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Price Discrimination and Market Access are not Barriers to Electric Vehicle Adoption by Low-Income Households

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Issue

Policymakers consider alternative fuel vehicles an important element of reducing urban air pollution, lowering carbon emissions and reducing overall petroleum consumption. Federal, state and local governments offer incentives to encourage consumer adoption of these vehicles. But adoption of these vehicles by African-American, Hispanic and low-income consumers has lagged behind the adoption by Asian, White and high-income consumers (see Figures 1 and 2)*. As a result, incentives have tended to accrue disproportionately towards high-income households¹.

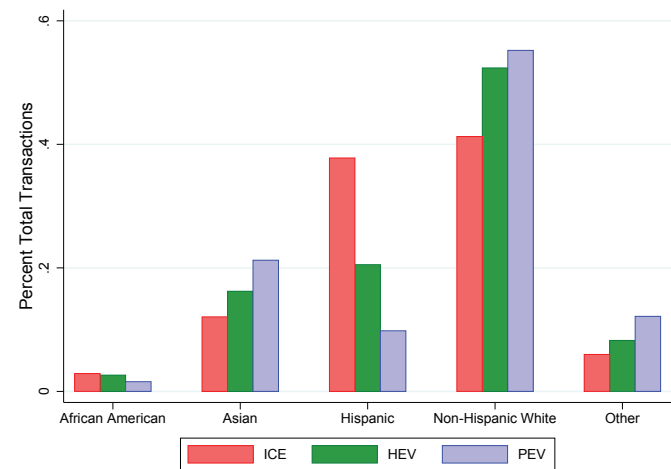


Figure 1 Purchase by Ethnicity

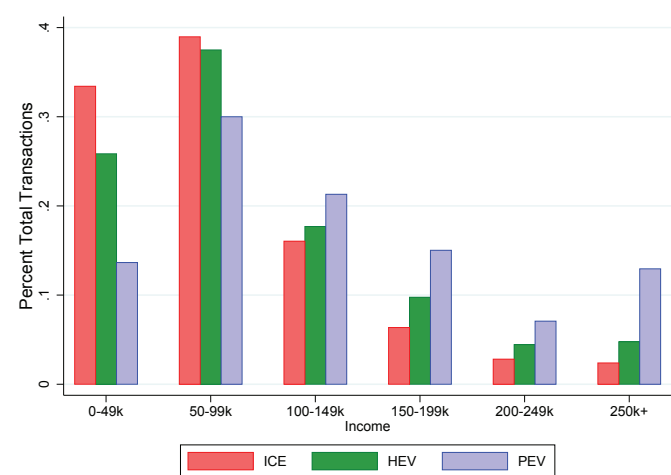


Figure 2 Purchase by Income

Understanding the low-rate of adoption for certain demographic groups is of particular interest to California – SB350 requires the California Air Resources Board to study barriers to zero-emission transportation options faced by low-income consumers. The Clean Vehicle Rebate Program (CVRP) and Enhanced Fleet Modernization Program (EMFP) target these groups by offering more lucrative tax incentives to low income consumers or consumers who live in disadvantaged communities.

Key Research Findings

Two commonly asserted barriers to EV adoption are: (1) price discrimination against low-income consumers and (2) limited selection of EVs at dealerships proximate to disadvantaged communities. To understand the relevance of these barriers, we analyzed over 400,000 California vehicle sales between 2012 and 2015, including information on the price paid by the consumer, the location of the dealership, the zip code of the buyer and buyer demographic characteristics (e.g., race, gender, income, age) for each transaction. Key findings from this analysis are as follows:

Low-income, Hispanic customers do not seem to face higher prices when negotiating a plug-in electric vehicle (PEV) – if anything, these customers purchase PEVs at a slight discount compared to high-income, non-Hispanic white customers. First, we calculate how much more (or less) a particular demographic group paid relative to the average price paid all vehicles of the same make, model, model-year and trim. The left panel of Figure 3 displays the average price premium for internal combustion engine (ICE – in red) vehicles and electric vehicles (PEVs – in blue) paid by Hispanic customers at different household income levels. The right panel displays the analogous information for non-Hispanic white customers. Values greater than zero mean that the group paid higher prices than the average customer, while values lower than zero mean that the group paid lower prices than the average customer.

*Note that these figures reflect the proportions in our dataset, which is a non-random subsample of the California vehicle population. Therefore they should not be interpreted as representative of the California population.

¹ Borenstein, S. and L. Davis (2016). "The Distributional Effects of U.S. Clean Energy Tax Credits," NBER Tax Policy and the Economy, 30(1), 191-234.

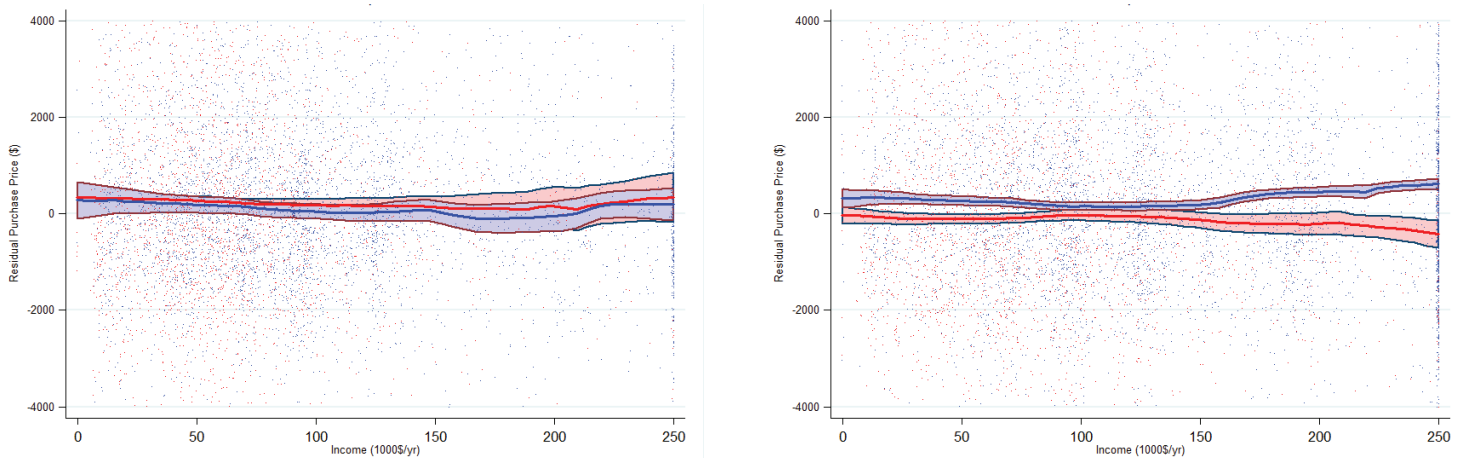


Figure 3. Average price premium for internal combustion engine (ICE – in red) vehicles and plug-in electric vehicles (PEVs – in blue) paid by Hispanic customers (on left) and non-white customers (on right) at different household income levels

Local availability of alternative fuel vehicles does not explain the gap in adoption by low-income customers If local dealerships in disadvantaged communities do not have sufficient supply of alternative fuel vehicles, we would expect that consumers in these communities who purchase alternative fuel vehicles would have to travel relatively further to make the purchase. To test this assumption, we calculate the average distance traveled by a new car buyer from their home to the dealership at which they purchased a new PEV (in blue) or ICE (in red) (Figure 4). The average distances are quite comparable across demographic groups and income brackets. We do not find significant differences in the distance traveled by demographic group or income.

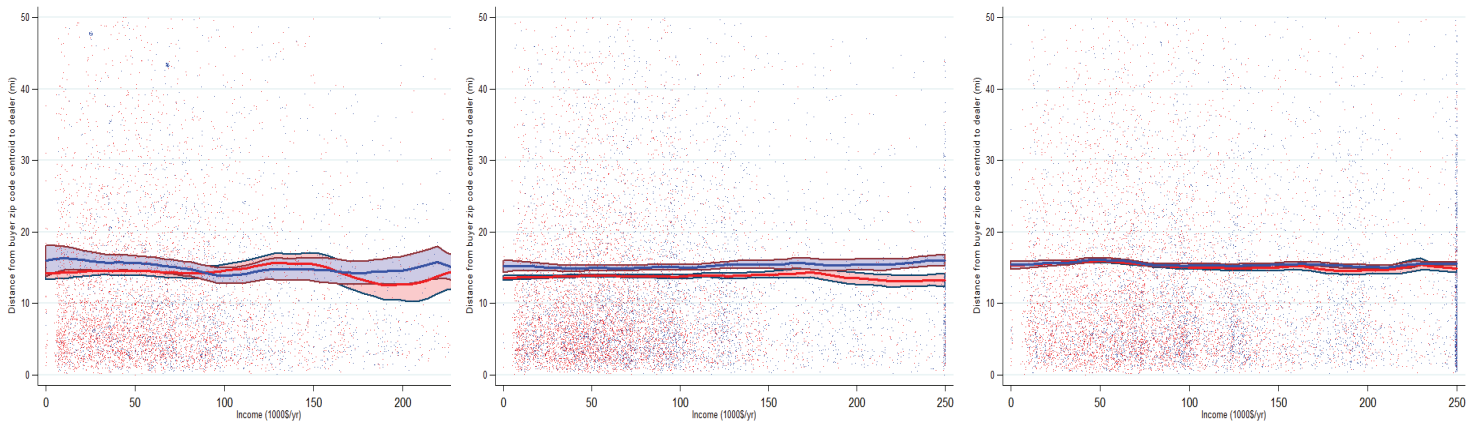


Figure 4. Average distance traveled by a new African American car buyer (left), Hispanic car buyer (middle), and Non-Hispanic car buyer (right) from their home to the dealership at which they purchased a new PEV (in blue) or ICE (in red) by Hispanic customers (on left) and non-white customers (on right) at different household income levels

Conclusion

Our findings suggest that price discrimination and market access are not limiting adoption amongst these groups. The low rates of adoption we observe are likely to be a result of differences in preferences. Nonetheless, investments through the Low Carbon Transportation funds, including the CVRP and the EFMP, may help to increase adoption levels, and evaluating the effects of these is an important area of future research.

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