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Clues from the RINs Market about the EPA's RVO Proposals for 2014, 2015, and 2016

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As required by a recent consent decree, the EPA will soon release its proposed RFS rules for 2014-2016. The proposal may be released yet this week and almost certainly no later than next week. This will be the latest turn in the tumultuous process that started with the release of the preliminary RFS rulemaking for 2014 on November 15, 2013. The most controversial aspect of the proposal was the write down of the renewable mandate for 2014 from 14.4 to 13 billion gallons. The substantial write down from the statutory mandates resulted in the EPA receiving over 15,000 comments and was met with the threat of legal challenges. A final rule for 2014 had been expected shortly after the November 2014 U.S. elections, but the EPA surprised virtually everyone by announcing on November 21, 2014 that the final 2014 rules would be delayed until sometime in 2015 and the 2015 and 2016 rules would be released at the same time.

Several previous *farmdoc daily* articles have examined the behavior of RINs prices as an indicator of the future direction of EPA policy (October 10, 2013; February 19, 2014; March 5, 2014; August 8, 2014; and October 15, 2014). The purpose of today's article is to review the current structure of RINs prices and analyze what this implies about the expectations of the RINs market with respect to the upcoming EPA proposal.

The latest available market data on RINs prices is presented in Table 1. Prices are presented for three RINs categories: i) D4 biomass-based diesel (commonly referred to as biodiesel), ii) D5 advanced, and iii) D6 ethanol. Three "vintages" are presented for each category, reflecting the year the RINs was created. RINs with vintages before 2015 still have market value because they can be used for RFS compliance up to two calendar years after their creation date (*farmdoc daily*, April 6, 2012). Two basic characteristics stand out. First, the RINs values reflect the nested compliance structure of the RFS. That is, D4 RINs can be used to comply with the biodiesel, advanced, and ethanol (renewable) mandates; D5 RINs can be used to comply with the advanced and ethanol mandates; and D6 RINs can only be used to comply the ethanol mandate. So, it makes sense that D4 RINs should be at least as valuable as D5 and D6 RINS and D5 RINs should be at least as valuable as D6 RINs. Second, with one exception, later vintages for a given category should be at least as valuable as earlier vintages. This also makes sense because more recent vintage RINs can be used for compliance over a longer time horizon. The one exception is 2014 D6 RINs, which are priced two cents higher than 2015 D6 RINs. This likely reflects a potential shortage of D6 RINs for 2014 compliance due to the fact that 2014 has now completely passed and there is no opportunity to increase the supply of 2014 vintage RINs.

Table 1. RINs Market Prices, Wednesday, May 27, 2015

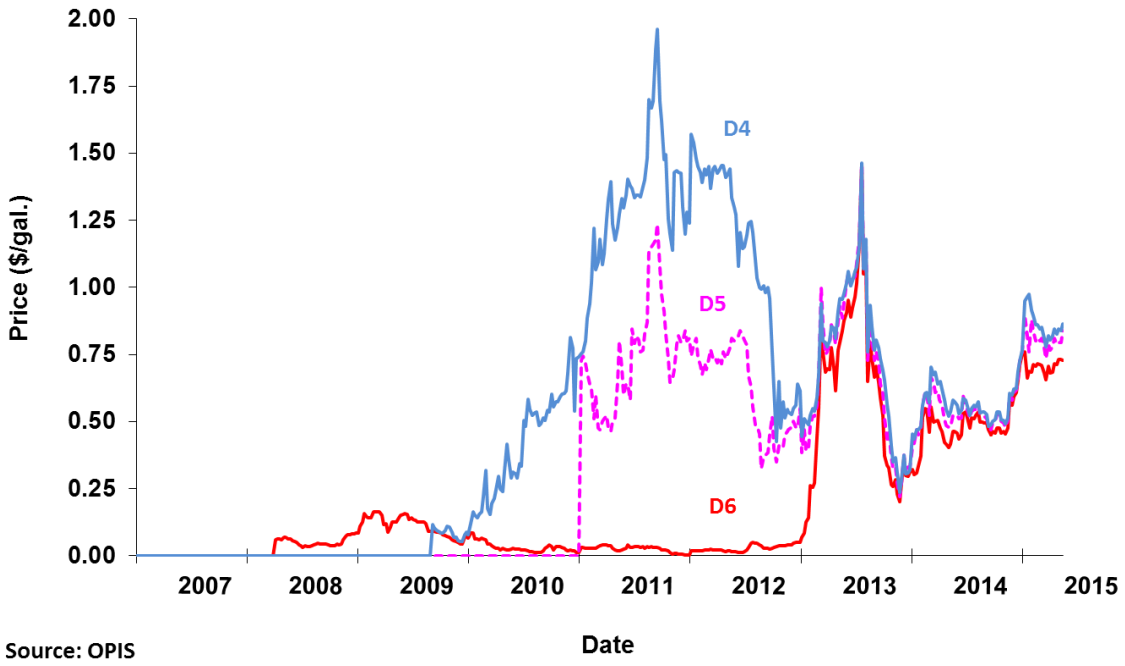
	Vintage		
Category	2013	2014	2015
D4	$0.67	$0.83	$0.87
D5	$0.67	$0.78	$0.83
D6	$0.66	$0.68	$0.66

Note: Prices quoted in $/gallon of ethanol or ethanol equivalents.

Source: OPIS

With that overview, we can now delve into the question of what RINs prices might reflect regarding the upcoming EPA proposal. Figure 1 provides historical perspective for the current RINs prices shown in Table 1. While not at the highest levels, Figure 1 shows that 2014 and 2015 D4 and D6 RINs prices are nonetheless still elevated in absolute terms, and D4 prices are higher relative to D6 prices than what was seen for most of the 2014 calendar year. This structure suggests three important conclusions: i) the RINs market is expecting relatively large biodiesel mandates for 2014-2016; ii) the RINs market does not expect the ethanol mandates in 2014-2016 to be set at the E10 blend wall (as in the first preliminary proposal of November 2013); and iii) the RINs market does not expect the ethanol mandate to immediately return to statutory levels. Note that the EPA has repeatedly signaled that the 2014 biodiesel and ethanol mandates will be near actual production levels in 2014.

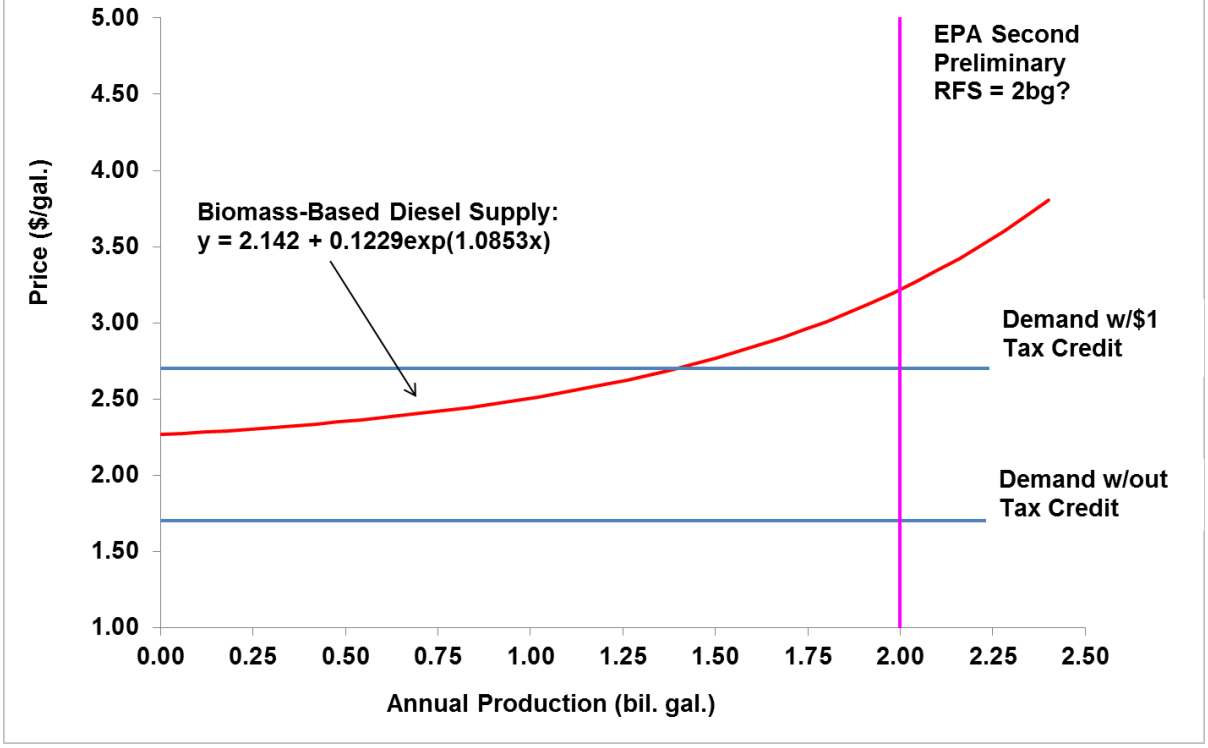
Figure1. Weekly (Thursday) D4 Biodiesel, D5 Advanced, and D6 Ethanol RINs Prices, 01/25/2007 - 05/14/2015



Source: OPIS

The evidence for the first conclusion—the RINs market is expecting relatively large biodiesel mandates for 2014-2016—is found in Figure 2, which presents an updated model of the biodiesel market used in previous *farmdoc daily* articles (February 28, 2014; October 10, 2014; October 15, 2014). The level of key supply and demand variables are set to average values for the first five months of 2015. Specifically, the assumed values for the supply curve are $0.315 cents per pound for soybean oil, $4 per 1,000 cubic feet for natural gas, $1.08 per pound for methanol, and $0.9 per gallon for glycerin. It is important to recognize that this supply curve represents the responsiveness of biomass-based based diesel, which includes both conventional biodiesel and renewable diesel (*farmdoc daily*, December 13, 2013). The demand curve without the $1 per gallon tax credit equals the price of wholesale (ultra low sulfur) diesel prices, assumed to be $1.70 per gallon. The demand curve with the $1 tax credit simply reflects the addition of $1 to the $1.70 diesel price.

Figure 2. Estimated U.S. Biomass-Based Diesel Supply and Demand Curves for 2015 under Alternative Policy Scenarios

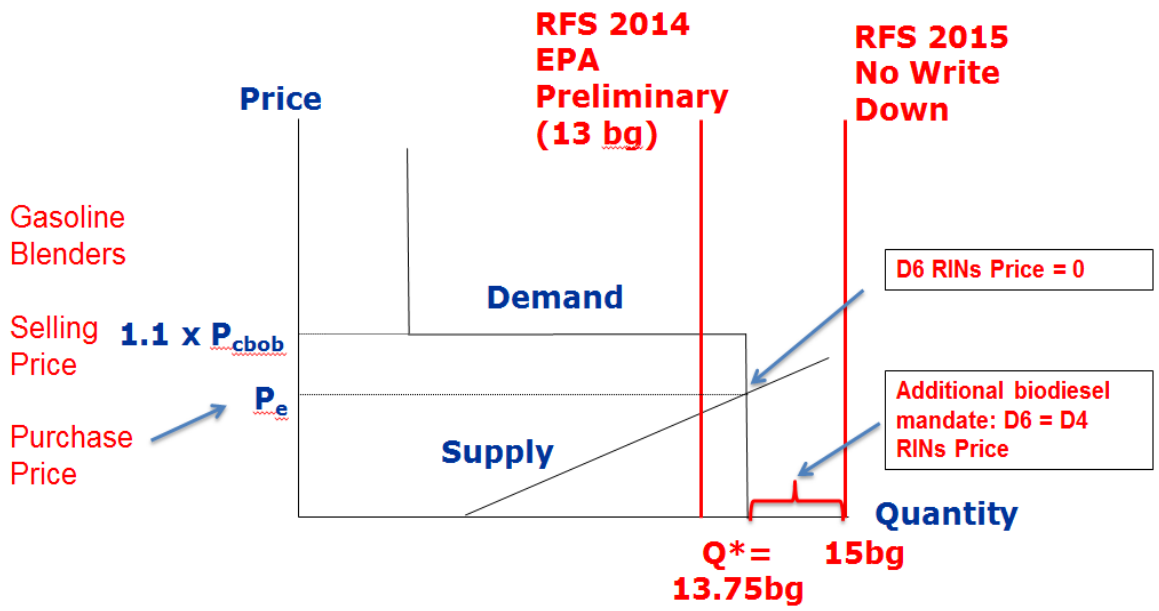


The D4 "intrinsic" value in Figure 2 is simply the vertical distance between the points where the mandate cuts the supply and demand curves. We can use this to determine a mandate level that is consistent with the D4 RINs prices presented in Table 1. A mandate of 2 billion gallons is a useful starting point. At this level, the D4 intrinsic value is $0.35 per gallon with the tax credit [($3.22 - $2.70)/1.5] and $1.01 gallon without the tax credit [($3.22 - $1.70)/1.5]. If we add $0.20 of time value (see the *farmdoc daily* article on October 15, 2014 for further details), this results in a range of D4 RINs values between $0.55 and $1.21 per gallon. In other words, if one expects a zero percent chance of the tax credit being reinstated retroactively, the expected D4 RINs price is $1.21, and if one expects a 100 percent chance of the tax credit being reinstated retroactively, the expected D4 RINs price is $0.55. The current market D4 RINs price of $0.87 falls towards the lower half of the computed range and is consistent with an expectation of a 2 billion gallon biodiesel mandate and a more than a 50 percent chance that the biodiesel tax credit will be reinstated retroactively. This seems quite reasonable given that the tax credit was reinstated in December 2014 for the 2014 calendar year. Of course, there are many other combinations of mandate and tax credit expectations

that could be consistent with the observed D4 RINs price. For example, lower mandate levels and a lower chance of tax credit reinstatement could be consistent with observed prices.

The evidence for the second conclusion—that the ethanol mandate in 2014-2016 will not be set at the E10 blend wall—is found in Figure 3. Here, a conceptual model of the ethanol market is presented that we have used in several previous *farmdoc daily* articles (e.g., July 19, 2013) to understand the "message" from the RINs markets. In this general representation, the intersection of market supply and demand results in an equilibrium quantity of 13.75 billion gallons, assumed to be equal to the E10 blend wall for 2015. The model shows that the D6 RINs price is zero if the RFS ethanol mandate is less than or equal to the E10 blend wall, since it is profitable for gasoline blenders to blend ethanol with gasoline up to 10 percent blends. So, if the RINs market expected the EPA to set the ethanol mandate in 2015 at the level of the E10 blend wall, we should observe D6 RINs prices much closer to zero than we do. The current level of D6 RINs prices, $0.66 per gallon, is simply too high to be consistent with an expectation that the EPA will write down the ethanol mandate in 2014-2016 to the E10 blend wall. The RINs market, instead, expects the ethanol mandate to be set at levels above the E10 blend wall.

Figure 3. The Ethanol Market under Alternative RFS Mandates

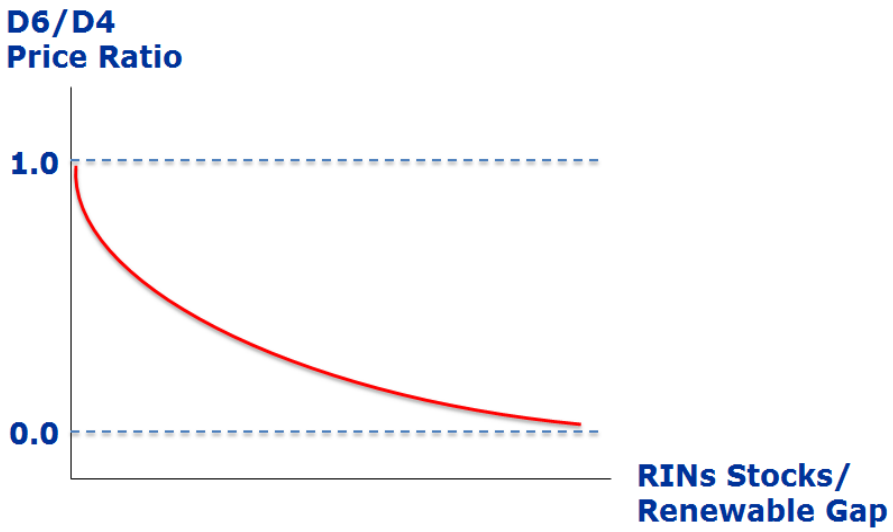


The evidence for the third conclusion—that the ethanol mandate in 2014-2016 will not immediately return to statutory levels—is also found in Figure 3. If ethanol mandates returned to statutory levels in 2014-2016 (14.4 billion gallons in 2014 and 15 billion gallons thereafter), the model predicts that the D6 RINs price should equal the D4 RINs price because the ethanol mandate above the E10 blend wall (the "renewable gap") effectively becomes additional biodiesel mandate. If the market expected the ethanol mandate to be set at statutory levels, which are clearly greater than virtually all estimates of the E10 blend wall, then, we should observe D6 prices trading close to D4 prices. But, as can be easily computed with the data in Table 1, the current ratio of D6 to D4 RINs prices is only 76 percent. So, the RINs market thinks it is unlikely that the ethanol mandates will be set at statutory levels in 2014-2016.

We can draw another interesting conclusion if we broaden the ethanol model to include consideration of the available stock of RINs and the multi-year compliance horizon used by most obligated parties under the RFS. Figure 4, first developed in this earlier *farmdoc daily* article (August 8, 2014), illustrates how these two additional factors might combine to impact the pricing of RINs. The *y*-axis plots the ratio of D6 to D4 RINs prices. The *x*-axis plots the ratio of RINs stocks to the renewable gap. The RINs stocks correspond to the initial stocks at the start of obligated parties' multi-year planning horizon and the renewable gap (ethanol mandate minus E10 blend wall) is the sum of the renewable gap for each year during the planning horizon.

The two extremes in Figure 4 are straightforward to explain. If the size of the renewable gap is large relative to the size of RINs stocks, the ratio on the *x*-axis will be small, reflecting the fact that obligated parties will rapidly use up the stock of RINs to fill in the renewable gap. After the stock is used up the situation reverts to the scenario in Figure 3 where the renewable mandate exceeds the E10 blend wall. That is, obligated parties have to incentivize production of biodiesel in order to generate the additional D4 RINs needed to fill in the rest of the renewable gap over the planning horizon. The end result is that obligated parties will rationally bid up the price of D6 RINs close to the level of D4 RINs in expectation of quickly using up the stock of RINs. At the other extreme, if the size of the renewable gap is small relative to the stock of RINs, the ratio on the *x*-axis will be large, and obligated parties have on hand sufficient RINs to fill in the renewable gap for a number of years, perhaps the entire length of the planning horizon. If this is the case, than the situation reverts to the scenario in Figure 3 where the renewable mandate is less than the E10 blend wall. Since the price of a D6 RINs is zero in this scenario, obligated parties will not be willing to bid anything more than a small amount for D6 RINs and the price ratio approaches zero. Outcomes between these two extremes are less certain, but the convex shape of the curve in Figure 3 is at least plausible.

Figure 4. Theoretical Relationship between Relative Prices of D6 and D4 RINs and the Stock of RINs Relative to the Renewable Gap



The model in Figure 4 is helpful for interpreting the current ratio of D6 to D4 RINs prices. While the current ratio, 76 percent, does not imply ethanol mandates in the very near future at statutory levels, it is high enough that we can conclude that the RINs market is forecasting the exhaustion of the stock of available RINs in the not too distant future. This suggests that the ethanol mandate could be on a trajectory to return to statutory levels, even perhaps as early as 2016. Regardless, this is an important clue that the EPA proposal may contain signals about the future path of the ethanol mandate beyond 2016. If this were not the case, the D6 RINs price would not need to be as high as it is relative to D4 RINs prices. An alternative explanation is that the RINs market expects a court challenge to any cuts to the ethanol mandate over 2014-2016 and is factoring this into the level of D6 RINs prices.

Implications

There is intense interest in the upcoming EPA proposal for 2014, 2015, and 2016 RFS rules, which is scheduled to be released in the very near future. The RINs market has an exceptional track record in recent years of predicting EPA policy changes. Hence, the structure of current RINs prices is analyzed for clues regarding what the new EPA proposal might contain. In recent weeks, 2014 and 2015 D4 and D6 RINs

prices have remained high in absolute terms and D4 prices have been elevated relative to D6 prices. This structure suggests three important conclusions: i) the RINs market is expecting relatively large biodiesel mandates for 2014-2016; ii) the RINs market does not expect the ethanol mandates in 2014-2016 to be set at the E10 blend wall (as in the first preliminary proposal of November 2013); and iii) the RINs market does not expect the ethanol mandate to immediately return to statutory levels. It would not be surprising if the EPA proposes biodiesel mandates for 2014-2016 in the range of 1.8-2.3 billion gallons and ethanol mandates for 2014-2016 in the range of 13.8-14.5 billion gallons. We shall soon find out.

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