Wacaha

Pricing and Retail Analytics

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1 Technical section

This is where your technical material should go. You might start by reading in the data.

1.1 Data setup

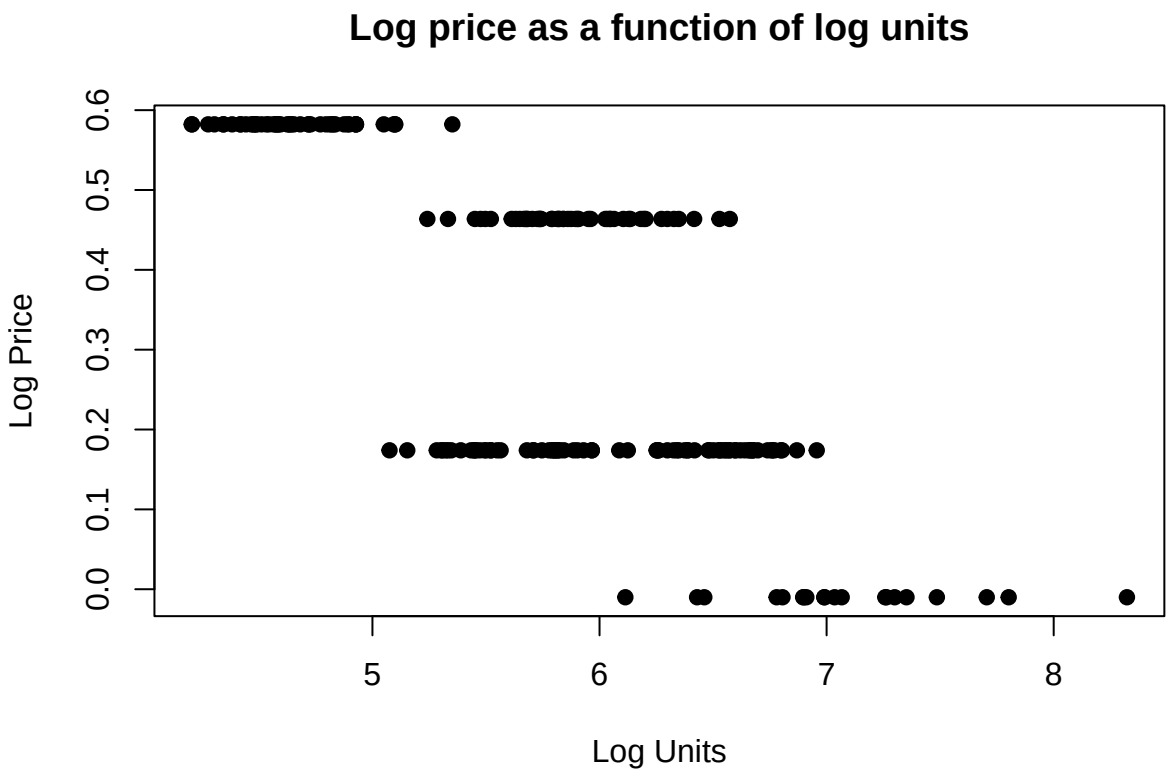
```
# Read in the data
df <- read_excel("small_salsa.xlsx")

# Create logged prices and quantities
df <- df %>%
  mutate(ln_p = log(price),
         ln_q = log(units),
         Dholiday = factor(holiday),
         Dstore = factor(store),
         Dzone= factor(zone))
```

1.2 Data Exploration

```
#plot price versus units
plot(df$price, df$units,main="Units as a function of price",xlab="Price",ylab="Units",pc
```


```
plot(df$ln_q,df$ln_p,main="Log price as a function of log units",xlab="Log Units",ylab="
```



1.3 Correlation

```
corr.test(df %>% select(price, pop, units, holiday))
```

```
Call:corr.test(x = df %>% select(price, pop, units, holiday))
Correlation matrix
        price   pop units holiday
price    1.00 -0.17 -0.61   -0.50
pop     -0.17  1.00  0.45    0.00
units   -0.61  0.45  1.00    0.67
holiday -0.50  0.00  0.67    1.00
Sample Size
[1] 200
Probability values (Entries above the diagonal are adjusted for multiple tests.)
        price  pop units holiday
price    0.00 0.03     0       0
pop      0.02 0.00     0       1
units    0.00 0.00     0       0
holiday  0.00 1.00     0       0
```

```
 To see confidence intervals of the correlations, print with the short=FALSE option
```

1.4 Regression

```
reg1 <- lm(ln_q ~ ln_p + Dzone + Dholiday, data=df)
summary(reg1)
```

```

Call:
lm(formula = ln_q ~ ln_p + Dzone + Dholiday, data = df)

Residuals:
     Min       1Q   Median       3Q      Max
-0.63263 -0.19428 -0.02146  0.18465  0.76698

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.96265    0.04703 148.058  < 2e-16 ***
ln_p        -2.34677    0.11293 -20.780  < 2e-16 ***
Dzone2      -0.92446    0.03835 -24.108  < 2e-16 ***
Dholiday1    0.56942    0.07604   7.489 2.32e-12 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.267 on 196 degrees of freedom
Multiple R-squared:  0.8998,    Adjusted R-squared:  0.8983
F-statistic: 586.9 on 3 and 196 DF,  p-value: < 2.2e-16
```

The regression indicates that the price elasticity is -2.347.

1.5 Regression Calculation for Zone 1

```
reg2 <- lm(ln_q ~ ln_p + Dholiday, data=df %>% filter(Dzone==1))
summary(reg2)
```

```

Call:
lm(formula = ln_q ~ ln_p + Dholiday, data = df %>% filter(Dzone ==
    1))

Residuals:
```

```
     Min       1Q   Median       3Q      Max
-0.65367 -0.18896 -0.01899  0.15606  0.87123

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.94964    0.07245  95.926  < 2e-16 ***
ln_p        -2.27334    0.19871 -11.440  < 2e-16 ***
Dholiday1    0.47892    0.11352   4.219 5.53e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2715 on 97 degrees of freedom
Multiple R-squared:  0.7706,    Adjusted R-squared:  0.7658
F-statistic: 162.9 on 2 and 97 DF,  p-value: < 2.2e-16
```

The regression indicates that the price elasticity for Zone 1 is -2.273.

1.6 Regression Calculation for Zone 2

```
reg3 <- lm(ln_q ~ ln_p + Dholiday, data=df %>% filter(Dzone==2))
summary(reg3)
```

```
Call:
lm(formula = ln_q ~ ln_p + Dholiday, data = df %>% filter(Dzone ==
    2))

Residuals:
     Min       1Q   Median       3Q      Max
-0.62176 -0.17960 -0.01737  0.18030  0.69492

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.03401    0.06075  99.325  < 2e-16 ***
ln_p        -2.36523    0.13525 -17.488  < 2e-16 ***
Dholiday1    0.67766    0.10303   6.577 2.43e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2603 on 97 degrees of freedom
Multiple R-squared:  0.8731,    Adjusted R-squared:  0.8705
F-statistic: 333.6 on 2 and 97 DF,  p-value: < 2.2e-16
```

The regression indicates that the price elasticity for Zone 2 is -2.365.

1.7 Population Regression Calculation for Zone 1

```
reg4 <- lm(ln_q ~ ln_p + pop, data=df %>% filter(Dzone==1))
summary(reg4)
```

```
Call:
lm(formula = ln_q ~ ln_p + pop, data = df %>% filter(Dzone ==
    1))

Residuals:
    Min      1Q  Median      3Q     Max
-0.6605 -0.1797 -0.0380  0.1585  1.0998

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   5.5930     0.8907   6.279 9.61e-09 ***
ln_p         -2.7796     0.1696 -16.385  < 2e-16 ***
pop           0.2224     0.1270   1.751    0.083 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2907 on 97 degrees of freedom
Multiple R-squared:  0.7368,    Adjusted R-squared:  0.7314
F-statistic: 135.8 on 2 and 97 DF,  p-value: < 2.2e-16
```

The regression indicates that the price elasticity for Zone 1 is -2.78.

2 Managerial Discussion

In Scenario 1, the promotion price of £1.19, Tesco's trade budget is £1540 in zone 1 and £599 in zone 2 during an average week. This equates to a total weekly trade budget of £2139. If the promotion price is changed to £1.09 in scenario 2, the trade budget increases to £1880 in zone 1 and £736 in zone 2. The new total weekly trade budget increases to £2616. While scenario 2 require Wahaca to pay more money to Tesco in the scanbacks, it ends up being the more profitable option for Wahaca. The high elasticity of the salsa leads to large increases in quantity demanded with decreased prices. This increase in demand is sufficient to offset the decrease in price, as shown by the increase in total gross profit from £6009 to £6105. The issue with scenario 2, though, is Tesco is making less money than they did with the original promotion price. In the original promotion, Wahaca covered £0.21 of the £0.40 decrease with their scanback. In covering the majority of the scanback, Wahaca makes less money in promoted weeks under scenario 1 than they do during regular weeks. In the switch to a price of £1.09, Wahaca still pays £0.21 per item, but the price decrease is

now £0.50. This means that Tesco is stuck absorbing a larger percentage of the promotion, making the price change less profitable for them. If the scanback price were changed to £0.24 in scenario 2, Wahaca would still be making more money during a promotion week than a regular week, making it preferable to scenario 1 from their perspective. Additionally, the increase in the scanback would make the price change more profitable for Tesco as well. Given the fact that this salsa is new to the market, scenario 2 may also make more sense to push volume and increase market penetration.