Lab 8

Agenda

- Reminder: Exam 2 in class next Wednesday
  - Multinomial regression and prediction
  - Poisson regression
  - Quasi-Poisson and negative binomial models
  - A little bit on ZIP models
- Some time in class on Monday for review. Come with questions!

Class activity from last time

$$Price_{ij} = \beta_0 + \beta_1 Satisfaction_{ij} + u_i + \varepsilon_{ij}$$

fixed effects

u_i: random effect

$$u_i \overset{iid}{\sim} N(0, \sigma_u^2) \qquad \varepsilon_{ij} \overset{iid}{\sim} N(0, \sigma_\varepsilon^2)$$

where $Price_{ij}$ is the price of rental j in neighborhood i.

- $\widehat{\beta}_0 = 27.28$ ← (across neighborhoods) on average, we expect that the price of a rental with 0 satisfaction is \$27.28
- $\widehat{\beta}_1 = 14.81$

> How would I interpret $\widehat{\beta}_0$ and $\widehat{\beta}_1$?

For a given neighborhood, an increase of 1 point in overall satisfaction is associated with an increase of \$14.81 in rental price

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For a fixed neighborhood, an increase of 1 point in overall satisfaction is associated with an increase of $14.81 in rental price.

Class activity from last time

$$\rho_{group} = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_\varepsilon^2} = \frac{\text{variability between groups}}{\text{total variability}}$$

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$$u_i \overset{iid}{\sim} N(0, \sigma_u^2) \qquad \varepsilon_{ij} \overset{iid}{\sim} N(0, \sigma_\varepsilon^2)$$

where $Price_{ij}$ is the price of rental j in neighborhood i.

$$\hat{\rho}_{group} = \frac{\hat{\sigma}_u^2}{\hat{\sigma}_u^2 + \hat{\sigma}_\varepsilon^2} = \frac{1048}{1048 + 6762} = 0.134$$

> How do I interpret this estimated intra-class correlation?

About 13% of the variability in price is explained by differences in the average price between neighborhoods (after accounting for satisfaction)

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Practice with mixed effects models