Why Biofuel subsidy?
1. Reducing dependence on imported oil,
2. Reducing greenhouse gas emissions and
3. improving rural development related to biofuel plants, and farm income support at different levels across states

Subsidy is through
1. The Volumetric Ethanol Excise Tax Credit (VEETC),
2. Renewable Fuel Standard, a 45¢/gallon tax credit to refiners blending ethanol with gasoline at least a certain amount of renewable fuel
3. import tariff

Fig 1: Domestic Ethanol Production and Federal Tax Expenditures, 1980-2008

Objective of the study:
- to estimate welfare gains and losses of removing the current blender’s tax credit using consumer and producer surplus techniques

Methodology
Using standard log-linear version of comparative statics that allows Product-Factor Market Connections i.e., industry-level cost function, with two outputs (ethanol & DDG) and four inputs (corn, energy, labor, & capital) in the ethanol industry

Mathematically
1. Demand for ethanol and DDGs
\[ Y(\text{ethanol, DDGs}) = f(P) \]
2. Marginal cost is equal to price of output
\[ C_y(.) = P_s \]
3. Zero profit condition
\[ C(P_{\text{corn}}, P_{\text{energy}}, \text{Wage, Rent}) = YP_s \]
4. Optimal inputs:
\[ C_W = X(\text{ethanol, DDGs}, P_{\text{corn}}, P_{\text{energy}}, \text{Rent, wage}) \]
5. Input supply
\[ X(\text{ethanol, DDGs}, P_{\text{corn}}, P_{\text{energy}}, \text{Wage, Rent}) = g(w) \]
6. Output wedges
\[ (P_s/P) = \eta + \tau \]

Result and Discussion
Change in Producer Surplus
1.1 Output market: Ethanol

- Loss in Consumer surplus = $0.60 Billion
- Producer surplus = $3.45 Billion

1.2 Output market: DDGs

- The gain in consumer is canceled out by loss in producer surplus

2. Input market
2.1 Corn

- Loss of $2.53 Billion

2.2 Energy

- Loss of $0.45 Billion

2.3 Labor market

- Loss of $0.04 Billion

Change in producer Surplus

Conclusion
The welfare losses to ethanol producers is about $3.4 billion, far greater than the $1.4 billion losses to ethanol consumers. In this model with zero profits in the industry, all revenue losses are passed through to the ethanol input markets, which of course include owners of ethanol plants (capital.)

Taxpayers saved $4.05 billion outlays under the removal of ethanol tax credit. The overall deadweight gain recovered by removing subsidy is $0.47 billion. Removing the tax credit in the wake of the rapid expansion of ethanol plant and production in many states has negative implications for the welfare of the producer and consumers.

Literature cited

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For further information
Please contact: Kassu Wamisho at kassuwam@yahoo.com
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