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# The Ethanol Tax Credit—It's Worse Than You Think



This means the tax credit will not increase ethanol consumption at all. Using CBO's own (correct) formula of dividing taxpayer costs by the increase in ethanol consumption due to the tax credit, the cost of the tax credit in reducing gasoline consumption and greenhouse gas emissions is *infinite*, not \$1.78 per gallon and \$754 per ton, respectively.

# (2) Ethanol does not replace gasoline gallon for gallon – there are fuel market effects

The second error the CBO makes is that it assumes each gallon of ethanol (energy equivalent) replaces a gallon of gasoline. But this ignores 'leakage' or indirect market effects in the fuel market. Ethanol production due to the tax credit shifts the fuel supply curve to the right, causing the market price of fuel to decline and total fuel consumption to increase. The increase in total fuel consumption is the leakage or amount of gasoline *displaced*. The difference between the increase in ethanol supply and the increase in total fuel consumption is the amount of gasoline *replaced*.

How big is leakage in the fuel market? The most comprehensive study on leakages in the fuel market due to biofuel <u>policy</u> is by <u>Drabik and de Gorter which finds that one gallon (energy equivalent) of ethanol generated by tax credits is likely to replace only 0.3 of a gallon of gasoline. This means the market effect or leakage in the fuel market is 70 percent. In other words, instead of corn-ethanol costing \$1.78 to replace one gallon of gasoline and \$754 to reduce one ton of green house gas emissions, it costs about 3 times more even if we don't correct those CBO estimates for the existence of the consumption mandate.</u>

This second CBO error of assuming no leakage in the fuel market is ironic because 2.5 pages (of the total 17.5 page report) are analysis of indirect land use change due to biofuel policy. Indirect land use change is all about including a leakage, or market effect, in commodity markets. As land is diverted to biofuel production, commodity prices go up. Land is therefore converted from forests and grasslands elsewhere to take advantage of these higher commodity prices. This generates upfront green-house gas emissions and the CBO argues that these emissions must also be included as costs.

Why did the CBO discuss leakage or market effects in commodity markets and not in the market for fuel itself? Economists have estimated that greenhouse gas emissions from the leakage in commodity markets (generated by indirect land use change) is about onethird of that from leakage in the fuel market.

#### (3) The tax credit subsidizes gasoline consumption with a mandate So far, the debate has been about how much the tax credit expands ethanol

consumption and *reduces* gasoline consumption. But if the mandate is binding (i.e., determines the ethanol market price), as the CBO predicts, then the situation is even worse because the tax credit now subsidizes *gasoline* consumption instead. This is a recognized and accepted result amongst economists and so an explanation will not be repeated here. It has been adequately explained in the original and peer reviewed articles by de Gorter and Just (here and here), intuitive explanations in de Gorter and Just (here, here, and here), and in de Gorter. The result has been confirmed by Lapan and Moschini, Rapier (here and here) and Fischer and Preonas.

Given that the CBO report predicts mandates will bind in the future, surely the CBO had something to say as to what the tax credit would do in that case? The report did indeed comment on that situation with the following statement in two very prominent paragraphs (the last paragraph in each of the summary of the report and of the report itself):

the biofuel tax credits would no longer be increasing production, but they would still be reducing the costs borne by producers and consumers of biofuels.

The CBO's contention that a tax credit with a binding mandate converts into a decoupled subsidy to biofuel producers and consumers defies economic logic and completely ignores the burgeoning literature on how tax credits subsidize gasoline consumption described in the previous paragraph. In reality, ethanol producers will be unaffected but biofuel consumers benefit in the form of lower *fuel* (ethanol and gasoline) prices. Because the mandate determines the ethanol price, this means the consumer price of *gasoline* declines.

## (4) The ethanol consumption mandate is binding

The CBO report makes the same mistake as the earlier GAO report on biofuels by automatically concluding just because total ethanol consumption exceeded the mandated quantity in the past two years, the mandate was therefore not 'binding'; i.e., did not determine ethanol market prices directly.

There are a multitude of reasons why the mandate is binding even if *ex post* ethanol consumption exceeds mandated volumes. For example, although the U.S. employs a consumption mandate requiring that a fixed amount of ethanol be used as fuel each year, it is nevertheless implemented as a blend mandate. The blend is based on a forecast of total fuel consumption for the upcoming year. If the forecast is wrong, then actual consumption does not equal observed consumption *ex post*. But that does not binds for every day of the year but one, then observed consumption *ex post* is automatically going to be greater than the mandate volume. But is it then reasonable to conclude that the mandate did not bind? Moreover, firms can bank their mandated quantities (firms can use up to 20% of their RINs in the following year), automatically generating consumption levels beyond that year's mandated volume.

How, then, might we determine whether the mandate is binding or not? The only fool proof way is to subtract the observed ethanol market price from the predicted ethanol price if the tax credit was the only policy instrument (see Figure 1). If the difference between these two variables is positive, then the mandate is binding (why otherwise





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would blenders pay a <u>premium</u>?). If the difference is negative, then there must be market disequilibrium (why otherwise would blenders forego profits?). If the difference is zero, then the tax credit determined ethanol prices and the mandate is dormant (not binding).



The negative values in Figure 1 arose because ethanol production increased so fast that in June of 2008, the infrastructure could not handle supplies while more recently, the "blend wall" is in effect where non-flex cars are subject to the current 10% blending limit.

The important implication is that if the tax credit determines ethanol market prices, then the mandate is dormant. Evidence in Figure 1 indicates that occurred in 4 months of the past 30 months. For 6 months, the blend wall seems to be the factor determining ethanol prices. In all the other 20 months, the mandate is determining the ethanol price.

But most importantly, if either the mandate or the blend wall is binding, then the tax credit is subsidizing gasoline or fuel (90% of which is gasoline) consumption.

### A New Beginning?

After the CBO issued their report recently, Senate Energy and Natural Resources Chairman Jeff Bingaman (D., N.M), who commissioned the report, suggested that Congress "should look seriously at this expenditure rather than just reflexively extending it." We suggest Chairman Bingaman not reflexively accept this report in its current state.

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