

# NEW Pricing Strategy



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# Background

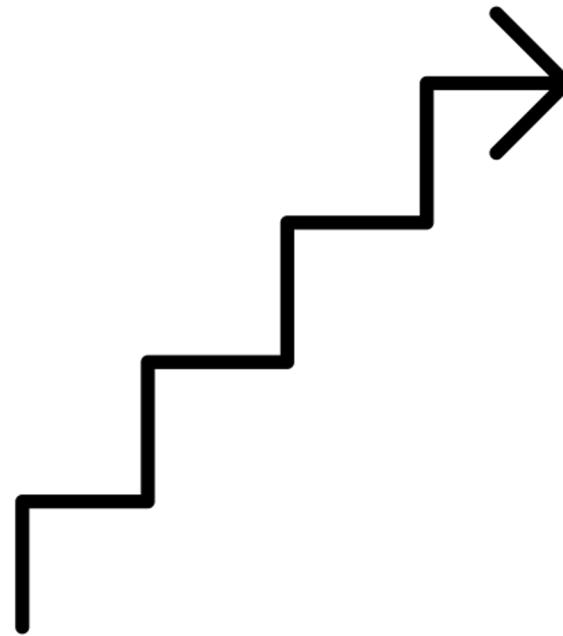
- Market Presence: 30.01%
  - Kinds
    - Family: \$2.80
    - Kids: \$2.68
  - Pricing strategy
    - Competitive pricing
- “better” prices



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# Steps

1. Exploratory Data Analysis
  2. Pricing Setting
  3. Model and Predictions
- Estimated Profits



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# Exploratory Data Analysis (EDA)

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# Price v.s Units

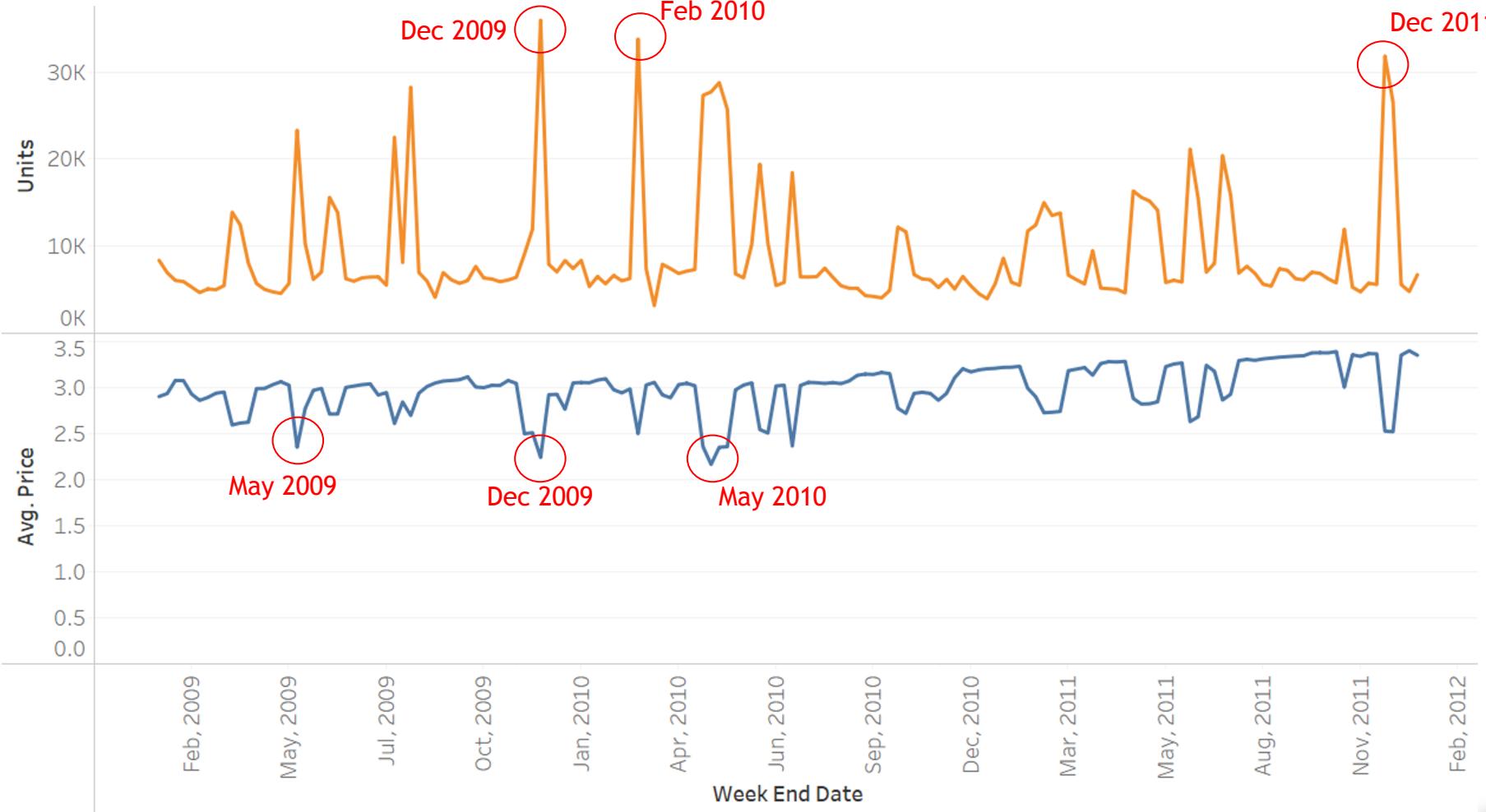


Correlation Matrix

	PRICE	UNITS
PRICE	1.000000	-0.555772
UNITS	-0.555772	1.000000

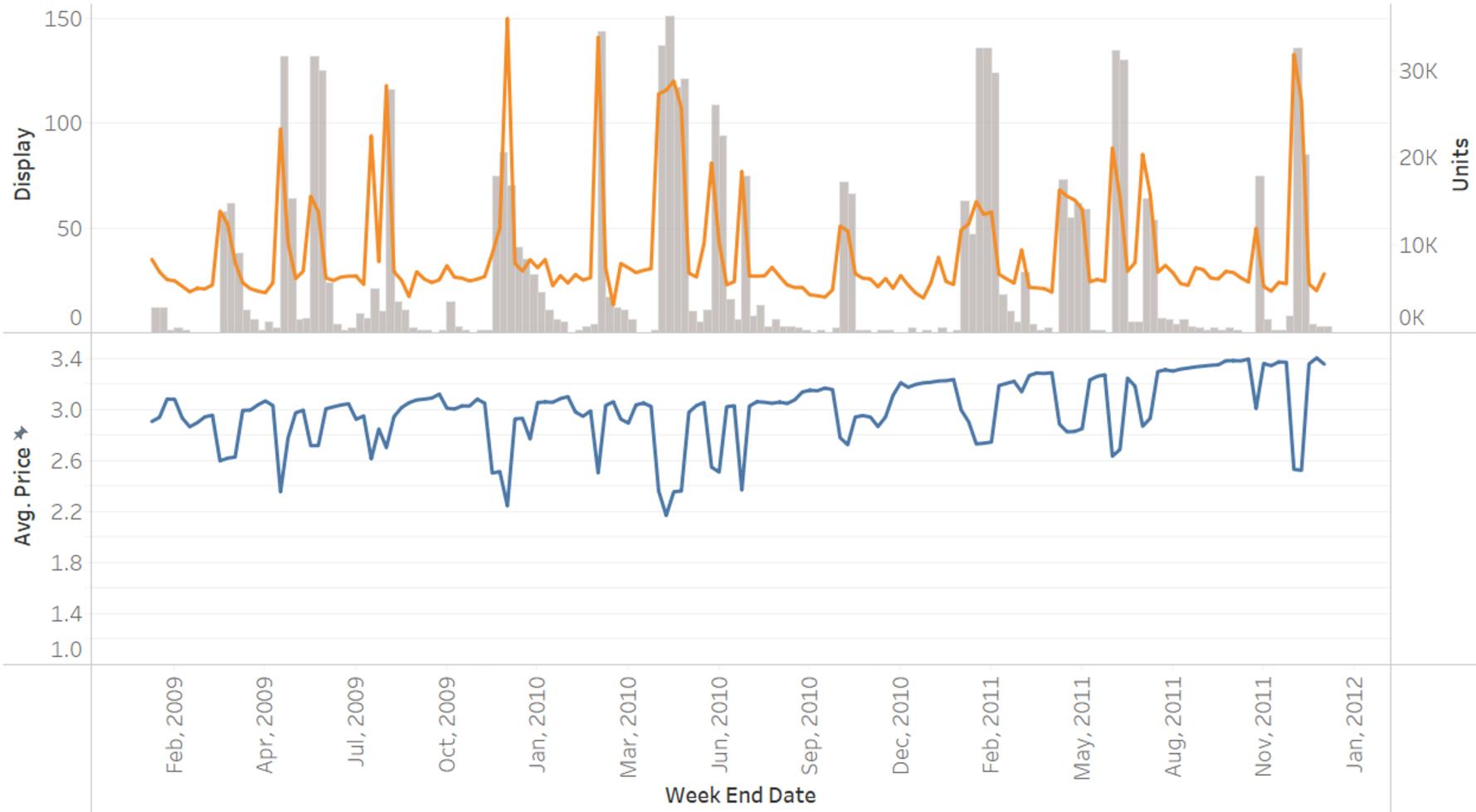
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# Price & Units Over Time



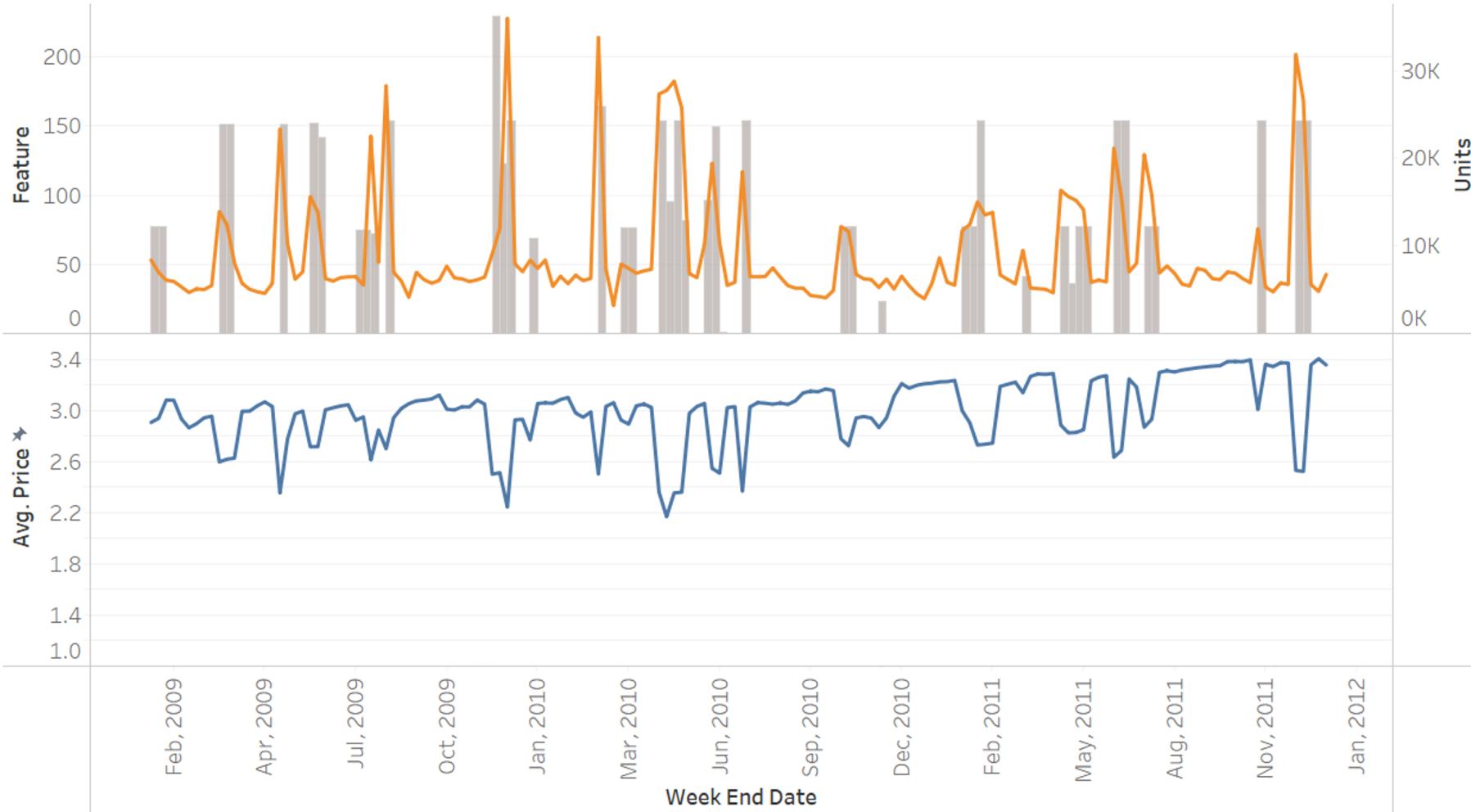
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# Price & Units Over Time (w/ display)



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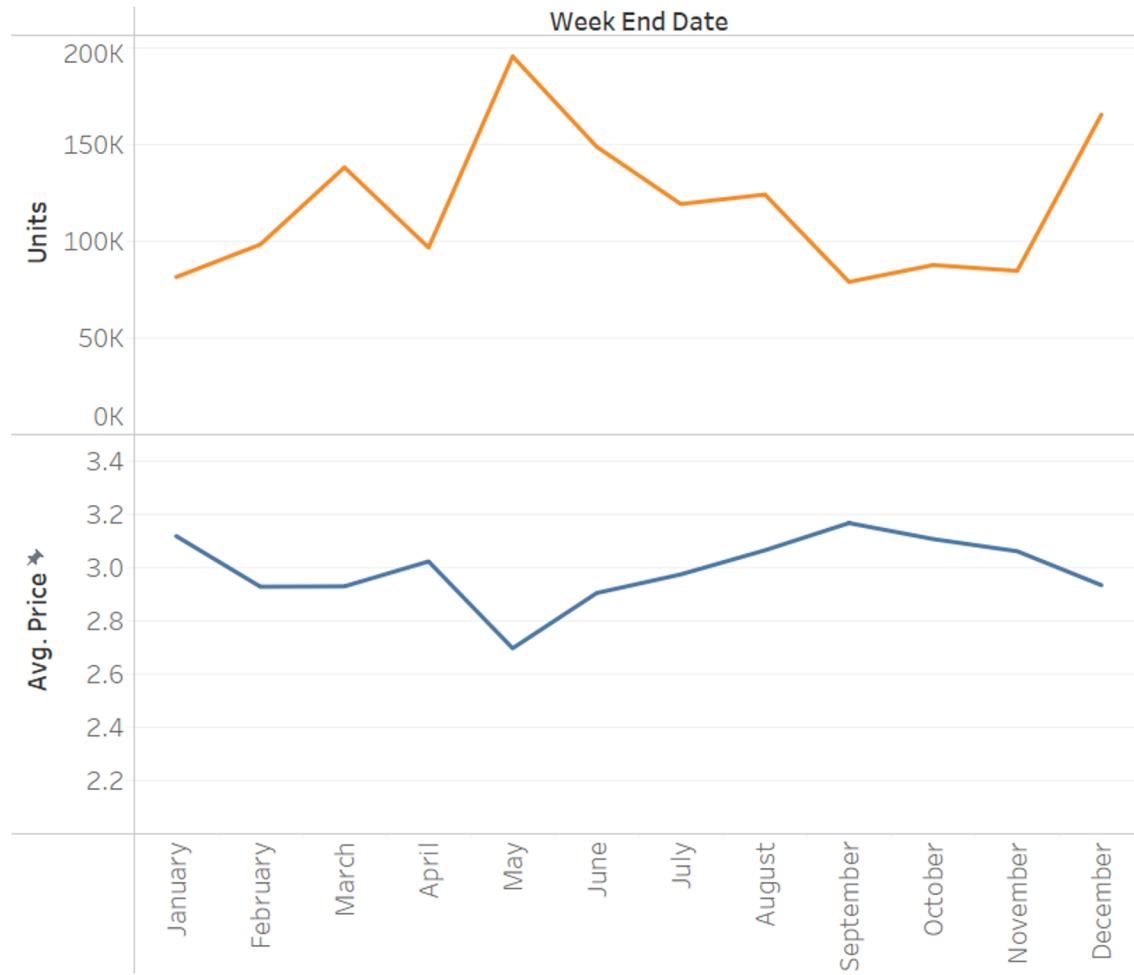
# Price & Units Over Time (w/ feature)



In-store circular example

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# Price & Units by Month



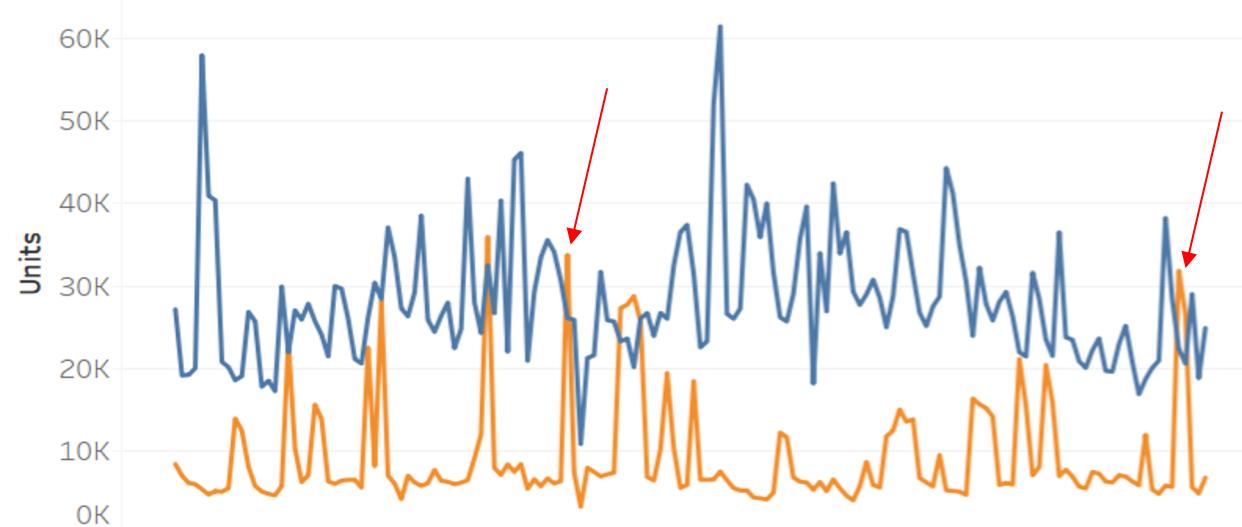
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**Manufacturer**

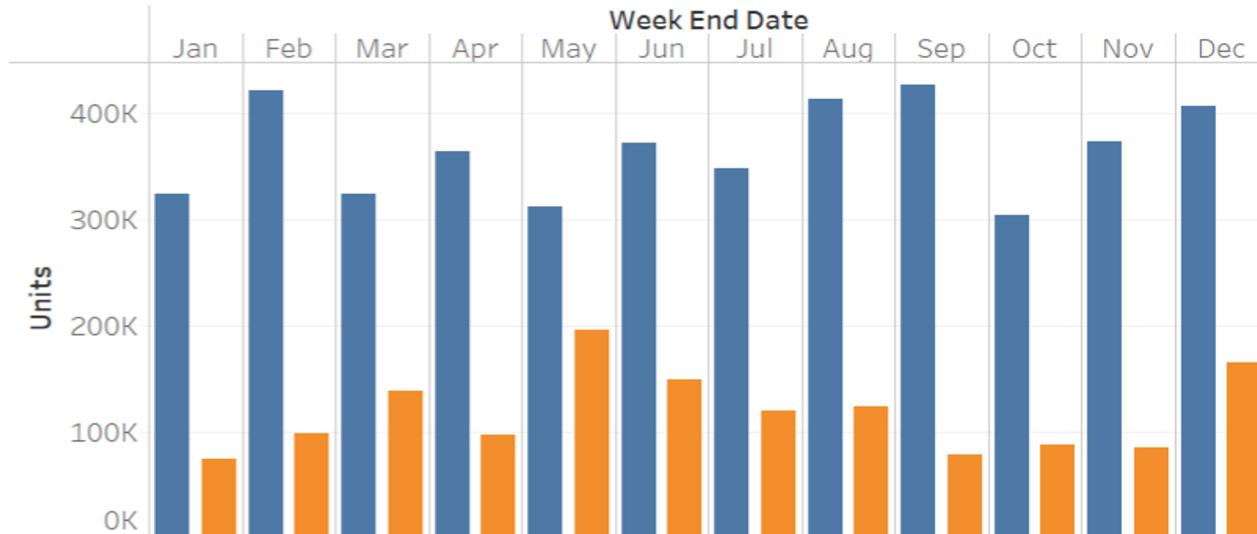
- COMPETITOR
- KELLOGG

# Kellogg's v.s Competitors

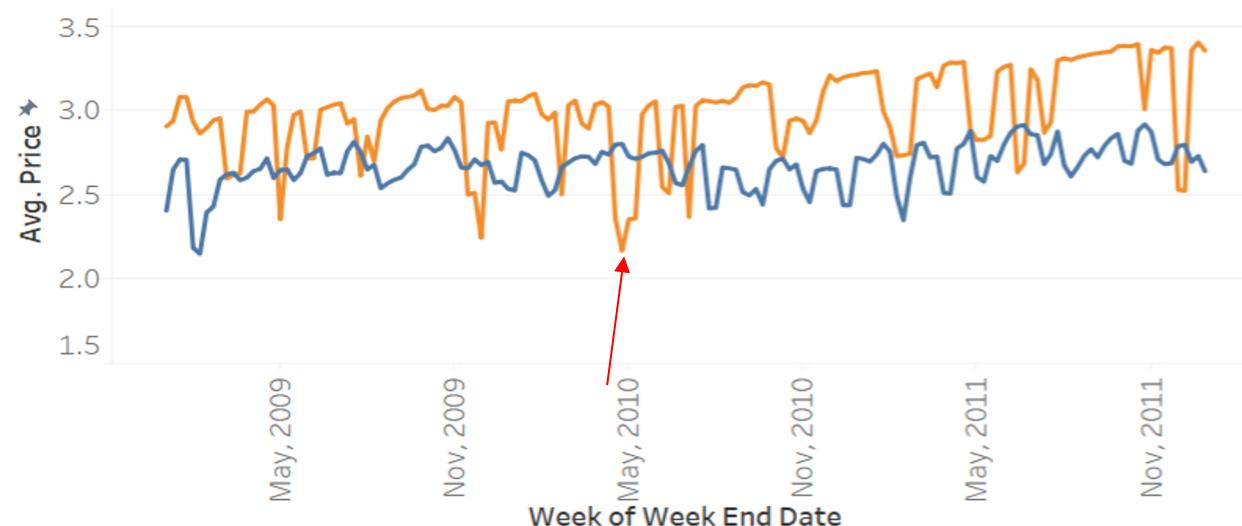
Units by Manufacturer over time



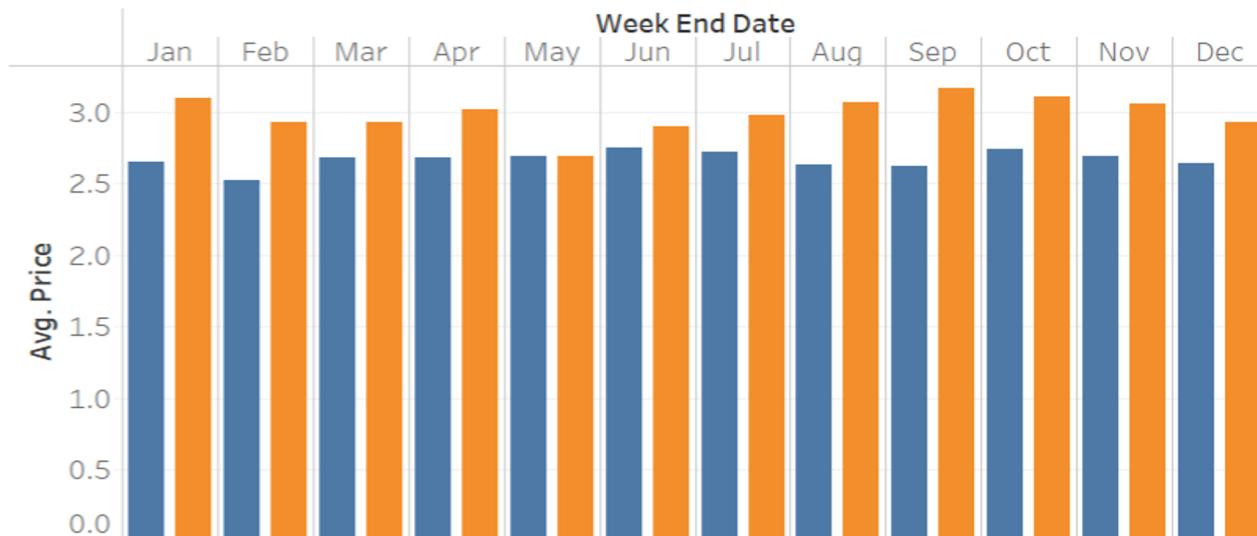
Units by Manufacturer by Month



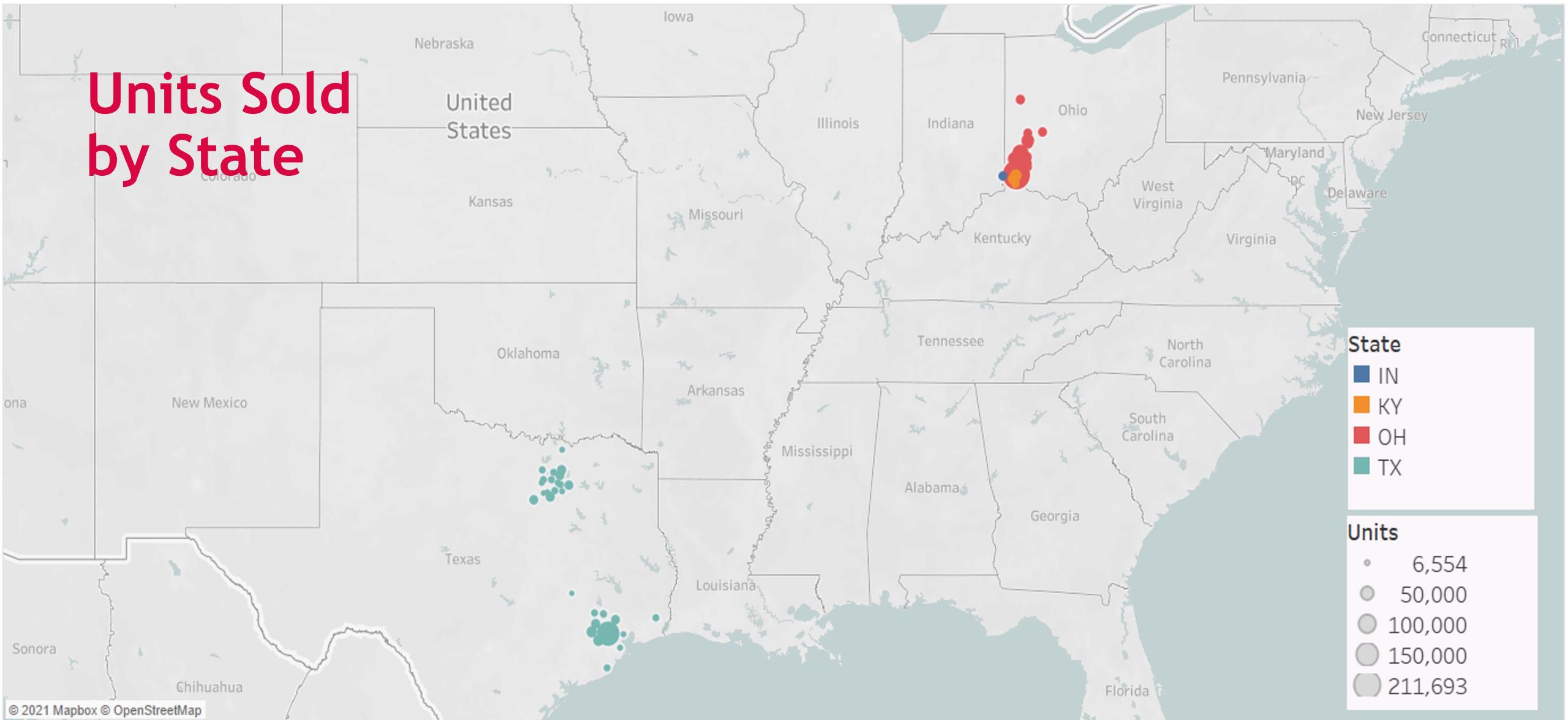
Price by Manufacturer over time



Price by Manufacturer by Month



# Units Sold by State



Address	State	Prov	Code	Avg. Price	Units	Spend	Count of Store Id
	IN			3.14	20,328	55,722	1
	KY			3.05	88,984	238,088	4
	OH			3.04	668,500	1,826,978	31
	TX			2.95	643,160	1,730,457	41

# Sub-Category by Manufacturer

Manufacturer	ADULT CEREAL		Sub Category		KIDS CEREAL		
	Avg. Price	Units	ALL FAMILY CEREAL	Avg. Price	Units	Avg. Price	Units
GENERAL MI			3.2671	1,689,338			
KELLOGG			3.1644	396,439	2.9085	1,024,533	
POST FOODS	3.2052	568,280			2.5574	290,707	
PRIVATE LABEL	1.7566	369,046	1.9477	730,230			
QUAKER			2.7403	172,285	2.4841	586,524	



TARGETING “Family” and “Kids” Cereal

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# Sub-Category by Segment

Seg Value Name	Manufacturer	Sub Category					
		ADULT CEREAL		ALL FAMILY CEREAL		KIDS CEREAL	
Avg. Price	Units	Avg. Price	Units	Avg. Price	Units	Avg. Price	Units
MAINSTREAM	COMPETITOR	2.6788	508,273	2.7323	1,499,336	2.5077	479,405
	KELLOGG			3.1658	228,672	2.9067	562,465
UPSCALE	COMPETITOR	2.6823	215,139	2.7505	676,103	2.5106	153,555
	KELLOGG			3.1568	104,660	2.9138	197,078
VALUE	COMPETITOR	2.6776	213,914	2.7493	416,414	2.5072	244,271
	KELLOGG			3.1671	63,107	2.9086	264,990



**SEGMENTING** customers into three categories

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# Price Setting

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# Profit Max Equation

$$\pi = (p - vc) * d(p) - fc$$

$$\frac{\partial \pi}{\partial p} = d(p) \left( 1 + \frac{(p - vc)}{p} \frac{\partial d(p)}{\partial p} \frac{p}{d(p)} \right)$$

$$= \underline{d(p)} \left( 1 + \frac{(p - vc)}{p} \underline{\varepsilon} \right) \Downarrow$$

$$p^* = vc \left( \frac{\varepsilon}{1 + \varepsilon} \right)$$

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# Regression Analysis

- Log - Log form
- Other effects
  - Competitors prices
  - Geographic Information
  - Seasonality

$$\rightarrow \log(\text{Sales}) = \beta_0 + \beta_1 * \log(\text{Price}) + \beta_2 * \text{Competitors Prices} + \\ \beta_3 * \text{Geographic location} + \beta_4 * \text{Seasonality}$$



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# Family Cereal

- Elasticity: -1.91
- Optimal Price

$$p^* = vc \left( \frac{\varepsilon}{1+\varepsilon} \right)$$



$$P^* = (\text{Current price} * 60\%) * (-1.91/(1-1.91)) = \$3.53$$

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# Kids Cereal

- Elasticity: -2.41
- Optimal Price

$$p^* = vc \left( \frac{\varepsilon}{1 + \varepsilon} \right)$$

$$P^* = (\text{Current price} * 60\%) * \left( \frac{-1.91}{(1 - 1.91)} \right) = \$2.87$$



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# Competitions

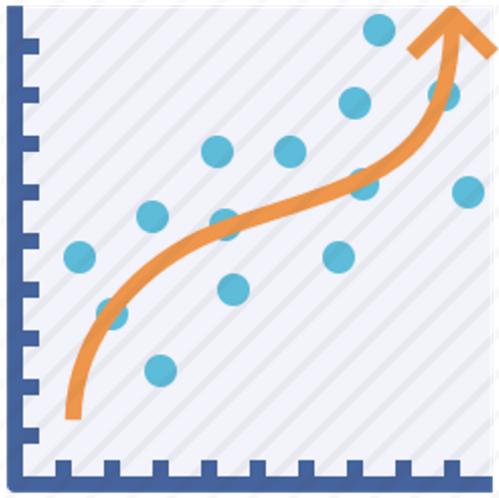
- Family Cereal
  - Without: \$3.532
  - With: \$3.530

→ Bias: 0.063%
- Kids Cereal
  - Without: \$2.866
  - With: \$2.873

→ Bias: 0.225%



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# Modelling & Prediction

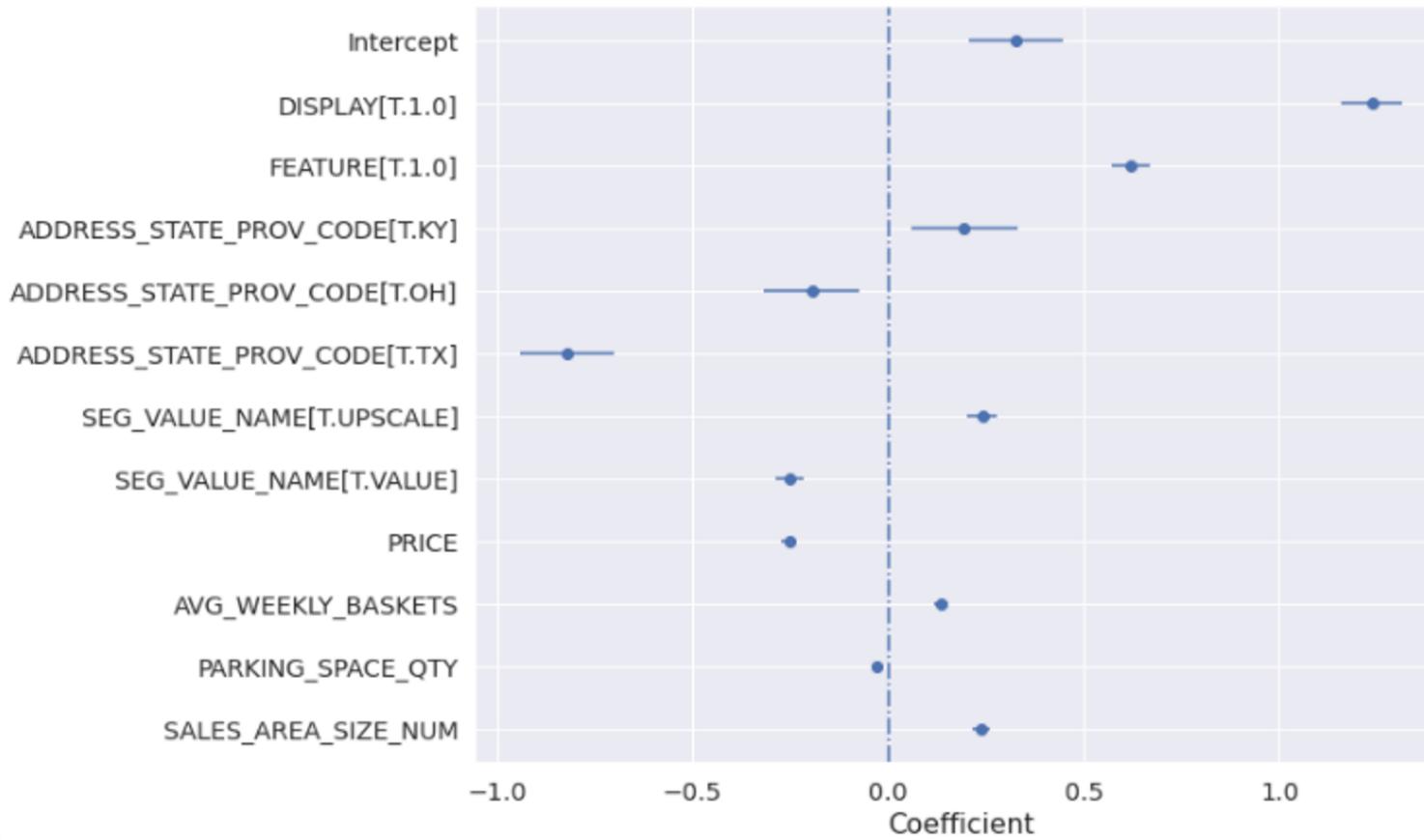
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# Modelling

- Model Training Set: 2009-2010  
Model Test Set: 2011-2012Jan
- Modelling Method: Linear Regression
- Dependent Variables: UNITS (demand)
- Independent Variables:
  - Transaction Data: PRICE + FEATURE + DISPLAY
  - Store Data: ADDRESS\_STATE\_PROV\_CODE + AVG\_WEEKLY\_BASKETS +  
SEG\_VALUE\_NAME + PARKING\_SPACE\_QTY +  
SALES\_AREA\_SIZE\_NUM

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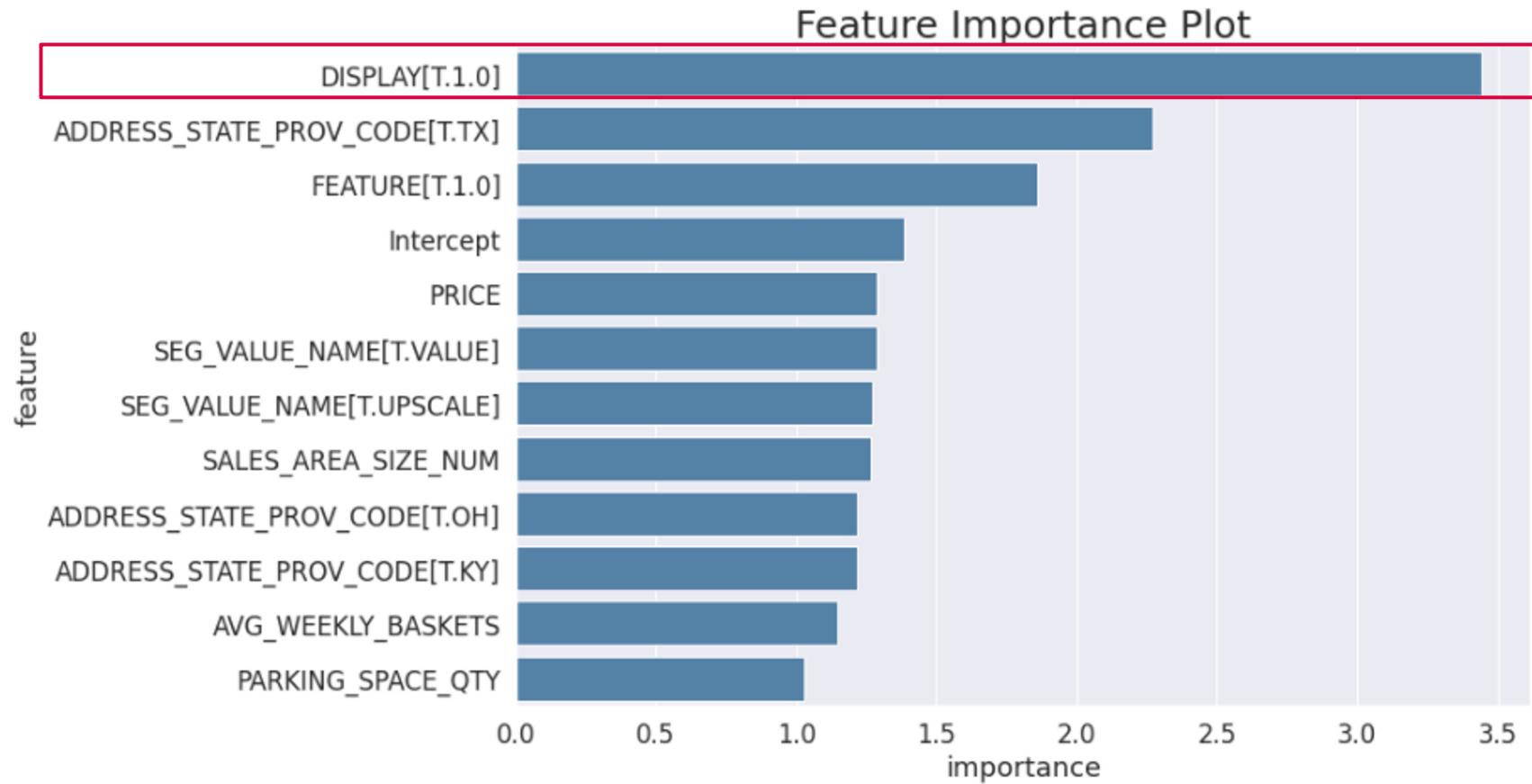
# Family Cereal



R-squared = 0.605

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# Family Cereal



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# Family Cereal Profits Predictions



COGS rate = **60%**  
Set Price = **\$3.53**  
Profits Increase  
**3.15%**

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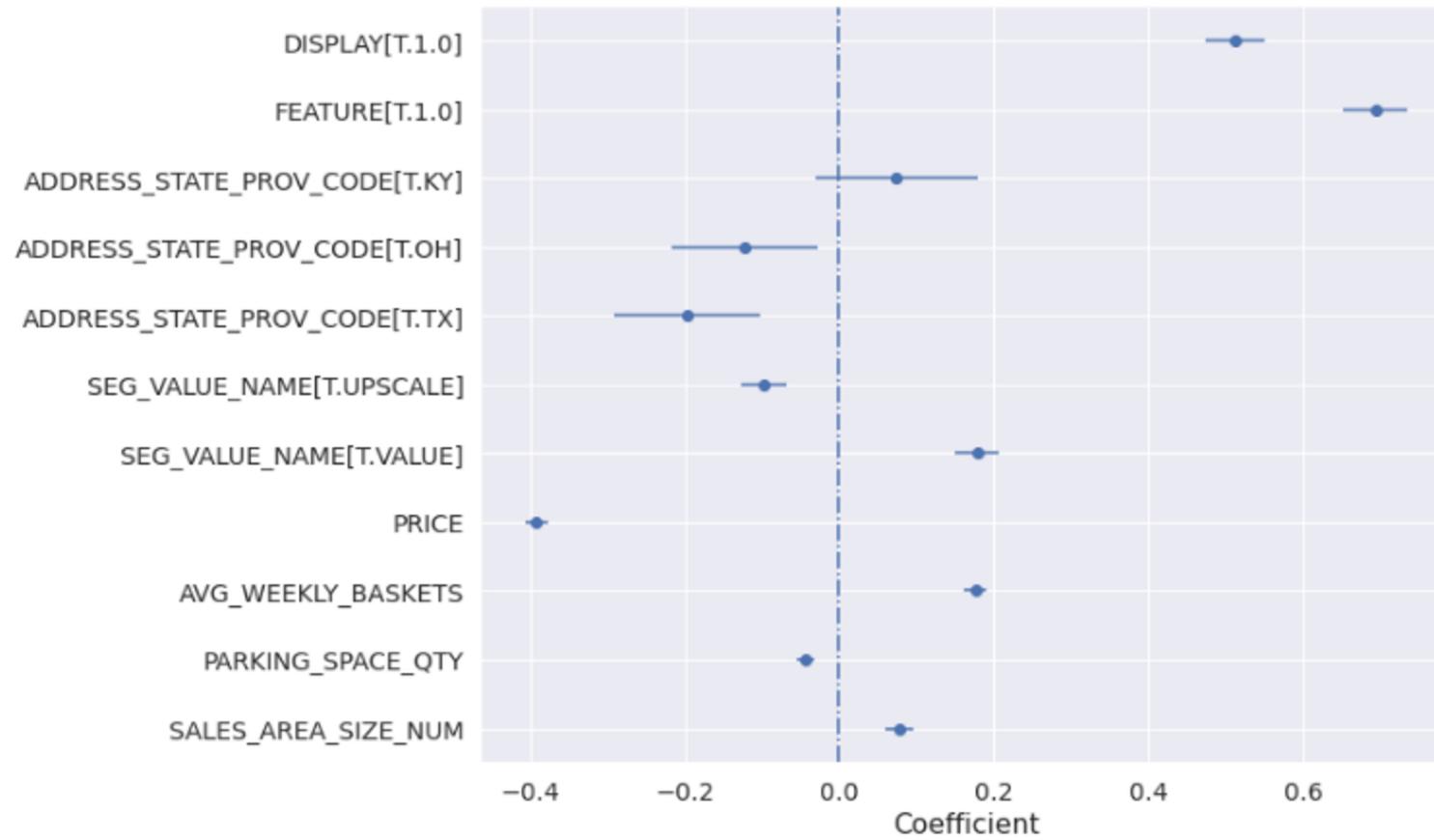
# Family Cereal Profits Predictions (w/ Display)



COGS rate = 80%  
Set Price = \$3.53  
Profits Increase  
**47.18%**

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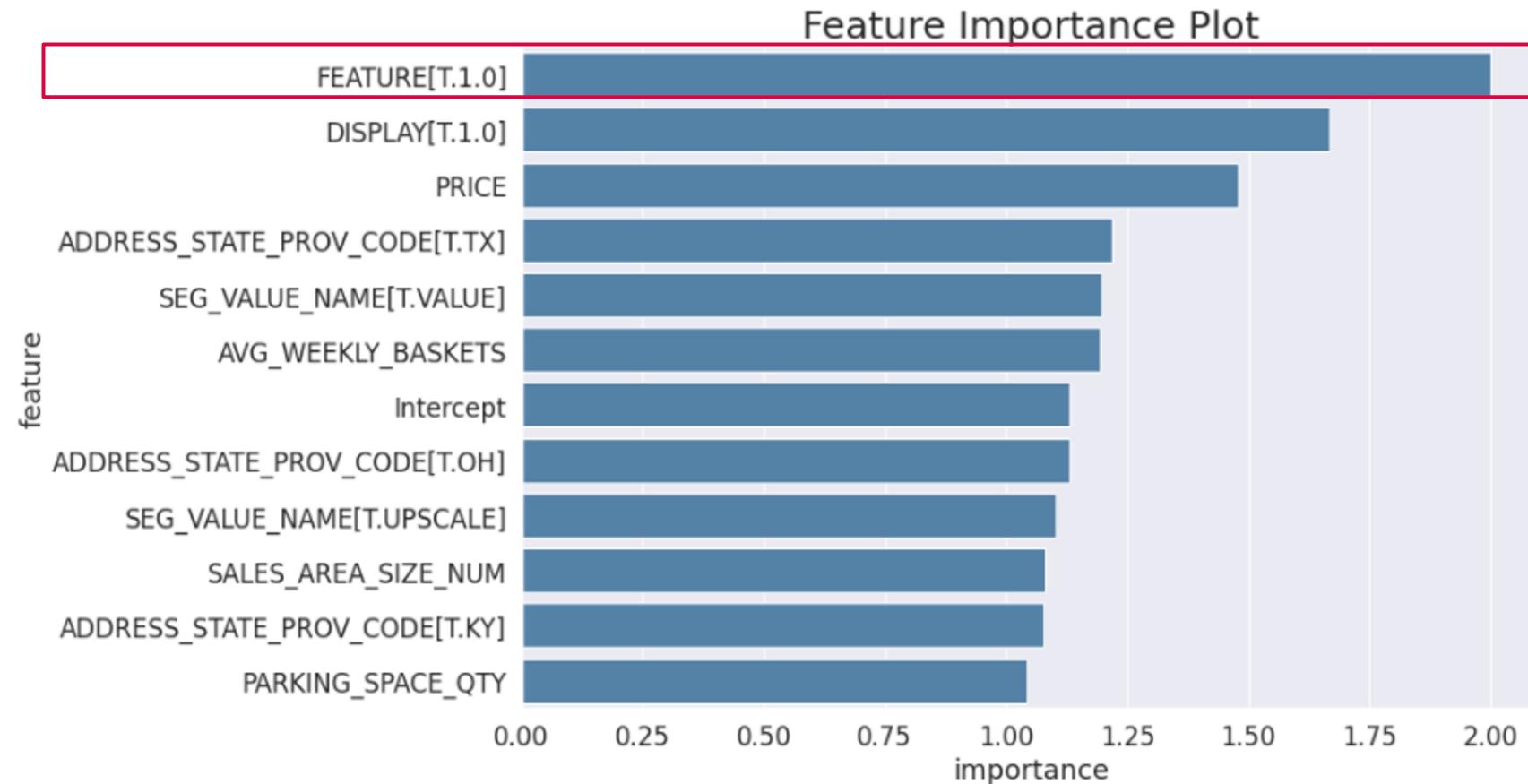
# Kids Cereal



R-squared = 0.538

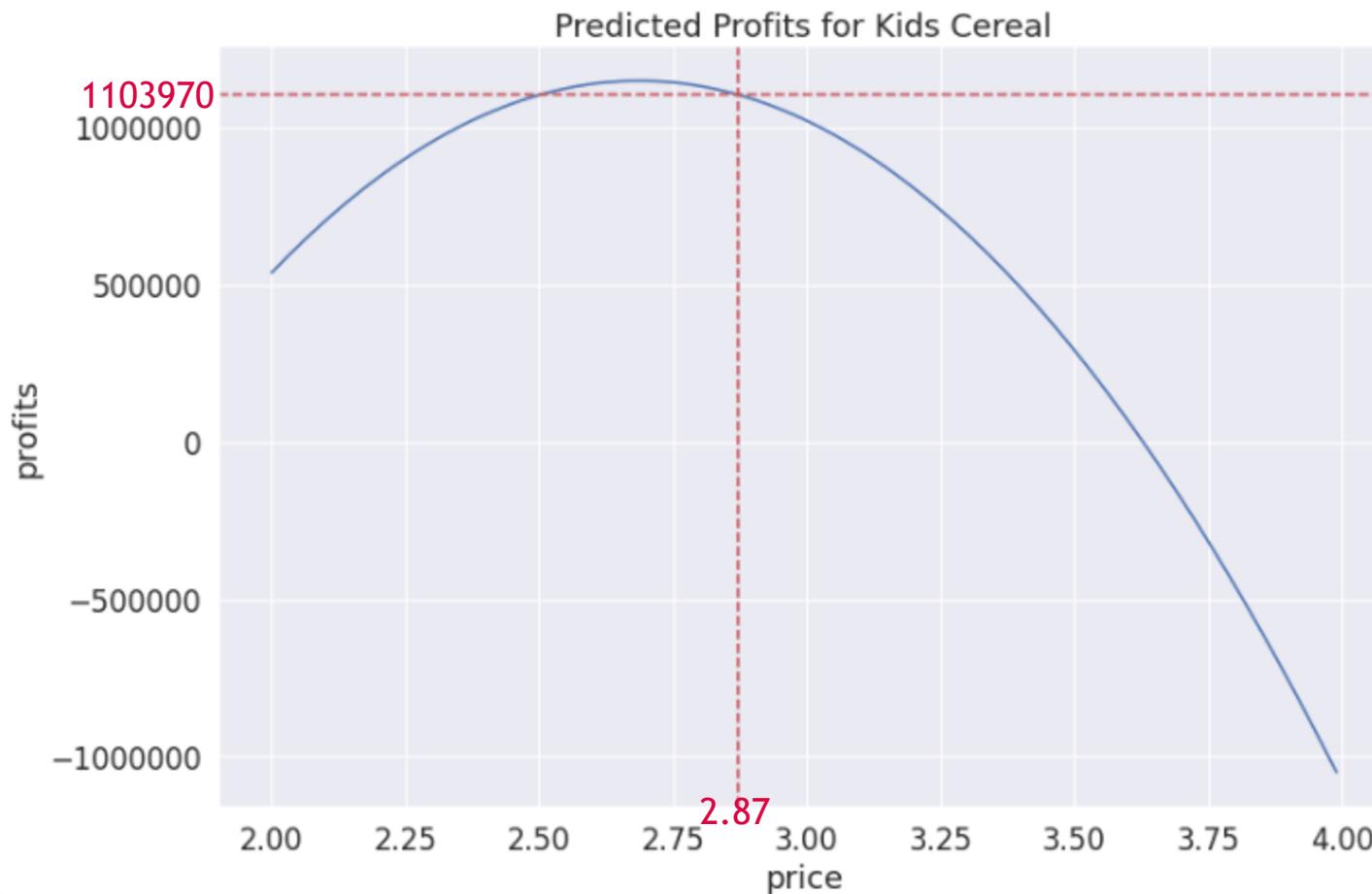
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# Kids Cereal



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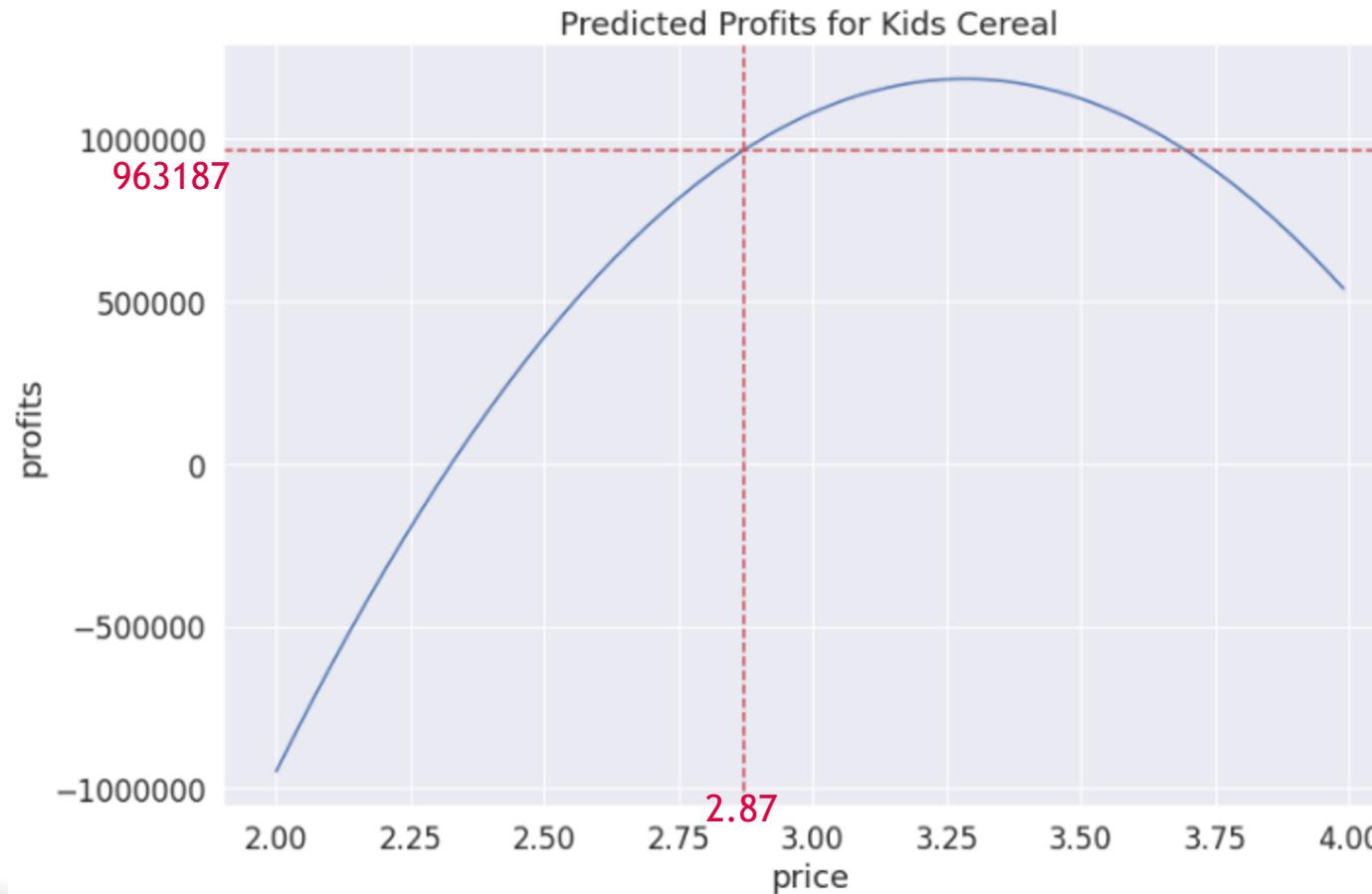
# Kids Cereal Profits Predictions



COGS rate = **60%**  
Set Price = **\$2.87**  
Profits Increase  
**30.33%**

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# Kids Cereal Profits Predictions (w/ Feature)



COGS rate = 80%  
Set Price = \$2.87  
Profits Increase  
**13.71%**

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# Results

Sub-Category	Price Setting	Marketing Strategy	COGS Rate	% of Profits Increase
Family Cereal	3.53	No Specify	0.6	3.15%
		In-store Display	0.8	47.18%
Kids Cereal	2.87	No Specify	0.6	30.33%
		In-store Featuring	0.8	13.71%

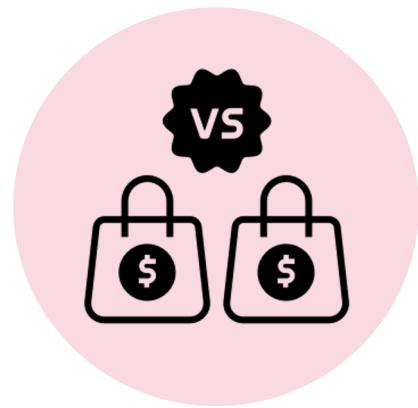
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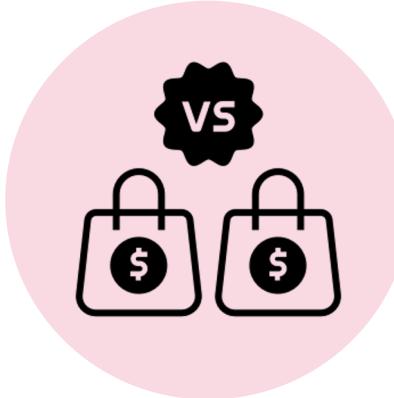
# Conclusion

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# Pricing Strategy



Competitive  
Pricing



Competitive  
Pricing

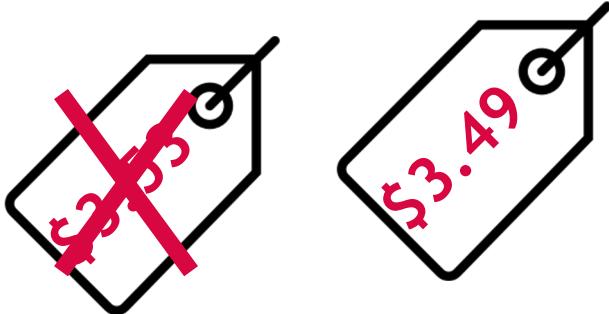


Value  
Pricing

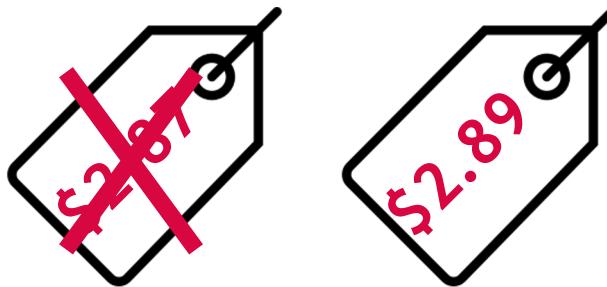
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# Pricing Strategy

Family Cereal



Kids Cereal



In-store Display



In-store Featuring



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# What can be Done Better?

- Short-term v.s Long-term
- Solid cost assumptions & additional marketing expense
- Model Comparison (e.g. Neural Network, Random Forest)

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Thank you!

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