



Case Brief

" "Greatest Aussie Groceries Pty Ltd"

Think Tank
2016

Sales Impact of Price Promotion Effects: Your Analysis & Managerial Recommendations

Greatest Aussie Groceries Pty Ltd (not their real name) is an iconic private Australian supermarket chain. They stock many kinds of fresh foods and grocery items in each of their **seven store locations** across Queensland. One year ago, the management of Greatest Aussie Groceries Pty Ltd decide to introduce two brands of freshly squeezed breakfast fruit juice into their stores to offer up for sale to their customers, alongside all of the existing ranges of grocery items.

Now, 52 weeks later, all of the weekly sales data for these two fruit juice brands, across all 7 stores, has been collected into a

data file, which has been provided along with this case brief. The data has been aggregated for each store, so that each observation denotes the sales of one UPC (universal product code) per week and store. The data cover sales in 7 stores, over 52 weeks, for 2 brands, with an organic and a non-organic juice option under each brand label. A number of other variables have also been recorded by Greatest Aussie Groceries Pty Ltd as they deemed them to be relevant.

This is quite a rich panel dataset. The data could be aggregated even more by adding sales across all stores to determine chain-wide sales per week etc. The dataset

has already been cleaned and simplified. The 2 brands are referred to as brand X and brand Y, and the UPC codes have been translated into brand names (**UPC_X** and **UPC_Y**). The organic versus nonorganic options for each brand have been added using **CLASS**. The dataset has also been arranged in the spreadsheet so that for each week and store there are 2 UPCs listed in each data row, one for brand X and one for brand Y (complete with unit prices and unit costs), for each format (size, flavor and class). This makes it easier to calculate the **cross-price elasticities of demand**.

The following variables have been included in the dataset.

STORE: identification of individual stores in which an observation was recorded

Hval_150: the percentage of real estate property in the so-called store trading area (i.e. the store neighbourhood) whose value exceeds \$150000

WEEK: the week in which an observation was recorded

OUNCES: package weight (number of liquid ounces per package)

UPC_X: universal product code for brand X item

deal_X: indicator/dummy variable of whether a UPC was price-promoted by brand X that week (takes on value 0 or 1)

feat_X: indicator/dummy variable of whether a UPC was advertised or put on in-store display by brand X that week (takes on value 0 or 1)

oz_X: the number of liquid ounces sold for a UPC by brand X (per week and store)

pack_X: the number of packs sold for a UPC by brand X (per week and store)

UPC_Y: universal product code for brand Y item

deal_Y: indicator/dummy variable of whether a UPC was price-promoted by brand Y that week (takes on value 0 or 1)

feat_Y: indicator/dummy variable of whether a UPC was advertised

or put on in-store display by brand Y that week (takes on value 0 or 1)

oz_Y: the number of liquid ounces sold for a UPC by brand Y (per week and store)

pack_Y: the number of packs sold for a UPC by brand Y (per week and store)

px: the retail price per liquid ounce for a UPC by brand X (per week and store) in dollars

py: the retail price per liquid ounce for a UPC by brand Y (per week and store) in dollars

cx: the retailers cost (i.e. the manufacturer price) per liquid ounce for a UPC by brand X (per week and store) in dollars

cy: the retailers cost (i.e. the manufacturer price) per liquid ounce for a UPC by brand Y (per week and store) in dollars

class: classification as organic versus inorganic fruit juice

YOUR TASK AS CONSULTANTS:

Your clientele is the management of Greatest Aussie Groceries Pty Ltd. They have brought you in as consultants because they wish to understand what they can do to improve their profits. They would like to know **(1)** the breakdown of their *profits* and *sales performance* from this past year, **(2)** whether the *marketing price-promotions* (*special bargain deals*) run this year *made a significant difference compared to when they were not run*, **(3)** whether *featuring the juices prominently in-store made a significant difference compared to*

when this was not done, and **(4)** what they should do next year in terms of *bargains, advertising, and raising or lowering the selling price (and by how much?) to maximize or at least increase profits*. **OPTIONAL CHALLENGE:** **(5)** Show the *profits that could be achieved next year* by following your recommendations, under the assumption that the economic operating environment and the consumer preferences are unchanged from this year.

You must prepare a **slide deck** for a ten-minute presentation to the management of Greatest Aussie Groceries Pty Ltd. This slide deck and your presentation of it should outline key findings from the data using clear and appropriate diagrams, graphs and tables, and integrate these seamlessly into a well-constructed argument that builds towards your solution – the economic pricing and marketing strategy you are recommending to management based on your analysis of the operational data from the past year.

The management team will have 5 minutes to ask your questions after your presentation, so be prepared to more fully explain your approach!

HAVE FUN!

TECHNICAL POINTERS TO HELP START YOU OFF

Aggregate constant price elasticity of demand for **regular** and **promotional** prices for each of the two brands (you can follow the same process here for in-store feature advertising).

Note that a promotional price is indicated by **deal_X** or **deal_Y=1** and a regular price by **deal_X** or **deal_Y=0**.

"Constant" means that you estimate a non-linear demand curve such that at each point of the curve, the elasticity is the same. [note that for linear demand curves, the price elasticity of demand changes as you move along the curve; if you remember from introductory microeconomics]. Beyond these fancy terms, this is just another regression analysis like the ones you would have done many times before in an introductory statistics or econometrics class.

You should probably use a log-log regression model, regressing the natural log of sales on the natural log of price. This will "linearise" a non-linear demand function.

So you first take the natural log of **oz_X** or **oz_Y** and the natural log of **p_x** or **p_y**, which means you will first transform the variables in the data file using the natural log "ln".

The reason why we suggest using the log-log model is that it takes what in reality is a curved (due to diminishing marginal utility) demand function and makes it linear for the purpose of analysis. This is statistically convenient, because it can be shown that the regression parameter for the independent variable $\ln(p_x)$ or $\ln(p_y)$ is a constant elasticity, indicating by what percentage the dependent variable "sales" (i.e. demand, or **oz_X** or **oz_Y**) changes in response to a one-percent change in price (let's not worry about the mathematical derivation of this here). Remember, the price elasticity of demand is defined as the percent change in demand divided by the percent change in price. [note that your elasticity estimates depend on the prices charged by competing brands and would change when these prices change.]

The simplest regression you could run is $\ln(\text{oz_X}) = \alpha + \beta \cdot \ln(p_x) + \epsilon$

And $\ln(\text{oz_Y}) = \alpha + \beta \cdot \ln(p_y) + \epsilon$

What are the constant price elasticities of demand (for all prices) of each of the two brands?

How could you then determine if regular and promotional prices have different elasticities? What would you alter in the above regressions?

To determine if the elasticities are statistically different for each of the two brands, think about how to include the variable **deal_X** or **deal_Y** in the regression.

You could use Excel's Data Analysis Tool pack to do all of the necessary analysis for this case, or alternatively you could use another program of your choice (e.g. Stata or Eviews).

USEFUL LINKS FOR READING

[https://en.wikipedia.org/wiki/Elasticity_\(economics\)](https://en.wikipedia.org/wiki/Elasticity_(economics))

https://en.wikipedia.org/wiki/Price_elasticity_of_demand (take note of the material on total revenue, constant elasticity, optimal pricing and profit-maximisation – this relates to point 4 of your consulting task)

https://en.wikipedia.org/wiki/Cross_elasticity_of_demand

ADVICE ON PREPARING YOUR SLIDE DECK

<http://www.consultantsmind.com/tag/presentation/>

<https://drive.google.com/file/d/oB6tKbHSWGslJLTNLbW5ST3RHM3c/view?usp=sharing> (66 page advanced guide to business presentations)