The State of Biofuel Today

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What Biofuels Do We Have?

• Ethanol
  – Corn
  – Sugar cane

• Biodiesel
  – Animal fat
  – Vegetable oil (rape and soybean)

• Palm oil renewable diesel
Market Overview

• Sugar cane ethanol
  – Brazil cannot keep up with domestic demand
  – About 50% of vehicle fleet is now flex fuel
  – 2009 financial disaster has stalled investment
  – Pries likely to remain higher than US prices for another year or two
  – UNICA is encouraging drivers not us E100
Market Overview

• Biodiesel
  – Margin cost of production exceeds diesel cost by $2.00 per gallon
  – $1.00 tax credit, $1.00 RIN price
Corn Ethanol

• Largely a break-even business
Ethanol Operating Margins based on nearby futures and Iowa corn prices

Center for Agricultural and Rural Development (CARD), www.card.iastate.edu, Iowa State University, Ames, Iowa
Corn Ethanol

• $0.45 VEETC keeping demand high
• Mandate creates a floor at about 11 billion gallons due to carryover RIN
• Big issues are political (ethanol is an oversubsidized, uneconomic industry that is starving the world’s poor and causing loss of rainforests) and saturation of markets (blend wall of less than 14 billion gallons)
Rest of Talk

• Is corn ethanol an over-subsidized, uneconomic industry that is starving the world’s poor and destroying rainforests?
• What is the outlook for biofuels given the 14 billion gallon blend wall?
Corn Prices

Marketing Year

$/bu

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
Plant Payback

• A 100 million gallon ethanol plant cost about $125 million to build in 2005.
• If margins are $1.25 could pay for the plant in one year of operation
Ethanol Margins

$/gal

October to September Processing Year

2001 2002 2003 2004 2005 2006 2007 2008 2009
Was Corn Ethanol a Good Investment?

• At 2007/08 margins of $0.75 per gallon, could pay back the plant and plant cost increase to $150 million, could pay back the plant in two years

• Of course margins did not turn out the way that investors had hoped
Role of Subsidies

• Were the high margins a result of subsidies or basic economics?

• Answer: We calibrated out FAPRI model to actual observed prices and quantities to recreate historical record.

• Then we re-ran model without subsidies after 2004/05 year allowing all markets to adjust.

• No accounting for role policy might have played in reducing uncertainty that could drive investments
Impact of VEETC and Mandate on Ethanol Margins

$/gal

October to September Processing Year

History
No Mandate or VEETC
Impact of VEETC and Mandate on US Ethanol Production

October to September Processing Year

Million gallons

- 05/06
- 06/07
- 07/08
- 08/09
- 09/10

History
No Mandate or VEETC

Legend
Impact of VEETC and Mandate on Corn Acreage

October to September Processing Year

Historical and No Mandate or VEETC Corn Acreage
Impact on Food Prices

• My rule of thumb: For each $1/bu increase in the price of corn, U.S. food expenditures increase by 0.6%

• Average impact of ethanol subsidies and mandates from 2005 to 2009: 12 cents per bushel

• Average impact on food prices: 0.1%
My Conclusions

• Ethanol may be over-subsidized, but the subsidies have had minimal impact on corn price and US food prices.

• Existence of ethanol has impacted corn prices and food prices
Is Corn Ethanol a “Good Idea?”

• Depends on if costs exceed benefits
• Production Costs
  – Capital, Labor, Energy, and Corn
• Externality Costs
  – Some additional nutrient pollution from additional corn production
• Source of transportation fuel and octane
  – 70% of the price of gasoline
• Externality Benefit
  – Wean U.S. marginally from reliance on fossil fuel
Cost of Producing Ethanol
(Net of Distillers Grains Value)
Corn ethanol generates fewer benefits than costs at $1.50 gasoline.
If the price of corn is less than $2.50/bu, benefit > cost.

Production Cost vs Ethanol Value

P_{gas} = $2.00
If the price of corn is less than $3.90/bu, benefit > cost.
If the price of corn is less than $5.20/bu, benefit > cost.
RFS for Biofuels other than Biodiesel

- 2011: 12.75
- 2012: 13.7
- 2013: 15
- 2014: 16
- 2015: 18
- 2016: 20
Can US consume 15 BG of ethanol?

• No. At 140 BG fuel consumption, 10% blend with 100% market penetration is about 14 BG
Outlook for 2013

• 15 BG of ethanol is greater than 10% blend

• Three options
  – Cap RFS down to 14 BG
  – Keep RFS and hope for drop-in fuels
  – Adopt policies to facilitate use of higher ethanol blends
Cap RFS at 14 BG

- Preferred choice of some in Congress (and some Berkeley professors)
- Likely choice of EPA if E15 is not adopted
- Creates no room for cellulosic ethanol
Hope for Drop-in Biofuels

• Conversion of ethanol plants to bio-butanol plants
• Expansion of bio-crude
• Synthetic gasoline
Why Does E15 Make Sense?

• Only path to meeting RFS with ethanol thereby creating room for cellulosic ethanol

• Push by existing ethanol producers because it will cause the value of existing corn ethanol plants to increase
  – Political deal in exchange for VEETC elimination?

• Cars can run on it
Why Does E15 Make No Sense?

• If corn production stays short of expectations, allowing expansion of production will only keep pressure on livestock industry and wheat processors

• Belief that corn ethanol is an unmitigated disaster that needs to be stopped now.