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Department of Agricultural and Consumer Economics, University of Illinois Urbana-Champaign

What's Up with RINs Prices?

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RINs prices have been making headlines in recent months, with prices at times crossing the psychologically important $1 per gallon mark. Echoing earlier complaints (*farmdoc daily*, July 19, 2013; December 4, 2015), this has caused some to question whether the RINs market is manipulated or even outright fraudulent. For example, on July 28 (as reported by OPIS) Jack Lipinski, CEO of CVR Refining stated that, "RINs have become a black pool allowing exempt parties, and even speculators, to drive prices to confiscatory levels. We believe the market may be cornered, the effect of which will be to bring small merchant refiners to the brink of bankruptcy while unjustly enriching speculators and exempt blenders." A few days later, (again as reported by OPIS) the President of the Renewable Fuels Association (RFA), Robert Dineen, stated in a letter to the U.S. Commodity Futures Trading Commission (CFTC) and the Environmental Protection Agency (EPA) that, "The recent spike in RIN prices appears contrived and driven by something other than basic supply-demand fundamentals…Indeed, the spike raises renewed questions about potential manipulation of the market by entities who may believe the specter of higher RIN prices supports their political efforts to repeal or reform the RFS." Well-known investor Carl Icahn upped the ante in August by arguing that the RINs market had become "the mother of all short squeezes" for independent refiners. These are serious charges about the operation of the RINs market, particularly in light of the fact that RINs prices represent the marginal cost of complying with RFS mandates. The purpose of this article is to analyze recent movements in RINs prices and provide some historical perspective regarding the manipulation charges.

Analysis

The starting point for the analysis is to review recent RINs price movements. Figure 1 shows the price of 2016 vintage D4 biodiesel and D6 ethanol RINs over November 2, 2015 through September 30, 2016. A 2016 "vintage" RIN indicates the RIN is generated within the 2016 calendar year and can be used for RFS compliance in 2016 and 2017. This means that any prices reported in 2015 for 2016 vintage RINs are forward contract transactions rather than spot transactions. The chart includes a vertical line representing the date of the EPA's release of the preliminary RFS rulemaking for 2017, the latest from the EPA. Both D4 and D6 prices have been volatile since the May rulemaking. D4 and D6 prices on the day before the release were $0.84 and $0.79 per gallon, respectively, rose to a peak of $1.05 and $0.97 on July 26, dropped sharply into mid-August, and then D4 prices recovered in recent weeks back above $1 and D6 prices near $0.90. So, D4 prices are now up a bit less than 30 percent and D6 prices are up 20 percent since the May EPA release. While these are indeed large price moves, they are by no means

unprecedented. For example, the volatility of prices during the last quarter of 2015 and first quarter of 2016 was even larger on a percentage basis.

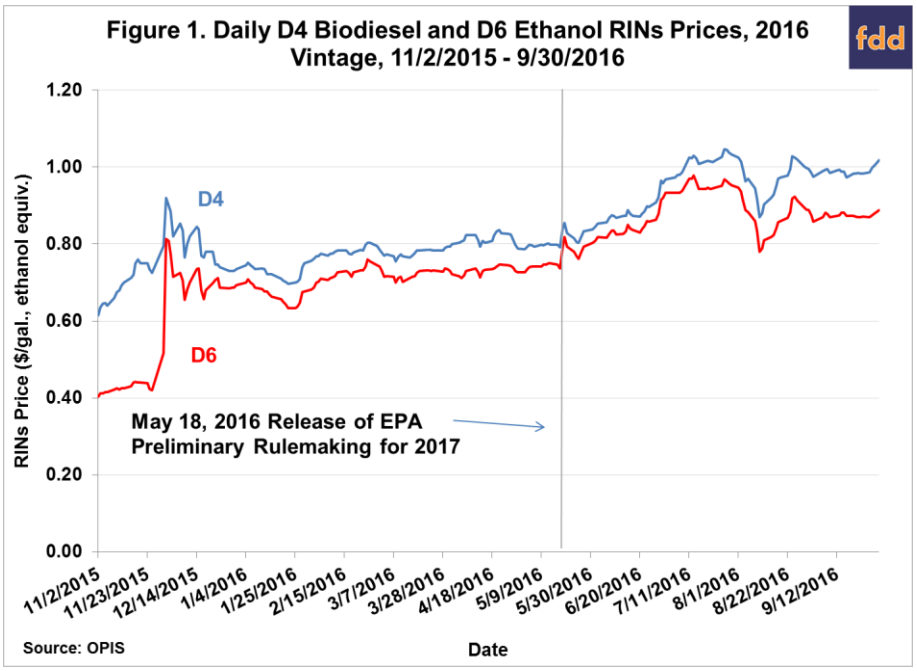
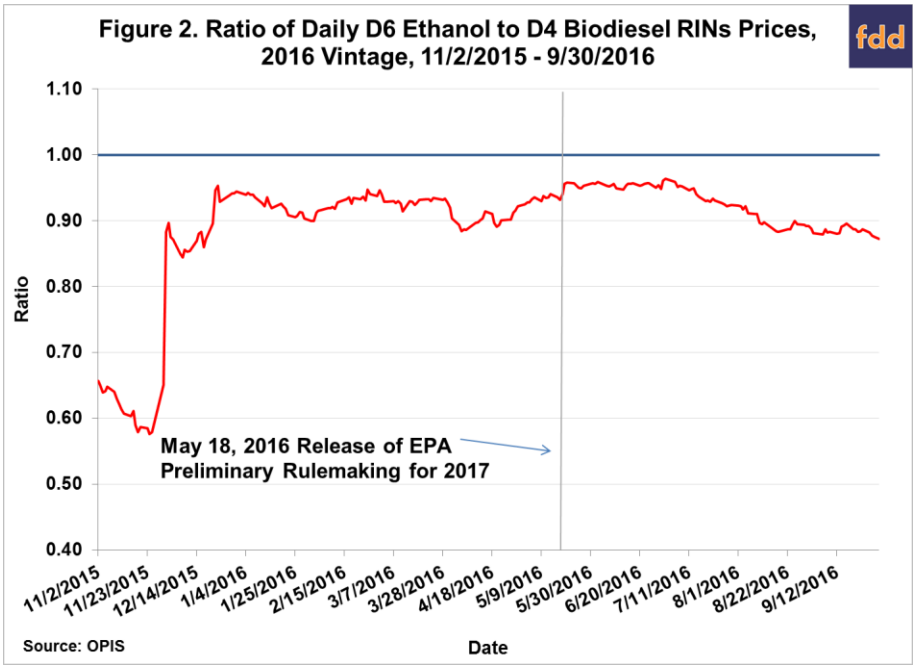


Figure 2 provides an alternative view of RINs market price dynamics by plotting the ratio of D6/D4 RINs prices. As we have discussed extensively in previous *farmdoc daily* articles (e.g., December 4, 2015), this ratio indicates whether ethanol or biodiesel is the marginal gallon for compliance with the conventional ethanol mandate. When the ratio is near one this signals that biodiesel is the marginal gallon, due to the E10 blend wall and related infrastructure constraints, and when the ratio is closer to zero the marginal gallon is ethanol. The ratio was 0.93 before the release of the 2017 preliminary rulemaking and peaked at 0.96 on July 5 and has since faded back to 0.87. So, while there has been some movement in the D6/D4 RINs price ratio in recent months, this movement has been relatively small and we can safely conclude that market expectations have changed only modestly with regard to whether biodiesel or ethanol is the marginal gallon for compliance with the conventional ethanol mandate.



The key takeaway point from this review of RINs prices is that if you want to understand the movement of ethanol RINs prices, which garner most of the headlines, then you have to first understand the movement of biodiesel RINs prices. The reason is that biodiesel is the marginal gallon for compliance with the conventional ethanol mandate and is expected to continue as the marginal gallon for some time into the future. When biodiesel is the marginal gallon D6 prices track D4 prices closely. So, to understand the 2016 "spike" in RINS prices one must figure out what has been driving D4 prices. We have previously developed a conceptual model of D4 RINs price determination that has been used to analyze RINs prices and RFS policy implementation in several previous *farmdoc daily* articles (e.g., *farmdoc daily*, October 10, 2014; September 10, 2015) . The conceptual model suggests four key drivers of D4 RINs prices: i) soybean oil prices, ii) biodiesel prices, iii) diesel prices, and iv) the biodiesel blenders tax credit. Soybean oil is the main feedstock used to make biodiesel in the U.S., and hence, is directly related to biodiesel prices. Diesel and biodiesel prices jointly determine the blending margin for biodiesel, and the blending margin, when negative, sets the lower bound for D4 RINs prices. The $1 per gallon biodiesel tax credit offsets blending losses, and therefore, reduces D4 prices. With this background, we can now turn our attention to the recent movement of each of these drivers.

Figure 3 presents the weekly price of biodiesel at Iowa plants and a simple breakeven relationship between soybean oil and biodiesel prices at the same plants from January 26, 2007 through September 30, 2016. The constant term in the breakeven relationship of 0.60, or 60 cents per gallon of biodiesel produced, represents all non-feedstock costs. The 7.55 slope is just the number of pounds of soybean oil assumed to produce a gallon of biodiesel. The breakeven relationship tracks the biodiesel price very closely except for spikes in 2011, 2013 and 2016 to date. In other words, outside of these periods, the market has generally priced biodiesel based on the cost of soybean oil, a partial markup for other variable and fixed costs, and zero profits. Implicit in this formulation is the idea that soybean oil prices lead (or "cause") biodiesel prices at the weekly time horizon (*farmdoc daily*, September 10, 2015). The reason that soybean oil prices at the weekly horizon lead biodiesel is the fact that the biodiesel mandate is binding for a wide-range of shifts in the biodiesel supply curve (*farmdoc daily*, September 10, 2015). The norm of losses outside of the spike periods can be traced to over-capacity in the biodiesel industry (*farmdoc daily*, February 11, 2016)

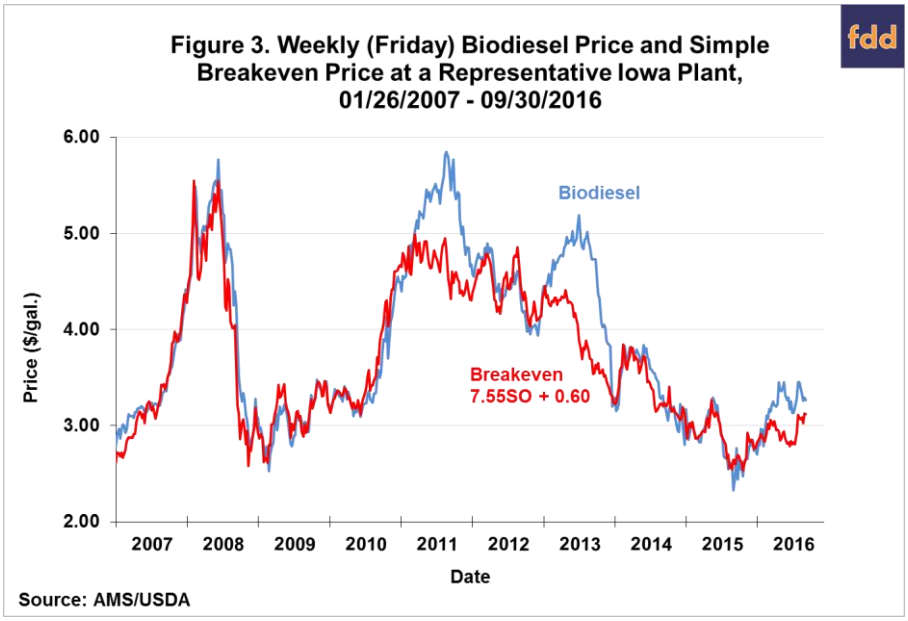
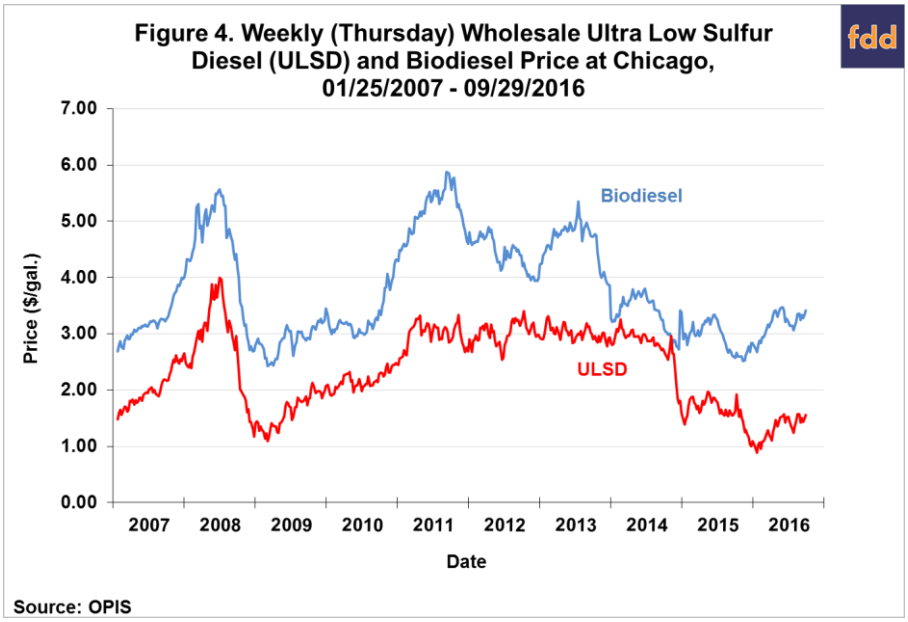
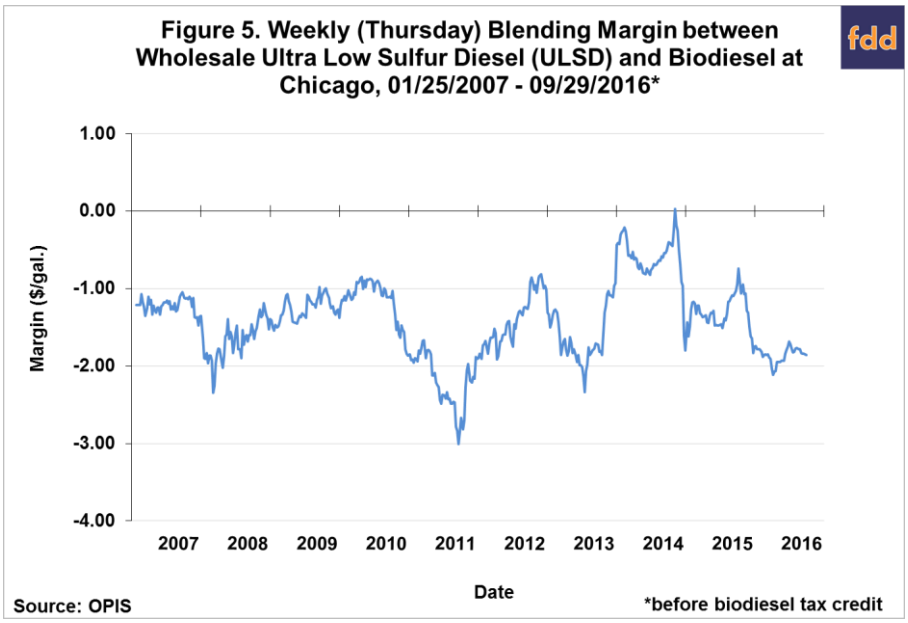


Figure 3 shows there has been an increase in soybean oil prices during 2016, about 16 percent through September. Given the normal causality running from soybean oil to biodiesel prices, this will lead to an increase in biodiesel prices of a similar magnitude and, all else constant, the same (unit) increase in the price of D4 RINs. So, an increase in soybean oil prices could be part of the explanation for rising RINs prices in 2016 if no other factors have changed.

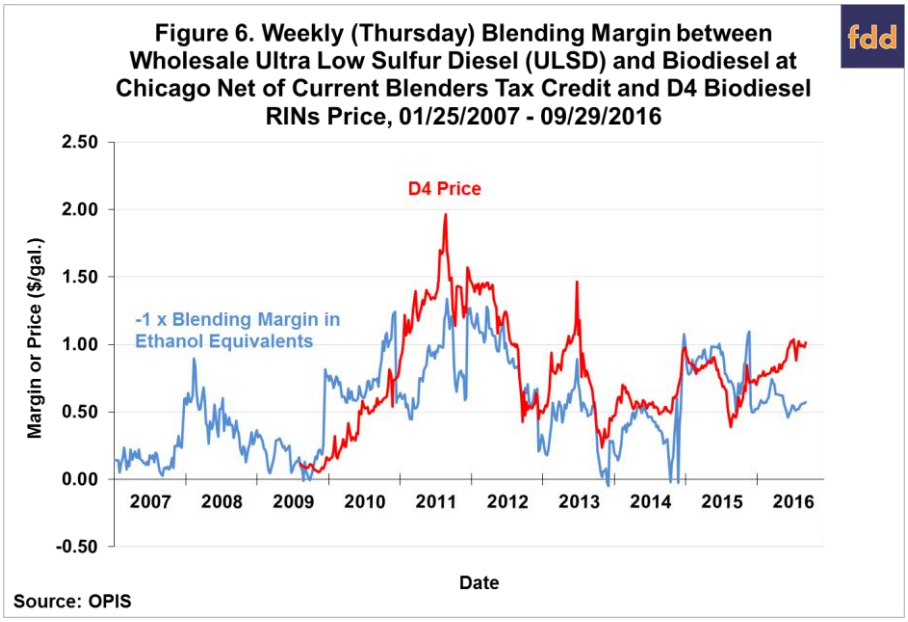
It is also abundantly clear from Figure 3 that biodiesel prices in 2016 have increased substantially more than have soybean oil prices. There is no mystery why this has happened. Just as in 2011 and 2013, the 2016 spike in biodiesel prices relative to soybean oil prices can be directly traced to the race by diesel blenders to take advantage of the blender tax credit set to expire at the end of the calendar year (e.g., *farmdoc daily* March 19, 2014; July 27, 2016). With blenders facing a binding RFS biodiesel mandate, it is rational to effectively purchase biodiesel at a discount in the current year, due to the tax credit, in order to meet mandates in later years. Once the tax credit expires, the incentive to push up prices, profits, and production disappears and the biodiesel industry returns to a norm of losses. This cycle, of course, depends on blenders perceiving there is substantial uncertainty whether the tax credit will be reinstated or not for the following year. The 2016 version of this spike is not as large as in 2011 and 2013 and this may be related to the belief there is a much higher probability that the credit will be extended than in the past, which lessens the incentives for bidding up the price of biodiesel. Another factor that may have contributed to the more muted cycle in 2016 is the rapid run-up in biodiesel imports, particularly from Argentina. Regardless, the looming expiration of the biodiesel tax credit at the end of 2016 is an important driver of increasing biodiesel prices, and hence, D4 RINs prices.

The next step is to examine the movement of biodiesel and diesel prices, in order to determine the relative contributions of each to changes in the biodiesel blending margin. Figure 4 shows the weekly wholesale price of biodiesel and (ultra low sulfur) diesel at Chicago from January 25, 2007 through September 29, 2016. The chart shows that the increase in biodiesel prices during 2016 has been roughly matched by the increase in diesel prices. The net effect, as shown, in Figure 5 has been to leave the biodiesel blending margin (diesel – biodiesel price) before the tax credit largely unchanged through 2016. This suggests that the increase in biodiesel prices was offset by the increase in diesel prices, and therefore, should not have led to an increase in D4 (and D6) RINs prices.



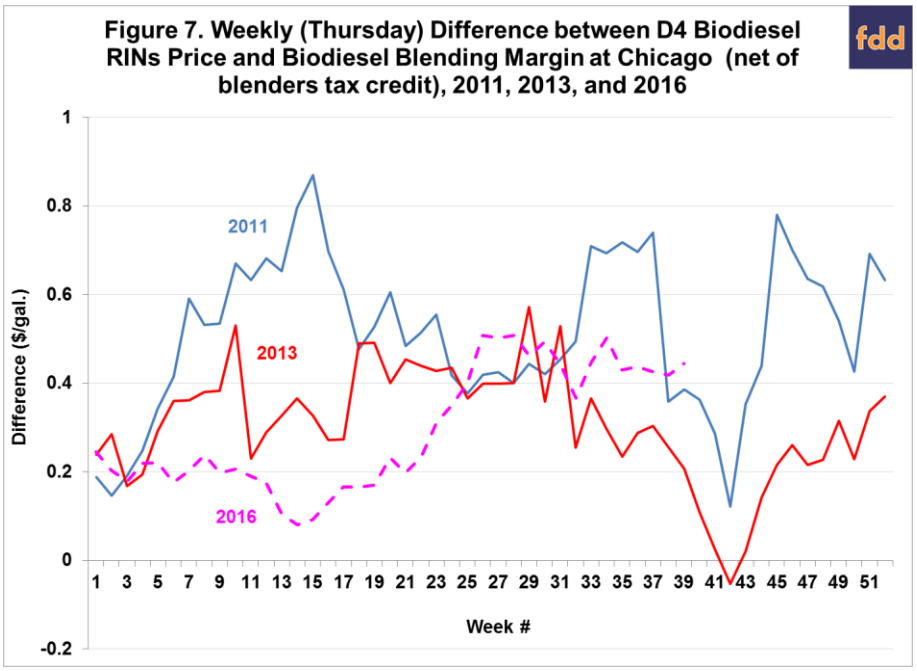


The apparent discrepancy between biodiesel blending margins and D4 RINs prices in 2016 is highlighted in Figure 6. This chart shows the same blending margin as in Figure 5 except the $1 per gallon blenders tax credit is added to the margin, the resulting margin is divided by 1.5 to convert to ethanol equivalents, and the converted margin is multiplied by -1 to facilitate comparison to D4 RINs prices. Since the beginning of the year, this version of the biodiesel blending margin has ranged from about $0.50 to $0.80 per gallon and averaged $0.57 with no apparent trend up or down. In contrast, D4 RINs prices have risen steadily from $0.74 at the beginning of January to $1.02 per gallon at the end of September.



Before concluding that the rise in D4 prices in the face of flat blending margins is the smoking gun that proves the charges of manipulation in the RINs market, it is important to consider the behavior of D4 prices in other years with an expiring tax credit. Notice in Figure 6 that D4 prices in 2011 and 2013 also increased substantially compared to blending margins. This is made more explicit in Figure 7 which shows the difference between D4 biodiesel RINs prices and blending margins (same as in Figure 6) for 2011, 2013, and 2016 to date. Notice that the peak difference between D4 prices and blending margins was much larger in 2011 and 2013. In addition, the average difference was $0.51 in 2011, $0.31 in 2013,

and $0.29 in 2016 to date. From this perspective, the behavior of D4 prices in 2016 does not seem abnormal.



While we can say that the behavior of D4 RINs prices relative to blending margins in 2016 is comparable to other years with an expiring tax credit, this does not explain why the differences became so large. It turns out that a quite reasonable explanation can be made using an options market interpretation of RINs prices. As discussed in this earlier *farmdoc daily* article (October 10, 2014), a RINs price can be thought of as the sum of two components: an intrinsic value and a time value. The "intrinsic" value of a biodiesel RINs refers to the immediate value of exercising the option. This is equivalent to the loss blenders incur today by blending biodiesel, and it is represented by the blending margin. As documented in Figures 5 and 6, this component of D4 value has changed little during 2016. The second component of option value is called "extrinsic," or "time," value and it reflects the value to an option owner of waiting until later to exercise the option when the intrinsic value may be even higher than it is today. In other words, time value reflects the chance that blending margins will be even larger (bigger losses) in the future. This is where uncertainty with regard to extension of the tax credit enters the story. If the tax credit is not extended in future years this will increase expectations of blending losses by $0.67 per gallon of ethanol equivalents, a large amount in relative or absolute terms. Furthermore, the longer the delay in extending the tax credit, the market may interpret this as a signal that the chance of the credit being extended is shrinking. So, uncertainty about extension of the blenders credit increases the odds that blending losses will be larger in future years, which shows up as an increase in the time value of the RINs “option.” As noted above, the average increase of this component of RINs value in 2016, $0.29, is very close to the average value in 2013 of $0.31, and much smaller than the average value of $0.51 in 2011. In this context, what appears to be an unusual and anomalous increase in D4 RINs prices is actually a rational response to increased uncertainty about one of the main drivers of RINs prices.

Implications

Accusations of manipulation and fraud have been leveled at the RINs market this year. Despite the highly-charged rhetoric, there is actually a fairly straightforward explanation for RINs price increases in 2016. The starting point is the fact that biodiesel continues to be the marginal gallon for meeting the conventional ethanol mandate, due to the E10 blend wall and related infrastructure constraints. When this occurs, D6 ethanol RINs prices closely track D4 biodiesel RINs prices. It follows that the key to understanding the general rise in RINs prices in 2016 is to understand the factors driving biodiesel RINs prices. A review of the relevant data shows that the increase in RINs prices seen in 2016 is likely due to the looming expiration of the $1 per gallon biodiesel tax credit at the end of the year. Uncertainty about

extension of the blenders credit increases the odds that blending losses will be larger in future years, which shows up as an increase in the time value of the RINs "option." This component of RINs prices in 2016 is either similar to or smaller than what was observed in previous years when the tax credit also was scheduled to expire. So, while one cannot say with certainty that the RINs market has not been manipulated, there is a logical economic explanation for the credit price increases seen this year. The charge that "the mother of all short squeezes" has been pushing RINs prices higher does not seem to have much merit.

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