



RESEARCH BRIEF

Cost Pass-Through to Higher Ethanol Blends at the Pump: Evidence from Minnesota Gas Station Data

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Whether retailers pass on government subsidies for renewable technologies is an important determinant of the success and costs of any subsidy policy. We study the pass-through of wholesale costs to pump prices in the Minnesota retail market for E85 and find that retailer pass-through rates are very heterogeneous, but on average, retailers pass on only half of the Renewable Fuel Standard implicit subsidy for E85 to consumers. Our results suggest that market structure and firm choices over product variety and pricing are crucial to consider for policies aiming to encourage technology adoption through subsidies.

The Energy Independence and Security Act of 2007 set ambitious goals for blending renewable fuels into the U.S. surface transportation fuel supply. The regulatory structure for achieving these goals is the Renewable Fuel Standard (RFS). The RFS effectively provides a revenue-neutral tax on fuels with low renewable content and a subsidy to fuels with high renewable content, which operates through the market for tradable RFS compliance certificates, RINs (Renewable Identification Numbers).

For the past decade, the main renewable fuel in the United States has been ethanol made from corn kernels, and the dominant fuel blend sold at retail today is E10, which is 10% ethanol. Selling more ethanol into

the fuel supply than provided through E10 requires sales of higher blends. Although there have been attempts to sell E15, the main higher blend available is E85, which is between 51% and 83% ethanol and can be used only by flex fuel vehicles. Because E85 has lower energy content than E10 and thus requires more frequent refueling, boosting sales of E85 requires providing a price incentive to flex fuel vehicle owners to buy E85. This price incentive is provided by the RIN subsidy, assuming it is passed through to the consumer in the form of lower prices in the E85 market.

This paper studies the pass-through of wholesale prices and RIN values to pump prices in the retail market for E85. The retail market is the final of three

steps in the gasoline supply chain. With considerable simplification, in the first (upstream) step importers and refiners sell bulk refined petroleum fuels on exchanges and at the bulk wholesale level. That petroleum blendstock is then transported to a regional distribution terminal, typically via pipeline. Separately, ethanol is produced then transported to the terminal, typically by rail. In the second (midstream) step, these two fuels are blended at the terminal, sold to retailers, and pumped into tanker trucks for delivery to the gas station. At the third (downstream) step, the retailer sells the fuel to the end consumer at the gas station.

Our core data are monthly observations at the retail gas station level on E85 retail prices collected by the Minnesota Department of Commerce. We augment these data with data from OPIS on retail prices for E10, matched at the month-station level. We also use OPIS rack prices for E10 and E85; by matching stations to racks, we estimate station-level wholesale prices for E10 and E85. Because we know the locations of the E85 stations, we can also compute regional station density measures, for example the number of competing E85 stations within a 10-minute drive. Our full data set spans January 2007 to March 2015, which includes the period of high ethanol RIN prices beginning in January 2013.

We have three main findings. First, consistent with a large literature on E10 pricing, we find complete pass-through in the E10 market: over the full sample period, we estimate a cumulative pass-through coefficient of 1.003 (SE = 0.003) using our sample of 247 stations for which we observe both E85 and E10 prices.

Second, we find only partial pass-through to the E85 retail price of the E85 wholesale price, controlling for the E10 wholesale price, that is, of the E85-E10 wholesale spread to the E85-E10 retail spread. This pass-through increased over the sample period from 0.323 (SE = 0.021) in 2007-December 2011 to 0.525 (SE = 0.053) in January 2012-March 2015.

Third, there is considerable heterogeneity in E85 pass-through rates. Much of this variation is explained by observable factors. In particular, we find that pass-through is higher if there are more local stations that

sell E85. Moreover, the entry of a nearby station into the E85 market reduces the markup on E85 charged by an E85 retailer. We also examine whether there is variation in pass-through or markups associated with whether the retailer is affiliated with an entity that is obligated under the RFS to retire RINs with the EPA. We find no meaningful association with obligation status, consistent with the profit-maximizing incentives for marketing E85 being the same at the station level whether or not the station is affiliated with an obligated party.

Taken together, these results are consistent with the E10 market being highly competitive, but the E85 market being comprised of local markets in which participants frequently have considerable market power. Having more local E85 stations increases competition and is associated with higher pass-through. In the Twin Cities (Minneapolis-St. Paul) metro area, an area of relatively high E85 station density, we find essentially complete pass-through of the E85-E10 rack price discount to retail prices. Outside the Twin Cities, slightly less than half the E85-E10 wholesale price discount is passed along to consumers.

Returning to the RIN subsidy, we estimate that in the Twin Cities, nearly all of the RIN price subsidy for E85 is passed through the full supply chain and is received by the retail consumer. Outside the Twin Cities, however, we estimate that roughly three-fourths of the RIN value is passed through at the rack, and slightly less than half of that is passed through to retail prices. Statewide, we estimate that 0.35 (SE = 0.05) of the RIN subsidy passes through the full supply chain to retail E85 prices.

Our results suggest that, in the context of the RFS and other similar price subsidy policies, market structure and firm competition can erode the anticipated benefits and lead to higher compliance costs. Therefore, policies to increase entry and competition in the markets that policymakers want to support may make the standalone price subsidies more effective and less costly.

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References

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