BLP Notes

$$u_{ijt} = x_{jt}\beta_i - \alpha_i p_{jt} + \xi_{jt} + e_{ijt}$$

i - individual
j - good
t - market

- Estimating individual i's utility for consuming good j

x_{jt} - product characteristics
- same for all individuals, but each person cares differently
- β_i - how much this individual cares about characteristics

p_{jt} - price, similar to product characteristics
- α_i - how much individuals care about price

ξ_{jt} - unobserved characteristics, applies to all individuals

e_{ijt} - type I extreme value, individual preference shock

Take away - given my preference β_i, α_i and all available options, there is some prob of buying each good

- Adding new goods always adds welfare

- Individual coefficients random
  - $\bar{\beta}, \bar{\alpha}$ - how much average person cares

- β is a vector, $\bar{\beta}_i$ is the mean + ε_{ijt} random component

- we observe: aggregate market share for each good, prices of each good, characteristics of each good

- don't observe: ε_{ijt} which only varies across j, e_{ijt}

- want to measure $\bar{\alpha}$, $\bar{\beta}$, covariances

- "OLS" → "BLP OLS"
  - OLS moment condition w/in GMM: $E[Xe] = 0$
  - "IV" would mean estimate s.t. $E[Ze] = 0$

- Hessian - standard errors
- Numerical minimizer (of GMM criterion) - coefficients

- criterion function: $\min [S - s]$
  - S: observed market share
  - s: estimated market share
  - this approach not usually taken.

- criterion function: $\hat{\theta} = \underset{\theta}{\text{argmin}}\ w(\theta)' Z \phi^{-1} Z' w(\theta)$

This is what we use in PS3 for the IV case

- $w(\theta)$ - function of model parameters
- Z - instruments
- ϕ - consistent estimate of $E[Z'wwZ]$, weight matrix