Analyze the Ethanol Gasoline Blending Ratio and the Pass-through of RINs and the Blender’s Credits

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Outline

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• Objectives

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Motivation

• Ethanol can substitute for petroleum as a transportation fuel to an extent
• Ethanol-gasoline blending ratio depends on various factors
• Blending wall: E10, E15, ..., E85, ...
• RFS: 36 billion gallons of ethanol and biofuel annually by 2022
Million gallons of corn based ethanol production and million bushels of corn used in ethanol production

Value Chain in the Ethanol Market

Farmers → Ethanol Producers → Blenders → Consumers

Government Policy and Regulations
RINs and Blender’s Credits

- **Volumetric Ethanol Excise Tax Credit (VEETC)/Blender’s credit**
  - 45 cents per gallon of corn ethanol
  - 1.01$ per gallon of cellulosic ethanol

- **Renewable Identification Number (RIN)**
  - 38-character numeric code
  - Value change with market: 0.25 cent each in 2007, has been traded for 25 cents each
Ethanol Supply Chain
Revenue, Costs, and Profit
(corn at cost of production)

Source: USDA AMS Iowa Ethanol Report, ISU Ethanol Profitability, EIA
Ethanol Profits for Ethanol Producer and Corn Farmer
($ per gallon) (corn at production cost)
Objectives

- Develop an economic model to investigate the competition between ethanol and gasoline fuel
- Perform scenario analysis to investigate the impacts of agricultural, energy and environmental policies
- Perform sensitivity analysis to study the implications of changes in policy, energy prices and consumer demand.
Approach and Tasks(1)

- Visit and interview stakeholders to understand the interactions between oil companies, ethanol companies, and regulatory agencies.
  - ConocoPhillips
  - Sundrop Fuels
  - Archer Daniels Midland (ADM)
  - BP, Valero, Koch Fuel
Approach and Tasks (2)

- Formulate the interaction and competition among the parties
  - Economic models
  - Engineering models

- Analyze market equilibrium and profitability to determine the optimal ethanol gasoline blending ratio
Approach and Tasks (3)

• Analyze the pass-through of blender’s credits and RINs under various scenarios
  – Perfect competition
  – Imperfect competition
  – Mandate binding
  – Mandate not binding
Approach and Tasks (4)

• Assess the influence of current and proposed policies on gasoline and ethanol fuel and corn markets.
  – Policy as is
  – Corn ethanol blender’s credit is removed
  – RIN is removed

• Write academic and public policy papers
Questions?
Billions of Gallons per Year

- Renewable Biofuel
- Cellulosic Biofuel
- Biomass-based Diesel
- Undifferentiated Advanced Biofuel