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Fuel Price Impacts of the Renewable Fuel Standard

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Fuel Price Impacts of the Renewable Fuel Standard

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GASOLINE PRICES are the lowest they've been in a decade, and according to recent data from the Department of Energy, Americans are buying more gas than ever. While low gas prices are good for consumers, they may be troublesome to those who worry about greenhouse gas emissions. Meanwhile, two important federal policies are pushing ahead to decrease transportation sector emissions by increasing vehicle efficiency and the use of renewable fuels: the federal Corporate Average Fuel Economy standards and the US Renewable Fuel Standard (RFS). Both policies have substantial impacts on consumers' vehicle and fuel choices as well as on their fuel spending.

The Renewable Fuel Standard and RIN Markets

The RFS was passed in 2007 and established aggressive biofuel mandates—25 percent by 2022. The policy is a market-based regulation. Rather than requiring refineries to get into the biofuel business, the Environmental Protection Agency (EPA) created an accounting system where every gallon of biofuel produced in or imported into the United States generates a credit, known as a RIN. To comply with the RFS, refiners must turn in their required amount of RINs to the EPA at the end of each year. How they obtain those RINs is up to them. Petroleum refiners can buy RINs from independent biofuel producers, or get into the biofuel business and produce RINs themselves. Importantly, the price of RINs is set by market forces. The RFS determines the demand for RINs by specifying how much biofuel, and therefore how many



RINs, need to be sold in aggregate each year. Biofuel producers determine the supply. As demand for RINs or the cost of producing biofuel increases, the price of RINs will increase and vice versa.

Several individuals in the popular press, as well as refiners and large investors in oil companies, have called the viability of the RIN market into question recently. Criticisms come primarily in two forms: (a) the market lacks transparency and is subject to manipulation by speculators; and (b) refiners are getting unduly squeezed by RIN costs. Except for known fake RIN generation in the biodiesel market several years ago, there is little concrete evidence to support the first claim. Many markets operate outside of formal exchanges, and recent work by Lade, Lin-Lawell, and Smith (2016) finds that RIN markets are efficient. The second claim ignores the economic principle of cost pass-through—when refiners' costs go up, either because of increased oil prices or higher taxes, they pass a portion or all of the increased costs to downstream users.

Impacts of the RFS on Consumers and Fuel Prices

The RFS doesn't just affect refineries and biofuel producers.

The policy needs consumers to purchase more biofuels to succeed. For most consumers, this has meant switching from using pure gasoline to using E10—gasoline containing 10 percent ethanol. In fact, nearly all gasoline sold in the United States today contains 10 percent ethanol (EIA 2016). Still, in 2007 Congress envisioned an even greater amount of biofuel use. This means that consumers must start using higher blends of ethanol such as E15 and E85 to reach the targets set in 2007.

RINs directly impact the relative cost of ethanol and gasoline. They subsidize biofuels and increase the cost of selling gasoline and diesel. These effects are reflected in the price that regional fuel terminals pay for fuel, and therefore affect prices paid by consumers at the pump. How large these price effects are depends on the pass-through of RINs and the ethanol-gasoline blend of fuels.

Fuel market supply and demand conditions determine pass-through. Because fuel demand is inelastic (people's driving habits do not change much in response to gas prices), we expect taxes and subsidies on upstream producers to be passed through to retail prices. This means that as RIN prices \uparrow

increase, gasoline will become more expensive and ethanol will become cheaper. What some critics of the RFS essentially argue is that this is not happening due to some market failure.

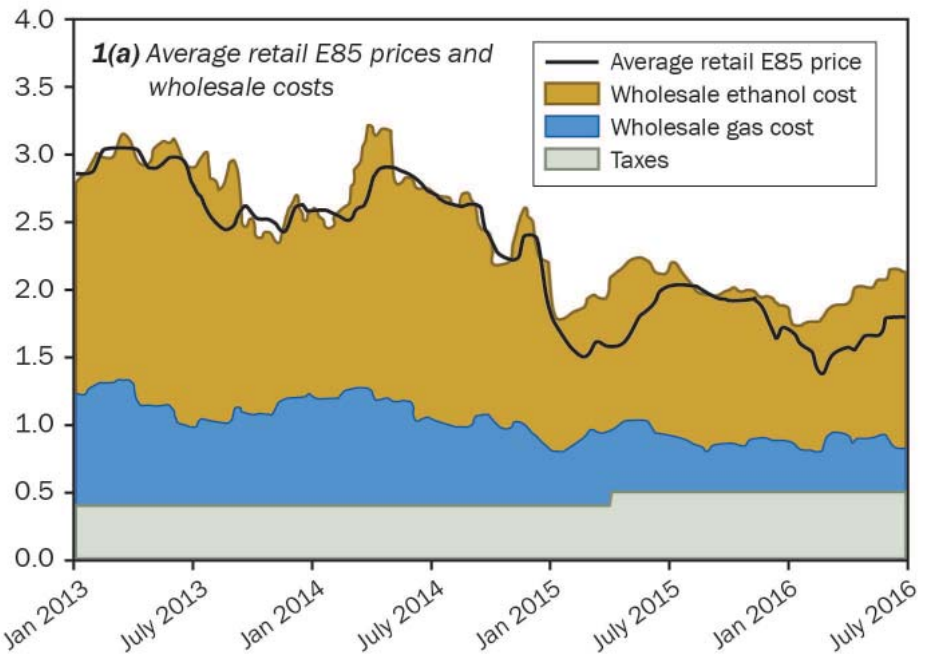
To examine this issue, we study RIN pass-through in a market where we most expect to detect it: the market for E85. E85 contains between 51 and 83 percent ethanol, and therefore the value of the RIN subsidy for ethanol is high relative to the RIN tax on gasoline. Thus, when RIN prices rise, we expect E85 to become cheaper. Examining prices from over 450 stations in the Midwest, we find that the net subsidy for E85 is mostly passed through to retail prices.

Figure 1 illustrates this point for our stations in Iowa. In Figure 1(a), we graph the average retail E85 price along with our estimates of the wholesale ethanol and gasoline cost components of E85 from 2013–2016. After accounting for state and federal retail fuel taxes, we find that wholesale E85 fuel costs largely exceeded retail prices over the period. Only when we allow for pass-through of RINs by adjusting the wholesale fuel costs can we rationalize historical retail E85 prices. When we adjust the wholesale costs by the RIN subsidy and tax in Figure 1(b), our estimated average retail margins are \$0.29/gal, in line with estimates of retail margins for other fuels.

Overall, our findings mean that as RIN prices rise, refiners and biofuel producers pass along their additional costs and savings onto consumers, respectively. What does this mean for US consumers in coming years? This depends on how aggressively the EPA pushes the biofuel mandates. The agency has slowed the pace of the mandates since 2013 from the original schedule passed by Congress. However, if the EPA continues to push the mandates beyond 10 percent, consumers will likely see prices of higher blend ethanol fuels like E15 and E85 fall.

The United States government wants you to use more ethanol, but it certainly

Margins (\$/gallon)



Margins (\$/gallon)

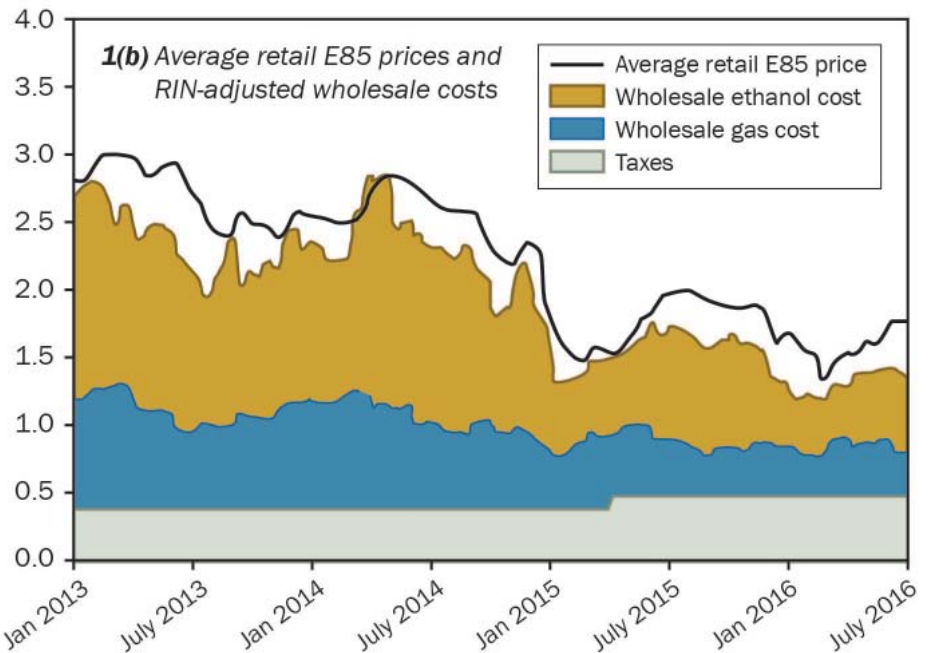


Figure 1. E85 pass-through—retail E85 prices and wholesale fuel costs in Iowa.

doesn't expect you to do so out of the kindness of your heart—that is the beauty of market-based mechanisms. Prices will adjust, a potential boon for consumers filling up with greater than E10 blends. Just make sure you have the right vehicle—not all vehicles are capable of using more than 10 percent ethanol. ■

References

Energy Information Agency (EIA). 2016. "Almost all U.S. Gasoline is Blended with 10% Ethanol." *Energy Information Agency: Today in Energy*, May 4, 2016.

Lade, G.E., C.-Y.C. Lin Lawell, and A. Smith. 2016. "Policy Shocks and Market-Based Regulations: Evidence from the Renewable Fuel Standard." Working Paper 16-WP 565. Center for Agricultural and Rural Development, Iowa State University.