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# Beyond the Label: Price Competition and Promotional Effectiveness in Mouthwash



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# Agenda

- 01** Background, Data, & Methodology
- 02** Exploratory Data Analysis
- 03** Model Results & Insights
- 04** Recommendation & Future Work

# Price and Promotion Shape Competitive Outcomes in Retail Mouthwash

**Problem Statement:** Understand the price elasticity and impact of promotions across different mouthwash products in retail stores throughout the United States.

## Use Cases:

- **Manufacturers** can use this analysis to better understand how promotions and price changes impact product performance in the marketplace.
- **Retailers** can leverage these insights to more effectively negotiate in-store promotion rates with manufacturers.
- **New entrants** can use the findings to guide pricing strategy and assess whether it is financially viable to enter the mouthwash market.

# Log-Log Model Captures Own & Cross-Brand Price & Promotional Effects

**Data Source:** Breakfast at the Frat ([dunnhumby.com/source-files](http://dunnhumby.com/source-files))

**Date Range:** January 8, 2009 – January 14, 2012 (weekly observations)

## Variables Used:

- **Response Variable:** Sales (USD)
- **Predictors:** Price (USD), Promotion Types (Feature, Display, Temporary Price Reduction [TPR])
- **Product Characteristics:** Product Name, Manufacturer, Size

## Modeling Approach:

A **log-log linear regression model** is employed to estimate the elasticity of sales with respect to price and promotional activities, both for the focal product and its competitors. The log-log functional form allows for interpreting coefficients as elasticities.

## General Model Equation:

$$\log(\text{Sales}) = \beta_0 + \beta_1 \log(\text{Price}) + \beta_2 \cdot \text{Feature} + \beta_3 \cdot \text{Display} + \beta_4 \cdot \text{TPR} + \sum_j (\beta_{5j} \log(\text{Price}_j) + \beta_{6j} \cdot \text{Feature}_j + \beta_{7j} \cdot \text{Display}_j + \beta_{8j} \cdot \text{TPR}_j) + \varepsilon$$

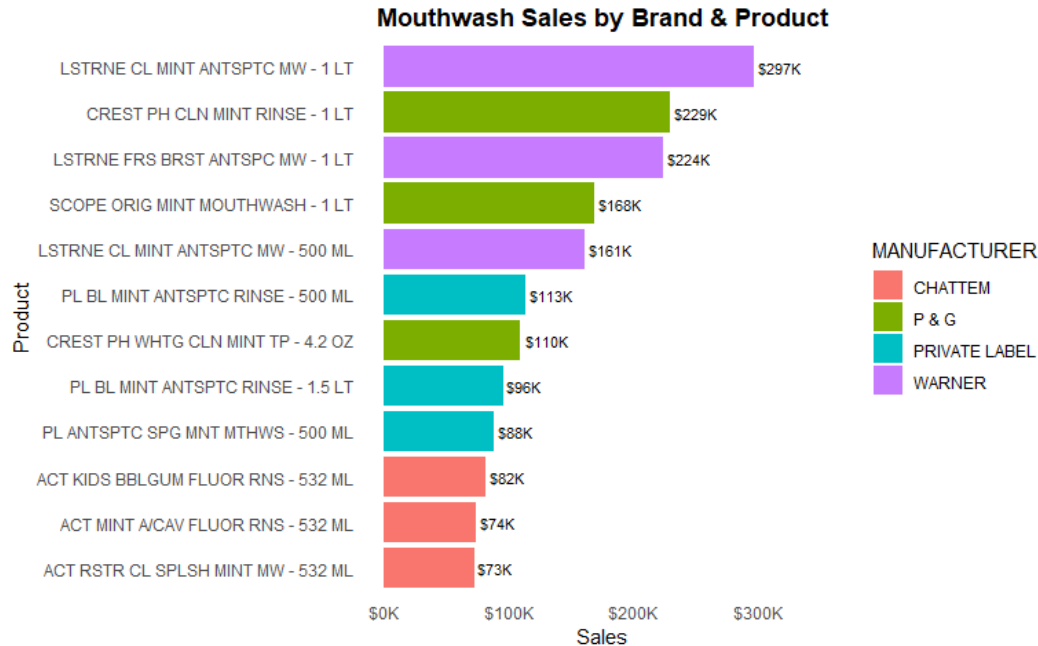
## Variable Selection:

To improve interpretability and prevent overfitting, **backward selection** was applied, retaining only variables that significantly contributed to explaining variation in  $\log(\text{Sales})$ .

## Competitive Sizes and Prices Define a Divided Mouthwash Market

	Manufacturer - Brand	Sizes	Price Range	Sales Market Share	Units Market Share
	Warner - Listerine	500 mL, 1 L	\$4.5 - \$5.0	40%	30%
	P&G – Crest + Scope	4.2 oz, 1 L	\$3.5 - \$5.5	30%	25%
	Private Label	500 mL, 1 L	\$1.5 - \$3.5	17%	36%
	Chattem - ACT	532 mL	\$4.5 - \$5.0	13%	10%

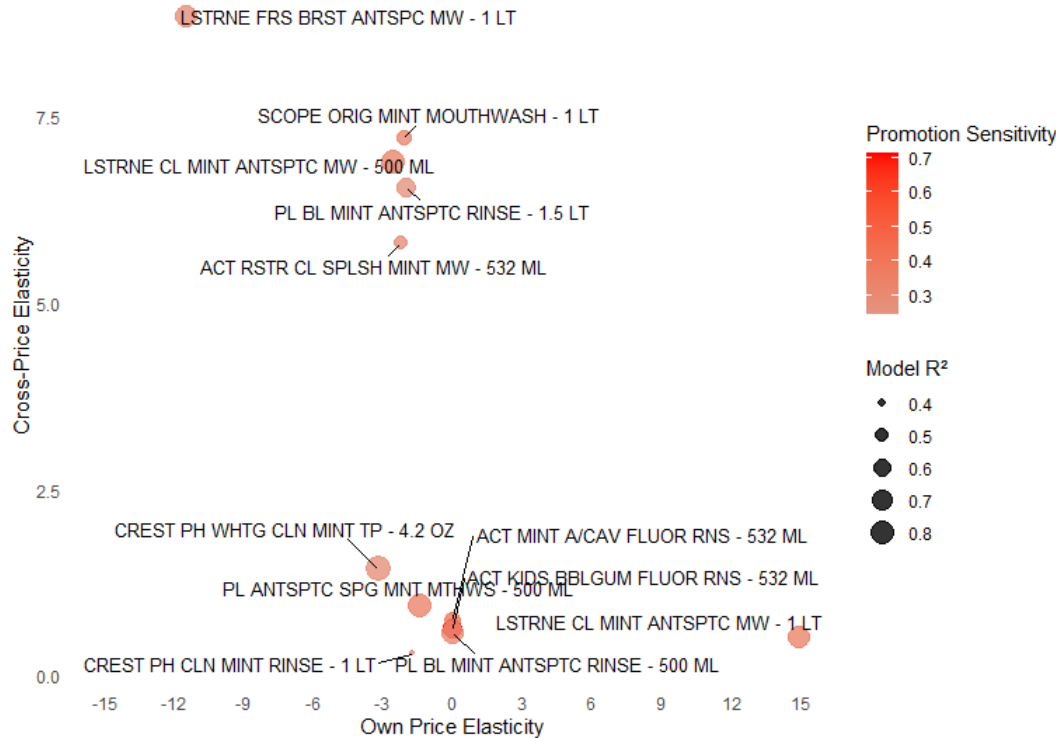
## Highly Competitive Larger Products Top Sales Rankings



- 1 – 1.5 L products, primarily from Warner & P&G, make up the majority of sales during this period, likely indicating that consumers are interested in minimizing their \$/L for mouthwash.
- Private Label products make up the majority of sales amongst 500 mL products, as consumers are likely drawn to their lower price points relative to other brands of the same size.
- Across both size categories, sales show intense competitions across brands; there is no brand that has clearly differentiated itself as the dominant brand, indicating that consumers may be heavily influenced by price with many substitutes available.

# Elastic Market Reacts Sharply to Price Changes

## Mouthwash Category: Competitive Map



- Mouthwash appears to be a moderately elastic product, with 7 of the 12 products exhibiting own-price elasticities between -1.5 and -3.2. In practical terms, this indicates that a 10% increase in price typically leads to a 15 - 32% decrease in sales as consumers would switch to competitor brands.
- From a cross-price elasticity perspective, the products tend to fall into two groups: one group is only moderately affected by competitors' pricing (elasticities between 0.3 and 1.4), while the other is highly sensitive to competitor price changes (elasticities ranging from 5.8 to 8.8).
- Promotional effects, both for a product and its competitors, are relatively limited, with elasticities ranging from 0.3 to 0.7. This suggests that sales responses are primarily driven by actual price changes, rather than by the promotional tactics used to advertise them.

## Larger Sizes Show Greater Price Elasticity

Competitive Group	Products in Group	Own Price Sensitivity	Cross Price Sensitivity
Big Sellers	LSTRNE FRS BRST ANTSPC MW - 1 LT SCOPE ORIG MINT MOUTHWASH - 1 LT LSTRNE CL MINT ANTSPC MW - 500 ML PL BL MINT ANTSPC RINSE - 1.5 LT	High (-11.5 – -2.0)	High (6.6 – 8.8)
Niche Players	PL ANTSPC SPG MNT MTHWS - 500 ML ACT RSTR CL SPLSH MINT MW - 532 ML CREST PH WHTG CLN MINT TP - 4.2 OZ	Medium (- 3.2 – -1.5)	Medium (0.9 – 5.8)
Price Insensitive	ACT KIDS BBLGUM FLUOR RNS - 532 ML CREST PH CLN MINT RINSE - 1 LT ACT MINT A/CAV FLUOR RNS - 532 ML LSTRNE CL MINT ANTSPC MW - 1 LT PL BL MINT ANTSPC RINSE - 500 ML	Varies (- 1.7 – 14.9)	Low (0.3 – 0.7)



## Each Stakeholder Faces a Unique Price Challenge

Stakeholder	Key Concept	Recommendation
Manufacturers	Cross Price Elasticity > Own Price Elasticity	Monitoring competitors' prices and knowing when they will go on sale to price/promote defensively is more important than trying to win sales through promotions/price reductions.
Retailers	Promotion Value is in Price, Not Advertising	While there is some brand awareness, the selling point of promotions to manufacturers is the ability to communicate the lower price, more so that garnering consumer impressions for the brand.
New Entrants	Mouthwash is Largely Commoditized	New products will either need to show significant differentiation in features compared to the incumbent brands to be able to break into a highly commoditized field

## Opportunities for Future Analysis: Inflation, Bundling, and Marketing

**Long-Term Inflation Study** – While this analysis focuses on the short-term risks of price increases, it raises a key strategic question: how can brands sustain pricing power as manufacturing costs rise over time? A longitudinal study exploring how mouthwash brands manage pricing in inflationary environments (10–20 years) would complement these findings and help inform durable pricing strategies.

**Category Expansion Analysis** – Because increasing prices risks volume loss and decreasing prices erodes margins, brands may need to look beyond pricing to drive growth. Identifying complementary products that are frequently purchased with mouthwash could uncover opportunities for bundling or cross-promotion that lift sales without sacrificing margin.

**Marketing Mix Modeling** – Expanding this analysis into a full marketing mix model, incorporating national media spend, seasonal trends, and promotional calendars, would provide a more complete view of the external levers brands can use to grow sales independent of pricing.