Bottlenecks and Oil Price Spikes: Impact on U.S. Ethanol and Agriculture

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2007 Swine Disease for Practitioners Conference XV
Ames, Iowa
November 9, 2007
Outline

- Based on an update of our earlier study “Emerging Biofuels: Outlook of Effects on U.S. Grain, Oilseed, and Livestock Markets”
  
  http://www.card.iastate.edu/publications/synopsis.aspx?id=1050

- Updated with available 2006 and 2007 data

- The objective is to estimate:
  - how large the biofuels sector in the U.S. could become
  - the impact of the biofuels sector on crops markets, trade, and on livestock markets
  - the response of world agricultural markets
Model Interactions

Macroeconomic Variables

Policy Parameters

International Dairy ➔ International Livestock ➔ International Grains

International Livestock ➔ U.S. Dairy ➔ U.S. Crops

International Grains ➔ Ethanol

U.S. Livestock ➔ International Oilseeds ➔ International Sugar

U.S. Crops ➔ International Rice
Current ethanol capacity: 131 plants, 6.92 billion gallons/year

Total capacity under construction and expansion: 6.56 billion gallons/year

73 new ethanol plants and 10 expansion projects underway

2.2 billion bushels of corn were used in producing fuel ethanol in 2006/2007 marketing year.

3.2-3.5 billion bushels of corn are expected to be used in producing fuel ethanol for 2007/2008 marketing year.
Three Cases

- Baseline
  - Current policies, “normal” weather

- Higher oil prices throughout projection period
  - Adding $10/barrel to the crude oil price

- Drought in the 2012 crop year
  - Placing a 1988-style drought in the middle of the projection period
Projected U.S. Ethanol Production

Annual production based on Jan.-July 2007 numbers ~ 6.4 billion gallons
Wholesale Gasoline and Ethanol Prices

US$/gallon


Unleaded Gasoline Ethanol Unl. Gas (Sept. 2007) Ethanol (Sept. 2007)
Projected U.S. Dry Mill Margins

US$/bushel

Margin Over Operating Costs
Margin Over Total Cost
Projected U.S. Corn Planted Area

million acres

Projected U.S. Corn Production and Prices
Projected U.S. Distillers Grains Production and Prices

![Graph showing projected U.S. Distillers Grains Production and Prices from 2006 to 2016. The graph displays the production in million tons on the y-axis and the years 2006 to 2016 on the x-axis. The price per ton is also shown, with a slight decrease over the years.]
Projected U.S. Soybean Meal Production and Prices
Projected U.S. Market Hogs (Dec. 1)
Projected U.S. Pork Production and Prices

- Production
- Price
Projected U.S. Hog Net Returns

$/cwt.

Impact of Higher Crude Oil Price

- Increased crude oil price by $10/barrel over the projection
- Margins on ethanol plants increase
- New incentive to invest in added capacity for ethanol production
- Eventually, a new equilibrium reached where there is no incentive to invest in or exit the ethanol industry
- Will demand for ethanol be enough?
  - E-10 market will saturate around 15 billion gallons
  - Drop in ethanol price will eventually encourage increase in demand for the flex-fuel cars
Projected U.S. Ethanol Production

billion gallons

Scenario Baseline
Wholesale Gasoline and Ethanol Prices

US$/gallon

Unleaded Gasoline
Ethanol
Unl. Gas (Sept. 2007)
Ethanol (Sept. 2007)
Projected U.S. Corn Planted Area

million acres

Scenario Baseline
Projected U.S. Corn Production and Prices
Projected Utilization of U.S. Corn

- Feed
- Fuel
- HFCS
- Seed
- Food, Other
- Exports

million bushels

Projected U.S. Distillers Grains Production and Prices

- Production (in million tons)
- Price ($ per ton)

Year: 2006 to 2016
Usage of Distillers Grains by Species

- Beef: 66%
- Pork: 13%
- Poultry: 12%
- Dairy: 9%
Projected U.S. Soybean Meal Production and Prices

- Production
- Price


Million tons

$ per ton


Projected U.S. Meat Production

billion pounds


Beef | Pork | Broiler

Projected U.S. Market Hogs (Dec. 1)
Projected U.S. Pork Production

- Scenario
- Baseline

Billion pounds

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Projected U.S. Hog Prices

Scenario Baseline
Impact on Rest of the World

- World grain and oilseed prices increase
- Result in higher feed and food prices
- Higher livestock production cost
- Countries in South America and Asia fill the crop gap
Impact of Short Crop Scenario

- Drought in 2012 similar to 1988
  - Regional yields of corn, soybeans and wheat changed from trend levels
  - Yields were off by 25% for corn, 18% for soybeans, and 11% for wheat in 1988

- Ethanol mandate for 2012 assumed to be 14.7 billion gallons
Historical Corn Production Deviations

-35%
-30%
-25%
-20%
-15%
-10%
-5%
0%
5%
10%
15%
20%

Corn, Soybean and Ethanol Markets

- Corn price increases by 44% above baseline levels
- Soybean price rises by 22%
- Corn exports and stock levels decline by more than 60%
- Corn exports from South America, China, etc. fill part of the gap from decline in U.S. corn exports
- Corn feed use declines by 16% (switch to other feeds)
- Ethanol trade increases moderately
Livestock Market

- Higher feed costs affect the livestock sector but to a lesser extent as shock is perceived as temporary
- Production declines
  - Broiler production declines the most (over 2.5%)
  - Milk production declines the least (0.5%)
Projected U.S. Pork Production

![Graph showing projected U.S. pork production from 2006 to 2016. The graph includes a baseline and scenario line, with the scenario line generally indicating higher production levels.]
Projected U.S. Hog Net Returns

-3
-2
-1
0
1
2
3
4
5
6
7
8
9

$/cwt.


Scenario Baseline

$/cwt.


Scenario Baseline

Scenario Baseline
Thank You