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February 22, 2017

Sarah Dunham
Acting Assistant Administrator for Air and Radiation
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Mail Code 6101A
Washington, DC 20460

RE: Proposed Denial of Petitions for Rulemaking to Change the RFS Point of Obligation: Docket ID No. EPA-OAR–2016–0544

Dear Acting Assistant Administrator Dunham:

I write concerning the economic consequences of moving the Point of Obligation under the Renewable Fuel Standard (RFS).

I am an academic economist with expertise in biofuels, the U.S. fuel system, and methods for analyzing economic data. I am not being paid for our work on the topic of the Point of Obligation, and I do not represent any interested parties in this matter.

This letter summarizes work in five academic papers pertinent to this matter, which have been separately submitted to the docket.[1] This letter summarizes the main findings in these five papers. It also discusses the implication of these findings for the proposal to move the Point of Obligation from refiners and importers to the owner of petroleum fuel immediately prior to its blending with renewable fuel (the owner "just above the rack"). Although I have benefited from extensive discussions with the authors of these five papers about the content of those papers and the Point of Obligation, the views expressed in this letter are mine alone.

As an academic economist, my policy interest in this matter is that the RFS program be structured so that it achieves the goal of blending renewable fuels into the fuel supply with the greatest possible economic efficiency. More specifically, my interest is in whether there are economic inefficiencies under the current RFS system, and in whether there is scope for improving efficiency by moving the Point of Obligation.[2]

[1] Knittel, Meiselman, and Stock (2016a, 2016b), Pouliot, Smith, and Stock (2017), Lade and Bushnell (2016), and Li and Stock (2017). See the reference list at the end of this letter for the full citations.
[2] I use the term economic efficiency in its standard sense, which is to maximize the net benefits to society of the program. Therefore, our focus is not on economic transfers between producers of petroleum fuel and

As I explain below, from an economist's perspective, the RFS works by providing a financial incentive for producing and using renewable fuels, and a financial disincentive for using petroleum fuels. This financial incentive operates through the RIN system, whereby fuels with high renewable content receive a "RIN subsidy" and fuels with low renewable content pay a "RIN fee". Abstracting from the administrative costs of the program, the question of the economic efficiency of the RFS reduces to the question of whether the net RIN cost is being fully passed on to the producers and end consumers of renewable fuels. For corn kernel ethanol and ethanol blend fractions at or above the E10 blend-wall, the RIN value should be fully passed on to the consumer, to incentivize consumption of higher ethanol blends.

For these reasons, the empirical work in the five papers focuses on quantifying the amount of pass-through of RIN prices to final (pump) fuel prices. To gain additional insights into pass-through and market structure, this work studies fuel transactions at three key points in the supply chain: bulk wholesale transactions at exchange-traded prices; transactions at the rack; and transactions at the retail outlet (at the pump).

Summary of empirical findings of RIN price pass-through. The five academic papers reach the following conclusions:

1. There is complete pass-through in the bulk fuel (exchange-traded) market. The RFS event in bulk markets is that the seller of the fuel into the fuel supply takes on a net RIN obligation. Knittel, Meiselman, and Stock (2016a,b) find that the value of this RIN obligation is fully passed through to the exchange traded price, that is, if RIN prices go up so that the RIN obligation for a gallon of petroleum blendstock increases by 1¢, then the exchange-traded price of that blendstock (for example, the price for New York Harbor RBOB) increases by 1¢, so that the seller of the fuel fully recoups the RIN fee through an increase in the exchange-traded price. More precisely, using updated data through November 2016, Knittel, Meiselman, and Stock (2016b) estimate a RIN price pass-through coefficient of 1.12 (SE = 0.09), which is statistically indistinguishable from complete pass-through (that is, a pass-through coefficient of 1.00).

2. The next RFS event occurs at the rack, when a renewable fuel is blended into the fuel supply; this blending detaches the RIN, which can then be sold. Complete pass-through of the RIN price at the rack corresponds to passing through the market value of this detached D6 RIN. Pouliot, Smith, and Stock (2017) find that there is a great deal of heterogeneity in pass-through at the rack. In the ethanol belt in the Midwest, RIN pass-through coefficients for pass-through of detached D6 RIN prices to E10 prices at the rack at the rack are very nearly 1. The pooled

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biofuels, or among producers of petroleum fuels, except to the extent that those transfers induce *net* costs to society. Similarly, in this work we do not consider what the appropriate volumetric or percentage obligation is; rather, we ask, for a given RFS obligation (for example, the 2017 percentage obligation), is that standard being met as efficiently as possible, in the sense of minimizing the net costs to society of achieving a given standard.

coefficient for major Midwestern cities is 0.88 for branded fuel and 0.99 for unbranded fuel. These estimates are which is statistically indistinguishable from 1: the respective 95% confidence intervals are [0.74, 1.02] and [0.83, 1.16]. In contrast, RIN pass-through to E10 prices on the East coast is incomplete, with an average pass-through coefficients of 0.38 (branded, 95% confidence interval [0.13, 0.63]) and 0.50 (unbranded, 95% confidence interval [0.14, 0.85]). Using a population-weighted average, they estimate a national average pass-through coefficient of RIN prices to E10 of 0.63 for branded fuel (95% confidence interval [0.23, 1.03]) and a 0.92 for unbranded fuel (95% confidence interval [0.70, 1.14]). The population-weighted national average estimates have very wide confidence intervals, with values that include complete pass-through and values that include pass-through coefficients substantially less than one.

3. The final step in the fuel supply chain is sale to the end consumer at the pump. For retailers who purchase blended fuel at the rack, as is done for essentially all E10 and for much E85, there is no RFS event between the purchase of the fuel at the rack and sale at the pump. Thus the question of pass-through at the pump is a question of whether there is full pass-through of the rack price to the pump price. A large body of empirical literature shows that there is full pass-through for E10 from the rack to the pump, and this finding is confirmed by Li and Stock (2017) using data from Minnesota gas stations. However, there is considerable heterogeneity in pass-through of E85 rack prices to E85 pump prices. The main driver of this heterogeneity appears to be the extent of local competition in the E85 market, that is, whether an E85 retailer has nearby competitors who also offer E85. In regions with high E85 station density, pass-through from rack to pump is nearly complete, however in regions with low E85 station density, rack-to-pump pass-through is less than complete and can be as low as 0.5 (Lade and Bushnell (2016), Li and Stock (2017)).

4. Taken together, these findings provide the following characterization of pass-through to the end retail consumer.

    a. In regions with well-developed retail E85 markets, both higher blends and E100, which can be used for splash-blending of E85, are available at the rack. This competition among higher blends, and the option of splash-blending, leads to full RIN pass-through at the rack. In addition, in areas with competitive retail markets for E85, rack prices are passed through to pump prices of E85. In these regions with local E85 competition and demand for higher blends, there is complete pass-through to final consumers and the RFS is working efficiently. This situation characterizes mature metropolitan markets for higher blends, such as the Twin Cities, Des Moines, and Chicago.

    b. In regions with high demand for higher blends and E100, but low levels of local competition in retail E85, there tends to be complete pass-through at the rack but incomplete pass-through from rack to retail. In such regions, retailers act as a local monopolist in the E85 market. These retailers can charge an additional premium on E85 and can therefore retain some of the rack price discount of E85, relative to E10. Because this discount is largely driven by fluctuations in RIN prices, these markets are characterized by full RIN pass-through to E10 consumers, but not to E85 consumers. In this setting, the RFS is working efficiently in the E10 market, but not in the market for higher blends. This situation would reasonably characterize rural areas and small towns in the Midwest ethanol belt.

c. In regions with little sales of higher blends, there is little or no availability of higher blends or E100 at the rack. Relative to regions with well-developed markets for higher blends, there is less RIN pass-through at the rack (to E10 and E85), and even less RIN pass-through from bulk wholesale to retail because of the lack of local competition. In these regions, the full RIN value is not passed on to consumers of either E10 or E85. This situation would reflect much of the country, including the population centers of the East Coast.[3]

The remainder of this comment is organized as follows. I first review the economics of the RFS and why the pass-through of RIN prices to pump prices of blended gasoline is a measure of the economic efficiency of the RFS. Next, I summarize the five papers in more detail. I conclude with a discussion of the implications of this work for the proposal of moving the Point of Obligation.

Economics of the RFS and the Pass-Through of RIN prices.

The goal of the Renewable Fuel Standard program is to increase the volumes of renewable fuels in the U.S. fuel supply, as laid out in the Energy Independence and Security Act of 2007 and as explained in the preambles of multiple RFS rulemakings. Because the statutory cap of 15 billion gallons of conventional renewable fuels has been hit as of the 2017 final RFS rulemaking, further increasing the volume of renewable fuels in the fuels supply now means increasing the volumes of advanced fuels, in particular second-generation advanced fuels with potential for substantial future growth.

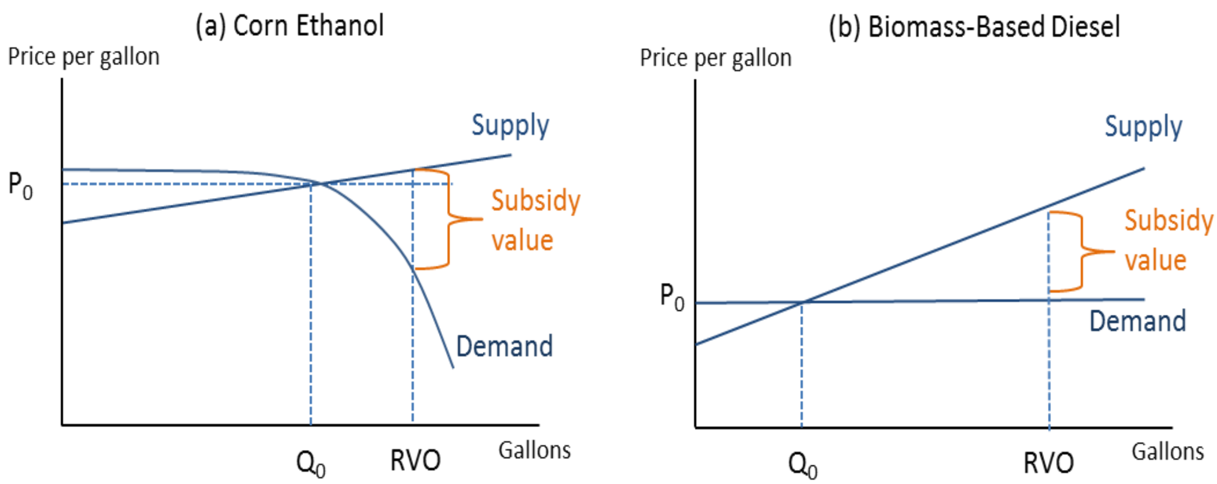
In economic terms, the RFS operates through the RIN system. A petroleum fuel blended incurs the requirement that a RIN bundle (determined by that year's RFS proportional obligation) be retired with the EPA, which serves as a fee on petroleum fuels. RINs can be sold by the owner of renewable fuels when they are blended with petroleum fuel, and the revenue generated by that sale provides a subsidy for the production and consumption of renewable fuels.

In theory, in competitive markets, the RIN subsidy could go to producers of renewable fuels or to end consumers of renewable fuels, or both. Figure 1 (which is Figure 4 in

[3] Results for the West coast in Pouliot, Smith, and Stock (2017) are inconclusive because of the highly volatile rack spreads, especially in California, as discussed in that paper.

Knittel, Meiselman, and Stock (2016)) illustrates two different cases: biodiesel and corn ethanol. At current blending ratios, biomass-based diesel is well below any operational blend wall and can be blended smoothly into the diesel supply, so a gallon of biodiesel receives the same market price as petroleum diesel. However, biodiesel is more expensive to produce, so under perfect competition the RIN subsidy accrues to the producer. For corn ethanol, the supply curve is effectively flat in the narrow region at and just above the blend wall, but the demand curve drops steeply because flex fuel vehicle owners require an incentive to purchase ethanol as E85. In this case, under perfect competition the subsidy passes through entirely to the consumer.

Figure 1. Incidence of the RIN subsidy in a competitive market for fuels.



Source: Knittel, Meiselman, and Stock (2017), Figure 4.

This reasoning motivates focusing on pass-through of RIN prices to retail E85 prices for gasoline. Because the supply curve of ethanol is effectively flat in the small range at and above the E10 blend wall, but above the E10 blend wall demand drops off sharply, effectively all of the RIN subsidy should be passed on to consumers. This logic rests on the basic economic principle that a seller of a good in a competitive market sets price equal to marginal cost. In the case of blended gasoline, that price is the price of the wet (physical) fuel, plus any RIN fee or minus any RIN subsidy. A finding that RIN price pass-through is incomplete somewhere along the supply chain is indicative of at least some firms having market power along the supply chain. In that case, end consumers only partially see the RIN subsidy, and instead the RIN value is providing economic rents to producers with market power.

If RIN pass-through is complete, then the RFS program is operating efficiently, in the sense of minimizing the net costs to society of the program, given the fractional obligation.[4] This concept of economic efficiency nets out costs by one obligated party that are a transfer to another party under the RFS. More specifically, some obligated

[4] This is equivalent to maximizing the net benefits of the program, given a predetermined percentage obligation. Under RFS cost-benefit calculations, the benefits arise from using the renewable fuels. Holding constant the fraction of renewable fuels, maximizing net benefits is equivalent to minimizing net costs.

parties have alleged that they are financially disadvantaged by the current Point of Obligation, relative to other obligated parties; but any disparate effect of the Point of Obligation on obligated parties is not our primary concern because the transfers among obligated parties are netted out.

Summary of main pass-through findings

The five papers summarized here examine RIN pass-through at three steps along the fuel supply chain.

The first (upstream) step is when an importer or refiner (obligated party) sells bulk refined petroleum fuels at the bulk wholesale level for use as a surface transportation fuel. At that point, the obligated party incurs the obligation to retire a RIN bundle with the EPA, where the bundle is determined by the current year's fraction obligation. This step is examined by Knittel, Meiselman, and Stock (2016a,b).

The second (midstream) step occurs when the petroleum fuel is blended with a renewable fuel at a terminal for sale as a blended fuel (E10, E15, or E85). At this stage, the RIN is detached from the renewable fuel, and the owner of the RIN (typically the owner of the renewable fuel just above the rack) can sell the RIN. This step is examined by Pouliot, Smith, and Stock (2017).

The third step (downstream) step is sale to the final consumer at a retail outlet. There is no RFS RIN obligation or generation at this stage. For blended fuels purchased at the rack, as is the case with E10, RIN pass-through is equivalent to full pass-through of rack prices to pump prices. For fuels splash-blended at the rack, or if the fuel is purchased by the retailer above the rack, the retailer can also be the owner of the detached RIN, in which case the second and third steps are in effect merged. Pass-through of RIN prices to final pump prices of higher blends is studied by Lade and Bushnell (2016) and Li and Stock (2017).

A. Bulk Wholesale

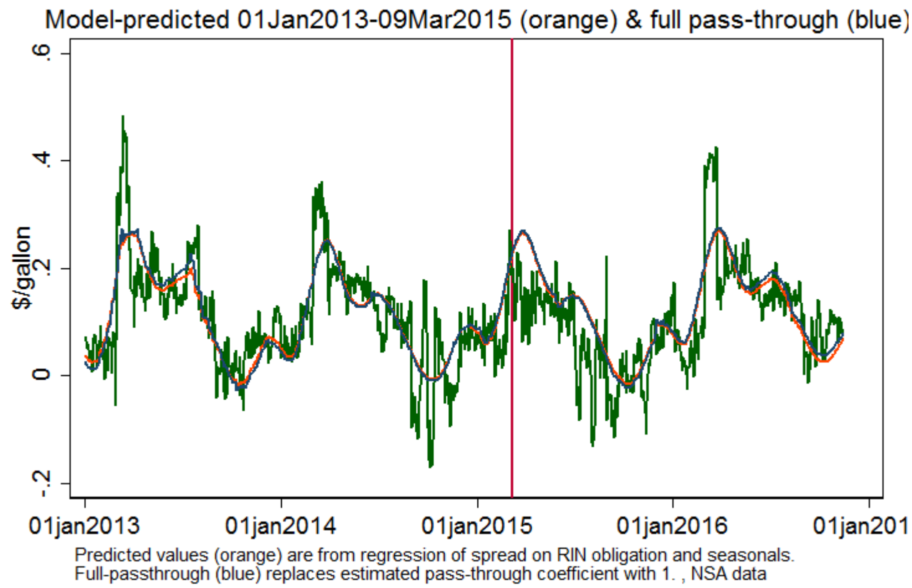
Knittel, Meiselman, and Stock (2016a) use regressions to examine the graphical analysis of Burkholder (2015). The analysis of Knittel, Meiselman, and Stock (2016a) uses data from January 1, 2013 to March 9, 2015. Knittel, Meiselman, and Stock (2016b) update that analysis using data through November 14, 2016.

The strategy of all three papers is the same, which is to compare bulk wholesale prices of pairs of petroleum fuels, where one fuel is obligated under the RFS and one is not. For example, one of the spreads examined in all three papers is the spread between New York Harbor RBOB and Rotterdam EuroBOB. The two fuels are chemically very similar, but because the NYH RBOB is sold into the U.S. fuel supply, it incurs a RIN obligation, whereas the Rotterdam EBOB does not. Under perfect competition, the NYH RBOB price should incorporate the RIN fee, whereas the Rotterdam EuroBOB would not. Thus an increase in RIN prices that increased the RIN bundle on petroleum blendstock by

$0.05/gallon should result in an increase in the NYH RBOB – Rotterdam EuoroBOB spread by $0.05.

Figure 2, which is Figure A (right panel) in Knittel, Meiselman, and Stock (2016b), shows the daily NYH RBOB – Rotterdam EuroBOB spread, Jan. 1, 2013 – November 14, 2016. The solid lines are the predicted values of the spread based solely on RIN prices and seasonals, based on the estimates in Knittel, Meiselman, and Stock (2016a), which use data through March 9, 2015. As suggested by Figure 2, these BOB spread relationships estimated through March 9, 2015 hold up in the post-March 10, 2015 sample.

Figure 2. New York Harbor RBOB – Rotterdam EBOB spread and predicted values



Knittel, Meiselman, and Stock's (2016b) econometric analysis of five refined product spreads – one fuel obligated, one not – result in a pooled estimate of pass-through coefficients of 1.12 (standard error = 0.09), which is not statistically different the complete pass-through value of this coefficient, 1.0.

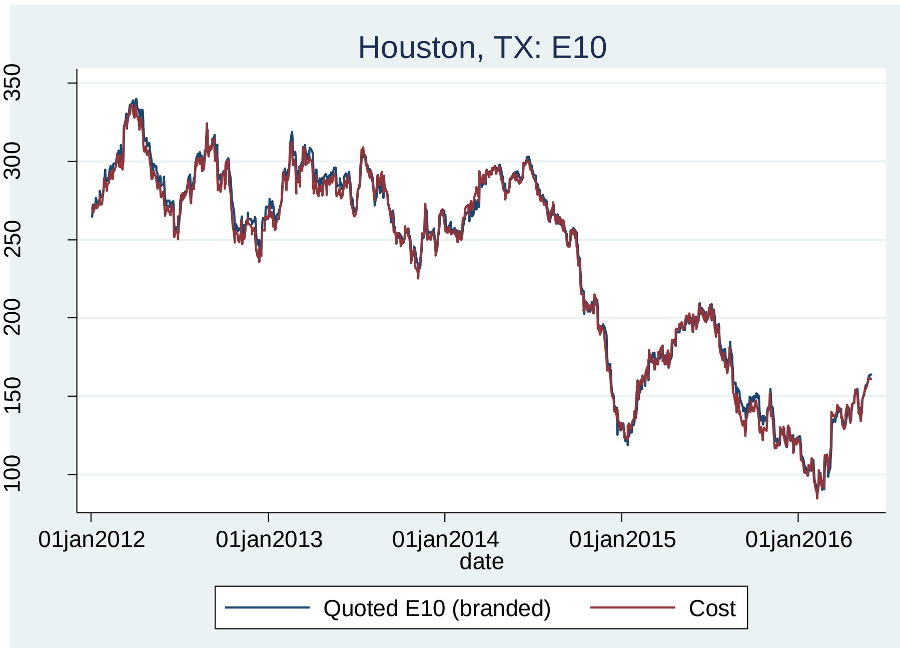
Knittel, Meiselman, and Stock (2016a) also used two crack spreads, using the logic that crude oil is not obligated, but refined gasoline blendstock is. Because the crack spread moves for many reasons in addition to RIN prices, and RIN fee movements are small compared to overall fluctuations in crack spreads, Knittel, Meiselman, and Stock's (2016a) original estimates are noisy. Knittel, Meiselman, and Stock (2016b) show that they are also not robust to extending the sample period. At least one contributing factor in the Los Angeles RBOB – Brent spread was the Exxon-Torrance refinery fire, which produced high crack spreads through the fall of 2015, a period when RIN prices were relatively low. Knittel, Meiselman, and Stock (2016b) conclude that the use of crack spreads to estimate RIN price pass-through is less reliable than the use of refined product spreads.

B. At the rack

The RFS event at the rack is the detachment of the RIN from the blended renewable fuel, at which point the RIN can be retired or sold. Thus, the marginal cost of fuel at the rack is the sum of two components: the upstream cost of the bulk fuel (e.g. RBOB exchange price and Ethanol exchange price), and the value of the detached RIN.

Pouliot, Smith, and Stock (2017) use daily data from OPIS on rack prices of blended gasoline and pure ethanol to estimate pass-through at the rack. They find evidence of complete pass-through of the wet fuels component of the marginal cost. This finding is illustrated in Figure 3, which shows the OPIS city average rack price of E10 in Houston and the wet-fuel cost of E10 based on bulk fuel market prices. The two prices move essentially one-for-one.

Figure 3. Houston average E10 rack price and the cost of the constituent fuels based on bulk exchange prices.



In contrast to full pass-through of wet fuel prices, Pouliot, Smith, and Stock (2017) find heterogeneous pass-through of RIN prices to blended fuel prices which, on average, is incomplete:

1. Using the 20 major cities in their data set, they estimate a population-weighted national average pass-through of 0.63 for branded fuel; however, this coefficient is imprecisely estimated, with a 95% confidence interval of [0.23, 1.03], which includes complete pass-through.

2. There is considerable heterogeneity in pass-through. This is illustrated in Figure 4 (also Figure 4 in their paper), which shows estimated pass-through coefficients at the rack for different groups of racks.

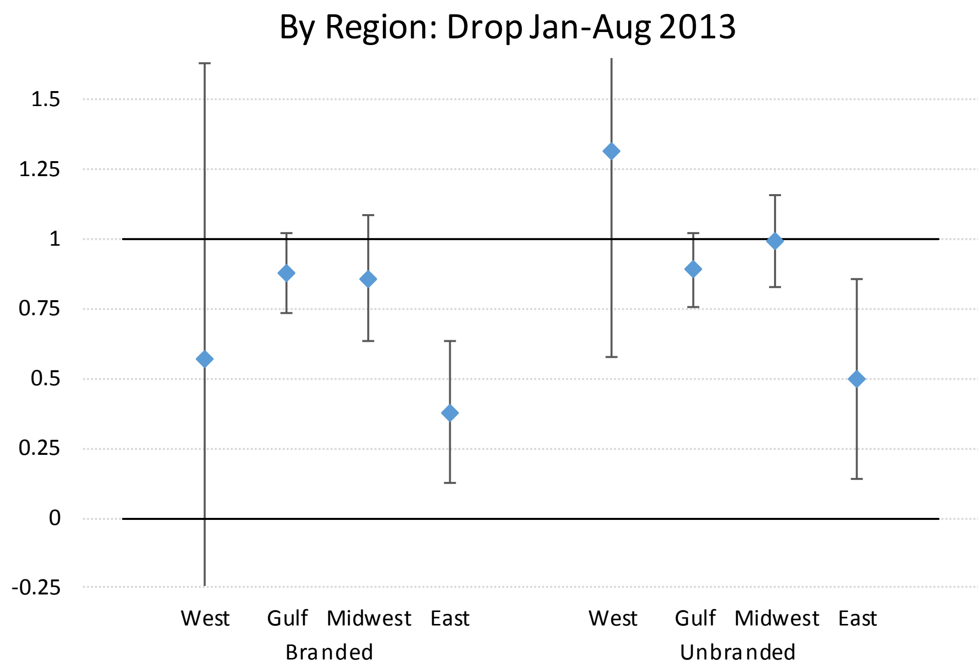
    a. In the Gulf and Midwest – the ethanol belt – pass-through at the rack is complete or nearly so, with an average branded pass-through in the Midwest of 0.86 (95% CI [0.63, 1.09]).

    b. In the East, RIN pass-through is incomplete, with an average pass-through coefficient of 0.38 (95% CI [0.13, 0.63]).

    c. Pass-through in the West is also estimated to be incomplete, but for Western racks the pass-through coefficient is very imprecisely estimated. This imprecision is due to the high volatility and persistence of Western rack spreads, for which RIN values are only a small part of the rack spreads.

    d. Pass-through is greater for unbranded E10 than for branded E10, and it is greater when there are multiple suppliers of higher blends (including E85) at the rack (Figure 4, lower panel). For branded fuels, pass-through of E10 is statistically indistinguishable from 1 if the number of suppliers of E100 plus the number of suppliers of branded higher blends at the rack exceeds 5. As Figure 5 shows, the racks in the Pouliot, Smith, and Stock data for which there is high availability of blended fuels or E100 at the rack are in the Gulf and Midwest.

Figure 4. Average RIN pass-through coefficients from bulk wholesale prices to rack prices for E10 (bars denote 95% confidence intervals)



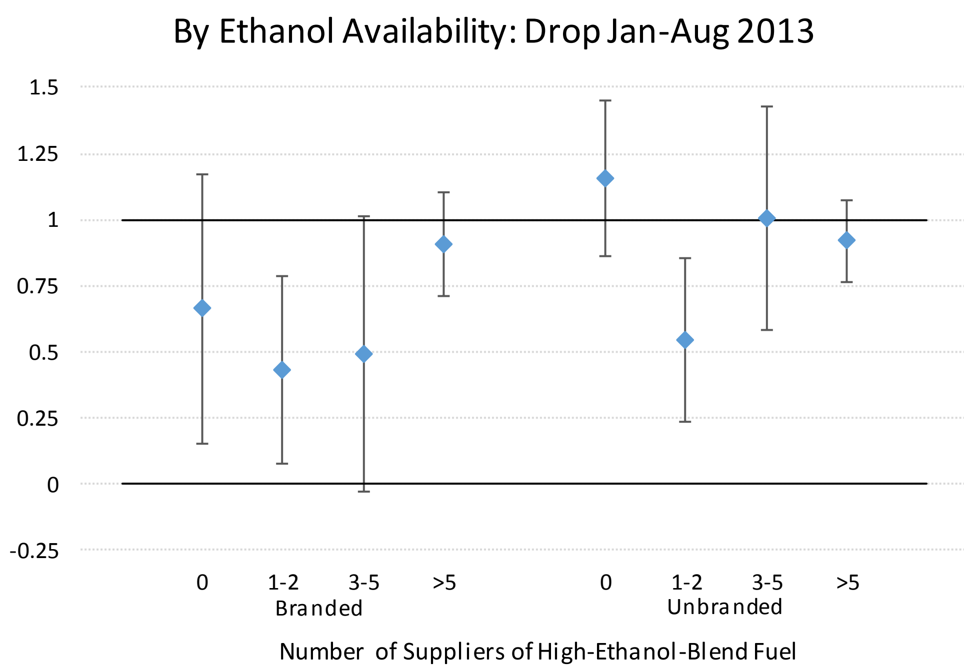
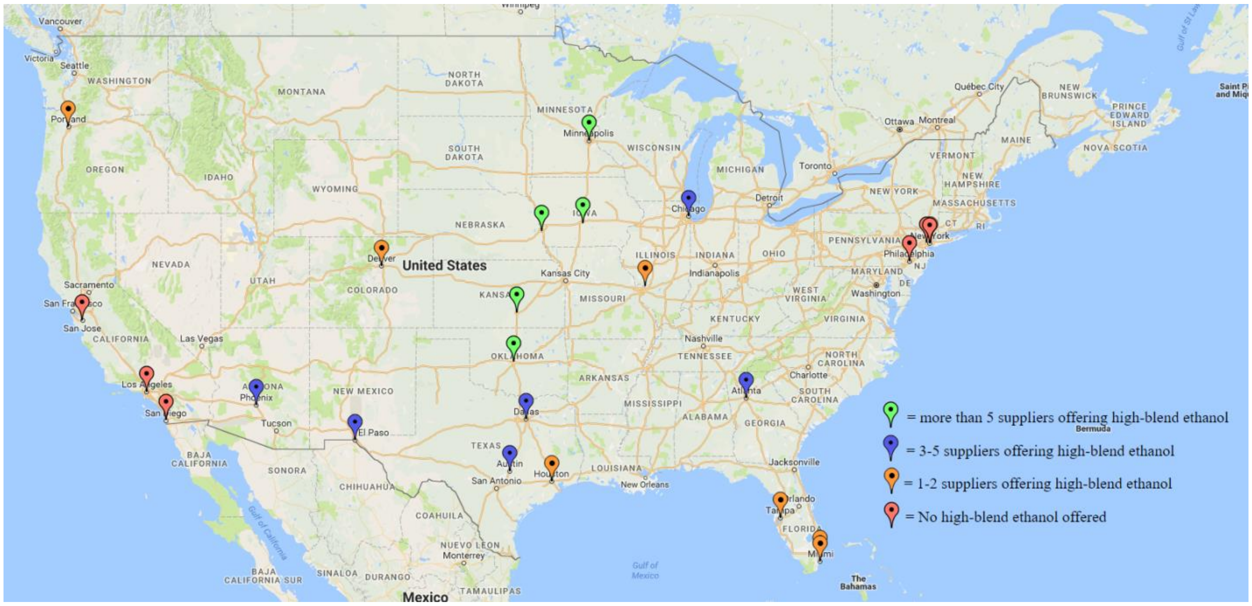


Figure 5. Racks in Pouliot, Smith and Stock data set, by number of suppliers offering blended higher blends and/or E100 at the rack (major cities only)



The data set in Pouliot, Smith, and Stock is comprised of 216 active terminals. As Table 1 shows, of these terminals, 24% offer higher blends. This fraction likely overstates the fraction of terminals nationally that offer higher blends, because the terminal sampling scheme in Pouliot, Smith, and Stock intentionally oversamples terminals in the ethanol belt. Still, it is instructive to look at the terminals offering higher blends by the owner's obligation status under the RFS, and by whether the terminal is RIN long or RIN short.[5] As shown in Table 1, no higher blends were offered at terminals owned by RIN long obligated parties. Among terminals operated by RIN short obligated parties, 17% offered higher blends. The category of terminal most likely to offer higher blends is terminals owned by non-obligated parties (42%).

[5] RIN long/RIN short terminal owner classifications are from Ronald Minsk, Comments about EPA Proposed Denial of Petition, February 22, 2017, Table 3.

Table 1. Availability of higher blends at terminals by rack owner status in Pouliot, Smith and Stock terminal data

Terminal Owner Classification	Number of terminals	Number offering high-blend fuels	Percent offering higher blends
RIN Long	48	0	0%
RIN Short	35	6	17%
Not obligated	84	35	42%
Obligation unknown	49	10	20%
Total	216	51	24%

Notes: A terminal is classified as having higher blends if, for at least 250 days a year during January 9, 2013 – May 31, 2016, at least one rack supplier offered from E60 up to E100. To be included in this count, E10 must have been offered for at least 250 days a year by at least one rack supplier during this period. The sample of terminals in Pouliot, Smith, and Stock oversamples the ethanol belt so the totals and percentages are not nationally representative. Among the terminals owners used to construct Table 1 here, the classifications are: RIN long: BP Oil, Chevron, Shell/Motiva, Exxon Mobil; RIN short: Citgo, Marathon, Phillips, Valero, Western; Not obligated: Buckeye, Kinder Morgan, Magellan, Nustar, Transmont; Obligation unkown: Flint Hills, Sopus, SPMT, Tesoro, Calumet, CARBO, Global, Sinclair, other (22 entities that own a single terminal in the data set).

C. At the pump

Lade and Bushnell (2016) and Li and Stock (2017) examine RIN price pass-through to pump prices for higher blends. Lade and Bushnell (2106) use weekly observations on E85 retail prices at 450 retail stations in Minnesota, Iowa, and Illinois; for their wet fuel costs, they use exchange-traded bulk fuel prices. Li and Stock (2017) use monthly data on 274 retail stations in Minnesota on E85 and E10 retail prices; for their wet fuel costs, they use rack prices of blended fuels. Lade and Smith's data set heavily represents urban stations, whereas Li and Stock's data has a large number of rural stations.

Taking into account the differences in the two data sets, the two papers reach similar conclusions:

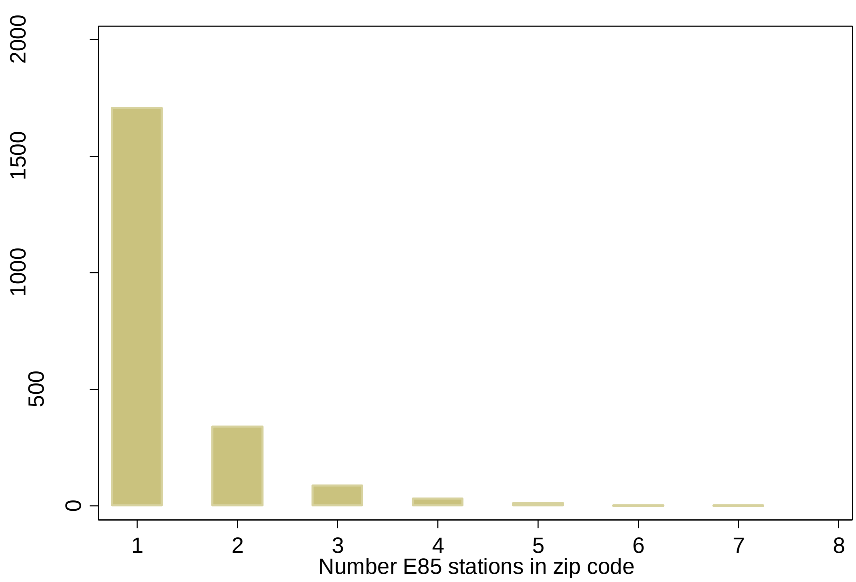
1. There is a high degree of pass-through of blended fuel prices at the rack, to pump prices, in areas that have a high density of retail stations that sell E85. Lade and Bushnell estimate RIN pass-through along the full supply chain of 1.08 (standard error = 0.18). When Li and Stock restrict their data to the Twin Cities (specifically, Hennepin and Ramsey counties in Minnesota), they estimate RIN pass-through along the full supply chain of 0.80 (standard error = 0.05). Despite the seemingly large differences in estimated pass-through, these estimates are not statistically different from each other.

2. Both papers find that the degree of pass-through depends on the amount of local competition among E85 retailers. One illustration of this finding is Li and Stock's estimate of pass-through in the Twin Cities vs. outside of the Twin Cities. Their estimate of RIN pass-through along the full supply chain outside the Twin Cities is 0.31 (standard error = 0.05). They attribute this low pass-through rate mainly to pass-through of approximately half from blended rack prices to retail prices of higher blends (specifically, E85-E10 spreads at the rack to E85-E10 spreads at the pump), combined with partial RIN pass-through of 0.74 (standard error = 0.06) at the rack outside the Twin Cities.

Combining these results at the three steps along the supply chain leads to the summary provided in the first section of this letter. In particular, these results indicate that, in well-developed markets for higher blends, RIN pass-through at the rack is effectively complete and RIN (and wet fuel cost) pass-through from rack to pump is effectively complete. In these areas, consumers are on average receiving the full RIN subsidy and the RFS is economically efficient in the sense defined above.

This said, most E85 stations nationally are not in competitive E85 retail markets. Figure 6 is a histogram of the number of E85 stations by zip code, using stations in the Alternative Fuel Data Center Web site (accessed February 20, 2017). Of the approximately 43,000 zip codes in the United States, 1707 have one E85 station, 340 have two E85 stations, and only 131 have three or more E85 stations; the rest have no E85 stations.

Figure 6. Histogram of number of E85 retail stations in a zip code, national data



Source: Alternative Fuels Data Center and authors' calculations

Implications for the Point of Obligation

We now turn to a discussion of these results for the proposal to move the Point of Obligation under the RFS from refineries and importers when they sell petroleum fuel into the fuel supply, to the owners of the fuel at the upstream terminal gate ("just above the rack").

Ability of RIN-short entities to recoup RIN costs.

One source of concern is over the distributional effects of the RIN system in the gasoline supply chain. Recall that the RIN price is a tax on gasoline and a subsidy to ethanol. By its construction, the RIN system creates a transfer and has a distributional effect. The issue is whether some market participants benefit and others are hurt from the RIN system in a manner other than that intended. In particular, one argument is that refineries who are RIN short must purchase RINs to show compliance with the RFS and thus the RIN system lowers their profits. The most RIN-short refiners are so-called merchant refiners who do not blend any ethanol with gasoline. The flip side of the argument is that pure blenders and refiners who are RIN long profit from the RIN system because they can sell their extra RINs to create a revenue stream.

One conclusion from the analysis in Knittel, Meiselman, and Stock (2016a,b) is that RIN-short obligated parties, such as merchant refiners, recoup the cost of their RIN obligations in the bulk market on average. Because this occurs through exchange-traded and bulk wholesale prices, which go up one-for-one with the increase in the value of the RIN obligation as RIN prices change, this recouping of costs is not necessarily transparent to market participants. In particular, this recouping of costs does not appear as a balance sheet revenue item, in the way that the cost of RIN purchases appears as a balance sheet cost. This said, the combination of fluctuations in RIN prices and mismatches in timing of RIN obligation and purchases can expose obligated parties to balance sheet uncertainty even if they recoup RIN prices on average.

This logic and empirical evidence also implies that moving the point of obligation downstream will not affect the bottom line of merchant refiners that sell primarily into the bulk refined product market. The reason is that because they would no longer bear a RIN obligation, competition in the bulk wholesale fuels market would drive down the exchange-traded prices so that they still equaled marginal cost; that is, the crack spread would be reduced by the amount that the per-gallon RIN obligation is reduced. The reduction of compliance costs for a currently RIN-short obligated party would be offset one-for-one by the decline in the price it can charge for its BOB.

Will moving the Point of Obligation increase sales of higher blends at the rack and at retail?

An argument put forth by petitioners is that, under the current system, RIN-long obligated parties that own or control a terminal currently have a disincentive to detach more ethanol RINs from sales of higher blends, because doing so would drive down the value of the RINs that they currently own or that they generate through blending more E10 than they refine (as blendstock). For example, consider a RIN-long obligated party that purchases from merchant refiners at bulk exchange prices, then blends that petroleum fuel along with blendstock from its own refineries, and detaches the associated RINs.

Because this RIN-long obligated party makes money from selling RINs, actions that reduce RIN prices, in particular selling E85 at racks at its terminal, are not in its interest. According to this argument, moving the Point of Obligation to the owner of the fuel just above the rack would make all obligated parties RIN short. Thus the formerly RIN-long obligated party would now have the incentive to sell higher blends at the rack to meet its obligation (and to drive down RIN prices) instead of having an incentive not to do so.

I consider this to be the key argument concerning moving the Point of Obligation, and I make the following observations on this argument.

(1) For this argument to be valid, RIN-long parties (a) must have the ability to control which fuels are provided at the rack and (b) must have market power at the rack. Absent these two conditions, a retail chain could splash-blend E100 and E10 if the E10 were available, and with perfect competition, the RIN value would be passed on to the retailer (through the E100 price at the rack). Knowledge of the industry and the results in Pouliot, Smith, and Stock suggest that conditions (a) and (b) hold.

   (a) My understanding is that many terminals, especially those on the West and East Coasts are owned by obligated parties or their subsidiaries. In addition, even at racks owned by non-obligated parties, decisions to make investments for provision of E100 or higher blends require support of the fuel providers currently using the terminal. Thus, a RIN-long obligated party can exercise control of fuels provided at its own terminals and even at terminals owned by a third party.

   (b) Our findings of incomplete pass-through at the rack on the East and West coasts aligns with only a few, or no, higher blends being offered at those terminals. Not providing higher blends or E100, or rack and storage space to retailers who buy above the rack, eliminates what Pouliot, Smith, and Stock finds to be an important channel for RIN pass-through, which is RIN price arbitrage at the rack.

   (c) Table 1 above shows that, of the 46 terminals in the Pouliot, Smith, and Stock data set that are owned by obligated parties, none offer higher blends or E100 at the rack.

(2) This argument also requires that it be in the self-interest of a RIN-long party that own or control a rack not to provide higher blends at its rack. I believe that this condition plausibly holds in this market, either for parties that hold an existing stock of RINs or for RIN-long parties that exercise market power at the rack. I first lay out the our reasoning in the case that there are negligible investment costs associated with providing higher blends at a rack, then consider the case that there are investment costs. Throughout, I suppose that the RIN-long party either owns or controls the terminal, and that the party is RIN-long because it blends more fuel into E10 than it refines.

   (a) First suppose that there are no investment costs, that the party holds no existing carry-over RIN inventory, and has local market power at the rack so that it is able to pass-through only a fraction of the RIN value. Then two considerations are in play when this obligated party considers offering higher blends at its rack. On the one hand, the additional RIN generated by selling a higher blend will have market value, and because the party has local market power at the rack, it will be able to retain part of that RIN value. On the other hand, increasing the number of RINs in the system by blending E85 will decrease the price of D6 RINs, which decreases the party's profits on the fraction of the RIN value it is able to retain on its RINs generated through its normal E10 operations. If RIN values depended only weakly on the number of RINs detached, the first of these effects (generating a RIN from selling E85) would dominate; however, for volumes above the blend wall, RIN prices depend strongly on the amount of RINs available. Thus, for these RIN-long parties, if their net RIN detachment is sufficiently large, and their pass-through rate is sufficiently low, it will be in their own self-interest not to generate additional RINs by offering E85 at their rack. Moreover, it is not in their self-interest to allow others to splash-blend at the rack (that is, not offer E100 at the rack) or to lease space to parties who would purchase E10 and E100 above the rack and splash blend.

(b) The argument in (2)(a) is strengthened if the RIN-long obligated party has a carryforward inventory of RINs, because generating an additional RIN from higher blend sales devalues that additional stock.

(c) The argument in (2)(a) is strengthened if there are substantial investment costs that must be paid to offer higher blends and/or E100 at the rack. The magnitude of these investment costs is portrayed differently by different market participants. Our understanding is that, at some terminals, they may be as modest as a software upgrade. At other terminals, they might require additional piping, a blender upgrade, a new blending manifold, or possibly even new ethanol tank capacity. Overall, my impression is that these costs are fairly minor, although they might be substantial at some terminals.

(d) An additional consequence of a RIN-long obligated party selling higher blends at its rack is that doing so could result in competition at the rack and reduce its ability to retain part of the RIN value, thus eroding its profits. The evidence in Pouliot, Smith, and Stock shows that there is more RIN pass-through at racks with multiple sellers of higher blends, than at racks with no or few sellers of higher blends. Pouliot, Smith, and Stock do not demonstrate that this correlation is causal; still, it is plausible that increasing competition for higher blends at the rack would increase pass-through.

(e) The logic in (2)(a) does not depend on there being collusion among terminal owners or RIN-long parties, nor does it appeal to long-term gaming among parties. It hinges on
   (i) A particular terminal ownership structure (owned or controlled by RIN-long parties),

(ii) Market power at the terminal. This market power can arise because of local history of terminals being open or closed, the very high fixed cost of opening a third-party terminal, and local features of the service area of terminals.

(iii) A very steep relationship between the D6 RIN price and the volume of the RIN obligation in excess of the RIN capacity of E10. The history of RIN prices indicates that relationship is in fact very steep, resulting in RIN prices of $0.50 to $1.00 for conventional RVOs that entail ethanol consumption on the order of hundreds of millions of gallons above the RIN capacity of E10. In effect, this very steep relationship provides every entity generating D6 RINs through the sale of higher blends into entities with market power in the RIN market, that is, the power to change the D6 RIN price.

(3) The foregoing argument about RIN-long parties having an incentive not to sell higher blends at their terminals rests on those parties being RIN long. Changing the POO would make those parties RIN short. Thus the key channel of this argument, which is retaining the economic profits from RIN sales (the retained RIN value), would no longer be present. Thus all parties, including currently RIN-long parties, would shift from having a disincentive to offer higher blends at the rack under the current Point of Obligation, to having an incentive to offer higher blends or E100, because all sellers of petroleum fuel would be RIN short if the conventional fuel obligation exceeds the ethanol capacity of E10.

(4) This said, there are several reasons why changing the Point of Obligation might not substantially increase the efficiency of the RFS, or substantially increase the amount of higher blends available at retail.

(a) Terminals that currently have local market power would continue to do so. While the formerly RIN-long owners of those terminals would, after the change, have an incentive to offer higher blends at the rack, because of their market power I would expect that there would continue to be incomplete pass-through of RIN prices to rack prices of E10 and higher blends. That is, while there might be more availability of higher blends, there would not necessarily be more pass-through, as long as the terminal remained closed.

(b) As shown by Lade and Bushnell (2016) and Li and Stock (2017), the ability of RIN prices to pass through to retail depends on how competitive is the local retail market for E85. Outside of some urban areas in the ethanol belt, the evidence is that this market is not competitive because E85 retailers are thinly spread out. Thus, even in the most optimistic interpretation of changing the Point of Obligation, I would expect modest effects on the availability of competitively priced higher blends at retail.

(c) An integrated RIN-long obligated party, which owns or has under contract retail outlets, currently has a disincentive to provide higher blends at that station, for the reasons outlined in (2)(a) (it is not in their short-run best interest to do so). This argument is strengthened because of the substantial investment costs of installing blender pumps, especially if it entails adding a tank at the retail outlet (logic of (2)(b)). This incentive would shift were the point of obligation to be moved to the owner of the fuel above the rack, because these integrated obligated parties would now be RIN short. This said, it would continue to be in the interests of the obligated parties to install blender pumps in a way that maximizes profits, which plausibly would mean upgrading stations spatially so as not to enhance local E85 retail competition. This way, more of the RIN value could be harvested at retail.

(d) The investment costs for E85 at retail are large, especially if they entail breaking concrete. As a result, I would expect that direct interventions at retail, such as the USDA BIP program, would be a more direct way to stimulate sales of higher blends than changing the Point of Obligation, especially if the associated subsidies for infrastructure upgrades were targeted to achieve station density in specific regions, rather than spread across the country and creating more retail outlets with local market power.

(e) Terminals are either open or closed. An open terminal allows access to its tanks and has multiple racks offering a menu of fuels. I would not expect the decision to change the point of obligation to result in closed terminals becoming open. Terminal openness provides for arbitrage opportunities for rack sellers and for retailers demanding fuel. At a closed terminal, fuel buyers cannot lease tank space and must purchase the blended fuels offered by sellers at the terminal. Potential rack sellers may be unable to perform an arbitrage if they cannot get tank space. A terminal, which has the opportunity to exert market power by limiting sales, can do so only by being closed to limit competition from within its own terminal. Opening its facility would mean eroding its market power, regardless of the location of Point of Obligation. Because changing the Point of Obligation from refiners to rack sellers in closed terminals would not impact a terminal's local market power, doing so would not create a new incentive for the terminal to open itself up.

(5) A remaining puzzle in this story is that some rack sellers that are RIN short do not offer higher blends at the rack, even though they have an incentive to do so: detaching a RIN from selling higher blends has the twin advantage of avoiding purchasing a RIN to meet its obligation, and driving down the RIN price because of the steep RIN price curve. But in Table 1 above, only 6 of the 35 terminals owned by RIN-short parties offer higher blends. One explanation is that the RIN-short party might not have long-term contractual relations with local retailers that would provide a retailer with the certainty needed to justify installing a blender pump; however, a RIN-short entity should be able to develop such a relationship, for example with a retail chain that wanted to establish an E85 presence. Another explanation for this puzzle is that there is insufficient demand at retail in the service area of these terminals. But if that is the reason for the fuels not being offered at these racks, it simply reinforces the comment above that policies targeted at increasing the number and density of retail E85 outlets would be more effective at increasing pass-through and stimulating sales of higher blends than changing the Point of Obligation.

(6) There is a risk that moving the POO could have some unintended consequences.

(a) Moving the Point of Obligation could reduce competition at the rack by removing some entities that currently buy fuel above the rack. Specifically, at an open rack, currently a non-obligated party can buy BOB and E100 above the rack, lease storage space, pay the terminal operator a fee for blending, and retain and sell the RIN. This provides a channel for arbitrage of rack prices, which serves to increase competition at the rack. We do not have data on the prevalence of this strategy, but it is our understanding that this is used, at least occasionally, by some retail chains to reduce rack markups and to harvest the RIN value generated at blending E100. Such entities would become obligated parties were the Point of Obligation to be changed to the owner of the fuel just above the rack. Becoming an obligated party would impose additional administrative compliance costs and legal risks, which could result in such entities ceasing to purchase above the rack and thus reducing competition at the rack. This said, one can also imagine third-party entities emerging to handle the additional compliance burden for such entities, which would mitigate this effect. I do not have data to quantify this risk that moving the Point of Obligation would actually decrease competition, and thus decrease pass-through, at the rack.

(b) Finally, I understand that moving the Point of Obligation would entail a substantial administrative burden on the EPA. That burden would likely crowd out other important work on the RFS. In particular, I expect it will shortly be necessary to reset the EISA statutory table. In my view, the reset provides substantial possibilities for improving the functioning of the RFS and providing certainty to industry participants. In my view, it would be undesirable for the substantial effort associated with moving the Point of Obligation to crowd out thoughtful and important work on other RFS priorities such as the reset and pathway approvals.

Sincerely,

James H. Stock

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