

Choice with multiple alternatives

Specification of the deterministic part

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Introduction to choice models



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Nonlinear specifications: data preprocessing

Behavioral motivation

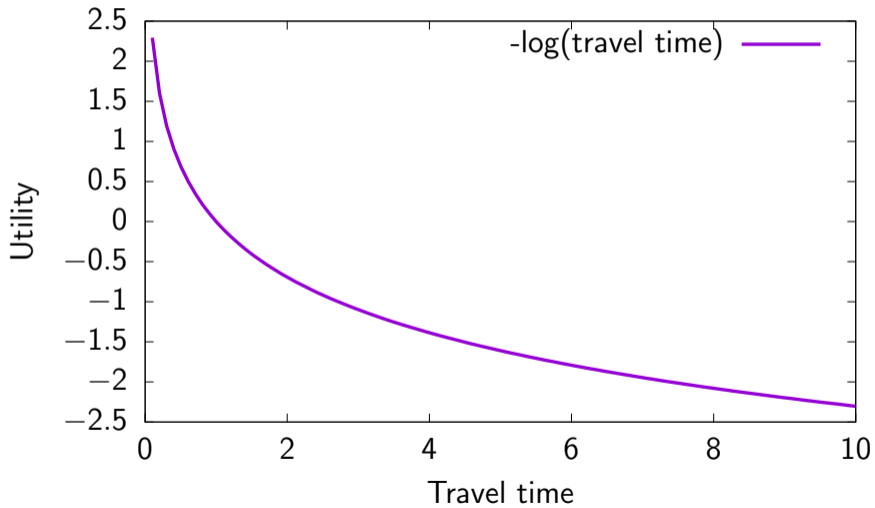
Example with travel time

- ▶ Compare a trip of 5 min with a trip of 10 min
- ▶ Compare a trip of 120 min with a trip of 125 min
- ▶ Utility difference: $\beta_T \times 5$ min, in both cases.

Behavioral assumption

One more minute of travel is not perceived the same way for short trips as for long trips

Behavioral motivation



Nonlinear transformations of the variables

Assumption 1: the marginal impact of travel time is constant

$$V_{in} = \beta_T \text{time}_{in} + \dots$$

Assumption 2: the marginal impact of travel time decreases with travel time

$$V_{in} = \beta_T \ln(\text{time}_{in}) + \dots$$

Remarks

- ▶ It is still a linear-in-parameters form
- ▶ The unit, the value, and the interpretation of β_T are different

Nonlinear transformations of the variables

Data can be preprocessed to account for nonlinearities

$$V_{in} = V(h(z_{in}, S_n)) = \sum_k \beta_k (h(z_{in}, S_n))_k$$

It is linear-in-parameter, even with h nonlinear.

Note

Interactions between attributes and socio-economic characteristics are a special case of h