

Electric Vehicle Subsidies: Cost-Effectiveness and Emission Reductions

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Abstract

This paper studies the impact of the Roulez Vert program, which subsidized new purchases of electric vehicles in the province of Quebec, Canada. I study the impact of the program on sales, firms' pricing behavior, and charging station deployment, and estimate the marginal cost of avoiding carbon emissions using subsidies. To evaluate the impact of subsidies, I rely on a structural model in which demand follows a nested logit specification and supply is determined by multi-product firms competing on prices. I augment the model to incorporate charging station deployment. Specifically, I allow for county-level governments to choose where and how many stations to install in their region to provide charging capacity to electric vehicle owners. I find that the program explains 45% of electric vehicle sales and 26% of charging stations installed between 2012 and 2018. Taking into account gains to consumer surplus, I estimate the marginal abatement cost to be \$340 per ton of CO₂, well above conventional estimates of the social cost of carbon emissions. Part of the reason behind this high estimated cost is that more than half of the subsidies went to infra-marginal consumers and would have purchased an electric vehicle whether or not subsidies are available. Additionally, my results suggest that only 43% of the additional hybrid and electric vehicles sales generated by the program are replacing fuel vehicle sales which limits carbon emission savings.