Effects of climate change legislation on U.S. agriculture: Some sources of uncertainty

Patrick Westhoff (westhoffp@missouri.edu)
FAPRI-MU (www.fapri.missouri.edu)
University of Missouri

"Research Perspectives on Carbon and Climate Change Issues"
Farm Foundation Forum, Washington, D.C.
November 10, 2009

Food and Agricultural Policy Research Institute
FAPRI

Agenda

- Two major sources of uncertainty in estimating climate change bill impacts
  - How much will energy costs change?
  - How much cropland will shift into forestry uses?
- Some other sources of uncertainty

Some estimates of impacts on energy costs (change from baseline)

	EIA basic HR 2454	EIA high offset	EIA high cost	EPA HR2454
2020				
Diesel fuel	8.3%	4.6%	9.0%	4.0%
Electricity	3.8%	3.6%	5.4%	12.7%
Industrial natural gas	14.4%	8.3%	20.2%	8.5%
2030				
Diesel fuel	15.0%	8.0%	17.5%	5.6%
Electricity	22.3%	11.8%	32.7%	13.3%
Industrial natural gas	25.9%	10.2%	39.9%	10.4%

Source: EIA and EPA analysis of HR 2454, the House climate change bill

Uncertainties in estimating crop production cost impacts

- How much will energy costs change?
- How does a given change in energy costs affect prices for fertilizer, chemicals, etc.?
- How will provisions to benefit energy-intensive, trade-exposed (EITE) industries work?
- What changes will farmers make in production practices?

Estimated impacts on corn operating costs (change from baseline)

	EIA basic HR 2454	EIA high offset	EIA high cost	EPA HR2454
2020				
With free EITE allowances	1.8%	0.9%	2.5%	1.6%
Without EITE allowances	3.9%	2.3%	4.8%	2.7%
2030				
With free EITE allowances*	5.7%	2.3%	8.4%	2.5%
Without EITE allowances	7.9%	3.8%	10.9%	3.3%

*Free allowances are phased out between 2025 and 2035 under HR 2454.

Source: FAPRI-MU estimates. These preliminary estimates may be modified after further review of assumed relationships between energy costs and crop production expenses.

Cropland shifts to forestry

- FASOM model results: much crop and pasture land will shift to forestry
- Reduction in crop production results in higher crop prices
- This increases per-acre revenues for remaining crop producers
- Means crop producers might be beneficiaries even if
  - They face higher production costs and
  - They do not earn any offset income

Effects on crop producer net income

Production cost increase	Moderate	Moderate	Moderate	Larger
Acreage shift	None*	Moderate	Larger	Moderate
Effect on crop prices	Slightly higher	Moderately higher	Significantly higher	Moderately higher
Effect on net returns over costs	Negative	Little net change	Positive	Slightly negative

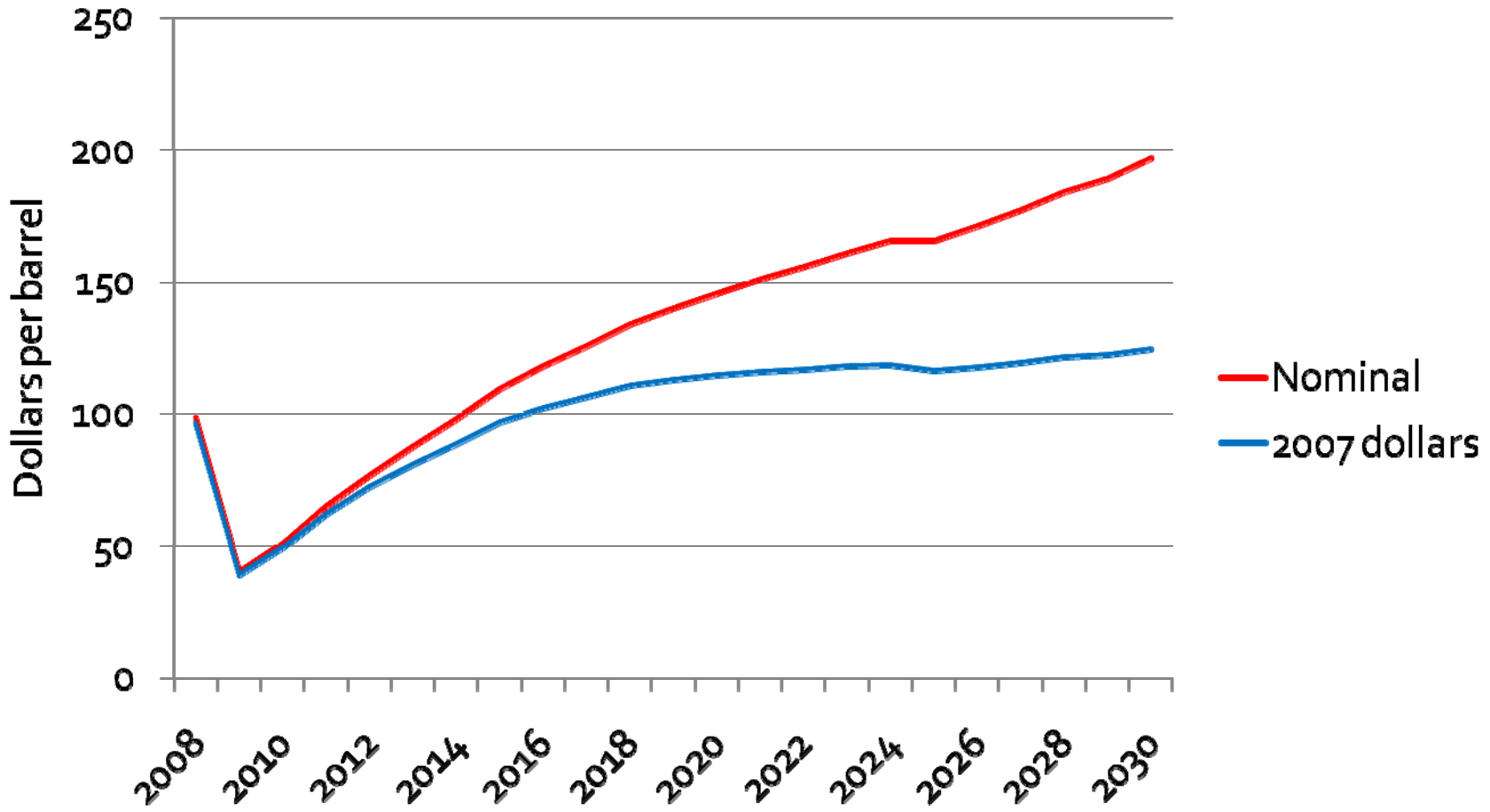
*Except for small negative response to higher production costs

Source: Stylized description of preliminary results of scenarios assuming different changes in production expenses and shifts from crop to forestry uses

Other sources of uncertainty about impacts on crop producer income

- Offset income
  - What practices earn how much?
  - How many farmers can expect to earn offset income?
- Effect on biofuel industry
  - Could be critical, depending on oil prices and how rules apply to industry
  - Biofuel and crop markets will be closely related, especially over the long run

EIA oil price projection
March 2009 reference scenario



Other sources of uncertainty about impacts on crop producer income

- Foreign response
  - How do foreign producers and consumers respond to changes in world crop prices?
  - Do some countries reduce crop production to plant trees and earn offset income?
- Livestock sector response
  - Reduced livestock production seems likely, due to higher costs for feed, fuel and electricity
  - But how big is the effect?

Other food sector impacts

- Livestock sector net income
  - Reduced by higher feed and fuel prices
  - Some producers may earn offset income
- From farm to plate
  - Increased cost of transporting, processing
  - All else equal, larger farm-retail margins
- Macro effects on food demand?

THANKS!

- To contact me: westhoffp@missouri.edu
- FAPRI-Missouri website: www.fapri.missouri.edu