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The Economics of RINs and U.S. Ethanol Demand

Gabriel E. Lade

Assistant Professor of Economics

Iowa State University and CARD

11th Annual Biofuels: Science and Sustainability Tour

Fraud? Manipulation? Bankruptcies? SREs? Demand Destruction?

ENERGY & ENVIRONMENT

U.S. Struggles to Rescue Green Program Hit by Fraud

By MATTHEW L. WALD OCT. 11, 2012

BUSINESS DAY | THE HOUSE EDGE

Wall St. Exploits Ethanol Credits, and Prices Spike

By GRETCHEN MORGENSON and ROBERT GEBELOFF SEPT. 14, 2013

Bloomberg Markets Markets Tech Pursuits Politics Opinion Businessweek

Icahn Calls on EPA to Fix 'Mother of All Short Squeezes'

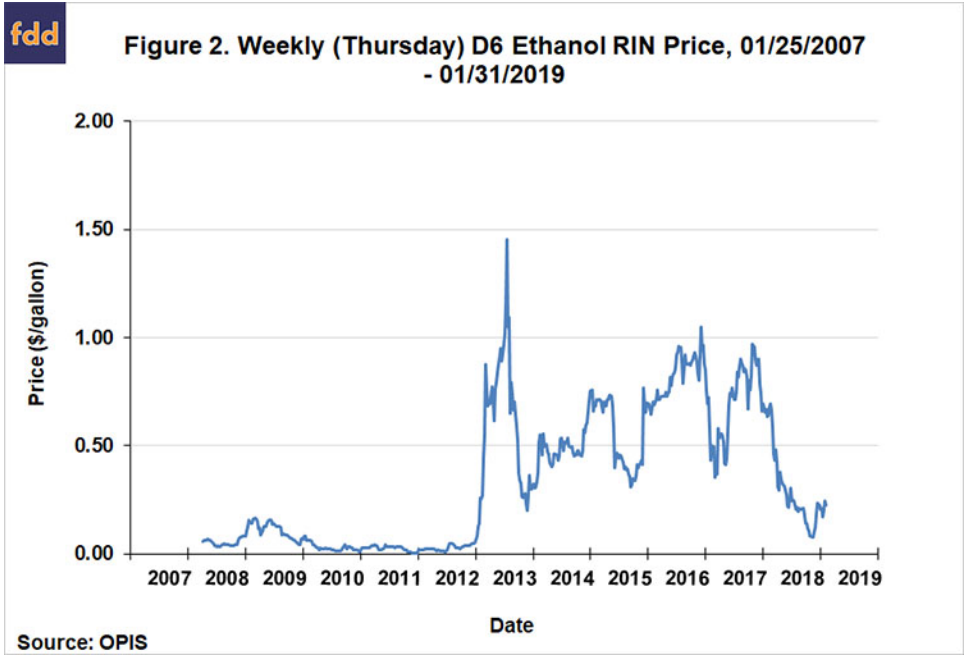
By Laura Blewitt and Zachary Mider
August 15, 2016, 2:21 PM CDT *Updated on* August 16, 2016, 2:31 PM CDT

Bloomberg Markets Tech Pursuits Politics Opinion Businessweek

Biggest U.S. East Coast Oil Refinery Files for Bankruptcy

By Barbara J Powell and Tiffany Kary
January 22, 2018, 12:26 AM CST *Updated on* January 22, 2018, 10:46 AM CST

→ Expenses tied to renewable fuels spur Chapter 11 filing

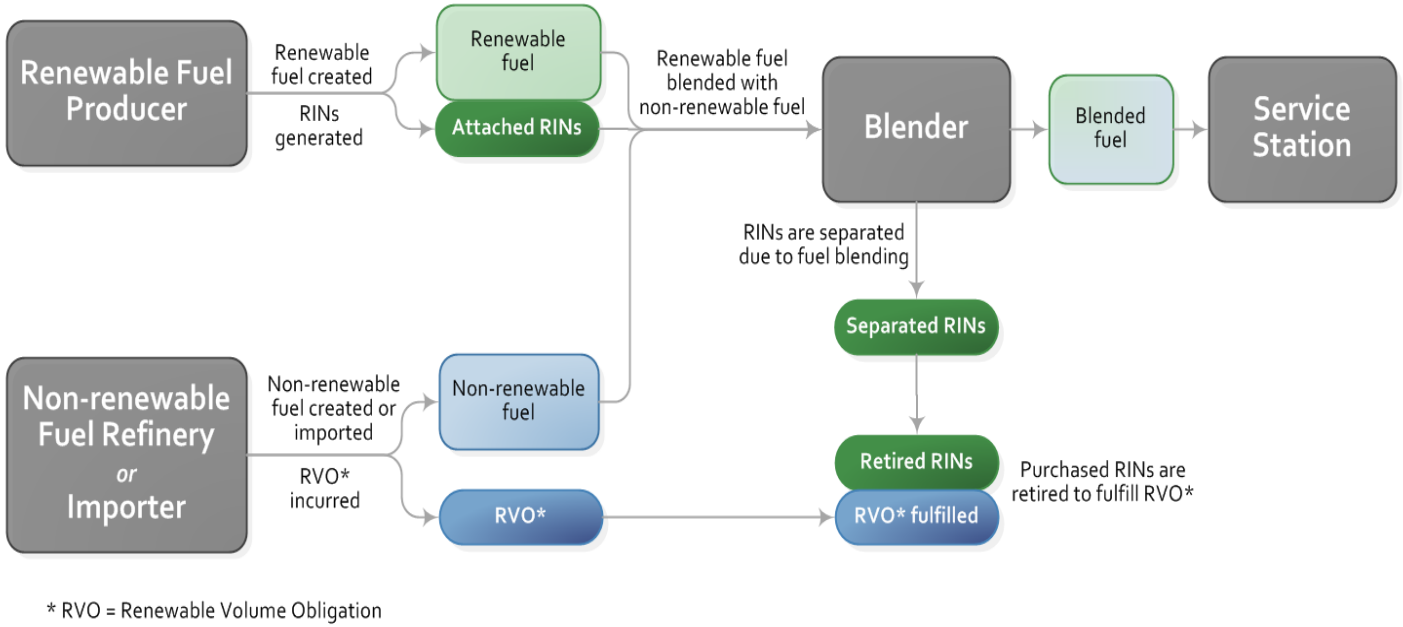


S&P Global Platts

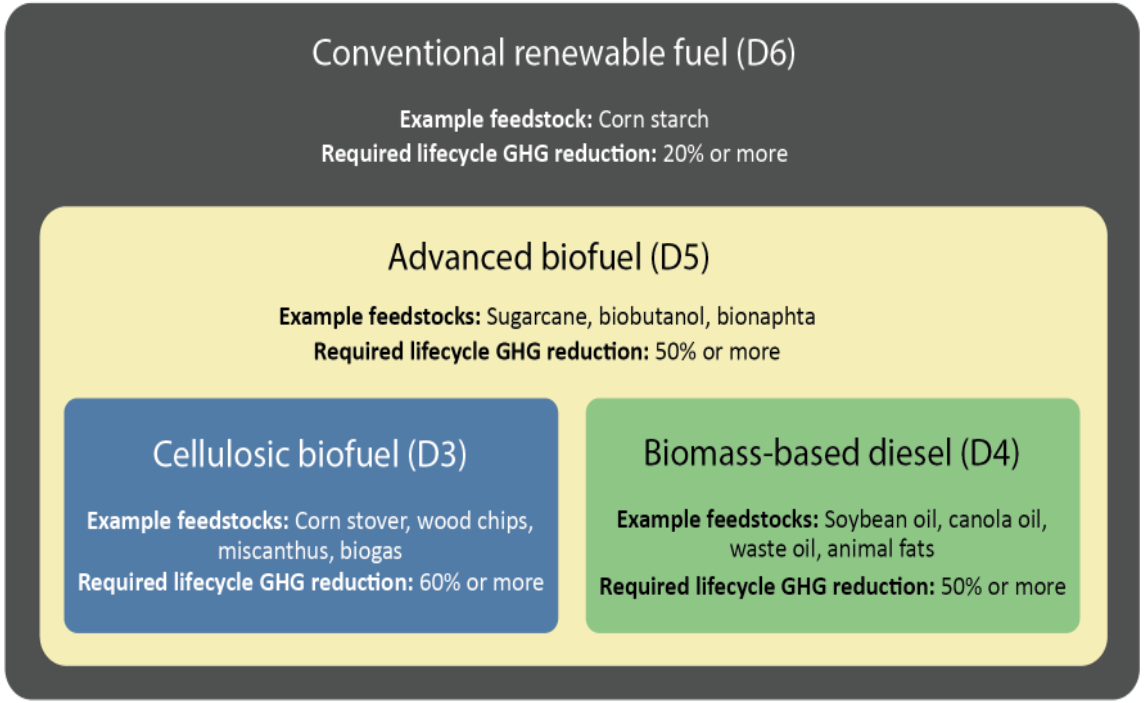
New US EPA chief defends small refinery waivers to biofuel mandate

RIN Market Basics

The Lifecycle of a RIN



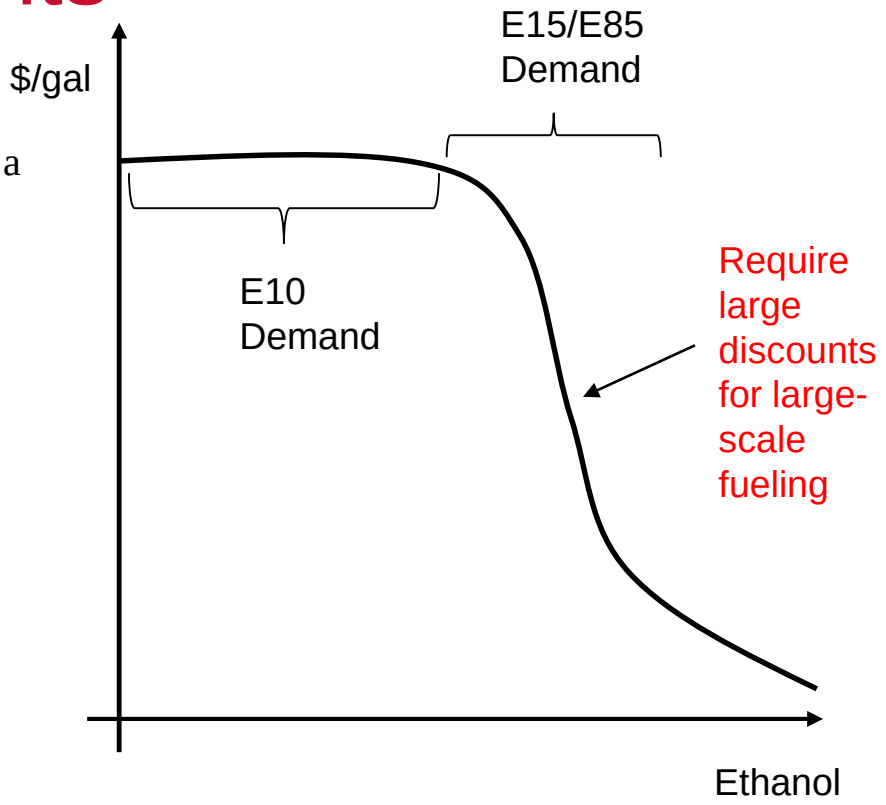
Nesting and RIN Prices



Economics of RINs: Ethanol Markets

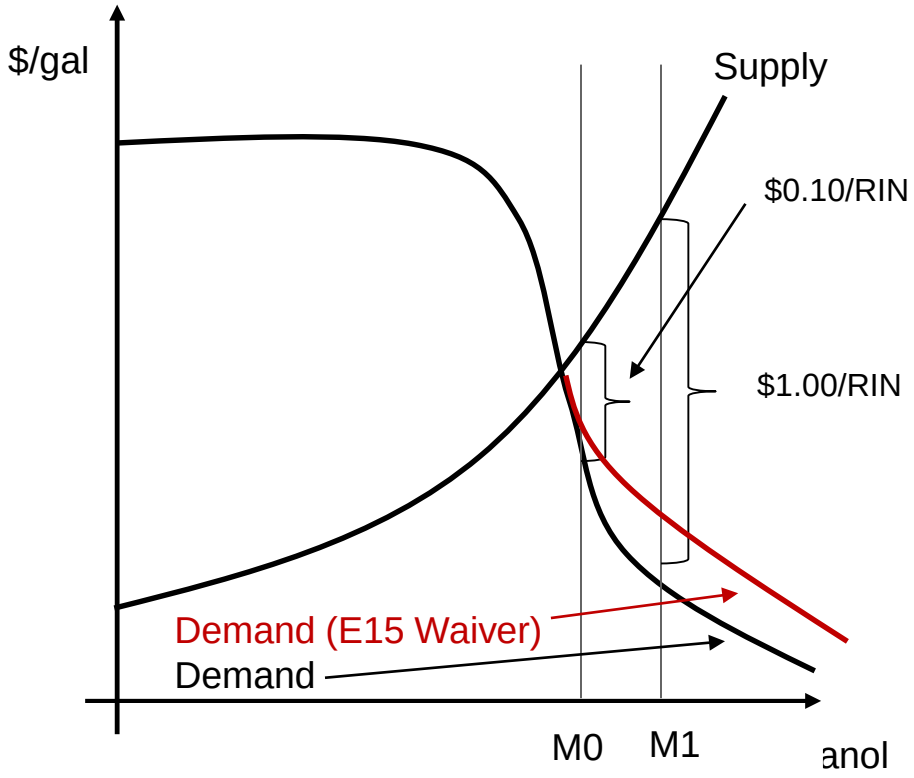
Ethanol: Three Segments

1. E10
   - Cost competitive octane enhancer for more than a decade
   - Limited future growth (likely declining)
2. E85
   - Stalled progress before BIP (>4,500 stations, higher 2018 growth
   - Unknown future with FFVs
3. E15
   - Relatively new and growing (~1,100 stations)
   - Potential for large ethanol demand in future if large-scale adoption



D6 RIN Price Drivers

1. Blend Wall
   - Expanding demand (new pumps, E15 waiver, information campaigns) ➔ Lower RIN prices
2. Ethanol Production Cost
   - Supply expanding and costs down ➔ Lower RIN prices
3. Mandate
   - Cut mandate (SREs) ➔ Lower RIN prices



RINs and Ethanol Demand: An Example

$0.00/RIN:

E15 Discount: **0.69%**
(Energy Difference: -1.7%)

E85 Discount: **8.86%**
(Energy Difference: -21%)

RINs and Ethanol Demand: An Example

$0.25/RIN:

E15 Discount: **1.31%**
(Energy Difference: -1.7%)

E85 Discount: **16.80%**
(Energy Difference: -21%)

RINs and Ethanol Demand: An Example

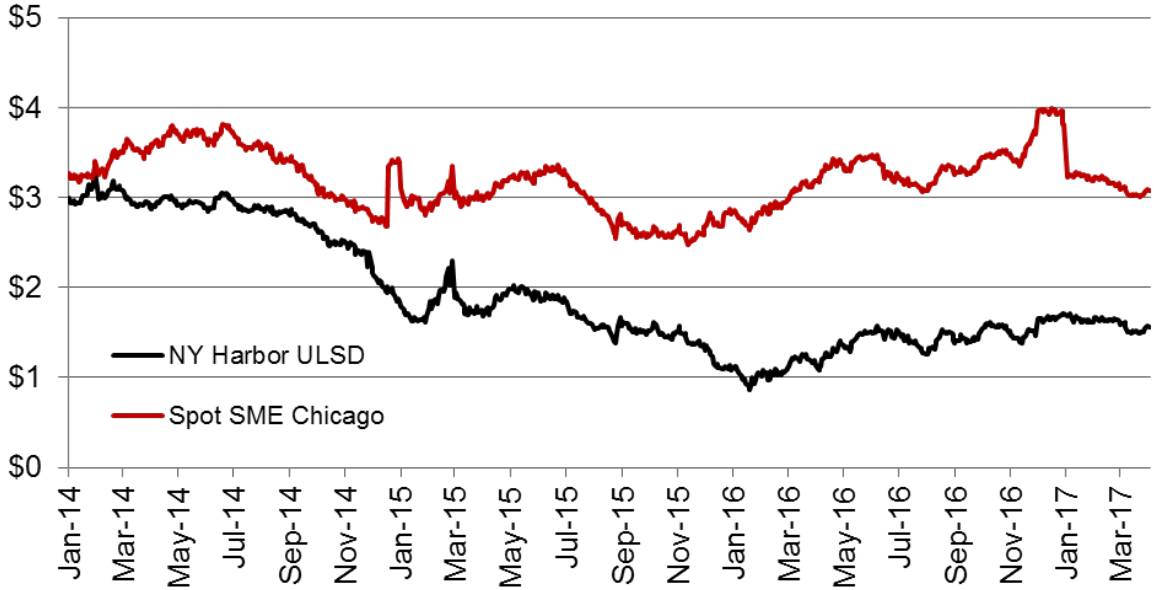
$0.75/RIN:

E15 Discount: **2.55%**
(Energy Difference: -1.7%)

E85 Discount: **32.65%**
(Energy Difference: -21%)

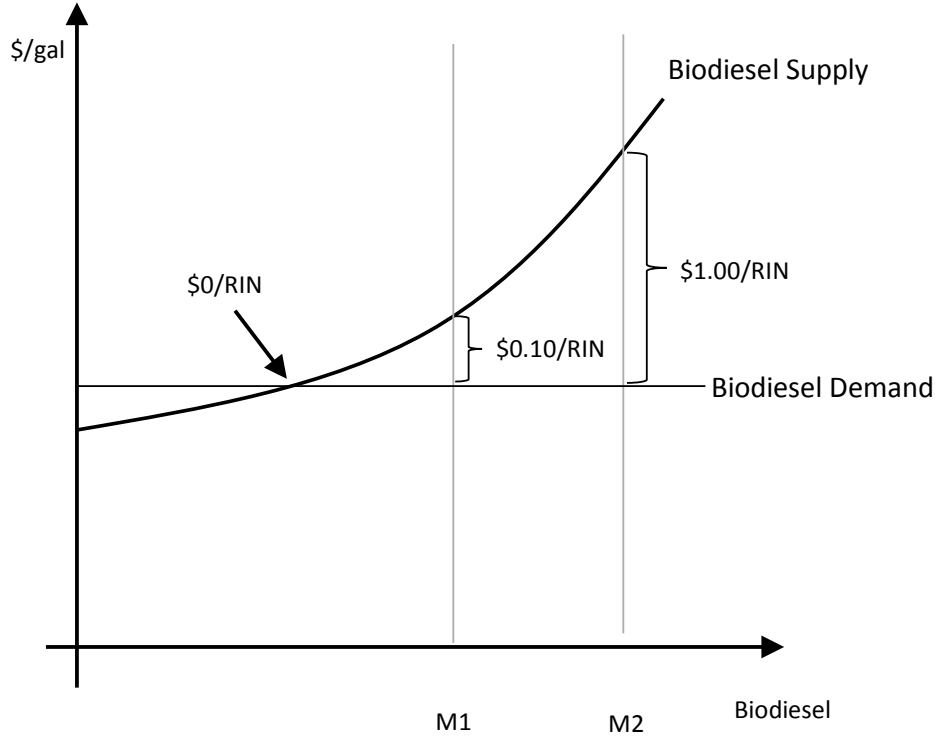
Economics of RINs: Biodiesel Markets

All about production cost

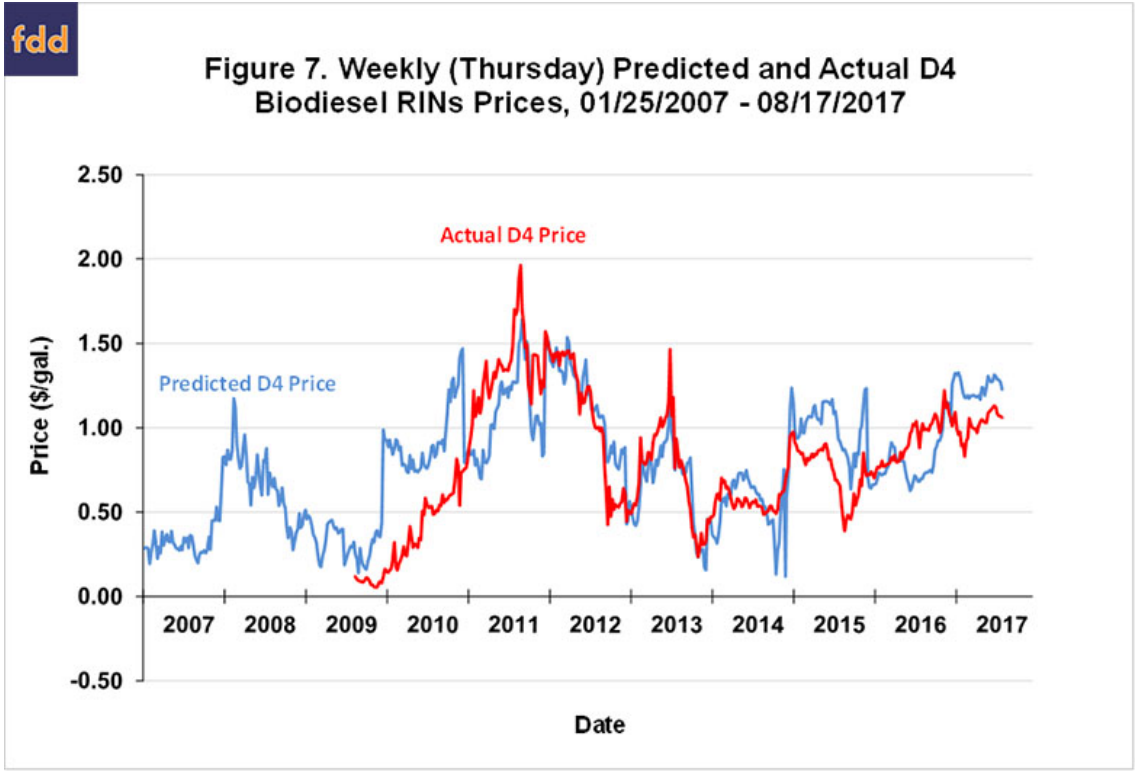


Biodiesel vs. ULSD Wholesale Prices

Biodiesel (D4) RIN Price Determinants



Fundamentals Drive Biodiesel (D4) RIN Prices



My take on current issues in RIN markets

1. RIN markets work

Most evidence shows RIN markets are efficient and free of manipulation

- Prices adjust quickly to changing compliance costs
- Better data/transparency would only help!

Fraud has happened, but only affects small number of RINs

- Tens of *millions* of fraudulent RINs vs. over 1.4 *billion* RINs generated to date
- Third-party quality assurance programs have stepped in to help

High RIN prices signal

- High compliance costs (blend wall, biodiesel)
- High investment value in biofuel production and distribution infrastructure

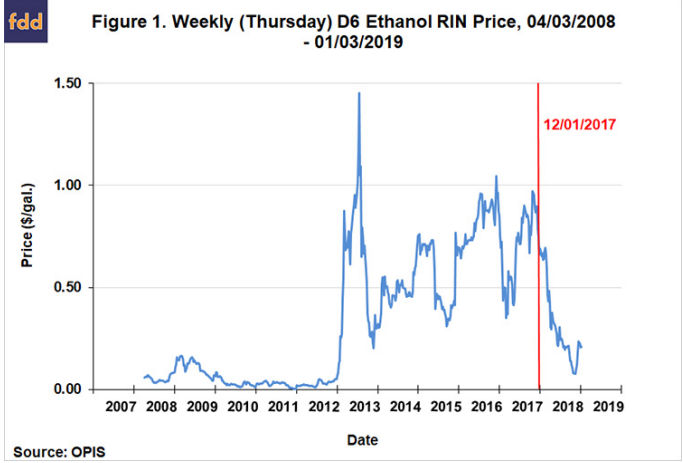
2. SREs are collapsing RIN prices

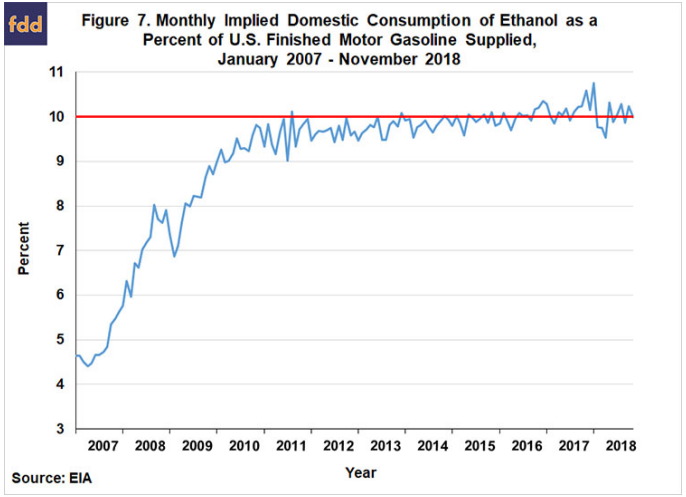
Short-Run Impacts:

1. Small impact on E85/E15 sales
   - Offset by lower ethanol prices due to over supply
2. Lower biodiesel sales
   - Bearing brunt of SREs

Long-Run Impacts:

1. Less investment in biofuel infrastructure
   - Regulatory uncertainty dampens investment incentives





3. SRE justifications are sketchy at best

Original SRE intent was to lessen *fixed* compliance cost burdens

- Hiring personnel, etc.

All empirical evidence suggests refiners are compensated for RIN costs

- Wholesale gasoline and diesel prices are higher because of RINs
- Small refiner exemptions likely **give competitive advantage to refiners with exemptions**

RFS costs are primarily shifting market shares (refiners ➔ biofuel producers)

- Small impact on consumers
- Will become more contentious as U.S. gas demand declines

4. My dream reform: RIN price caps

Would play an important, stabilizing role

- EPA limits RIN prices through mandate adjustments/SREs ➔ Largest driver of historic volatility
- Tradeoff: If RIN cap binds, biofuel use in U.S. will be below mandated levels

(Other) Academic experts to follow

Scott Irwin
University of Illinois

Bruce Babcock
UC Riverside

Aaron Smith
UC Davis

James Stock
Harvard University

I’m moving! Find me at Macalester College after Aug. 15

Contact Information:

(651) 696-6737

glade@macalester.edu

gabe-lade.com/outreach

@gabelade

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