

ETHANOL VS. GASOLINE IN BRAZIL: WHAT TO EXPECT WHEN SUSTAINABILITY IS INCORPORATED

Henrique Pacini, Royal Institute of Technology (KTH), +41 789 490827, pacini@kth.se
Bruno Ferreira Frascaroli, University of Paraiba, bruno@ccsa.ufpb.br
Antonio Carlos da Silva Filho, Uni-FACEF, acadasf@bol.com.br

Overview

Building upon previous studies on consumer choice of ethanol (Pacini and Silveira, 2011ab, Da Silva Filho et al., 2011), and taking into consideration recent data on fuel consumption, prices and fleet characteristics in Brazil, this article has developed an analysis of official data, which has not shown a clear relationship between price-elasticities of demand for ethanol and growth of the flex-fuel fleet in the country. However, dispersion modeling of fuel choices has shown that as ethanol markets incorporate sustainability premiums, the resulting higher prices for certified E100 could shift a significant part of ethanol demand towards gasoline.

Energy regulators in Brazil are faced with the challenge of maintaining the price attractiveness of hydrated ethanol fuel (E100) in a context of competition with gasoline. Efforts concentrated in dual fronts. The first took form of industrial and innovation policy seeking to foster technological progress and reduce costs along the entire lifecycle of ethanol production (Pacini and Strapasson, 2012). The second was to strike a regulatory setup to ensure ethanol could compete with gasoline in an environment of volatile prices (GIZ, 2012; Pacini and Silveira, 2011a). These two challenges – reducing costs and striking the right regulatory setup – have been the fundamental aspects determining the price-attractiveness of ethanol to consumers, consequently its economic sustainability as a renewable transport fuel in the Brazilian market.

More recently, regulators started facing a new dimension while trying to keep ethanol attractive to drivers in Brazil. Based on emerging research, public opinion and political pressure, targeted sustainability requirements started to be formally mandated into biofuels markets (Scarlat and Dallemand, 2011). Illustrating this, a directive adopted by the European Union (EU) in 2009 conditioned market access only to biofuels which are certified according to a set of sustainability criteria (EC, 2009). As market operators in Brazil, Europe and United States have perceived sustainability as a driving force for the industry in the long run (Van Dam et al., 2010), sustainability costs are now increasingly being incorporated in the formation of ethanol prices.

Methods

As the incorporation of sustainability criteria takes place in the ethanol industry, new costs are added to E100 prices at the pump. If at the one hand the introduction of sustainability rules help to make the ethanol industry more responsible, on the other hand they increase the cost of the biofuel, reducing its attractiveness to drivers. Based on market data representing consumer behavior in Brazil, this paper has modeled potential scenarios of how much market share ethanol would lose to gasoline, when sustainability premiums are introduced. The models can be useful for policy makers when evaluating impacts of regulatory changes on the national fuel mix.

Results

As hydrous ethanol (E100) and gasoline (E18-25) coexist as separate fuel options in the Brazilian market, relative prices tend to determine which fuel is chosen by drivers. This article examines the pattern observed by market shares between ethanol and gasoline, in a context of changing prices between those fuels in Brazil.

The creation of stable markets is key to enable renewable energy technologies to grow and continue delivering clean energy services, especially in developing countries. In Brazil, E100 has been competing with gasoline as a fuel choice for drivers since the introduction of flex-fuel fleets in the early 2000s. Given fuel economies of ethanol and gasoline, drivers tend to shy away from the biofuel once this crosses a price thresholds higher than 70% of that of gasoline.

Conclusions

The analysis indicated the fragile price-dynamics of ethanol in Brazil. The biofuel is continuously promoted to play a role in decarbonizing transport in Brazil and other countries pursuing ethanol as an alternative fuel. However, focusing only on ethanol is a difficult, myopic approach. As the bioethanol industry takes steps towards sustainability, fair consumer choice can only take place if sustainability criteria is also considered on gasoline prices. Given the limitation of policy tools to keep ethanol as a price-attractive fuel option, it is past the time to consider correctly pricing of gasoline, echoing the recent regulatory push for sustainability in biofuel markets. Only then – externalities incorporated – level playing fields conducive of renewables can be achieved.

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