

Binary choice – 3.2 Apply the model on data

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Practice quiz.

You have estimated the parameters of the following mode choice model, involving two transportation modes (index n has been dropped for notational convenience):

$$U_{\text{bicycle}} = ASC_{\text{bicycle}} + \beta_{\text{distance}} \cdot \text{distance} + \varepsilon_{\text{bicycle}} \quad (1)$$

$$U_{\text{metro}} = ASC_{\text{metro}} + \beta_{\text{time}} \cdot \text{time}_{\text{metro}} + \beta_{\text{cost}} \cdot \text{cost}_{\text{metro}} + \varepsilon_{\text{metro}} \quad (2)$$

where distance is the distance of the trip in kilometers, $\text{cost}_{\text{metro}}$ is the cost in Swiss francs (CHF) of the trip by metro and $\text{time}_{\text{metro}}$ is the time in minutes of the trip by metro. $\varepsilon_{\text{bicycle}}$ and $\varepsilon_{\text{metro}}$ are random terms.

In order to estimate the model, one of the two alternative specific constants must be normalized to zero. Table 1 reports the estimated parameters for each normalization. However, it is incomplete. First, complete the second column of Table 1 corresponding to the normalization $ASC_{\text{metro}} = 0$.

Parameters	Normalization 1	Normalization 2
ASC_{bicycle}	0	
ASC_{metro}	3	0
β_{distance}	-0.8	
β_{time}	-0.5	
β_{cost}	-1	

Table 1: Estimated parameters

Perform the following tasks for a respondent with a trip of 10 kilometers that takes 20 minutes and costs 2.2 CHF by metro:

1. calculate the choice probabilities in the case of a logit model with the parameter estimates with normalization 1, and the scale parameter set to one,

2. calculate the choice probabilities in the case of a probit model with the parameter estimates with normalization 1, and the scale parameter set to one,
3. calculate the choice probabilities in the case of a logit model with the parameter estimates with normalization 2, and the scale parameter set to one,
4. calculate the choice probabilities in the case of a probit model with the parameter estimates with normalization 2, and the scale parameter set to one.