Ethanol and grain markets: issues and uncertainties

Pat Westhoff (westhoffp@missouri.edu), Jarrett Whistance (whistancejl@missouri.edu) and Wyatt Thompson (thompsonw@missouri.edu)

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Ethanol production is dominated by a few major players

- **U.S.** is largest producer
  - Corn dominant feedstock
  - Little growth in recent years

- **Brazil** #2
  - Sugarcane main feedstock
  - U.S. + Brazil: 74% of world production in 2021

- **China** #3; **EU** #4
  - Mix of feedstocks

2021 ethanol production

- U.S.: 48%
- Brazil: 26%
- China: 9%
- EU: 5%
- Other: 12%

*Source: Foreign Agricultural Service, USDA, December 2022.*
How important is ethanol in explaining developments in global agricultural markets?

Really important

• USDA says 38% of 2022 U.S. corn crop will be used to make ethanol and coproducts

• Plus, need to consider use of sugarcane in Brazil and various feedstocks in other countries

• Keeps prices higher than they would otherwise be

• Plus, if policy makes ethanol demand inelastic, may exacerbate price swings
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Not so important
• Correcting for coproducts, U.S. use is just 8% of global corn use and about 3% of global grain use
• For comparison, the increase in China’s feed use of corn since 2000 is >10% of global corn use
• U.S. ethanol use of grain hasn’t changed much in last 10 years, probably won’t for next 10 years
• Thus, it’s hard to blame ethanol for recent price developments
In recent years, U.S. biofuel use roughly matches the applied Renewable Fuel Standard (RFS)

- Statutes, EPA rules, small-refinery waivers, fuel use and court cases can all affect the applied RFS for a given year

Suggests applied RFS largely determines overall biofuel use

- Mix of ethanol/biodiesel/other biofuels can change with market circumstances, other policies
- But total use only deviates slightly from applied RFS
- Rules allow some smoothing across years

Source: FAPRI November 2022 preliminary baseline
One piece of evidence that the RFS has been binding in most recent years

• Obligated parties must submit Renewable Identification Numbers (RINs) to show compliance with the RFS
  • Corn ethanol use generate D6 RINs
  • Other categories for biodiesel, etc.

• RINs are tradeable; “should” only have value when the RFS requires more use than market forces alone would suggest

• D6 RINs have had a positive value
  • $1.64/gallon D6 RIN value last week
  • $2.19/gallon Chicago ethanol last week (both according to OPIS)

Source: FAPRI November 2022 preliminary baseline
What could make the RFS less binding?

• Lower applied RFS
  • Not just stated level, but considering effects of any small refinery waivers, etc.
• Lower feedstock (grain, sugar, vegetable oil, etc.) prices
• Higher overall fuel use
  • Would increase quantity used, but each year’s requirement is a share of total fuel
• Greater ease of using biofuels
  • For example, policy changes that make it easier to use higher-level ethanol blends
• Other policies that boost biofuel use
  • California’s low-carbon fuel standard, biodiesel tax credits, etc.
• Maybe higher gasoline prices
  • Would, all else equal, encourage greater proportional blending of biofuels
  • But could reduce overall fuel use, so less ethanol use in standard 10% blends
Suggests the importance of setting the RFS and other biofuel policies

- U.S. Environmental Protection Agency has significant (not infinite) discretion in setting RFS for future years—possible policy goals
  - Push increased use—set the RFS higher
  - Reward capacity—if more renewable diesel plants are planned or being built, expand that portion of the RFS (chicken and egg issue)
  - Try to satisfy biofuel & crop producers, oil refiners—probably can’t satisfy all 3
  - Reflect changes in fuel demand—if fuel use drops with electric vehicles (EV’s), reduce RFS and/or make renewable electricity to power EV’s eligible for RINs
  - Maximize reduction in greenhouse gas emissions
  - Address food and fuel consumer concerns

- Non-federal policies matter, too
  - Low-carbon fuel standard in California encourages renewable diesel
  - That can come at expense of ethanol and conventional biodiesel, depending on RFS
U.S. ethanol use tied to gasoline use

- 10% ethanol blends dominate; small market shares for E-15, E-85 and gasoline without ethanol
- Gasoline and ethanol use fell in 2020 as fewer miles were driven
- Gasoline use has not recovered to the 2019 level
- Average blend is now slightly over 10%—policy and consumer demand will drive future blend rates

Source: FAPRI November 2022 preliminary baseline.
U.S. corn ethanol use

• November projections from both USDA and FAPRI show relatively flat projected U.S. use of corn to make ethanol & coproducts

• In addition to ethanol to supply the domestic market, FAPRI projected an increase in U.S. ethanol exports

Sources: FAPRI preliminary baseline, Nov. 2022; USDA long-term baseline, Nov. 2022
U.S. feed and residual use

• From 2005-2012
  • Higher corn prices contributed to reduction in U.S. corn feed use
  • Only partially offset by increased use of distillers dried grains and other coproducts of ethanol

• Since 2012
  • General upward trend in U.S. livestock production and feed use
  • Dip in 2022/23: high prices, reduced crop production
  • We project modest growth

Source FAPRI-MU preliminary baseline, Nov. 2022
U.S. corn and distillers grains exports

• Annual variation and trends in U.S. corn exports
  • Weather in U.S., other countries explains much of annual variation (2012 drought)
  • Ethanol use, of course, can affect available supplies and market prices
  • (Generally) upward trend since 2012

• 2022/23 U.S. corn exports are down
  • Weather-reduced U.S. crop
  • Competition from Brazil
  • In spite of reduced exports from Ukraine
  • More recent estimates: even larger reduction

• In addition, U.S. exports 10+ million tons of distillers grains each year

Source: FAPRI preliminary baseline, Nov. 2022.
U.S. marketing year average (MYA) prices

Sources: FAPRI preliminary baseline, Nov. 2022; USDA long-term baseline, Nov. 2022; CME Dec. (corn) and Nov. (soybean) futures contracts, 7 a.m. central time, Jan. 24, 2023.
U.S. crop yields and land use

Source: FAPRI preliminary baseline, Nov. 2022. Note: 11 other crops are wheat, sorghum, barley, oats, upland cotton, rice, peanuts, sunflowers, canola, sugar cane and sugar beets
Thanks!

• FAPRI-MU website: www.fapri.missouri.edu
• Follow us on Twitter: @FAPRI_MU
• To contact Pat Westhoff:
  • 573-882-4647
  • westhoffp@missouri.edu

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FAPRI-MU team:
• Julian Binfield
• Ben Brown
• Sera Chiuchiarelli
• Hoa Hoang
• Fazal Malakhail
• Bob Maltsbarger
• Marc Rosenbohm
• Juo-Han Tsay
• Wyatt Thompson
• Pat Westhoff
• Jarrett Whistance
• Peter Zimmel