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Implications of Changing the Biodiesel Tax Credit from a Blender to a Producer Credit

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August 5, 2015

***farmdoc daily* (5):142**

Recommended citation format: Irwin, S. "Implications of Changing the Biodiesel Tax Credit from a Blender to a Producer Credit." *farmdoc daily* (5):142, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, August 5, 2015.

Permalink: http://farmdocdaily.illinois.edu/2015/08/implications-of-changing-biodiesel-tax-credit.html

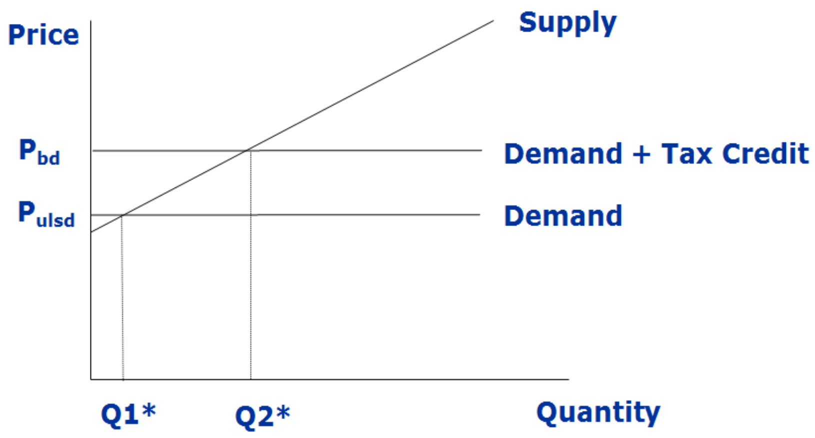
The biodiesel tax credit allows blenders of biodiesel (and renewable diesel) to claim a credit of $1 per gallon against their U.S. federal tax liability. The tax credit has expired four times since 2009 and then subsequently reinstated retroactively three times. The conditions where it does and does not make economic sense for blenders to share a retroactively reinstated tax credit with biodiesel producers were analyzed in a recent *farmdoc daily* article (July 22, 2015). Estimated supply and demand curves for 2015 indicated there is no economic rationale for blenders to share the credit with biodiesel producers if it is reinstated retroactively for 2015. A major change could be in the works starting in 2016. The Grassley-Cantwell amendment, passed by the U.S. Senate Finance Committee on July 21 2015, changes the biodiesel tax credit from a blender to a producer credit starting January 1, 2016. The purpose of today's article is to explore the implications of this possible conversion for biodiesel producers, blenders, and fuel consumers.

Analysis

The conceptual analysis uses the same model of the biodiesel market that was presented in the *farmdoc daily* article from July 22, 2015. The model assumes perfect competition and represents the supply of biodiesel producers and demand from diesel blenders at the wholesale level. Retail demand at the consumer level is implicitly represented by a simple percentage markup of the wholesale demand. The model also assumes that biodiesel demand is perfectly elastic (horizontal) for biodiesel prices equal to ultra low sulfur diesel prices. This reflects an assumption that biodiesel and diesel are perfect substitutes and that biodiesel is a small enough part of the diesel market that changes in the biodiesel price do not impact the overall demand for diesel fuel. One could go further and adjust biodiesel prices to reflect the lower energy content of biodiesel (about 12% lower) compared to petroleum diesel. However, given the low biodiesel blends typically used in the marketplace today (e.g., B2 or B5), it is doubtful that this lower energy content is priced at the retail level. Furthermore, a growing portion of "biodiesel" consumption in the U.S. is in the form of renewable diesel that has the same energy content as petroleum diesel (*farmdoc daily*, December 13, 2013). So, we assume no adjustment is necessary for energy content. We also do not explicitly consider imports and exports of biodiesel in this conceptual model.

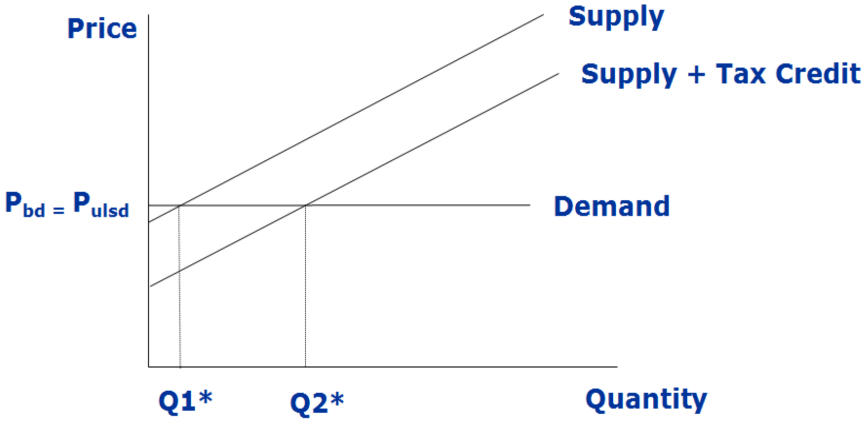
We begin the analysis by reviewing the scenario where this is a blenders tax credit and no volume mandate. As shown in Figure 1, only a small amount of biodiesel would be produced in the U.S. with no tax credit (Q1*) and biodiesel producers receive the same price as diesel producers (P_{ulsd}). The model accounts for the tax credit by shifting the biodiesel demand curve up by the amount of the credit, which is $1 per gallon. This assumes full pass through of the credit from blenders to producers. In other words, at any given quantity of biodiesel, the effective selling price for biodiesel producers is increased by the amount of the credit. The upward shift in the demand curve results in a much larger amount of biodiesel being produced (Q2*) as producers respond to the higher effective selling price (P_{bd}). It makes economic sense under this scenario for the biodiesel producer and blender to negotiate a sharing agreement for a tax credit that is reinstated after the fact. If the tax credit was not in place at the time of the transaction, the biodiesel producer would have been paid the same price as diesel producers. However, if the tax credit had been in place, the biodiesel selling price would be increased by $1 per gallon, the amount of the tax credit. One can think of a retroactively reinstated tax credit as a $1 per gallon windfall to blenders that would have gone to biodiesel producers in the form of a higher selling price if it had been in place at the time of the transaction.

Figure 1. The Biodiesel Market with a Blenders Tax Credit



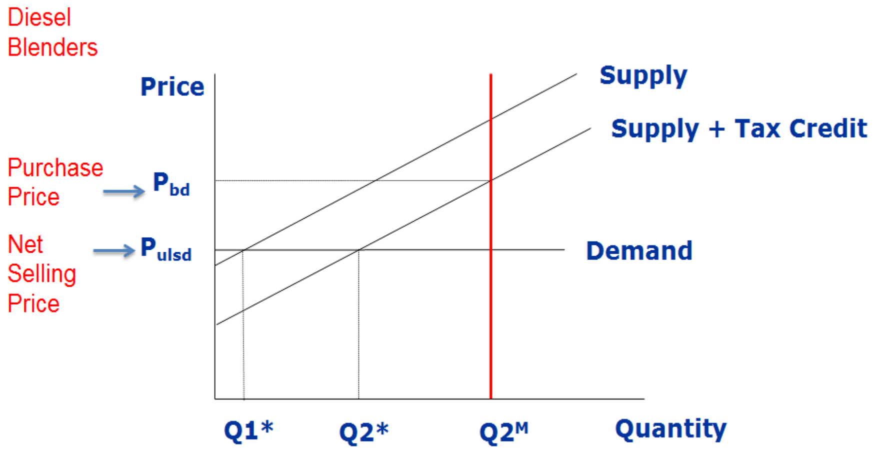
We now consider the scenario where the biodiesel tax credit is provided to producers instead of blenders. As shown in Figure 2, the tax credit shifts the biodiesel supply curve down by the amount of the credit, $1 per gallon. This assumes full pass through of the credit from producers to blenders. In other words, at any given quantity of biodiesel, the effective buying price for blenders is reduced by the amount of the credit. This, once again, results in a much higher amount of biodiesel being produced. Notice that as drawn in Figure 2 the amount of biodiesel produced (Q2*) is exactly the same as in the case of a blender tax credit. However, the selling price of biodiesel producers (P_{bd}) is the same as the wholesale price of diesel (P_{ulsd}) when the credit is given to producers. For this reason, it would never make economic sense for biodiesel producers to share with blenders a tax credit that is reinstated after the fact. Whether or not the tax credit is place at the time of the transaction, the blender pays the same price for biodiesel—the wholesale diesel price.

Figure 2. The Biodiesel Market with a Producer Tax Credit



The next step is to consider a policy scenario with both a producer biodiesel tax credit and a volume mandate. Figure 3 shows a scenario with a producer tax credit and a binding volume mandate. A producer tax credit with a non-binding mandate has similar impacts to a producer tax credit only, and therefore, will not be presented here (see the *farmdoc daily* article on July 22, 2015 for further details in the case of a blender credit). The mandate is binding in Figure 3 because it requires a higher level of production than under a tax credit alone ($Q2^M > Q2^*$). In order to incentivize the higher production, biodiesel producers must be paid a price that is higher (P_{bd}) than the wholesale diesel price (P_{ulsd}). However, the biodiesel price paid to producers is lowered by $1 per gallon due to the tax credit, as reflected in the downward shift in the supply curve. From the perspective of a diesel blender, there is still a wedge between the price paid to biodiesel producers and the price charged to retailers (consumers) for the biodiesel in diesel blends. This wedge, or loss, is the wholesale diesel price minus the biodiesel price at the mandated quantity. Under these assumptions, sharing provisions in marketing contracts are irrelevant because a binding volume mandate cannot be imposed retroactively (at least in theory).

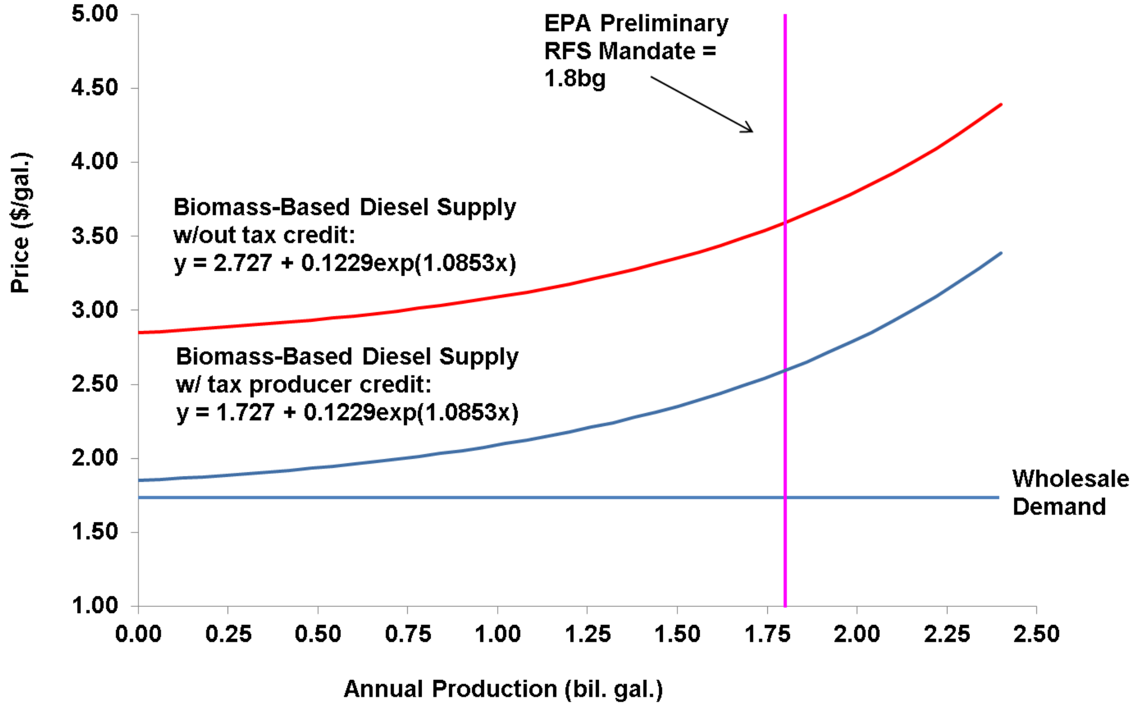
Figure 3. The Biodiesel Market with a Producer Tax Credit and Binding Volume Mandate



The effect of the tax credit under the scenario presented in Figure 3 is purely redistributive because production will be at the mandated volume whether the tax credit is in place or not. Note that without the tax credit the cost of requiring a level of production and consumption above the market equilibrium (Q1*) is initially borne by diesel blenders in the form of a producer biodiesel price that exceeds the wholesale diesel price. In the conceptual model used here, this cost is then fully passed on to diesel consumers in the form of higher retail prices for diesel (weighted appropriately for the proportion of the blend that is biodiesel). So, diesel consumers ultimately bear the cost of the binding volume mandate. When there is also a producer tax credit in place, as in Figure 3, the credit partially offsets the cost borne by diesel consumers in the form of a lower producer biodiesel price. In other words, the cost is lowered by the amount of the tax credit and the total cost of complying with the biodiesel mandate is shared between taxpayers and diesel consumers. Interestingly, this is the same outcome whether the tax credit is given initially to producers or blenders. The only thing that changes is the channel of the subsidy. Under a producer credit, taxpayers subsidize a lower producer biodiesel price, while under a blender credit taxpayers subsidize a higher wholesale biodiesel price.

We can now turn from a purely conceptual analysis to making specific estimates for 2016, when the biodiesel tax credit could be changed to a producer credit. Figure 4 presents estimated supply and demand curves for biomass-based diesel in 2016. The upper supply curve is the same as the supply curve used in the analysis of the blender tax credit in the July 22, 2015 *farmdoc daily* article (see Figure 5 in the article). This supply curve represents the combined domestic and import responsiveness of conventional biodiesel as well as renewable diesel (see the *farmdoc daily* article on December 13, 2013 for details). Average weekly values for key variables from January through mid-July 2015 were used to project variables for the entire 2015 calendar year for that analysis. The same projections for 2016 are reasonable given available data. In a like fashion, the 2016 demand curve is simply the horizontal curve given by the average level of the wholesale diesel prices to date in 2015, $1.73 per gallon. Given the simplicity of the model and estimation methods, the derived supply and demand curves should be viewed as useful approximations rather than highly reliable estimates.

Figure 4. Estimated 2016 Supply and Demand Curves for the U.S. Biomass-Based Diesel Market with Producer Tax Credit and RFS Mandate



The lower supply curve in Figure 4 simply shifts the supply curve down by $1 per gallon at each level of biodiesel production in order to reflect a producer biodiesel tax credit. Even with the incentive provided by the tax credit, the estimated supply and demand curves indicate the equilibrium quantity of biodiesel (both conventional and renewable) in Figure 4 is zero because the demand curve does not intersect the supply curve with the credit at any positive quantity. Given this situation, it is obvious that the (preliminary) 2016 RFS volume mandate of 1.8 billion gallons dominates the producer tax credit in terms of stimulating biodiesel production. Of course, there is a point where lower soybean oil or higher wholesale diesel prices will make the tax credit dominant in terms of stimulating biodiesel production. To reach the point where the producer tax credit is equal to the RFS mandate in quantity terms the soybean oil price would have to fall from $0.32 to $0.21 per pound or the wholesale diesel price would have to rise from $1.73 to $2.59 per gallon. Price movements of these magnitudes seem unlikely.

There is another impact of changing the biodiesel tax credit to a producer tax credit that is not reflected in Figure 4. As noted above, the supply curves represent the combined domestic and import responsiveness of conventional biodiesel as well as renewable diesel. The Grassley-Cantwell amendment recently approved by the U.S. Senate Finance Committee limits the tax credit to conventional biodiesel and renewable diesel produced in the U.S. Under previous legislation, the tax credit could be applied to biodiesel blended in the U.S. regardless of whether the biodiesel was produced in the U.S. or imported. Some evidence on the importance of this potential change is found in Table 1, which presents D4 biodiesel and D6 ethanol RINs generation net of error corrections for 2012-2015. Imported RINs are the sum of imported and foreign generated RINs. RINs generation for 2015 is estimated by annualizing January-June 2015 generation.

Table 1. D4 and D6 RINs Generation, 2012-2015

	D4 RINs Generation			D6 RINs Generation		
Year	**Total**	**Imported**	**Imported %**	**Total**	**Imported**	**Imported %**
2012	1.731	0.146	8.4	12.981	0.000	0.0
2013	2.730	0.553	20.3	13.326	0.243	1.8
2014	2.703	0.496	18.3	14.339	0.336	2.3
2015 est.	2.452	0.438	17.9	14.525	0.407	2.8

Notes: Total RINs generation is net of error corrections. Imported RINs are the sum of imported and foreign generated RINs. All categories reported in billion gallons of ethanol equivalents unless otherwise indicated. RINs generation for 2015 is estimated by annualizing January-June generation.

The data in Table 1 show that about 18-20 percent of D4 RINs generation and 2-3 percent of D6 RINs generation in recent years was associated with imported biofuel volumes. Converting the D4 import volumes back to “wet” gallons (using a weighted-average conversion factor of 1.62), imported volumes of conventional biodiesel and renewable diesel were between about 260 and 330 million gallons per year. One can infer that virtually all of the imported D6 RINs generation represents biodiesel and renewable diesel because these are listed separately in the EPA EMTS system and the annual totals for these two categories are within a few million gallons of the annual totals for foreign generated and imported D6 RINs. After converting the D6 import volumes back to “wet” gallons (using a weighted-average conversion factor of 1.62), imported volumes of conventional biodiesel and renewable diesel through this channel have been rising steadily in recent years and currently are on pace to total about 250 million gallons in 2015. The total of the two sources of imported conventional biodiesel and renewable diesel was about 100 million (wet) gallons in 2012 and near 500 million (wet) gallons each year over 2013-2015. Combining all four years, a total of about 1.6 billion gallons of conventional biodiesel and renewable diesel was imported, all of which was presumably eligible for the blenders tax credit. The total tax expenditure for imported biodiesel would therefore have been roughly $1.6 billion.

The available data suggest that changing the biodiesel tax credit to a U.S. producer only credit could have sizable impacts on the supply of biodiesel. The 500 million gallons of biodiesel imported into the U.S. in recent years would be subject to what is effectively a $1 per gallon import tariff. The possible economic impacts are illustrated in Figure 5. The middle supply curve subtracts 0.26 billion gallons of quantity for each price, which is roughly the amount of conventional biodiesel and renewable diesel imports through the D4 channel in recent years. Conventional biodiesel and renewable diesel imports through the D6 channel are not incorporated because the first (top) supply curve did not take into account these volumes in the original analysis (*farmdoc daily*, December 13, 2013). The main economic impact would once again be redistributive. Whether the tax credit is a producer or blender credit, the RFS mandate is highly likely to remain binding. So, the leftward shift of the supply curve relative to the lowest curve simply implies that more of the cost of complying with the RFS biodiesel mandate would be shifted from taxpayers to consumers. While seemingly small on the graph, the shift in Figure 5 represents $0.33 per gallon of biodiesel, a non-trivial amount. The restriction of biodiesel imports could have a much larger impacts on compliance costs for the RFS in future years if the degree of “push” above the E10 blend wall signaled in the EPA’s latest proposal (*farmdoc daily*, June 17, 2015) has to be met to a significant degree by biodiesel RINs generation.

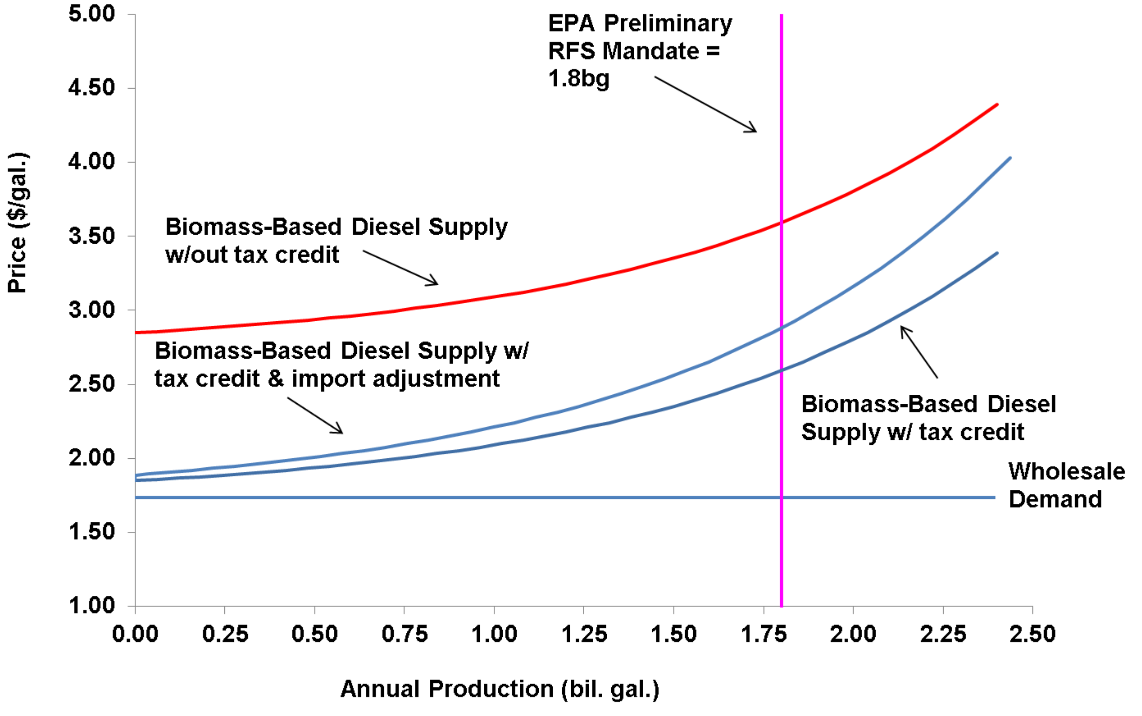


Figure 5. Estimated 2016 Supply and Demand Curves for the U.S. Biomass-Based Diesel Market with Producer Tax Credit, RFS Mandate, and Adjustment for Imports

Implications

A major change for the $1 per gallon biodiesel tax credit could be in the works starting in 2016. The Grassley-Cantwell amendment, passed by the U.S. Senate Finance Committee on July 21 2015, changes the biodiesel tax credit from a blender to a producer credit starting January 1, 2016. The analysis here indicates that it would never make economic sense for biodiesel producers to share with blenders a producer tax credit that is reinstated after the fact. The reason is that the blender pays the same price for biodiesel—the wholesale diesel price—whether or not the tax credit is place at the time of the transaction.

The biggest impact of a change to a producer biodiesel credit is likely to be on biodiesel imports. The Grassley-Cantwell amendment limits the tax credit to conventional biodiesel and renewable diesel produced in the U.S. Under previous legislation, the tax credit could be applied to biodiesel blended in the U.S. regardless of whether the biodiesel was produced in the U.S. or imported. In recent years, about 500 million gallons of conventional biodiesel and renewable diesel have been imported annually into the U.S. and used to generate RINs for RFS compliance. The change to a producer tax credit would make these imports ineligible for the tax credit, and therefore, effectively subject to a $1 per gallon import tariff. This would restrict the total supply of biodiesel in the U.S. and shift a non-trivial amount of the cost of complying with the RFS biodiesel mandate from taxpayers to consumers.

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