Binary Dependent Variable

GV 903 Week 16

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January 18, 2023

Binary Data

- A variable is binary if it only has two values, 0 or 1 ("No" or "Yes", etc.)
    - Did you vote or not?
    - Did a country adopt this new policy or not?
    - Did the war or protest end or not?

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- So we say, **a one-unit increase in X is associated with a three percentage point increase in the probability**.

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- By using OLS estimator, we assume linear trend in probabilities.

Generalized Linear Model

- A GLM equation looks like:

$$E(Y|X) = F(\beta_0 + \beta_1 X)$$

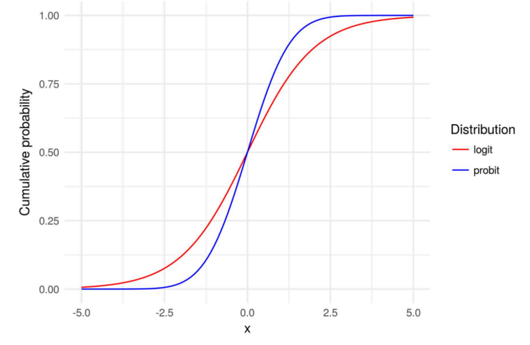
- Key difference:
    - **estimated by maximum likelihood**, rather than OLS.
    - **binomial distribution for binary data**, rather than normal distribution.
    - In R, **glm()**, rather than lm().

Probit vs. Logit

- Logit model is a form of a statistical model that is used to predict the probability of an event occurring
- Probit model is similar to logit model, but it determines the likelihood that an item or event will fall into one of a range of categories by estimating the probability that observation with specific features will belong to a particular category.
- So dependent variable for probit model can only take on **one of the two values, such as yes or no, true or false**.

Probit vs. Logit

Logit models are used to **model logistic distribution** while probit models are used to model the **cumulative standard normal distribution**.



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- So we convert them into odds-ratio by exponentiating: expo(coef(mode))

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    - predict(model, newdata, type="response")
    - And we write, **the predicted probability for the occurrence of an event is *****.