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The Impact of Recent Changes to China's Plug-In Electric Vehicle Subsidy Design

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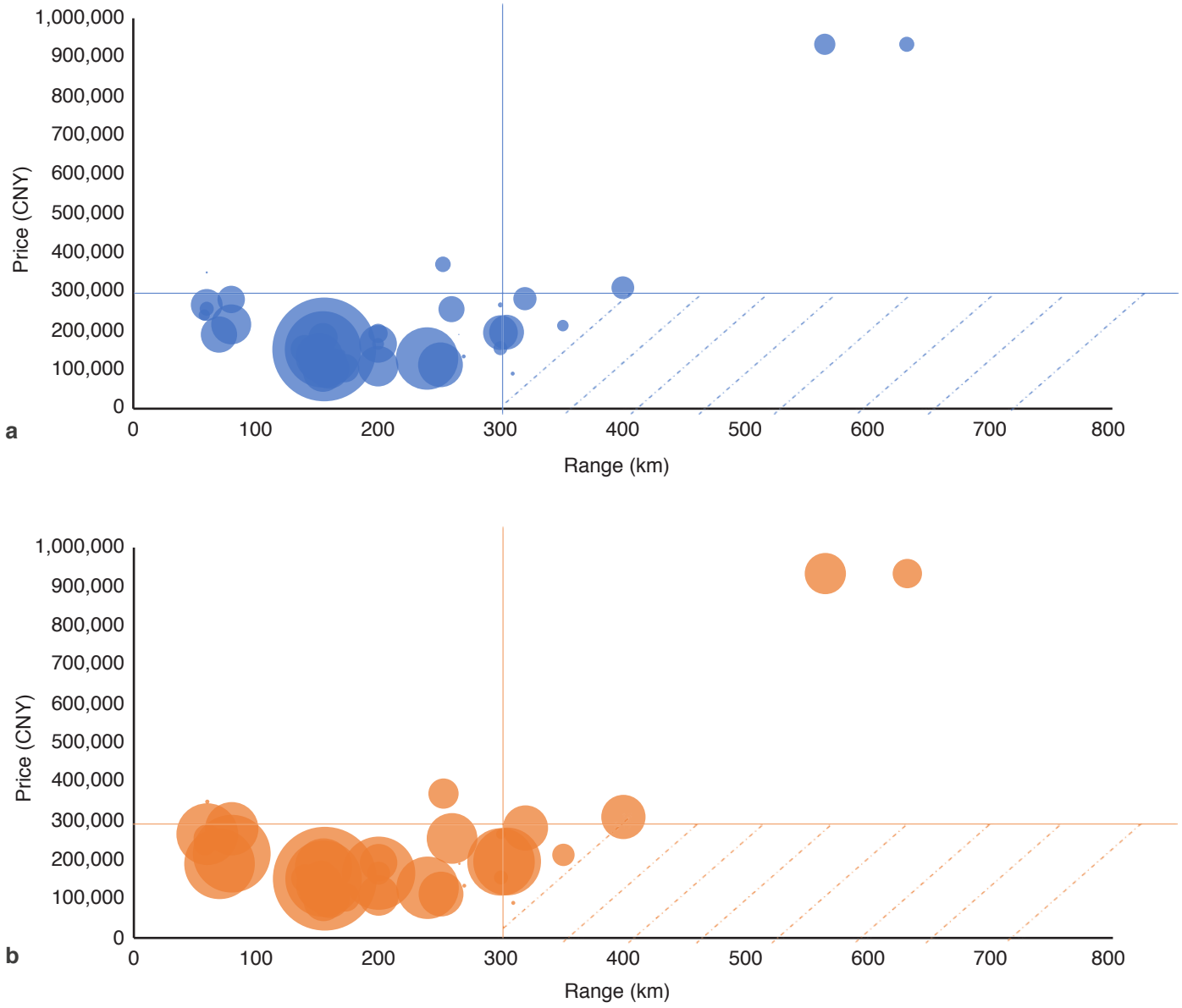
Subsidies that promote plug-in electric vehicle (PEV) adoption have been a key component of China's overall plan for reducing local air pollution and the greenhouse gas emissions from its light-duty vehicle sector. Since 2009, PEVs qualify for substantial rebates (up to US$9,000) from both the central and local Chinese governments (International Council on Clean Transportation 2017; Hancock 2019). However, PEV subsidies were cut by almost 50% from June 2019 onward, and China had plans to eliminate the subsidies in 2020 (Hancock 2019; Kharpal 2019).

A recent KAPSARC paper published in *Energy Economics* simulated the potential impact of China's subsidy reduction in 2019 (Sheldon and Dua 2020). Our simulation results suggested that the annual PEV market share in China would have declined by 21% had the subsidy been halved without any countervailing measures. Indeed, media reports indicated a drop in monthly PEV sales of 50% following the subsidy cuts, even before the impact of the COVID-19 pandemic hurt consumption (Shepherd 2019a, 2019b; Moss 2019; Shane 2019). Given the negative impact of the 2019 subsidy cut and the slump in new car sales during the COVID-19 pandemic, the Chinese government decided to postpone its subsidy elimination plans until 2022 (Randall 2020). The government decided to reduce the subsidy by 10% in 2020 from its 2019 levels. Furthermore, no subsidies would be given to PEVs with ranges of below 300 kilometers (km) per charge, an increase from the 250 km per charge limit in 2019. In addition, a vehicle price cap was also imposed, with only PEVs priced below 300,000 Chinese yuan (CNY) qualifying for the subsidy.

We used a vehicle choice model of new vehicle buyers in China, using 2017 data, to investigate the impact of the recent changes in China's PEV subsidy program. We also simulated the PEV market share if the revised subsidy budget was targeted to PEVs below a certain price or to low-income consumers only. This replicates the targeted subsidy design program used in California (Sheldon and Dua 2019) and other jurisdictions.

Our simulation results suggest that without any countervailing measures, the PEV market share in China would have declined by 14.3% had the subsidy been eliminated in 2020 (as originally planned) relative to the new subsidy design case. Using the same budget as the new 2020 subsidy design, had no PEV subsidies been given to vehicles priced below 157,000 CNY, the PEV market share would have increased by only 2.5% relative to the new 2020 subsidy design case. The low impact of the vehicle price-based targeted subsidy design is due to the limitation of subsidies for PEVs with ranges of below 300 km, on the basis that PEVs with lower ranges also have lower prices. These lower-priced cars are usually purchased by lower-income consumers who are more likely to be influenced by subsidies, as highlighted in Figure 1. Since the new subsidy design limits subsidies for lower-range PEVs, even a targeted subsidy design is unlikely to make much of an impact. Policymakers implement range-based subsidy constraints to promote the adoption of high-range PEVs, encouraging 'economies of scale' in the production of larger batteries.

Figure 1. Variation of PEV price (before subsidy) with PEV range for (a) low-income consumers and (b) for high-income consumers.



Source: KAPSARC analysis.
Note: Only the vehicles in the shaded-in region are eligible for subsidy as per the new 2020 subsidy design. The sizes of the bubbles are proportional to PEV sales.

Given the range constraint, the only other alternative for improving the impact of the subsidy program is to combine vehicle price-based subsidy targeting with income-based subsidy targeting. Our simulation results suggest that, even with the combined targeted approach, the PEV market share would only have increased by 5.7% relative to the new 2020 subsidy design. In summary, our findings suggest that targeted subsidy designs have very limited scope for improving the impact of China's PEV subsidy policy, given its aggressive range-based subsidy constraints.

References

Hancock, Tom. 2019. “Bankruptcies and slowdown hang over China’s electric car market.” *Financial Times*, June 13. https://www.ft.com/content/1ed039c8-7e14-11e9-81d2-f785092ab560.

International Council on Clean Transportation. 2017. “Adjustment to subsidies for new energy vehicles in China.” https://theicct.org/publications/adjustment-subsidies-new-energy-vehicles-china.

Kharpal, Arjun. 2019. “As China cuts support for its electric carmakers, auto firms could face a ‘war of attrition.’” CNBC, June 19. https://www.cnbc.com/2019/06/19/china-subsidy-cuts-for-electric-carmakers-could-lead-to-consolidation.html.

Moss, Trefor. 2019. “China Slips in Its Rush to Embrace Electric Vehicles.” *Wall Street Journal*, September 26. https://www.wsj.com/articles/china-slips-in-its-rush-to-embrace-electric-vehicles-11569497436.

Randall, Chris. 2020. “China to extend EV subsidies.” Electrive.com, April 1. https://www.electrive.com/2020/04/01/china-considers-extending-ev-subsidies/.

Shane, Daniel. 2019 “China clean energy car slowdown deepens.” *Financial Times*, November 11. https://www.ft.com/content/bd328c9a-0462-11ea-a984-fbbacad9e7dd.

Sheldon, Tamara L., and Rubal Dua. 2020. “Effectiveness of China’s Plug-in Electric Vehicle Subsidy.” *Energy Economics* no. 88:104773. doi: https://doi.org/10.1016/j.eneco.2019.104545.

Shepherd, Christian. 2019a. “China new energy vehicle sales decline for first time in 2 years.” *Financial Times*, August 12. https://www.ft.com/content/3b67a79a-bcdc-11e9-b350-db00d509634e.

Shepherd, Christian. 2019b. “China new energy vehicle sales drop 34%.” *Financial Times*, October 14. https://www.ft.com/content/adeb6c18-ee53-11e9-bfa4-b25f11f42901.

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