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Title: Effectiveness of China's Plug-in Electric Vehicle Subsidy

Abstract: China, the world's largest emitter of carbon dioxide, has announced ambitious climate goals in recent years. These include reducing carbon intensity of GDP by 40-45 percent of 2005 levels by 2020 and by 60-65 percent of 2005 levels by 2030. One component of China's overall plan to reduce carbon emissions is its "New Energy Vehicle Policy," a multi-pronged policy to increase the share of battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell vehicles. Since 2009, plug-in electric vehicles (PEVs, which include BEVs and PHEVs) qualify for substantial rebates (up to US$9,000) from both the central and local governments. Furthermore, in several big cities such as Shanghai and Shenzhen, PEVs are exempt from new vehicle registration lotteries and fees. These policies have led to significant PEV market share growth in recent years, with PEVs consisting of 2.5% new vehicle sales in 2017. Despite China's ambitious goal to have five million New Energy Vehicles (NEVs) on the road by 2020, there is uncertainty over the future of the subsidy program. This paper explores the impact of these subsidies with the aim of assisting the policy discussion, especially in the face of future program uncertainty. A vehicle choice model is estimated using a large, random survey sample of new vehicle purchases in China. The estimation results are used to predict PEV sales if subsidies were eliminated and if subsidies were targeted towards low income consumers. Findings suggest that PEVs have improved China's new vehicle fleet fuel economy by roughly 2%, reducing total gasoline consumption by roughly 6.66 billion liters. However, the current PEV subsidy is expensive, costing $1.90 per liter of gasoline reduction. This is due to a large number of non-additional PEV buyers, particularly high income consumers, who would have purchased the PEV regardless of the subsidy. Eliminating the subsidy for high income consumers and increasing it for low income consumers could result in a substantially lower cost per additional PEV ($13,758 versus $24,506). This would allow for greater PEV adoption (3.11% versus 2.47% market share) for the same budget.