

Are RIN prices high enough for E85 expansion?

Does the rising RIN price make E85 competitive?

The prices of crude oil and associated petroleum products have fallen dramatically in recent weeks. In fact, ethanol which for years has been sold at a discount to gasoline blendstock has been selling for a premium lately. RIN prices have also risen. In light of these changes, we return to the question of whether a high-level ethanol blend like E85 can be delivered to consumers at a competitive price.

One hypothesis is that expansion of ethanol consumption into fuels such as E85 would occur when the cost of retailing this fuel is comparable to other fuels, on an energy basis, so consumers are willing to buy it. If true, then there is some RIN price at which profit can be made from getting more ethanol to consumers. The exact level depends on costs of petroleum feedstock (RBOB, here), ethanol, and E85 distribution. The RIN price that makes E85 equal to the price of a competing fuel, E10, could be large, but it is finite. E85 adoption might start slowly or quickly at this point, depending at least in part on consumers' expectations and retailing practices.

When have actual RIN prices been high enough that E85 sales look likely?

We calculate a minimum conventional RIN price to allow profitable sales of E85 under certain assumptions (e.g. E85 contains 74% ethanol, and the E85 distribution margin including taxes is at least as high as the E10 margin). Figure 1 shows how the implied and actual conventional RIN prices have evolved from January 1, 2013 to January 14, 2015. The inferred RIN price that allows E85 to start to compete with E10 is calculated based on actual input fuel prices (RBOB gasoline and wholesale ethanol).

The costs of distribution to sell more E85 are a key unknown: the lower band of the gray area in the figure reflects the assumption that the distribution costs are equal to E10 distribution costs (\$0.60 per gallon) and the upper range of the gray area reflects the assumption that E85 distribution costs twice as much as E10 distribution (\$1.20 per gallon). The range might be taken as boundaries: it seems likely that selling a lot more E85 quickly incurs higher distribution costs than E10, so E85 expansion could still be unlikely at the lower end of the range; and it might also seem likely that the E85 distribution costs are not double those of E10, so E85 expansion is more likely at the high end of the range.

Figure 1 shows that the implied price has been higher than the actual price for most of the 2013-2015 time period, suggesting that E85 sales would not be profitable during these times. There were exceptions, particularly in 2013 when E85 sales could have attracted industry and consumer interest. Recently, declining ethanol prices and rising RIN prices

Summary:

E85 could be profitable to industry and competitively priced for consumers if the prices of Renewable Identification Numbers (RINs) are high enough. We calculate RIN prices that support E85 expansion. RIN prices were occasionally in this range before, and might be close again despite the falling petroleum price.

For more on this topic, see these FAPRI-MU reports:

#03-14

Model Documentation: US Biofuels, Corn Processing, Biomass-based Diesel, and Cellulosic Biomass

#03-13

Implied RIN Prices for E85 Expansion and the Effects of a Steeper Blend Wall

#07-13

Renewable Fuel Standard Waiver Options for 2014 and Beyond

#01-14

Biomass-based Diesel Policy Options: Larger RFS Requirements and Tax Credit Extension

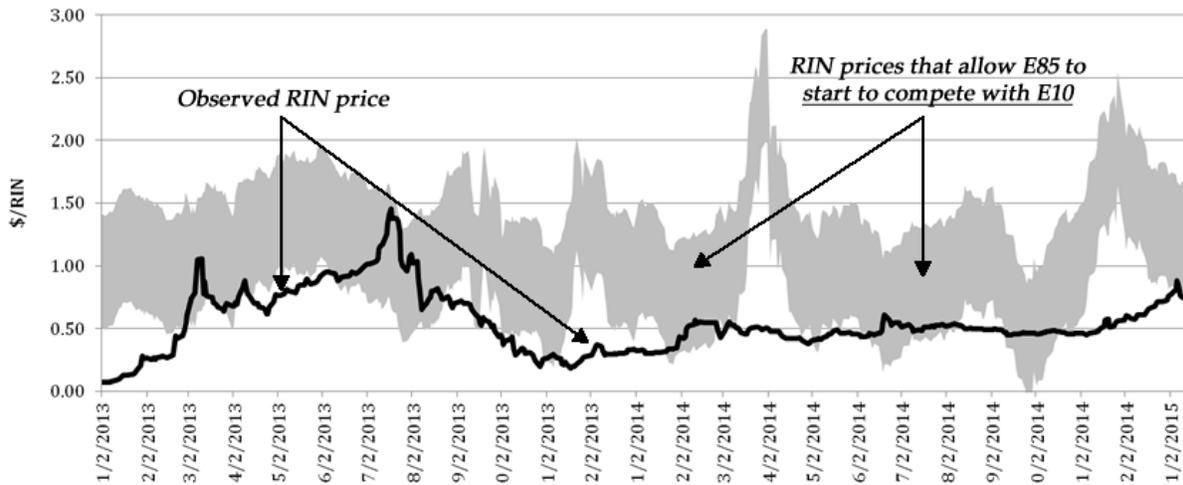
Article authors:

Jarrett Whistance
WhistanceJL@missouri.edu

Wyatt Thompson
ThompsonW@missouri.edu

Pat Westhoff
WesthoffP@missouri.edu

Figure 1. Actual conventional RIN price and the RIN price at which E85 might compete with E10.



Sources: Oil Price Information Service and authors' calculations based in part on EIA price data. The gray area reflects uncertainty about E85 distribution costs, but an actual RIN price at the high end of this range (or higher) gives a stronger impression that E85 can be priced to cover costs and attract consumers.

have resulted in the actual and implied prices converging despite the fall in petroleum prices. If that trend continues, the implication is that E85 sales might become profitable for industry and attractive to consumers.

An example based on selected historical prices

Table 1 calculates the inferred conventional RIN price to allow profitable E85 sales if the E85 margin is \$0.75 per gallon. The actual RIN price exceeded the inferred price on June 20, 2014. The calculation suggests there could have been an arbitrage opportunity in summer 2014: selling more E85 could generate retail fuel and RIN revenues that exceed the costs of input fuels and delivery. Given these assumptions, the observed RIN price was too low for profitable E85 sales at the other three times.

Calculations for January 14, 2015, suggest that a \$0.17 higher RIN price could be enough for E85 expansion. These numbers are sensitive to the assumed E85 distribution margin. If the E85 margin is \$0.12 lower than assumed here, then E85 can be both profitable for the industry and also competitively priced to consumers.

The calculations in the table indicate the potential for profitability on a day-by-day basis. Another uncertainty is how long the implied profitability must persist before market participants can take advantage of the opportunity to sell E85 at prices that attract consumers and also cover costs, taking RIN value into account. Some retailers may not be able to offer the fuel and some consumers may not be able to adopt E85 quickly even though the market prices suggest it would be advantageous to do so.

Table 1. When has the RIN price been high enough for E85 to compete in the past?

	Jan. 2, 2013	Jan. 2, 2014	June 20, 2014	Jan. 14, 2015
Prices				
RBOB gasoline price	2.81	2.70	3.13	1.35
Ethanol spot price	2.19	2.13	2.11	1.32
RIN price	0.07	0.32	0.61	0.67
Estimated cost of E10				
+ Gasoline cost	2.53	2.43	2.81	1.22
+ Ethanol cost	0.22	0.21	0.21	0.13
- RIN value	-0.01	-0.03	-0.06	-0.07
+ Assumed margin	0.60	0.60	0.60	0.60
Total cost per gallon	3.34	3.21	3.57	1.88
Total cost per 000 BTU	0.030	0.029	0.032	0.017
Estimated cost of E85				
+ Gasoline cost	0.73	0.70	0.81	0.35
+ Ethanol cost	1.62	1.57	1.56	0.98
- RIN value	-0.05	-0.24	-0.45	-0.50
+ Assumed margin	0.75	0.75	0.75	0.75
Total cost per gallon	3.05	2.78	2.68	1.58
Total cost per 000 BTU	0.035	0.032	0.031	0.018
E10 cost less E85 cost				
Per gallon basis	0.30	0.42	0.89	0.30
Per 000 BTU basis	-0.005	-0.003	0.001	-0.001
Calculated for competitive E85				
Implied RIN price	0.73	0.75	0.44	0.84
Actual price less calculated	-0.66	-0.42	0.16	-0.17

Sources: price data in the top rows are from EIA and OPIS, with all other entries representing authors' calculations.

Published by the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri (MU), 101 Park De Ville Dr., Suite E; Columbia, MO 65203. This material is based upon work supported by the U.S. Department of Agriculture under Agreement Nos. 58-0111-13-002 and 58-0111-14-001. Any opinion, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the USDA nor MU. Permission is granted to reproduce this information with appropriate attribution to the author and FAPRI-MU.