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King Abdullah Petroleum Studies and Research Center

Commentary

Responsiveness of Saudi New Vehicle Fleet Fuel Economy to Fuel and Vehicle Price Policy Levers

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The Kingdom of Saudi Arabia is the largest oil exporting country and historically had one of the highest levels of total oil consumption per capita – 44 barrels per year compared with 27 in the U.S. and 10 in the European Union (Blazquez et al. 2020). Low fuel prices and low average vehicle fleet fuel economy were considered as the major reasons for the high transportation energy consumption of roughly ~9 barrels per year per capita (SEEC 2018). Despite being a developing economy, the average new light-duty vehicle fleet fuel economy in Saudi Arabia in 2012 was among the lowest in the world, even lower than some major developed economies with low fuel prices, like the U.S. (SEEC 2018).

Since then, the Saudi government has implemented several policies to slow the growth of, or even reduce, its on-road motor gasoline consumption. These include demand-side policies such as raising fuel prices and supply-side policies such as the fuel economy standards (SASO and SEEC 2014). In fact, Saudi Arabia is among the first oil-exporting countries in the Middle East and North Africa (MENA) region to have attempted to drastically improve its fleet fuel efficiency. Understanding policy effectiveness in Saudi Arabia could therefore inform broader strategies for oil-exporting countries, especially in the MENA region, that have traditionally had lower gasoline prices. These countries might be considering supply-side policies to improve their new vehicle fleet fuel economy.

This commentary highlights the extent to which these policies have been effective in improving the Saudi new vehicle fleet fuel economy. In particular, it presents the findings from a recent KAPSARC paper published in *Energy Economics* that explored the impact of fuel- and vehicle price-related policies on Saudi Arabia's new vehicle fleet fuel economy (Sheldon and Dua 2020).

The findings were obtained by simulating counterfactual policy scenarios using vehicle choice models, estimated on both aggregate new vehicle sales data and disaggregate new vehicle buyer survey data. Several findings of interest to policymakers were obtained from the counterfactual policy scenario simulations.

The responsiveness of Saudi new vehicle fleet fuel economy to changes in fuel prices is three to seven times higher than for the U.S. new vehicle fleet

Increasing domestic transport fuel prices was postulated as a useful policy lever for improving the new-vehicle fleet fuel economy. Given that Saudi Arabia is a developing economy, the expectation was that raising fuel prices would drive a significant increase in average new vehicle fleet fuel economy. On a relative level, the paper found evidence that the responsiveness of Saudi new vehicle fleet fuel economy to changes in fuel prices is three to seven times higher than for the U.S. new vehicle fleet. However, on an absolute level, the elasticity of the new vehicle fleet fuel economy to changes in fuel prices was still fairly low (0.16). It is worth noting that, despite being classified as a developing economy, on a per capita gross national income (GNI) basis, Saudi Arabia is considered a high-income economy (United Nations 2014), which could be one of the reasons for the low elasticity value. The low elasticity values further warrant additional policy instruments such as fuel economy standards.

However, the low absolute value of elasticity weakens the argument that the Saudi fuel economy standards should be loosened (relative to the U.S.) due to the Kingdom's traditionally lower domestic fuel prices. Some stakeholders, particularly automakers, could argue for a loosening of the standards (relative to the U.S.) on the grounds that the Kingdom's lower domestic fuel prices make it harder to encourage consumers to consider higher fuel economy options. However, given that fuel prices appear to be a relatively weak driver of new vehicle fleet fuel economy improvements, this argument is not convincing. That being said, lower fuel prices could reduce the benefits derived from implementing fuel economy standards.

The paper also showed that the increase in domestic Saudi gasoline prices between 2014 and 2016 accounted for 42% of the increase in the estimated new vehicle fleet fuel economy during that period. The rest of the increase was attributed to changes in improved fuel economy and the interactive effect of changes in fuel price and product offerings.

Finally, the paper highlighted that the estimated preferences, elasticities, and thus policy sensitivities, varied by income and household size. Thus, progressive policies such as revenue-neutral household income- and size-based feebate policy, as well as fuel price increases with revenue recycled back to low- and middle-income households, are viable alternatives for improving the new vehicle fleet fuel economy. It is worth noting that Saudi Arabia already has a new program, the Citizen's Account Program, which directs cash transfers to help low- and middle-income Saudi families offset the impact of energy price increases (Matar 2020).

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About the Project

Promoting the adoption of energy-efficient vehicles has become a key policy imperative in both developed and developing countries. Understanding the impact of various factors on adoption rates forms the backbone of KAPSARC's efforts in the light-duty vehicle demand field. These factors include (i) consumer-related factors – demographics, behavioral, and psychographics; (ii) regulatory factors – policies, incentives, rebates, and perks; and (iii) geo-temporal factors – weather, infrastructure, and network effects. Our team is currently developing models at different levels: micro-level models using large-scale data comprising new car buyers' profiles, and macro-level models using aggregated adoption data to understand and project the effects of various factors that affect the adoption rate of energy-efficient vehicles.

About KAPSARC

The King Abdullah Petroleum Studies and Research Center (KAPSARC) is a non-profit global institution dedicated to independent research into energy economics, policy, technology and the environment across all types of energy. KAPSARC's mandate is to advance the understanding of energy challenges and opportunities facing the world today and tomorrow, through unbiased, independent, and high-caliber research for the benefit of society. KAPSARC is located in Riyadh, Saudi Arabia.

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