

US Biofuel Policy Effects on Agricultural Commodity Exports

by Wyatt Thompson, Seth Meyer, and Pat Westhoff

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Objective

- Background
 - Concerns about US biofuel policy effects
 - Food versus fuel
 - Indirect land use
 - Biofuel policy effects sensitive to context
- Problem
 - Range of US biofuel effects?
 - Measured by US agricultural exports

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Policies and Impacts

- Key biofuel policies
 - Tax credit
 - Specific ethanol tariff
 - Mandates (Renewable Fuel Standards)
- Impact on US trade?
 - Gardner: Tax credit → corn feed and exports -1%
 - Birur et al.: mandate → share of coarse grain production exported falls (23% to 10%)
 - Westhoff et al.: eliminate all → +19% corn exports
 - Meyer et al.: no ethanol supp't → +25% corn exports
 - Tyner and Taheripour: price effect sensitive to petro price

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Contribution

- Build on Westhoff et al. and Meyer et al.
 - Similar
 - Model and stochastic simulation
 - Different
 - Updated base data from Westhoff et al.
 - Not just ethanol focus as in Meyer et al.
 - Focus on US agricultural exports
 - Caveat
 - Focus on US markets and policies

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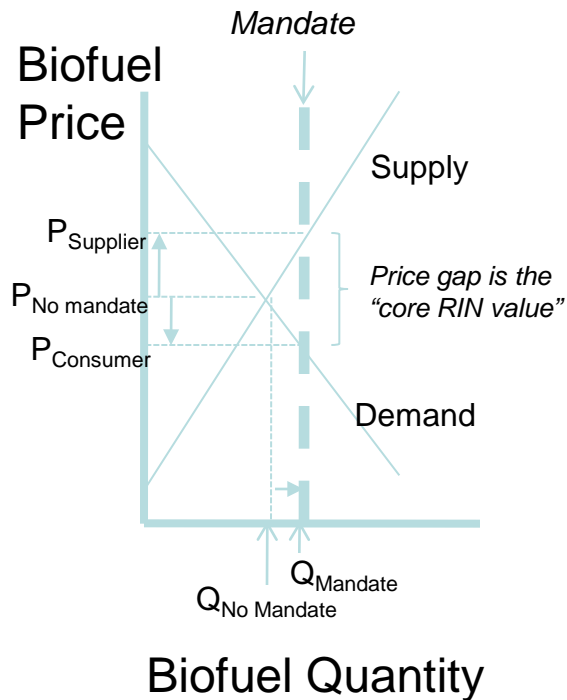
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Approach

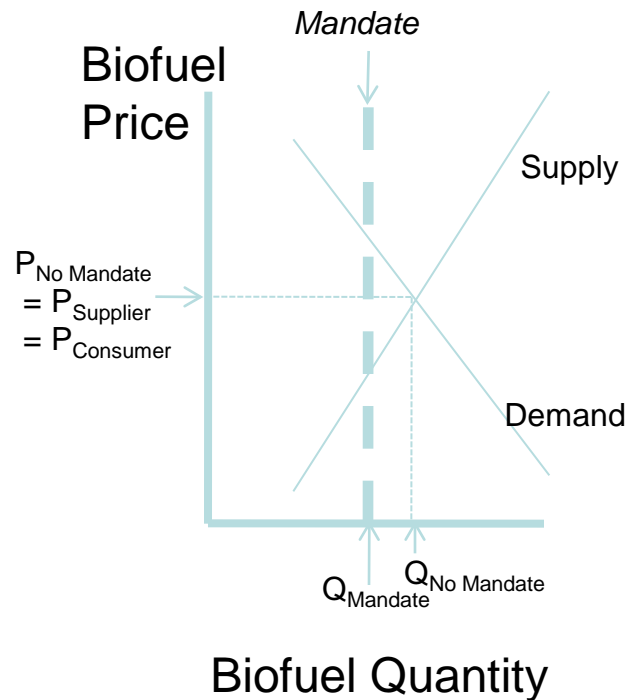
- FAPRI-MU model
 - partial equilibrium, non-spatial, forward-looking
 - US agricultural and biofuel markets
 - crop and livestock commodity markets
 - ethanol, biodiesel
 - biofuel and agricultural policies
- Stochastic simulation
 - repeated random draws on errors
 - petroleum price, yields, demands

Expect a Range of Possibilities

A binding mandate
→ higher quantities and a price gap

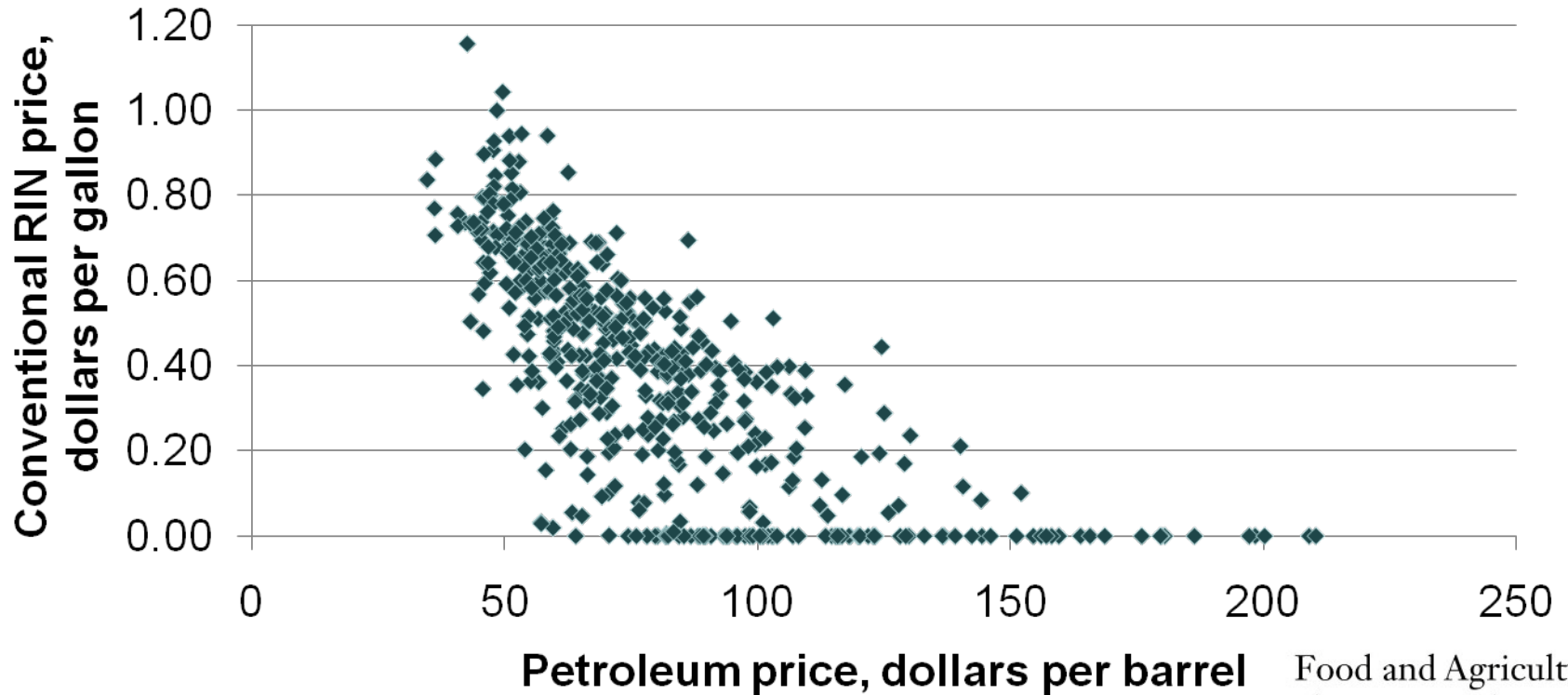


A non-binding mandate
→ no change to quantities or prices



Simulated Range of Possibilities

500 observations of 2015 Conventional Mandate
Cost per Gallon



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Results

Stochastic simulation over 10-year period

Baseline with policies

Scenario without policies

tax credit, ethanol specific tariff, mandates

Difference = effect of removing policies

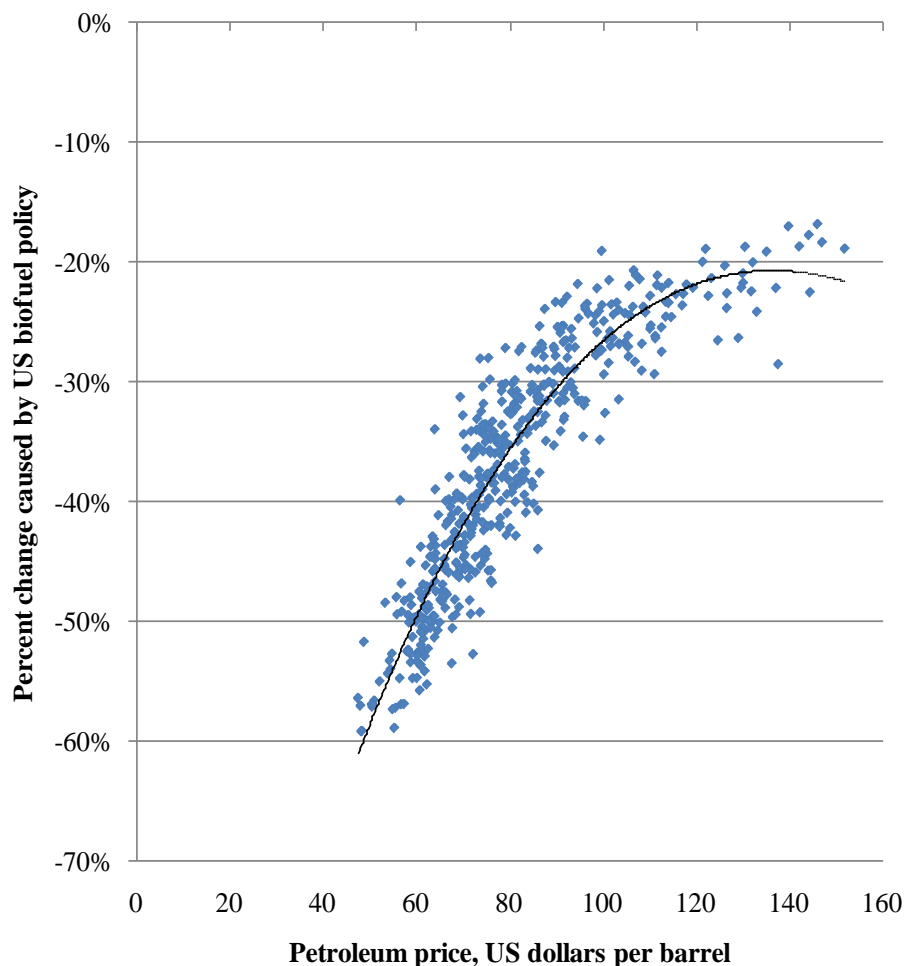
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Ethanol Use

percent change in average value of 2012-18 of stochastic output



Ethanol use billion gallons

2012-18 averages	BASE	SCENARIO
Avg	17.0	10.7 -37%
10 th per.	16.5	8.4 -49%
90 th per.	17.6	13.3 -24%

Note: the percent differences compare the average, 10th percentile, and 90th percentile of the 500 scenario values for ethanol use relative to average, 10th percentile, and 90th percentile of the 500 baseline results for ethanol use.

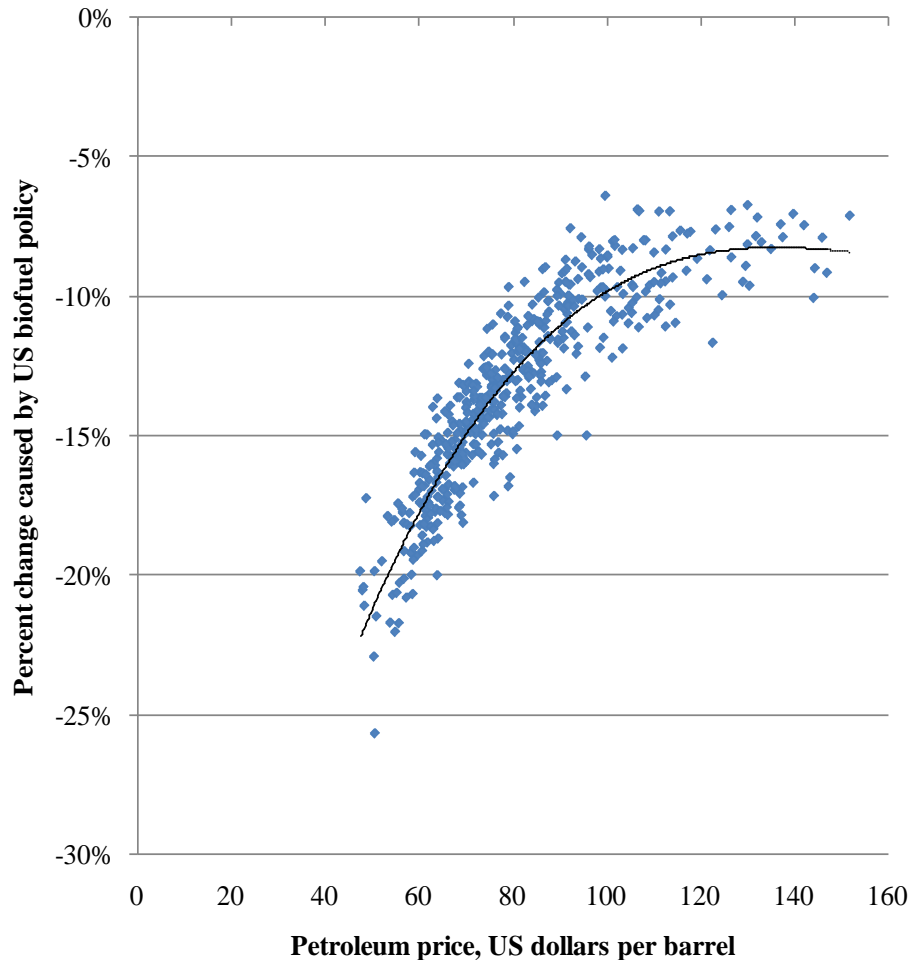
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Corn Price

percent change in average value of 2012-18 of stochastic output



Corn price dollars per bushel

2012-18 averages	BASE	SCENARIO
Avg	4.07	3.53 -13%
10 th per.	3.76	3.17 -16%
90 th per.	4.41	3.93 -11%

Note: see note to table of ethanol use results.

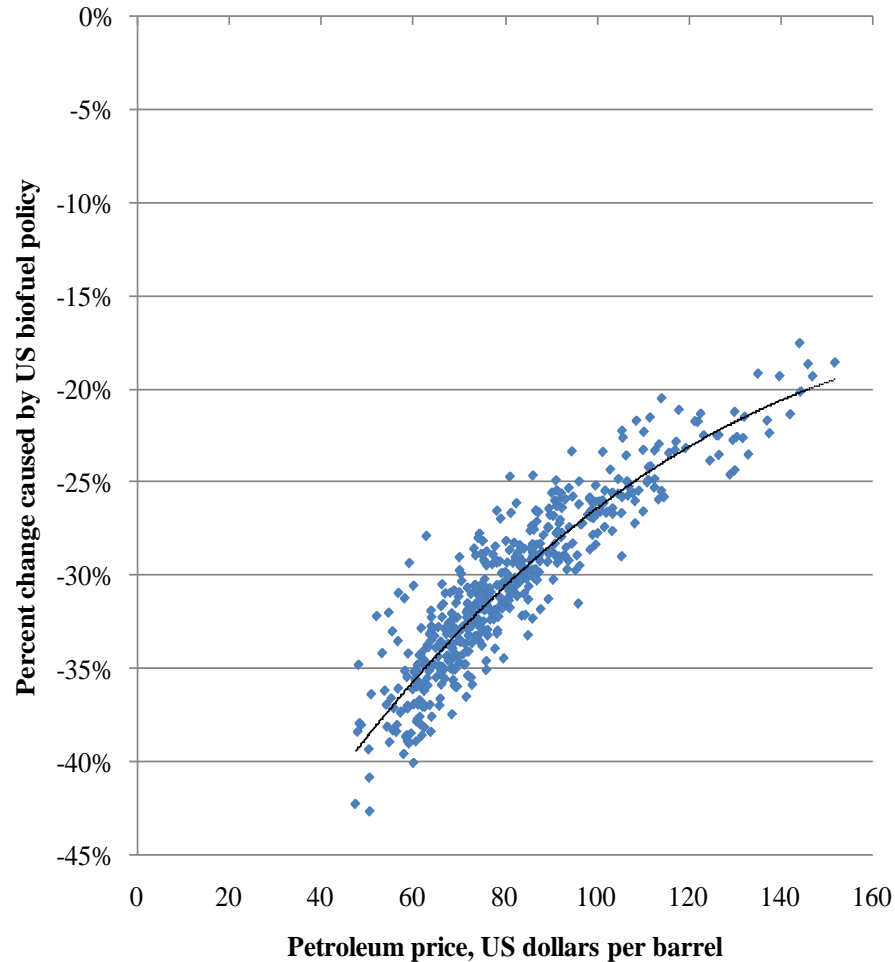
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Soybean Oil Price

percent change in average value of 2012-18 of stochastic output



Soybean oil price cents per pound

2012-18 averages	BASE	SCENARIO
Avg	48	33 -30%
10 th per.	44	29 -35%
90 th per.	52	38 -26%

Note: see note to table of ethanol use results.

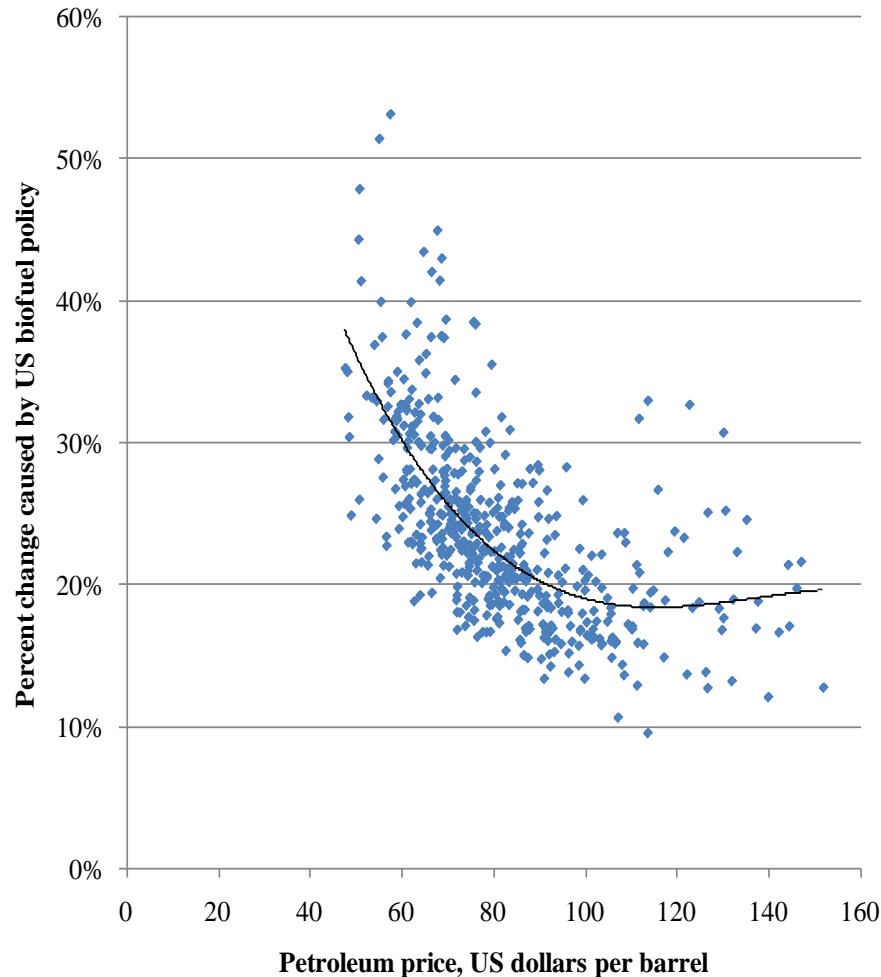
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Corn Exports

percent change in average value of 2012-18 of stochastic output



Corn exports billion bushels

2012-18 averages	BASE	SCENARIO
Avg	2.1	2.6 +23%
10 th per.	1.7	2.1 +24
90 th per.	2.5	3.1 +22%

Note: see note to table of ethanol use results.

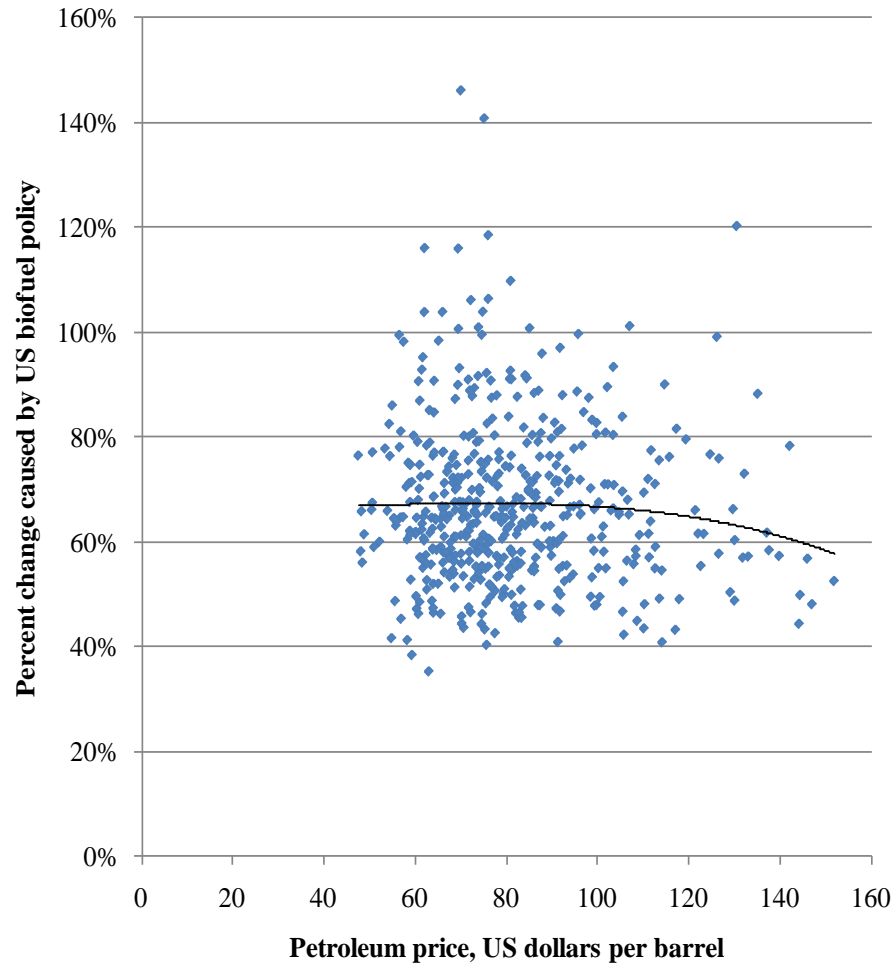
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Soybean Oil Exports

percent change in average value of 2012-18 of stochastic output



Soybean oil exports billion pounds

2012-18 averages	BASE	SCENARIO
Avg	3.0	4.9 +64%
10 th per.	2.1	3.8 +82%
90 th per.	3.9	5.9 +52%

Note: see note to table of ethanol use results.

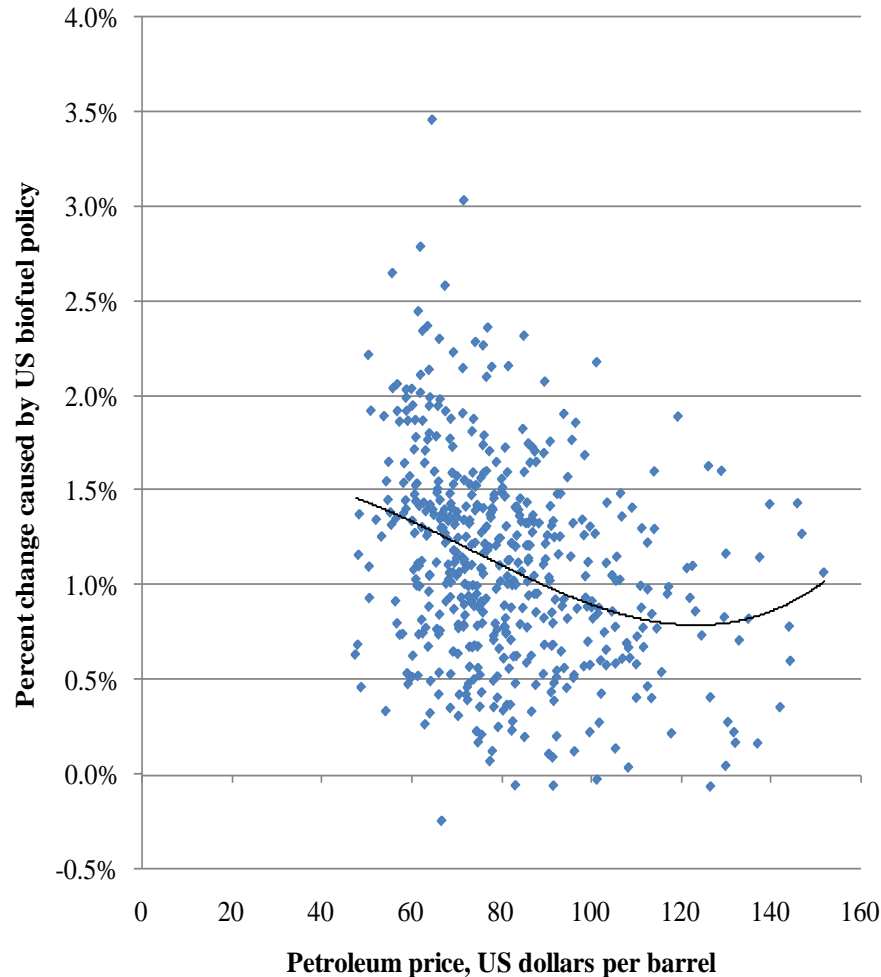
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Wheat Exports

percent change in average value of 2012-18 of stochastic output



Wheat exports billion bushels

2012-18 averages	BASE	SCENARIO
Avg	1.08	1.09 +1%
10 th per.	0.95	0.96 +1%
90 th per.	1.2	1.2 +2%

Note: see note to table of ethanol use results.

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Summary

Question *As first step to world market effects, how do US biofuel policies affect US ag trade?*

Finding discontinuing US biofuel support ...

Increases crop exports

$\frac{1}{4}$ corn, $\frac{2}{3}$ soybean oil, less for others

Sensitive to context

+10-40% corn, 40-100% soybean oil, less for others

- **Caveats:**

Focus on US

Discontinue support, not eliminate biofuel

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More information and other work in progress

<http://www.fapri.missouri.edu/>

FAPRI baseline

US ethanol and biofuel policy analysis

Renewable Identification Number (RIN) markets

Effects of climate policy on US crop production costs

Articles

“Renewable Identification Numbers Are the Tracking Instrument and Bellwether of US Biofuel Mandates” *Eurochoices* 2009

“Ethanol Policy Changes to Ease Pressures in Corn Markets: Could They Work?” *Choices* 2009

"How Does Petroleum Price and Corn Yield Volatility Affect Ethanol Markets with and without an Ethanol Use Mandate?" *Energy Policy* 2009

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