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Demand for plug-in electric vehicles across segments in the future vehicle market

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Abstract

The electrification of transport systems requires a change in the composition of the vehicle fleet towards higher shares of electric vehicles. A successful transition, however, depends on many factors of which some relate to purchase prices and vehicle features, while others relate to technology and charging infrastructure. This paper analyses the transition towards plug-in electric vehicles including both battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEV). The study is based on a recent national stated choice experiment in Denmark. As part of the experiment, attributes focusing on price aspects, charging infrastructure and vehicle features are included for relevant internal combustion engine vehicle (ICV), BEVs and PHEV alternatives. Based on these data, we estimate a mixed logit model for car purchase that allows for correlated random effects across fuel types and car segments as well as systematic heterogeneity.

The model thus includes a very detailed representation of type-specific attributes and we present related WTP measures and elasticities based on a calibrated model. We find large effects of access to home-charging, both when it comes to private home charging and the availability and distance to public chargers from home when a private parking place is not available. Price elasticities tend to dominate driving range elasticities. We find high within correlation between fuel types and between car segments. However, at the same time we also find evidence of correlations across fuel types and car segments, e.g. from a small ICV to a medium PEV. Such effects cannot be revealed from data where fuel types are analysed conditional on car segments, which has been the convention in previous studies.