Title: An Estimation of Guyana’s Gasoline Demand

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Introduction

- The continued growth in Guyana’s gasoline consumption is of particular interest because of several environmental consequences, from increased pollution and congestion to overall climate change.
- An understanding of price and income elasticities is important for public policies, but such estimations can be questionable due to the simultaneity between demand and supply.

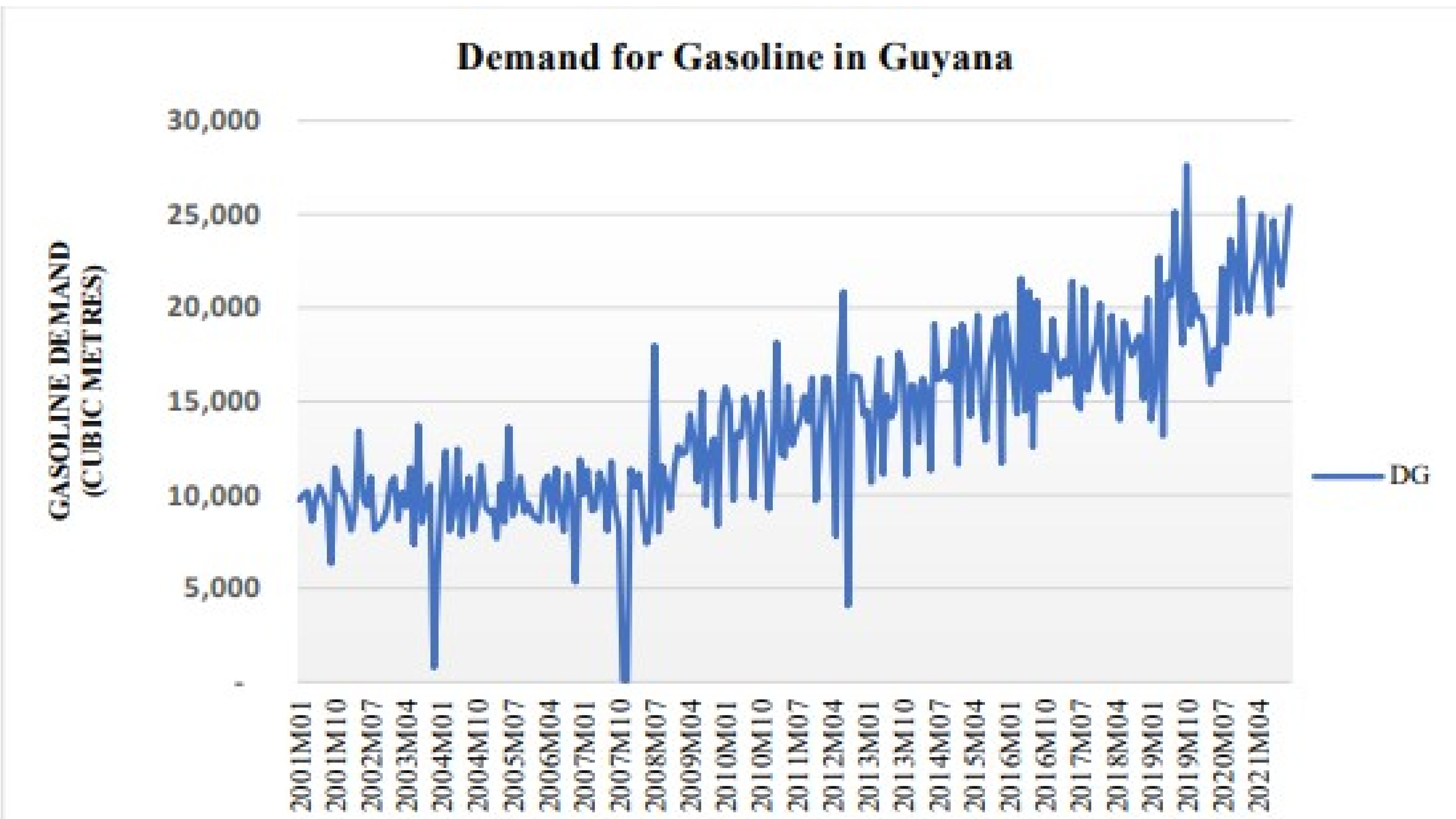

Figure1: Monthly Gasoline Consumption for Guyana 2001-2021

- The price elasticity of demand is the responsiveness of gasoline demand to changes in the price of gasoline.
- The income elasticity of gasoline demand is the proportionate change in the quantity demanded of gasoline resulting from a proportionate change in income.

Methodology

- The main estimation strategy is the two-stages least squares (2SLS) approach. The instrument used for price of gasoline is Brent Crude Oil price.
- In the first stage, price of gasoline is expressed as function of Brent Crude Oil price:
- In the second stage, the predicted value of the price of gasoline regression:

$$\Delta P_G = \varphi_0 + \varphi_1 \Delta BC + \tau$$

Results

Table 1: 2SLS Model Results

$$\Delta D_{Gt} = \alpha_0 + \alpha_1 \Delta P_{Gt} + \alpha_2 \Delta YD_t + \alpha_3 \Delta D_{(G-1)t} + \epsilon_D$$

Second Stage Instrument	
Period: 2001M01-2021M12	
α_0	2.794 (0.411)
ΔP_G	-0.046** (0.005)
ΔYD	0.921** (0.053)
ΔD_{G-1}	0.119*** (0.041)
Adjusted R-Squared	0.849
S.E. of Regression	0.231
F-Statistic	277.861
DW Statistic	1.979
2SLS Diagnostics	
Weak Instruments Test (~F test)	81.582; p=0.00
Durbin Wu-Hausman (Hausman) Test	17.04; p=0.00
Sargan Test	*m=k, model is exactly identified*

- Brent Crude Oil price is a valid and strong instrument for the price of gasoline.
- There is a statistical difference between the OLS estimates and the 2SLS estimates. The OLS estimate of price elasticity is biased towards zero.
- Price, income and first order lagged gasoline demand are statistically significant predictors of gasoline demand.
- The short run elasticity estimates for price and income are -0.046 and 0.921 respectively.
- Long-run estimates for these same elasticities are -0.052 and 1.046 respectively.

Conclusion and Policy Implications

- Elasticities are higher in the long run because consumers have more time to respond and adjust their spending patterns.
- Price-based tools are ineffective in reducing gasoline consumption and pollution in Guyana
- The limited sensitivity to gasoline price gives policymakers in Guyana the flexibility to manipulate prices for income purposes.
- Price-based policy mechanisms may become effective if prices rise faster than consumers’ income.
- Consumers in Guyana have a clearer idea of their future income than of future gasoline prices and can adjust their consumption to income changes faster.
- The Government of Guyana should adopt energy conservation measures and stimulate the use of alternative fuels to maintain positive economic growth.

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