The effect of attitudes on reference-dependent preferences: Estimation and validation for the case of alternative-fuel vehicles

Several recent studies in transportation have analysed how choices made by individuals are influenced by attitudes. Other studies have contributed to our understanding of apparently non-rational behaviour by examining how choices may reflect reference-dependent preferences. This paper examines how reference-dependent preferences and attitudes together may explain individual choices. In a modelling framework based on a hybrid choice model allowing for both concepts, we investigate how attitudes and reference-dependent preferences interact and how they affect willingness-to-pay measures and demand elasticities. Using a data set with stated choices among alternative-fuel vehicles, we see that allowing for reference-dependent preferences improves our ability to explain the stated choices in the data and that the attitude (appreciation of car features) explains part of the preference heterogeneity across individuals. The results indicate that individuals have reference-dependent preferences that could be explained by loss aversion and that these are indeed related to an individual's attitude towards car features. The models are validated using a large hold-out sample. This shows that the inclusion of attitudes improves the models' ability to explain behaviour in the hold-out sample. While neither reference-dependent preferences nor the attitude affect the average willingness-to-pay measures in our sample, their effect on choice behaviour has implications for policy recommendations as segments with varying attitudes and reference values will act differently when affected by policy instruments related to the demand for alternative-fuel vehicles, e.g. subsidies.

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