DIFFERENCE IN PROBABILITY WEIGHTING: A MANAGED LANE CHOICE APPLICATION #15-1553

Chao Huang, Ph.D., P.E., Transportation Engineer, C&M Associates, chaohuang1998@gmail.com
Mark Burris, Professor, Zachry Dept. of Civil Engineering, Texas A&M University, mburris@tamu.edu
Douglass Shaw, Professor, Dept. of Agricultural Economics, Texas A&M University, wdshawecon@gmail.com

Abstract

Using stated preference survey data pegged to data on a traveler’s most recent actual trip, this study predicts route choices. The model incorporates a probability weighting for risky travel times on a Houston, Texas freeway. The results indicate significant improvement in predictive power and confirm non-linearity in the probability weighting function.

The maximum willingness to pay (WTP) measures their objective probabilities. Age may serve to proxy the effects of more experience over time, or changing driving abilities, or changes in one’s sense of optimism or pessimism, or some difference in an innate sense of patience at different ages.

The parameter estimates indicate that the four age groups used four somewhat different weights to translate the objective occurrence of probability of faster or shorter travel times into perceived probability. This comparison suggests that travelers use different weights in probability weighting as they age. Significant estimates of γ and δ as people ages may imply a gradual adjustment of travelers’ attitude towards risk and objective probability. Respondents who are between 25 and 34 years old overestimate high probabilities and underweight low probabilities while older respondents generally underestimate high probabilities and overestimate low probabilities. Age may serve to proxy the effects of more experience over time, or changing driving abilities, or changes in one’s sense of optimism or pessimism, or some difference in an innate sense of patience at different ages.

Conclusions

Using stated preference survey data pegged to data on a traveler’s most recent actual trip, this study predicts route choices. The model incorporates a probability weighting for risky travel times on a Houston, Texas freeway. The results indicate significant improvement in predictive power and confirm non-linearity in the probability weighting function.

The maximum willingness to pay (WTP) measures their objective probabilities. Age may serve to proxy the effects of more experience over time, or changing driving abilities, or changes in one’s sense of optimism or pessimism, or some difference in an innate sense of patience at different ages.

The parameter estimates indicate that the four age groups used four somewhat different weights to translate the objective occurrence of probability of faster or shorter travel times into perceived probability. This comparison suggests that respondents use different weights in probability weighting as they age. Significant estimates of γ and δ as people ages may imply a gradual adjustment of travelers’ attitude towards risk and objective probability. Respondents who are between 25 and 34 years old overestimate high probabilities and underweight low probabilities while older respondents generally underestimate high probabilities and overestimate low probabilities. Age may serve to proxy the effects of more experience over time, or changing driving abilities, or changes in one’s sense of optimism or pessimism, or some difference in an innate sense of patience at different ages.

Acronyms

DA=Drive Alone, ML=Managed Lanes
DG=GDP, ML=Managed Lanes
TT=Travel Time, TV=Travel Time Variability
a=probability, ω= weighting function
ASC=Alternative Specific Coefficient

Data Collection, Discrete Choice Models & Results

Using stated preference survey data pegged to data on a traveler’s most recent actual trip, this study predicts route choices. The model incorporates a probability weighting for risky travel times on a Houston, Texas freeway. The results indicate significant improvement in predictive power and confirm non-linearity in the probability weighting function.

The maximum willingness to pay (WTP) measures their objective probabilities. Age may serve to proxy the effects of more experience over time, or changing driving abilities, or changes in one’s sense of optimism or pessimism, or some difference in an innate sense of patience at different ages.

The parameter estimates indicate that the four age groups used four somewhat different weights to translate the objective occurrence of probability of faster or shorter travel times into perceived probability. This comparison suggests that travelers use different weights in probability weighting as they age. Significant estimates of γ and δ as people ages may imply a gradual adjustment of travelers’ attitude towards risk and objective probability. Respondents who are between 25 and 34 years old overestimate high probabilities and underweight low probabilities while older respondents generally underestimate high probabilities and overestimate low probabilities. Age may serve to proxy the effects of more experience over time, or changing driving abilities, or changes in one’s sense of optimism or pessimism, or some difference in an innate sense of patience at different ages.

The parameter estimates indicate that the four age groups used four somewhat different weights to translate the objective occurrence of probability of faster or shorter travel times into perceived probability. This comparison suggests that respondents use different weights in probability weighting as they age. Significant estimates of γ and δ as people ages may imply a gradual adjustment of travelers’ attitude towards risk and objective probability. Respondents who are between 25 and 34 years old overestimate high probabilities and underweight low probabilities while older respondents generally underestimate high probabilities and overestimate low probabilities. Age may serve to proxy the effects of more experience over time, or changing driving abilities, or changes in one’s sense of optimism or pessimism, or some difference in an innate sense of patience at different ages.