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Demand of automotive fuels in Brazil: Underlying energy demand trend and asymmetric price response

Niágara Rodrigues, Luciano Losekann, Getulio Silveira Filho



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**Demand of automotive fuels in Brazil: Underlying energy demand trend and asymmetric price response**Niágara Rodrigues<sup>a</sup>, Luciano Losekann<sup>b</sup>, Getulio Silveira Filho<sup>c</sup><sup>a</sup> Energy Economics Group, Fluminense Federal University, Brazil<sup>b</sup> Energy Economics Group, Fluminense Federal University, Brazil<sup>c</sup> Federal University of Rio de Janeiro, Brazil**ABSTRACT**

This paper analyzes the role of Asymmetric Price Response (APR) and Underlying Energy Demand Trend (UEDT) in the Brazilian automotive fuel demand from June 2001 to December 2016. The demand functions of automotive gasoline, ethanol and compressed natural gas (CNG) were estimated by employing the autoregressive distributed lag (ARDL) model and Harvey's Structural Time Series Model (STSM). The importance of considering a more flexible approach incorporating both UEDT and APR was confirmed by the data. We identified that consumer response to changes in price is not linear. The model also inferred a high substitutability between gasoline and ethanol. Both in the short and the long term, demand for ethanol is more price elastic than demand for gasoline. Empirical analysis suggests that the decision to refuel a vehicle with CNG is not influenced by price variations in ethanol, which indicates that competition only occurs between CNG and gasoline. Therefore, the inclusion of UEDT and APR provides more precise information on the effect of price and income changes on automotive fuel demand. Such information is relevant for establishing public policies, as refinery expansion planning and CO<sub>2</sub> emission mitigation.

**KEYWORDS:** Energy Demand, Gasoline, Ethanol, Compressed Natural Gas, Underlying Energy Demand Trend (UEDT), Asymmetric Price Responses (APR)

**JEL CLASSIFICATION:** C22, C51, C52, Q41

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