

Discrete Response Model

Lecture 4

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Odds Ratio

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Because the log-odds are being modeled directly in a multinomial regression model, odds ratios are useful for interpreting an explanatory variable's relationship with the response.

Consider the model again of

$$\log(\pi_j/\pi_1) = \beta_{j0} + \beta_{j1}x \text{ for } j = 2, \dots, J$$

The odds of a **category j response vs. a category 1 response** are **$\exp(\beta_{j0} + \beta_{j1}x)$** . This directly leads to using odds ratios as a way to understand the explanatory variable in the model. Thus, **the odds of a category j vs. a category 1 response change by $e^{c\beta_{j1}}$ times for every c -unit increase in x .**

In a similar manner, we could also compare category j to j' ($j \neq j'$, $j > 1$, $j' > 1$):

$$e^{c(\beta_{j1} - \beta_{j'1})}$$

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