

# Outside Data, Political Ideology, Micro-targeting, and Causal Inference

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The collective political ideology of a city is expected to exert pressure on the behavior of its populace. Specifically, this project proposes that the political ideology of a city influences the decision of its residents to purchase hybrid/alternative fuel vehicles. A propensity score and Mahalanobis distance matching algorithm was used to determine a causal relationship between the city's political ideology and the preference for residents to submit a lead for a hybrid or alternative fuel vehicles.

Data from this project comes from two sources. The American Ideology Project has compiled data from over 15,000 cities and assigned a rating from around -1 (liberal) to 1 (conservative) to each city. Data from Edmunds.com, including detailed information on targeted advertisements, access of site through mobile device, propensity to view the loan calculator, safety information, car price, and many other features were used as an indicator of an individual's interests, age, income, and any other factors that would influence the treatment assignment or the outcome measure.

The Mahalanobis distance and propensity score matching algorithm is described and citations are given in detail in "Multivariate and Propensity Score Matching Software with Automated Balance Optimization: The Matching package for R." *Journal of Statistical Software*, 42(7): 1-52. 2011. We make use of the Rubin causal model to derive the average treatment effect.

Results from the study indicated that individuals living in a conservative city were 1.8% (0.3%) less likely to submit a lead on a hybrid or alternative fuel car while controlling for all other factors through the expert matching algorithm (average treatment effect). Without matching, people living in conservative cities were 3.0% less likely to submit a lead for a hybrid or alternative fuel vehicle, which suggests that the matching algorithm is capable of accounting for factors such as ideological self-selection and other factors such as price and income.