that relate to store brand purchase propensity. These studies have mostly focused on the following four demographic variables - household income, education level, age and family size (e.g., Coe, 1971; Myers, 1967; Hoch, 1996; Sethuraman, 2000). By and large, the findings have been that store brand consumers tend to be middle income, educated, older consumers with large families. However, these socio-economic variables account for only 4%–5% of the variation in store brand purchases, leading some researchers to conclude that there exist very little systematic demographic differences between store brand and national brand consumers (Frank, 1967; Dhar and Hoch, 1997).

On the question of the impact of store brand patronage on store performance, there is very little to report in the existing literature. In a recent paper, Ailawadi and Harlam (2004), show preliminary evidence using a univariate analysis that the relationship between household share of private label purchases and store profits might be nonlinear. To the best of our knowledge there has been no other empirical study assessing the relationship between store brand patronage and store performance. The univariate analysis in Ailawadi and Harlam does not control for other variables that affects total profits such as the breadth of purchases across different categories. Further, they aggregate a household's purchases across all categories. This aggregation does not allow them to account for the heterogeneity in prefer-

ences of households for the different categories. We therefore seek to investigate the relationship between household store brand share and profits at the level of each category.

III. Data and Variable Operationalization

To address our research questions, we use a unique and comprehensive dataset of household expenditures in 44 product categories over one quarter during the year 2003 at one large retailer in the Northeastern United States. By using quarterly expenditure data of a household on a particular category as the unit of analysis, we average out variations in basket purchases over 12 weeks, so our measure of expenditure in different categories is reasonably representative of the steady state averages for this household. We cover a wide range of products categories at this chain. While the largest number of categories are from edible groceries, our analysis includes non-edible groceries, health and beauty products etc. We draw a random sample of 2000 households from the database for the purposes of this analysis.

Given that we know the prices and margins at which the retailer sold each product in this category in any given week, we have an accurate measure of the household level revenues and profits from each category. We also have measures of the total values of store discounts (store coupons and frequent shopper discounts) and manufacturer coupons used by each household for each category. Further, we have measures of total dollar expenses on store brands by each household in each category. This enables us to compute the household's share of store brands in each category.

1. Dependent Variables: Category Level Store Patronage

We seek to measure store patronage of a household at the category level using two alternative sets of measures. One set of measures is based on total store revenues and profits from a household in the category. Here we use (1) the category level store revenues from each household and (2) category level store profits from each household.

A second measure of store patronage is based on the share of household spending in the category at the store in question. However, we do not have information on expenditures of the household at other competing stores. Fortunately, the chain has census block level address information for each household and a large number of demographic variables. Using consumer expenditure survey data, the chain estimates potential spending in each category for each household, by combining the census block information with demographic variables. An independent marketing research firm specializing in geo-demographic segmentation aids the chain in this analysis.

We thus develop an index of category level store patronage for a household by dividing the total store revenues and total store profits from the household in the category by the potential spending of the household in the category. The potential spending data enables us to control for household heterogeneity in spending across categories in a reasonable way and arrive at a "store-share" type approximation of store patronage for each category. This approach to measure store patronage is particularly valuable and practical for store managers, since they typically do not have household panel data of spending across chains.

Our empirical investigation is at the level of each household's expenditure in a category. Analyzing this problem at the household-category level has a number of advantages over a category level analysis (aggregated across households) or a household level analysis (aggregated across categories). While a category level analysis confounds household heterogeneity in preferences for store brands and categories, the household level analysis (aggregated across categories) confounds heterogeneity in household preferences for store brands across categories with heterogeneity in intrinsic preferences for different categories. By controlling each household's preferences within each category, we are able to better assess how store brand patronage affects store patronage and profits.

2. Explanatory Variables

The primary variables of interest to us in this study are those associated with store brand patronage. In addition we include a number of control variables in the regressions.

2.1. Store Brand Patronage

We use multiple variables to measure store brand patronage. An obvious measure is the household's share of store brand in the category, which measures the preference of the household for store brands within the specific category. To normalize the category level store brand penetration, we construct an index by dividing each household's store brand share by the category's store brand share.

To quantify the general propensity of the household to buy store brands across categories, we measure the extent to which store brand purchases are dispersed across a number of categories. This can be measured by computing a Herfindahl Index for store brand shares across categories. We compute the store brand Herfindahl Index in two ways: (a) using shares at a sub-category level such as edible groceries, non-edible groceries etc. and (b) using category shares within the largest sub-category: edible groceries.

In all, we use three variables to measure store brand patronage of a household: (1) Store brand share index of the household in the category (store brand share of household in category normalized by the aggregate category share of private labels); (2) Herfindahl index of store brand shares across sub-categories and (3) Herfindahl index of shares within the edible grocery category.

2.2. Control Variables: Demographics

We consider a number of demographic variables as control variables. However, demographic variables only had limited impact on store patronage. The two demographic variables we found to have some predictive ability were income and household size. We allowed for nonlinearity in these effects by including squared terms associated for these two variables. While in general, we expect incomes to have a positive effect on category levels store expenditures and profits, we wanted o allow for nonlinear effects of income because there is a general consensus in the trade press that upper middle class consumers view warehouse discounters as a serious competitor to traditional supermarkets. We allowed for nonlinear effects in household size to accommodate the notion that while larger households spend more at a store, very large households visited warehouse clubs to buy products in bulk.

2.3. Control Variables: Frequency of Shopping Visits and Coupon Use

As motivated in our introduction, store brand purchasers could be price sensitive and deal prone since store brands are frequently promoted as a "good value". Thus store brand patronage might be correlated with "deal proneness". Therefore to estimate the effect of store brand patronage, it is important to control the effects of deal propensity. Otherwise, there will be a negative bias on the effect of store brand patronage on the household's contribution to store profits.

Deal proneness is associated with low search costs, willingness to search and use of coupons. Thus we use shopping frequency and coupons as control variables to isolate the deal proneness effects and get the true impact of store brand patronage on store patronage.

A household that shops frequently has the opportunity to look for deals and take advantage of various store promotions. Since we do not have data on household behavior at other chains, store visit frequency is not necessarily an indicator of deal proneness. A loyal household which concentrates all of its shopping at the particular store of interest is a frequent visitor, but may not be deal prone. In contrast, a deal prone household that spreads its purchases across other stores will make fewer visits. But by interacting store visit frequency with coupon use data we can separate out the store loyalty and deal proneness effects.

Further, we also have information about the use of manufacturer and store coupons for each household. We normalize these with the average level of coupon use to obtain an index of store and manufacturer coupon use for the household. A high index of manufacturer coupon use at the store suggests that the household is deal-prone, but loyal to the store because these coupons could have been redeemed at other stores as well. In contrast, a high index of store coupon use suggests that the household is deal-prone, but it does not necessarily indicate store loyalty.

We also constructed additional variables by interacting coupon use and frequency of shopping. Per-se, frequent shopping might indicate greater loyalty to

the store or low search costs and greater cherry picking and thus an ambiguous effect on store patronage. In contrast, the interaction variables have more predictable expected relationships. A household that visits frequently and uses more store coupons is clearly more deal prone than just a household that visits frequently. On the other hand, a household that visits more frequently and uses more manufacturer coupons may indicate more loyalty to the store since the coupons could have been redeemed elsewhere.

2.4. Control Variables: Breadth of Shopping Basket

We include (1) a Herfindahl index of household shares across the major groupings of product categories: edible groceries, non-edible groceries and health and beauty products; (2) a Herfindahl index of shares for categories within the edible groceries group. A high Herfindahl index reflects that the basket of purchases for this household is fairly narrow and is restricted to a few product categories. A small value suggests that the household uses this store to buy in a wide range of product categories.

IV. Results

1. Descriptive Statistics

The average values of different variables and their standard deviations are reported in Table 1 to give us a general sense of the data. The average store expenditures of a household in a category (conditional on purchase in the category) is \$21.83 and the corresponding gross profits from these revenues is \$5.76, giving an average gross margin of 26%. The average ratio of household's store expenditure to its potential spending is 0.58. These numbers are conditional on household purchases occurring in the category. Thus we can interpret this as the average "share of the household wallet" for households that purchase from the category at this chain. The households who purchase at this chain, spend about 58% of all their expenses at the chain's stores in the categories that we study.

On average the households in our sample redeem \$4.66 of coupons in the categories under study. Given the total category level expenditures of \$21.83, this suggests that store coupons are close to $\$4.66/(\$21.83 + \$4.66) = 17.5\%$ of the regular prices at the store. This may appear unusually high level of redeemed coupons. However, it is important to recognize that this includes not just "store coupons", but also loyalty program rebates, which tends to be quite high and is redeemed by almost all customers at the store, since about 95% of households are members of the loyalty program. In contrast to store coupons, redemption of manufacturer coupons are much lower at 33 cents per category.

Households on average visit the store 1.62 times per week. The average income of the households in the sample is \$46,211 and the average household size 2.51. The average share of private labels among these household's purchases is 20%,

Table I. Average household level descriptive statistics

Mean	Std dev.	
Revenue ($/quarter)		
conditional on purchase in category	21.83	46.38
Profits ($/quarter/category)		
conditional on purchase in category	5.76	16.52
Revenue/potential		
conditional on purchase in category	0.58	0.87
Store coupon ($/category)	4.66	9.88
Manufacturer coupon ($/category)	0.33	1.55
Store visit frequency (#/week)	1.62	1.67
Median income ($)	46,211	16,767
HH size	2.51	0.38
SB share	0.2	0.34
SB sub category HFI	0.33	0.15
SB edible grocery HFI	0.45	0.32
Subcategory HFI	0.25	0.07
Edible grocery HFI	0.23	0.11

which is consistent with aggregate market shares of private labels both at this chain as well as nationally (Dunne and Narasimhan, 1999). The sub-category Herfindahl indices are small, indicating that households, on average, purchase across several groups of product categories. The edible grocery Herfindahl indices are also small, indicating that households buy from a number of product categories within this group of categories. The Herfindahl indices for store brand purchases are higher than the overall Herfindahl indices, indicating that store brand purchases are more concentrated in certain categories, compared to all purchases.

2. Store Revenue and Profit Regression

We report the results of the store revenue regression in Table 2. The category specific fixed effect estimates are not reported in the table to conserve space even though they were included in the model. We note that including the category fixed effects do not change the coefficients of the reported variables much, suggesting that category effects are fairly orthogonal to the reported household behavioral and demographic variables. However including the category fixed effects improves the R^2 from 0.21 to 0.33, reflecting the fact that store patronage at the chain varies considerably across categories. We organize our discussion of the explanatory variables into four categories (1) Demographics (2) Shopping Frequency and Coupon Responsiveness (3) Basket Width and (4) Store Brand Patronage.

Table II. Store category revenue regression

	Coefficient	Standard Error	*t*-stat.
Intercept	110.55	1.76	62.81
Demographics			
Income (10 K)	0.61	0.12	5.02
HH size	0.97	0.54	1.81
Shopping frequency and coupons			
Average weekly visits	5.30	0.13	41.19
Store coupon index	0.14	0.04	3.30
Store coupon index × weekly visits	−0.14	0.04	−3.79
Manufacturer coupon index	−0.05	0.01	−4.16
Manufacturer coupon index × weekly visits	0.03	0.01	4.25
Basket width			
All sub-category Herfindahl	−15.91	2.69	−5.92
All edible good Herfindahl	−35.52	1.72	−20.64
Store brand patronage			
Relative SB share index	−0.14	0.04	−3.60
SB sub-category Herfindahl	−17.33	1.35	−12.84
SB edible good Herfindahl	−1.69	0.59	−2.87

Number of observations: 41017.
R^2: 0.34.

2.1. Demographics

Several demographic variables that we included in preliminary regressions did not turn out to be significant. Two variables that we found useful in predicting revenues were income and household size. As expected, they have a positive effect on store revenues. We tested for a nonlinear effect of income, because it is suggested that upper middle-income families tend to be patrons of warehouse clubs such as Costco, Price Club and Sam's Club. We did not find such evidence of nonlinear effects in this regression.

2.2. Shopping Frequency and Coupon Usage

Shopping frequency has a highly significant and positive impact on store patronage, suggesting that more frequent visits are an indicator of greater share of the household wallet at this store rather than an indicator of low search costs and greater price sensitivity.

[2] The dummy variables associated with each category (to control for category level differences) are not shown in the Tables 2–4.

The estimates of store and manufacturer coupons show an interesting dichotomy. Since manufacturer coupons can be redeemed at any store, the redemption of manufacturer coupons suggests greater patronage for the store of interest. The manufacturer coupon variable has a negative estimate and the interaction of manufacturer coupon index and frequency of store visits has a positive effect. Both these effects have roughly the same magnitude. Thus for a one store visit, manufacturer coupons have no effect on store revenues, but for households which visit more frequently and redeems manufacturer coupons, there is a positive effect on revenues, suggesting greater patronage for this chain.

Store coupons have exactly the opposite effect of manufacturer coupons. For a household which visits the store once a week, store coupons have no effect on revenues (the main effect and the interaction effect roughly cancel each other out). This is because these households are doing their regular shopping and taking advantage of any coupons that are provided as part of the loyalty program. Thus they are not using coupons more than average. However, households that visit more often and use coupons above average now have a negative effect on revenues, because their above average use of coupons and greater shopping frequency reflects lower search costs and therefore greater cherry-picking by these consumers.

2.3. Basket Width

Both of the Herfindahl indices have a negative coefficient as expected, indicating that households who buy a larger basket of goods from the chain also purchase more on average in any given category.

2.4. Store Brand Patronage

Our primary variables of interest are measures of store brand patronage. As discussed earlier, we model store brand patronage using "breadth variables" that measure a household's store brand purchasing propensity across categories using Herfindahl indices and a store brand share index "depth variable" that measures the household's relative share of store brand in the category relative to the aggregate category store brand share.

The depth variable i.e., the store brand share index is negatively correlated with store revenues. There are two reasons for why this result can occur. One possibility is that store brand prices are lower than national brand prices; hence a household that purchases store brands in a category will spend relatively less compared to households that purchase national brands. A second possibility is that households that purchase store brands are more price-sensitive and have no strong brand preferences. Therefore they are more likely to switch across multiple stores (perhaps buy lower priced store brands at competing stores as well) leading to a lower index of dollar spending at the chain in question.

These two interpretations have dramatically different implications for the retailer. If the first reason is true and the household generally purchases much of

its purchases from the retailer, it is not necessarily unfavorable to the retailer and the total profits from this household will be favorable. However, if the household ends up splitting its share of purchases across a number of stores and therefore selectively buys the cheaper store brands from the store of interest, then it is not likely to be valuable.

The store brand Herfindahl index, which measures the dispersion of store brand purchases across multiple product categories, has a negative and significant coefficient, suggesting that a household that spreads its store brand purchases across more categories is likely to spend significantly more on any particular category. This indicates that the general propensity to buy store brands also increases the store's "share of wallet" and supports the store differentiation argument, rather than the increased price sensitivity effect.

We also directly test the relationship between store brand share index and store profits, by running a second regression with the dependent variable being store profits (rather than revenues). Since store brand wholesale prices are typically lower than national brand wholesale prices, the difference between national brand prices and store brand prices $(p_n - p_s)$ will be greater than the difference between national brand margins and store brand margins $((p_n - w_n) - (p_s - w_s) = (p_n - p_s) - (w_n - w_s))$, since we expect $w_n > w_s$, where w_n, w_s represent the wholesale prices of national and store brands respectively. Thus it is possible that even when an increase in store brand share leads to a decline in store revenues, it can lead to an increase in store profits.

The store profit regression results are reported in Table 3. The results are fairly similar in terms of signs for most variables though the magnitudes of the effects are much smaller, reflecting the fact that revenues are roughly 4 times as large as the profits (given the average 25% gross margins)

We discuss only the store brand patronage variables, given our interest in the role of store brands. The coefficient of store brand share index is now positive and significant unlike in the revenue regression. Thus even though store revenues fall due to lower prices of store brands, the store profits increase. Thus store brands improve the profitability of the retailer.

Ailawadi and Harlam (2004) have argued that there is a nonlinear effect between store brand share and store profits. They provide a univariate analysis where they tabulated revenues and profits from households with three levels of store brand share: 0%, <35%, >35%. They find a nonlinear inverted U shaped effect, where they found revenues and profits were greatest for households with medium level of private label share in the range of 0–35%. We allow for this possibility by allowing a nonlinear relationship between private label share and store revenues and profits in our regression by including a squared term for store brand share, but we do not find evidence of a nonlinear relationship.

Further, as Ailawadi and Harlam have argued that unit margins of store brands are not necessarily higher than for national brands, only percentage margins tend to be higher. In their paper they find that in one supermarket, unit margins are

Table III. Store category profit regression

	Coefficient	Standard error	*t*-stat.
Intercept	30.21	0.63	47.80
Demographics			
Income (10 K)	0.14	0.04	3.26
HH size	−0.15	0.19	−0.81
Shopping frequency and coupons			
Average weekly visits	1.23	0.05	26.56
Store coupon index	0.14	0.01	9.21
Store coupon index × weekly visits	−0.14	0.01	−10.55
Manufacturer coupon index	−0.04	0.00	−8.98
Manufacturer coupon index × weekly visits	0.03	0.00	10.67
Basket width			
All sub-category Herfindahl	−8.21	0.97	−8.50
All edible good Herfindahl	−11.62	0.62	−18.80
Store brand patronage			
Relative SB share index	0.03	0.01	2.07
SB Sub-category Herfindahl	−5.39	0.48	−11.13
SB edible good Herfindahl	−0.39	0.21	−1.84

Number of observations: 41017.
R^2: 0.33.

on average greater for national brands in all categories except one. If this were indeed the case, the increase in profits, should be due to greater "share of wallet".[2] Combining these results with the effect of store brand breadth on revenues and profits, we believe that greater store brand patronage by a household is positively related to the store's share of a household's wallet.

This validates the "store differentiation" role for private labels. Its refutes the alternative hypothesis in the literature that private label purchases are more correlated with greater price sensitivity and therefore households which purchase private

[2] In computing store profits, we use only the marginal cost faced by the retailer, i.e., wholesale prices. National brands offer display and feature allowances to promote their products as well. Our data does not include profits that might accrue to the store from the national brands through these allowances. If these profits were included, the relative improvements in profits as store brand shares increased would be lower. Thus our regression results may overstate the profits from store brands. However a countervailing force is that national brands may offer more feature and display allowances in categories where store brand shares are greater. In this case, the benefits of store brand to the retailer may be understated if the endogeneity of display and feature allowances is not accounted for. Since we do not have data on feature and display allowances we are unable to address these issues in this paper.

Table IV. Store category patronage index regression

	Coefficient	Standard error	*t*-stat.
Intercept	2.838	0.083	34.340
Demographics			
Income (10 K)	−0.145	0.008	−17.560
Income^2	0.007	0.001	9.300
HH size	0.000	0.010	−0.010
Shopping frequency and coupons			
Average weekly visits	0.099	0.003	37.290
Store coupon index	0.007	0.001	7.310
Store coupon index × weekly visits	−0.007	0.001	−7.630
Manufacturer coupon index	−0.001	0.000	−2.360
Manufacturer coupon index × weekly visits	0.001	0.000	2.750
Basket width			
All sub-category Herfindahl	−0.285	0.051	−5.600
All edible good Herfindahl	−0.609	0.033	−18.550
Store brand patronage			
Relative SB share index	−0.004	0.001	−5.130
SB sub-category Herfindahl	−0.277	00.02	−10.820
SB edible good Herfindahl	−0.045	0.011	−4.130

Number of observations: 36023.
R^2: 0.21.

labels tend to be ones who buy private labels brands from competing stores in the area depending on who has the lowest prices.

3. Store Revenue and Profit Share Regressions

As we discussed earlier, a share based measure of store patronage is reasonable as well. Estimating the effects of the variables we estimated earlier using the store's revenue shares and profit shares as the dependent variable allows us to test whether our results are robust as well. We first note the key similarities and highlight differences with our earlier results using total revenues and profits.

Except for the demographic variables, the results are pretty much similar to the earlier results. As before, the revenue shares tend to fall with increase in the share of private labels, but the profit share increase with the share of private labels. Increased dispersion in the purchases of store brands increase the revenue shares as well as profit shares of the store. Thus we continue to find support for the "store differentiation" role of private labels.

Table V. Store category patronage index regression

	Coefficient	Standard error	*t*-stat.
Intercept	1.234	0.030	41.11
Demographics			
Income (10 K)	−0.042	0.003	−13.96
Income^2	0.002	0.000	8.33
HH size	0.009	0.004	−2.42
Shopping frequency and coupons			
Average weekly visits	0.027	0.001	28.56
Store coupon index	0.010	0.001	28.82
Store coupon index × weekly visits	−0.010	0.000	−30.24
Manufacturer coupon index	−0.001	0.000	−7.91
Manufacturer coupon index × weekly visits	0.001	0.000	11.25
Basket width			
All sub-category Herfindahl	−0.159	0.019	−8.58
All edible good Herfindahl	−0.201	0.012	−16.88
Store brand patronage			
Relative SB share index	−0.001	0.000	−4.52
SB sub-category Herfindahl	−0.076	0.009	−8.13
SB edible good Herfindahl	−0.004	0.004	−1.02

Number of observations: 36023.
R^2: 0.19.

We find only one major difference. We find that there is a significant nonlinear effect of income in both the revenue share and profit regressions. Income has a significant inverted U-shaped effect. Households with median incomes around 100 K have the lowest store patronage in terms of both the store revenue share and profits. This is consistent with anecdotal evidence that middle and upper middle class consumers are more likely to use warehouse stores such as Sam's Club, Costco or Price Club for many of their purchases, while consumers with lower incomes or extremely high incomes disproportionately use supermarket chains for their grocery shopping.

4. Do the Control Variables Distort the True Effect of Store Brand Patronage?

One valid concern is that store brand patronage might be intrinsically correlated with a control variable such as coupon use that is symptomatic of price sensitivity. Thus by controlling for price sensitivity effects through variables such as coupon

use, we may be masking the true effect of store brand patronage. To address this issue we ran a regression with all of the four dependent variables as before, but including only the three store brand patronage related variables. The sign of the store patronage coefficients do not change, indicating that our earlier results are not due to the masking effect of the control variables.

V. Conclusion

Our goal in this paper was to investigate whether store brand patronage by households led to an increase in store patronage. We developed two sets of measures of store patronage: one based on store revenues and store profits from a household and the other based on share of store revenues and store profits due to a household. We find that revenues fall when store brand shares increase, but profits rise under both sets of measures. We also find that greater breadth of store brand purchases lead to greater revenues and profits. Collectively this evidence leads us to conclude that store brands contribute to greater store differentiation, rather than increased price sensitivity in the market.

Our results thus provide strategic justification for continued investment in store brands by retailers. From a tactical point of view, the finding that store brands serve to differentiate the store, allows managers to use store brand patronage as a targeting variable for promotions. This is in contrast to the use of price sensitivity that is commonly used as a targeting variable, because this can intensify competition between retailers (Shaffer and Zhang, 1995).

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