4 Book Notes

Friday, February 5, 2021 9:04 AM

Estimating and Interpreting Approximations

It can be difficult to maximize profit w/ mult. curves

Fitting a Linear Demand Approximation w/ 2 Points

Example:

$P = \$4$ and $q = 60$ **or** $P = \$3$ and $q = 70$

Find $\frac{\Delta P}{\Delta q} = \frac{4-3}{60-70} = -.1 \rightarrow \Delta P = -.1\Delta q$

$(P-4) = -.1(q-60)$

$P = 4 - .1(q-60)$

$P = 10 - .1q$

$C = 5 + 2q \rightarrow \pi = (10 - .1q)q - 5 - 2q$

$\frac{d\pi}{dq} = 8 - .2q = 0 \rightarrow q = 40$

$P = 10 - .1(40) = 6 \rightarrow \pi = 6(40) - 5 - 2(40) = 155$

P may not be \$6 because we only know data from \$3 - \$4

Fitting a Log-linear demand approximation w/ 2 Points

$q_D = aP^b \rightarrow 3^d$

↳ scale coefficient of demand

Example

$P = \$3$ + $q = 60$ or $P = \$4$ + $q = 70$

$60 = a4^n$ $70 = a3^n$

$\frac{60}{70} = \frac{a4^n}{a3^n} \rightarrow \frac{6}{7} = \left(\frac{4}{3}\right)^n \rightarrow \ln\left(\frac{6}{7}\right) = n\ln\left(\frac{4}{3}\right) \rightarrow n = -.5358$

$60 = a4^{-.5358} \rightarrow a = 126.11$

$q = 126.11P^{-.5358}$

$P^* = \left(\frac{n}{1+n}\right)MC \rightarrow P^* = \left(\frac{-.536}{1-.536}\right)2 = -2.31$

$|-.5358| < 1$, raise price

Regression - Fitting the best approximation w/ many data points

$\hat{\ }$ = estimates

Lots of stuff about regression

Interactions

Interaction term is a new independent var that is the product of two or more other ind. vars.

Categorical or Dummy Variables

remove data contamination

Flexibility of Functional Form - Log and Other Transformations