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Managing old vehicle imports into Uganda



- In brief:**
- Many low-income countries around the world rely on age-based import restrictions to reduce the inflow of old, highly polluting used vehicles. These policies are particularly important as they are typically one of only a few policies to curb local vehicle emissions.
 - This study examines the impact of one such policy in Uganda – a tariff called the “environmental levy” – by analysing imports and first-time registrations surrounding the sharp increase of this levy in July 2015.
 - The study finds that the environmental levy is effective in reducing imports of vehicles in the targeted age groups.
 - It also shows, however, that the levy’s effectiveness is undermined by two key factors. First, the existing vehicle inventory among intermediary traders acts as a buffer, so that overall first-time registrations are unaffected by the policy in the short run. Second, there is evidence of end-users’ substitution towards even older vehicles following the levy increase.
 - These findings point to highly progressive levies or outright bans (as recently implemented in Uganda) for an effective policy. In addition, these are ideally complemented by domestic regulation to reduce the adverse effect of substitution towards vehicles already in country.

This project was funded by IGC Uganda.

Policy motivation for the research

Low-income countries import hundreds of thousands of used vehicles from international markets every year. These used vehicles provide affordable mobility in places where only a small fraction of the population owns a car, but they also entail higher levels of pollution than their newer counterparts (due to older technology and physical depreciation).

In an effort to mitigate the adverse environmental consequences of old vehicles, many low-income countries rely on age-based import restrictions – tariffs/levies as studied in this paper or outright bans. These policies are particularly important for low-income countries, because they represent one of only few regulations to curb local vehicle emissions. In addition, they will likely become increasingly relevant going forward as tightening environmental regulation in exporting countries and advances in vehicle technology are expected to generate spill overs to low-income countries.

Despite their prominence and importance, however, the effectiveness of these age-based import restrictions is not well understood. This study therefore seeks to shed light on several central questions:

- How do imports of targeted vehicles respond to the levy? The magnitude of the reduction in imports for targeted vehicles is a first-order measure of the policy's effectiveness.
- How do first-time registrations of targeted vehicles respond to the levy? Emissions ultimately occur when vehicles are driven. The extent to which changes in imports are also reflected in registrations is therefore a key connection between the policy's point of implementation and the intended effect.
- What are the substitution patterns between different vehicles that arise due to the levy? Are there unintended consequences? End-users might substitute to younger or older vehicles depending on their relative prices, the magnitude of the levy for different age groups, and how much they care relatively about vehicle age versus price.

Overview of the research

Many low-income countries rely on age-based import restrictions to curb local pollution from old motor vehicles. In contrast to emissions regulations in richer countries, however, these policies have received little attention in the economics literature and their impact is not well understood. In an effort to assess the effectiveness of age-based import restrictions, this study therefore examines one prominent such policy – a tariff on old vehicle imports – in Uganda.

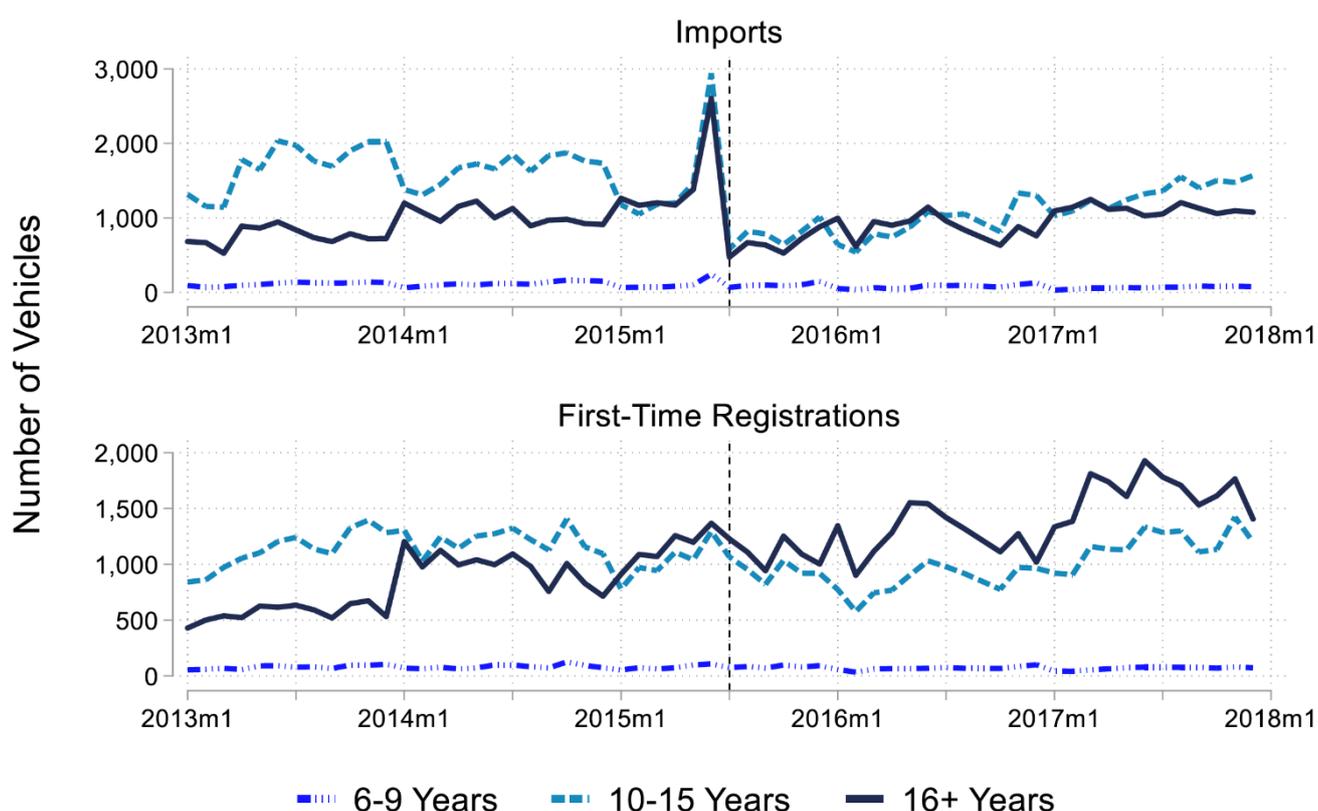
The Ugandan context is particularly suitable for this research for two reasons. First, Uganda's environmental levy has targeted only passenger vehicles (until very recently) while goods vehicles have been exempted. Secondly, the levy was raised sharply in July 2015. Taken together, these features allow the study to estimate the levy impact while accounting for potential confounding factors by comparing changes in passenger vehicles to those of goods vehicles.

The necessary data for this analysis were generously made available by the Uganda Revenue Authority (URA), the Ugandan Bureau of Statistics (UBOS), and two leading online sales platforms for used vehicles. Specifically, the URA provided data on all vehicle imports and registrations in the country between January 2013 and July 2018. The UBOS and the online sales platforms provided historical data on domestic vehicle prices.

This study then estimates the impact of the environmental levy on passenger vehicle imports and first-time registrations. Understanding these two parts of the market is important as many vehicles are imported by intermediary traders and only reach Ugandan roads once they are sold to and registered by end-users. Vehicle inventory among traders may therefore acts as a buffer between imports and registrations, so that the policy impact between these can be very different in the short run.

The analysis paints a mixed picture of the environmental levy's effectiveness. On the one hand, imports of targeted passenger vehicles declined sharply due to the levy increase (by approximately 34% for vehicles of age 10 years or over). First-time registrations, on the other hand, are hardly impacted at all. This difference is illustrated graphically in **Figure 1** below, which shows passenger vehicle imports (top panel) and first-time registrations (bottom panel) for the vehicle age groups targeted by the levy.

Figure 1: Passenger vehicle imports and first-time registrations by age group

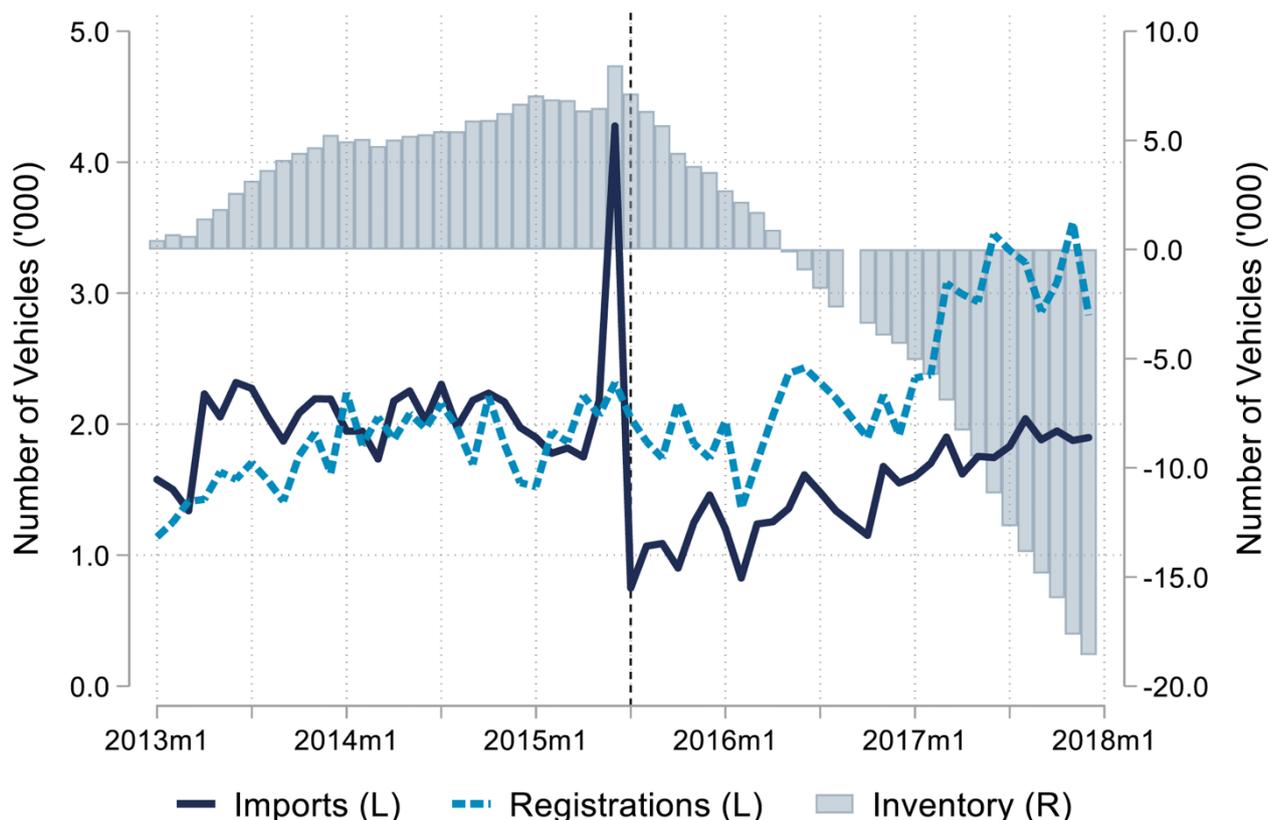


The study further separates imports and first-time registrations according to the channel by which the vehicles reach the end-user: directly for those imported by end-users versus indirectly for those imported by intermediary traders and subsequently sold to end-users. Focusing on the indirect channel, the study then compares imports and first-time registrations to compute a measure of trader inventory (relative to an unknown starting level at the beginning of 2013). This is illustrated in **Figure 2** below and shows that trader inventory gradually rose until July 2015 and was run down in the aftermath of the levy change. This suggests that the divergence of imports and registrations can indeed be attributed to the buffering role of trader inventory.

In addition, the analysis also provides evidence of substitution towards even older vehicles following the levy increase as end-users face higher prices across a wide range of vehicle age groups.

Given these findings, this study provides valuable insights into the effectiveness of the environmental levy in Uganda and similar policies in low-income countries more generally. Both the responsiveness of vehicle imports and the mitigating factors have important implications for effective regulation aimed at curbing local vehicle emissions.

Figure 2: Trader inventory of passenger vehicles



Policy implications

- The most effective age-based import restrictions are expected to be highly progressive tariff regimes or outright bans.

This study documents in the Ugandan context that tariffs can (unsurprisingly) lead to substantial reductions in the inflow of targeted vehicles into the country. It also shows, however, that the levy impact is decreasing in the vehicle age. This suggests that the increase in the levy between different vehicle age groups (e.g., between 6-9 and 10+ year old vehicles) must be very high if the use of the oldest vehicles is to be discouraged the most. Such a highly progressive tariff regime would counter a decreasing responsiveness of demand for older vehicles and the substitution towards older vehicles resulting from the levy. Alternatively, effective policies may include an outright ban of the oldest vehicles as was implemented in Uganda in 2018.

- Complementary regulation of the domestic market is important to achieve meaningful changes of the vehicles on the road.

This study highlights one way in which vehicles already in country may undermine the environmental levy's intended impact. Specifically, the lack of an impact among first-time registrations and the role of trader inventory in this show that the domestic market must be considered when designing effective policy (especially for short run objectives). The increasing purchases of old vehicles from trader inventory after the levy change also suggest that substitution towards domestic second-hand vehicles (those already used in country) may be relevant (although this is not analysed in this study). This could, in principle, lead to old vehicles being used for longer with an import restriction than without. In any case, the relevance of the domestic market emphasizes the need for domestic regulation to align the policies for vehicles in country with those newly entering.