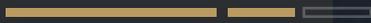# PRICE ELASTICITY ANALYSIS FOR A FOOD MAJOR

THE CLIENT
PROBLEM

Our client, a **major casual dining chain** in the U.S. needed a **broad understanding of price elasticity** i.e., how changing the price of an item impacted its sales potential. They wanted insights at two levels – menu items and stores. They also wanted to:

- Collate item pricing related data from disparate sources
- Categorize and price items based on their importance to retailers and customers
- Run various price scenarios and estimate the impact on the profitability of their portfolio

THE AQ
SOLUTION

AQ delivered two solutions:

- The first solution gave the client an understanding of the various **factors that impacted an item's sales and found the price elasticities** of different items
- We built an excel based **simulator** which helped check the impact of changing prices on sales volumes in various scenarios

STEP 1: PRE-WORK

Price

Brand equity

Seasonality

Sales

Competition

- Seasonality
- Price - promotions, festivities, etc.
- Competitors pricing
- Brand equity

- We identified the **probable factors** driving price-based changes in sales

- We undertook research to **collect the necessary data**

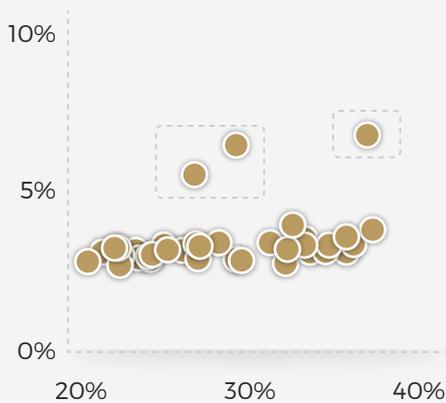- We cleaned & prepared the data to **handle outliers and missing values**

*The dependant variables for each scenario was decided based on the actual data.
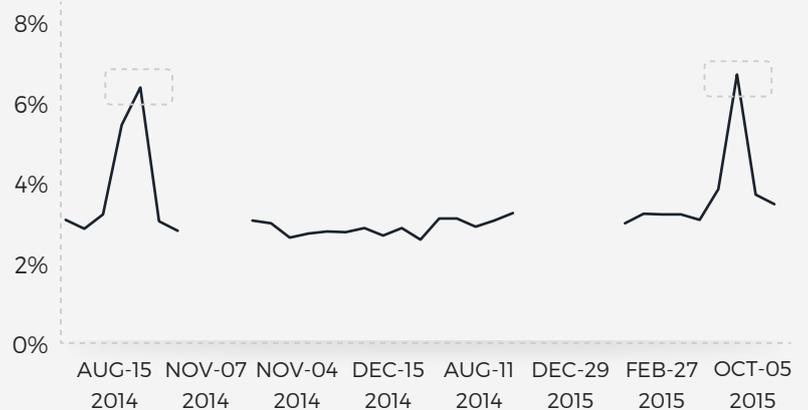
STEP 2: PRELIMINARY ANALYSIS

We checked for outliers and missing values in the data. Rolling data was incorporated as part of the data preparation process.

Remove outliers

Impute in case of missing values

4 weeks rolling data was considered

Week ending	Sales	Sales
31th January	1645	2887
28th February	1230	2875
28th March	1146	2376
25th April	890	2036
22nd May	1345	2235
19th June	1222	2567
16th July	1876	3098

- We studied and defined the **relationship between key variables**

- We studied trends to determine the **need for transformation**

- We looked out for **seasonality and other cyclical behaviour**

- We established **lead/lag** effects

*Outliers and missing values were handled depending on the nature of the data. A combination of moving average and historical values were used.

STEP 3: FORECASTING & VALIDATION

We used the ARIMAX forecasting process which included:

- Data preparation

- Identifying ARMA terms

- Evaluating X variables

- Forecasting and validation

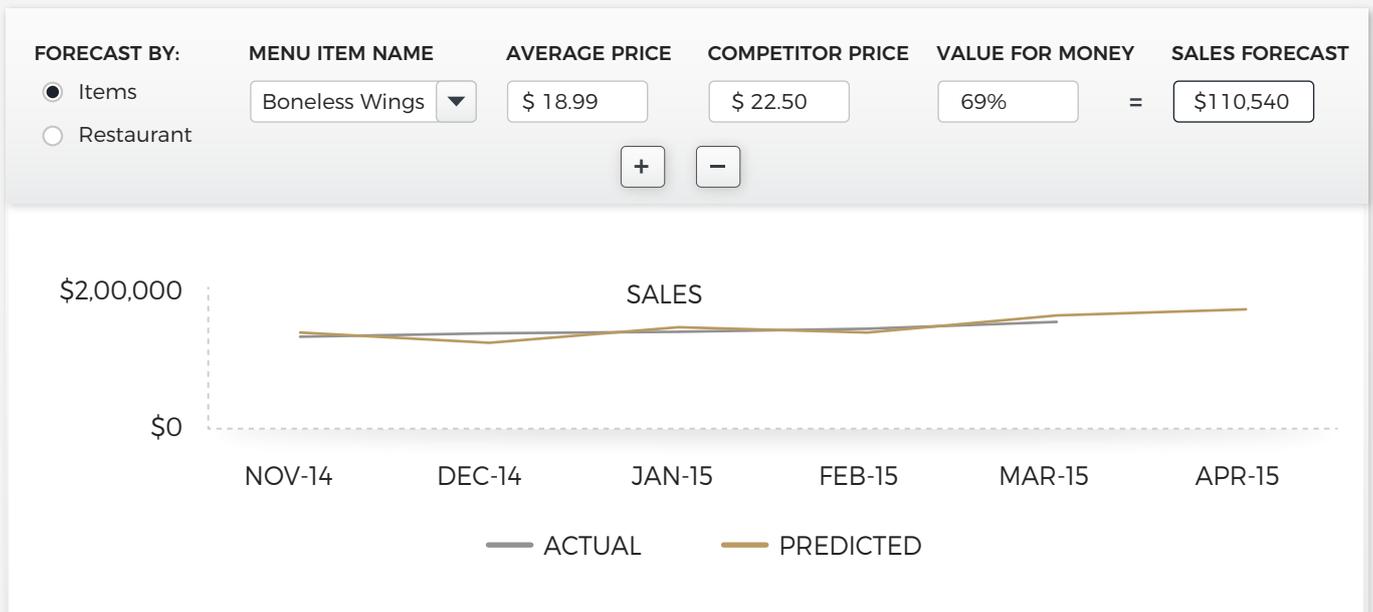A statistical technique was adopted to forecast price-based change in sales.

We validated the forecasted figures using metrics like MAPE (Mean Absolute Percentage Error).

STEP 4: BUILDING A FORECASTING TOOL

Users could input values for independent variables and determine the demand as illustrated below.

Sample simulator view for price of item X at all restaurant locations:

FORECAST BY:	MENU ITEM NAME	AVERAGE PRICE	COMPETITOR PRICE	VALUE FOR MONEY	SALES FORECAST
● Items	Boneless Wings ▼	$ 18.99	$ 22.50	69%	= $110,540
○ Restaurant					

[+] [−]

SALES

$2,00,000

$0

NOV-14   DEC-14   JAN-15   FEB-15   MAR-15   APR-15

—— ACTUAL   —— PREDICTED

After finalizing the models, a **simulator was developed.**

The simulator was used to forecast sales in different scenarios.

*By using such a simulator, a user could evaluate the impact a price change would have on sales.

THE CLIENT
BENEFIT

Our client was able to understand which items/restaurants were more price elastic so that positive/negative sales impact could be factored into pricing decisions.

Our client was able to predict the impact on sales with changed price/equity measures of themselves or competitors.

The price elasticity simulator enabled them to test various scenarios and make informed pricing decisions.

Analytics Quotient

Thank You

For any queries, get in touch with us.

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