

Filip Matějka and Alisdair McKay, Rational Inattention to Discrete Choices: A New Foundation for the Multinomial Logit Model

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We explore the behavior of an agent facing a discrete choice when information about the options is costly to acquire and process. For example, an employer is able to interview candidates for a job before selecting one to hire. In our setting, the decision maker (DM) processes information about the options in the manner that is optimal given the costs, which we model using the rational inattention framework introduced by (Sims2003, Sims2006).

Our findings are

- the DM chooses probabilistically with choice probabilities that follow a generalized multinomial logit model,
- if the DM views the options symmetrically *a priori*, then he chooses exactly according to the standard multinomial logit,
- our generalized logit model is not subject to Debreu's (1960) critique critique, which is now known as the red-bus-blue-bus problem,
- adding an option to the choice set can increase the probability that an existing option is selected.

The multinomial logit model is perhaps the most commonly used model of discrete choice (McFadden 2001). It is so widely used because it is particularly tractable both analytically and computationally and because it has a connection to consumer theory through a random utility model.

Our model is related to random utility models in the following way:

- it provides explicit foundation for the errors of perception (or preferences) interpretation of the multinomial logit without any distributional assumptions,
- the standard logit model is applicable in some cases, but in other cases the choice probabilities reflect the DM's a priori beliefs and attention allocation choices as well as the true values of the options.

The most important implications are:

- Interpretation of data on choices: under our interpretation of the logit model, an empirical estimate reflects both the values of the available options and the adjustments for prior knowledge and information processing strategies. These adjustments can confound the relationship between values and choice probabilities even when all individuals enter the choice situation with the same prior knowledge of the options.
- In addition to empirical applications, future theoretical work can build upon our results while still exploiting the tractability of the multinomial logit.