Forecasting

Revenue maximization

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Introduction to choice models

Revenue maximization

Revenue

Supplier i

- Consider the supplier of alternative i in the market.
- The price offered to individual n is p_{in}.
- The expected revenue generated by individual n is

$$p_{in} P(i|x_n, p_{in}; \theta)$$

- The total expected revenue is therefore

$$\sum_{n=1}^{N} p_{in} P(i|x_n, p_{in}; \theta)$$

Revenue maximization

Solve the problem

$$\max_{p_{i1},\ldots,p_{iN}} \sum_{n=1}^{N} p_{in} P(i|x_n, p_{in}; \theta)$$

Notes

- In practice, prices are often the same for the population, of for large groups.
- It assumes that the rest of the market is not affected.
- In practice, it is likely that the competition will also adjust the prices

Illustrative example

Binary logit model

$$\begin{aligned} V_{in} &= \beta_{pn} p_{in} - 0.5 \\ V_{jn} &= \beta_{pn} p_{jn} \end{aligned}$$

so that

$$P_n(i|p_{in}, p_{jn}) = \frac{e^{\beta_{pn} p_{in} - 0.5}}{e^{\beta_{pn} p_{in} - 0.5} + e^{\beta_p p_{jn}}}$$

Two groups in the population

- Group 1: $\beta_{pn} = -2$, $N_1 = 600$
- Group 2: $\beta_{pn} = -0.1$, $N_2 = 400$

Assume that $p_{jn} = 2$, $\forall n$.

Illustrative example