

BACKGROUND

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The Renewable Fuel Standard, Ethanol Use, and Corn Prices

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Abstract

The ethanol mandate in the federal Renewable Fuel Standard increases corn prices and food prices. This harms consumers and distorts the domestic and international commodity market. While waiving the mandate would be an improvement, eliminating it is the best choice.

As corn prices hit record highs, the folly of the federal ethanol mandate becomes ever more apparent. The widespread drought in the Corn Belt has dimmed expectations of a record harvest as predicted earlier this year. The U.S. Department of Agriculture's most recent projection for this year's corn harvest warns that it will be the lowest since 2006–2007 and that the per-acre yield will be the worst since 1995–1996.¹

On top of the drought's impact on corn prices is the impact of the federal Renewable Fuel Standard (RFS). The RFS sets a floor on the volume of ethanol that must be included in the U.S. gasoline supply. This floor ratchets up every year. Because cellulosic ethanol from non-food sources, such as switch grass and wood chips, has failed to develop as hoped, nearly all of the mandated ethanol is distilled from corn. Although the mandate's effect on corn prices can be significant—perhaps as high as 68 percent—calculating the impact is not straightforward.

A Renewable Cement Policy

Hypothetically, the government could impose a similarly misguided renewable cement policy mandating that a minimum fraction of cement be made with eggshells instead of

KEY POINTS

- The ethanol mandate increases corn prices and increases the price of food and products that use corn as an input.
- The U.S. produces 40 percent of the world's corn, and ethanol production uses about 40 percent of U.S. corn production.
- The resulting loss of 10.8 percent of the world's corn to ethanol production leads to a 68 percent increase in corn prices.
- This year's corn harvest is projected to be the lowest since 2006–2007, and the per-acre yield is projected to be the worst since 1995–1996.
- While the magnitude of the mandate's impact is debatable, its direction is not. Whether the impact is small or big, it is uniformly bad, and Congress should eliminate the ethanol mandate.

This paper, in its entirety, can be found at <http://report.heritage.org/bg2727>

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mineral sources of calcium carbonate. Even mandating a very small fraction could significantly increase the demand for eggs. Choosing a large enough fraction would increase the price of a dozen eggs to \$45.

This price increase would put a damper on Easter egg hunts, but its effect on the cost of eggs for breakfast would be unclear. Only the shells are needed for the renewable cement mandate, and scrambled and fried eggs are not normally served with eggshells.

In this extreme example, the production of eggs would increase dramatically as farms expanded to meet the increased demand. Because only the shells would be needed for the renewable cement mandate, the whites and yolks would likely be discarded. If the discarded yolks and whites could be processed, packaged, and distributed more cheaply than the current cost of eggs, the cost of yolks and whites would be cheaper than the previous cost of the whole egg. However, the cost of hard-boiled eggs, which require the shell, would rise dramatically.

Thus, boiled-egg consumers would pay \$45 per dozen, while scrambled-egg consumers might still be able to eat theirs for \$3 per dozen. While the renewable cement mandate might have little negative impact on scrambled-egg consumers,

it would clearly harm boiled-egg consumers, who would need to spend more than 10 times as much to buy their eggs.

The Value of Starch

Advocates for the ethanol mandate claim that the impact is more analogous to scrambled eggs than to boiled eggs.² Only the starch in the corn is useful for ethanol producers. The residual dried distiller's grains with solubles (DDGS) are sold and go back into the animal feed market—the destination of most of the field-corn crop in the first place. Further, these advocates claim that the starch diverted to ethanol production is of relatively little value given the large amounts of starch already going into the feed market.³

Two facts argue against these claims. First, the value of the residual DDGS is less than one-third of the value of the corn used for ethanol production.⁴ In other words, ethanol production uses more than two-thirds of the economic value of the corn.

It might be argued that the one-third residual is all that the corn would have been worth in the first place. In the hypothetical example of renewable cement, the shell appears to account for 90 percent or more of the value of the eggs, but this high value would not exist in the absence of the renewable cement mandate.

Therefore, the ethanol mandate might drive up the value of the corn by a factor of three, with ethanol producers bearing two-thirds of the cost and other corn consumers bearing no extra burden.

According to this line of reasoning, corn consumers need only what is in the DDGS. This argument, however, is quashed by the second fact: Over half of the corn crop goes to non-ethanol uses, which means that most corn consumers are willing to pay three times as much for the corn and its starch as they are to pay for just the non-starch components found in DDGS.

These two facts show that the starch is important for non-ethanol uses and that ethanol producers compete against the other users, driving up the price of corn by an estimated two-thirds.

Impact of Ethanol on Corn Prices

The U.S. produces 40 percent of the world's corn,⁵ and ethanol production uses about 40 percent of U.S. corn production,⁶ but roughly one-third of the value of the corn used in ethanol production returns to the feed market as DDGS. Thus, the equivalent diversion of corn value to ethanol production is 27 percent of the U.S. market or, more important, 10.8 percent of the world corn market.

1. U.S. Department of Agriculture, World Agricultural Outlook Board, "World Agricultural Supply and Demand Estimates," August 10, 2012, <http://www.usda.gov/oce/commodity/wasde/latest.pdf> (accessed August 23, 2012).

2. For instance, see BioFuel Energy Corporation, "FAQ's," <http://www.bfenergy.com/faq.html> (accessed August 24, 2012).

3. For instance, see Renewable Fuels Association, "Ethanol Facts: Agriculture," <http://www.ethanolrfa.org/pages/ethanol-facts-agriculture> (accessed August 24, 2012).

4. Although DDGS and corn sell for roughly the same amount on a per-ton basis, ethanol production generates only one-third of a ton of DDGS for every ton of corn used. Jeri Stroade, Anikka Martin, and Ann Conrad, "Distillers Grain Industry: Production, Use, Structure and Trends," North American Institute for Beef Economic Research, July 2009, p. 4, <http://www.naiber.org/Publications/NAIBER/Distillers-Grain-Industry.pdf> (accessed August 28, 2012).

5. U.S. Department of Agriculture, World Agricultural Outlook Board, "World Agricultural Supply and Demand Estimates," May 10, 2012, <http://www.thefarmsite.com/reports/contents/wasdemay.pdf> (accessed August 22, 2012).

6. Darrel Good and Scott Irwin, "Rationing the 2012 Corn Crop Revisited," University of Illinois, Department of Agricultural and Consumer Economics, *farmdoc Daily*, August 15, 2012, http://www.farmdocdaily.illinois.edu/2012/08/rationing_the_2012_corn_crop_r.html (accessed August 22, 2012).

As is typical with commodity markets, small changes in supply or demand can lead to large changes in price.⁷ The loss of 10.8 percent of the world's corn to ethanol production leads to a 68 percent (about two-thirds) increase in corn prices.

However, these calculations do not measure the mandate's impact on price. We do not know this impact because we do not know how much ethanol would be produced in the mandate's absence. Nor have we calculated the impact of expanded corn production on reducing the acreage of other farm commodities and the subsequent price increases for those commodities.

Using three scenarios, Bruce Babcock at Iowa State University has simulated market interactions for farm commodities and fuel.⁸ In the first scenario, actual production meets the ethanol mandate. In the second, the available flexibility to carry over accumulated renewable credits and/or to borrow renewable credits from future years significantly moderates the price impact of

the ethanol mandate in a given year. In the third scenario, the mandate is waived.

Babcock estimates that waiving the mandate would moderate corn prices by 8.0 percent to 34.4 percent. The lower value assumes that blenders (oil refiners that are obligated to blend the mandated volumes of ethanol into their gasoline) take full advantage of current provisions to carry over renewable credits.

Whether the price impact of the mandate is 8 percent, 34 percent, or 68 percent, the mandate has no justification in the first place. If the mandate has very little price impact, then the corn growers gain very little benefit and should offer proportionally little opposition to waiving or eliminating the mandate. On the other hand, if the impact is large, the case for eliminating this undue burden on consumers is even more compelling.

Conclusion

Ethanol production in the U.S. consumes a significant quantity

of corn and has a large impact on corn prices. We believe that ethanol production increases the world corn price by up to 68 percent. Since some corn would likely go to ethanol production with or without a federal mandate, the mandate's price impact is likely less than 68 percent. One estimate puts the price impact as low as 8 percent.

However, the direction of the impact is clear: The ethanol mandate increases corn prices and the prices of food and products that use corn as an input. Since the impact of the mandate is bad in any case, it is not redeemed by arguing that the bad impact might be a small bad impact.

Waiving the mandate is a good idea. Eliminating it is a better one.

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7. Michael J. Roberts and Wolfram Schlenker estimate that the elasticity of supply for corn ranges from 0.0826 to 0.1337. Their estimates for demand elasticity vary (in absolute value) from 0.0554 to 0.0797. We use 0.1 for the elasticity of supply and 0.06 for the elasticity of demand. See Michael J. Roberts and Wolfram Schlenker, "Identifying Supply and Demand Elasticities of Agricultural Commodities: Implications for the US Ethanol Mandate," National Bureau of Economic Research Working Paper No. 15921, April 2010.

8. Bruce Babcock, "Updated Assessment of the Drought's Impacts on Crop Prices and Biofuel Production," Iowa State University, Center for Agricultural and Rural Development Policy Brief No. 12-PB 8, August 2012, <http://www.card.iastate.edu/publications/dbs/pdffiles/12pb8.pdf> (accessed August 22, 2012).