

Effects of Biofuels Policy on Global Trade Flows

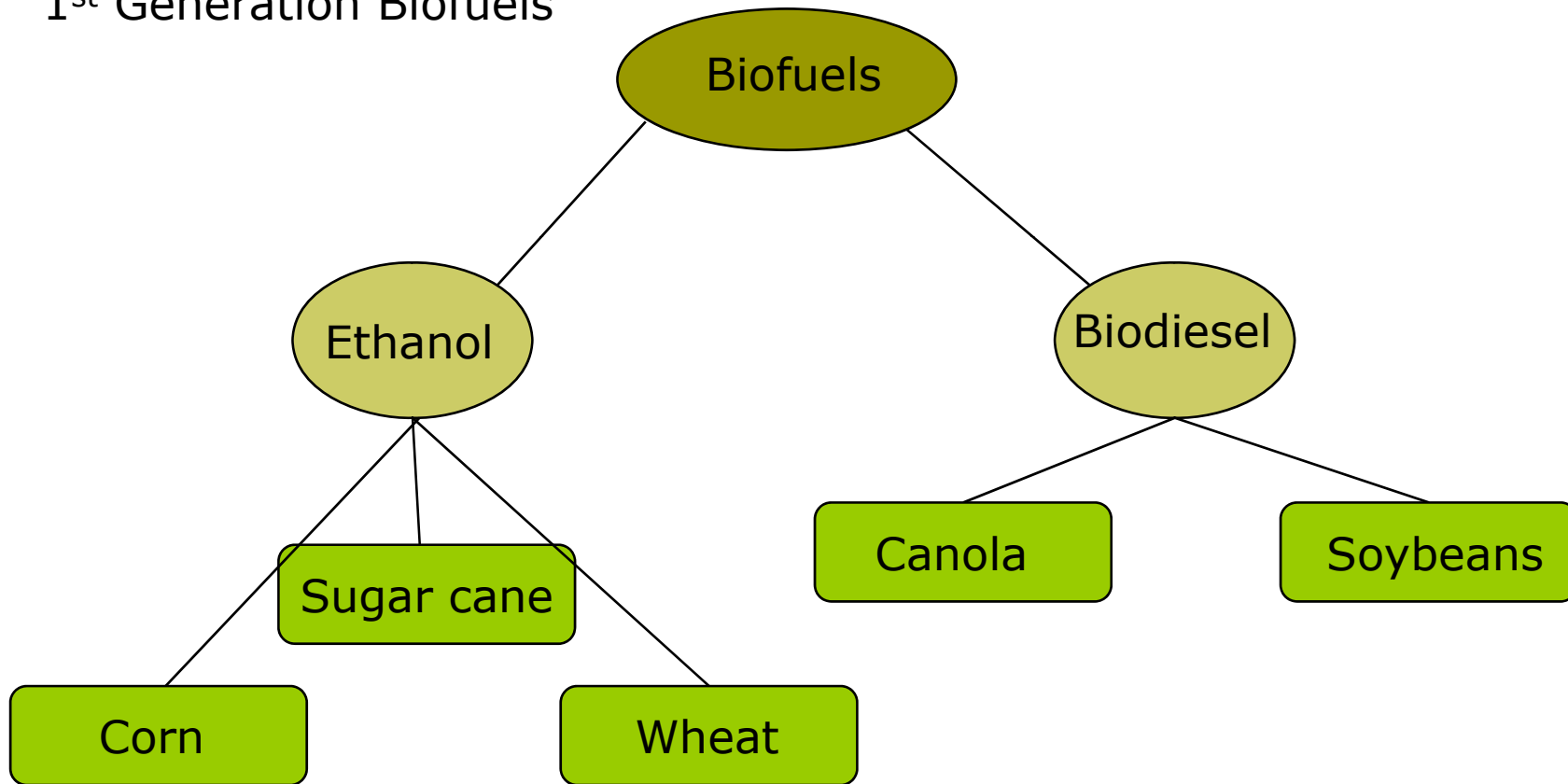
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Biofuels Background

1st Generation Biofuels



Biofuels Background

Initially there were...

- High oil prices
- Relatively low commodity prices
- Strong agriculture lobby
- Strong government involvement
 - Blending/consumption mandates
 - Production quotas
 - Import tariffs
 - Excise tax exemptions
 - Repayable loans for capital costs/construction
 - Purchase of surplus stocks for biofuels

Research Problem

- ❑ What are the price impacts of global biofuels policies, and to what extent do they affect trade flows?
- ❑ How are biofuels linked to the principles of the World Trade Organization, and what issues are raised by increased biofuel trade?

United States

- Corn-based ethanol
 - 2007 production: 5.8 billion gallons/year
- Soybean-based biodiesel
 - 2007 production: ~ 172 million gallons/year
- Goals:
 - Under RFS, 7.4 B gallons by 2012
- Motivations: energy security, agricultural support, environmental benefits

European Union

- Rapeseed-based biodiesel
 - Production (2006): 1.6 B gallons/year
- Goals:
 - 2% of total transportation fuel use from biofuels by 2005
 - 5.75% by 2010
- Motivations: environment, energy security, agricultural support

Canada

- Wheat/corn-based ethanol
 - 725 million litres/year
- Canola-based biodiesel
 - 100 million litres/year
- Goals:
 - 5% renewable content in gasoline by 2010
 - 2% in diesel and heating oil by 2012
- Motivations:
 - environment, agricultural support, rural development

AGLINK

- Dynamic partial equilibrium model
- Multi-region, multi-commodity
 - Crude oil, sugar exogenous
- Exogenous shocks
- Issues:
 - Value of the by-products
 - Emergence of second-generation biofuels

United States Ethanol Production

- Coarse grains consumption

$$QC_{CG}^{US} = CG_{FE}^{US} + CG_{FO}^{US} + CG_{OU}^{US}$$

- Apply the exogenous shock to CG_{OU}^{US}

- Account for by-products

$$\begin{aligned} \text{LN}(CG_{FE}^{US}) = & \alpha + \beta_1 * \text{LN}(\text{PRICE}_{CG}^{US} / \text{PRICE}_{WT}^{US}) + \beta_2 * \text{LN}(\text{PRICE}_{OM}^{US} / \\ & \text{PRICE}_{WT}^{US}) + \beta_3 * \text{LN}(QP_{NR}^{US}) + (1 - \beta_3) * \text{LN}(QP_{RU}^{US}) + \beta_4 * \text{LN}(\text{TRND}) + \\ & \text{LN}(R. CG_{FE}^{US}) \end{aligned}$$

as per Westcott (2007):

CORN: $0.75 * ((0.8 * \text{BF @ 100\%}) + (0.1 * \text{DAIRY @ 45\%}) + (0.05 * \text{PK @ 85\%}) + (0.05 * \text{PLTRY @ 55\%}))$

SOY: $0.75 * ((0.1 * \text{DAIRY @ 55\%}) + (0.05 * \text{PK @ 15\%}) + (0.05 * \text{PLTRY @ 45\%}))$

Canadian Biodiesel Production

□ Demand for oilseeds

$$QC_{OS}^{CAN} = OS_{CR}^{CAN} + OS_{FE}^{CAN}$$

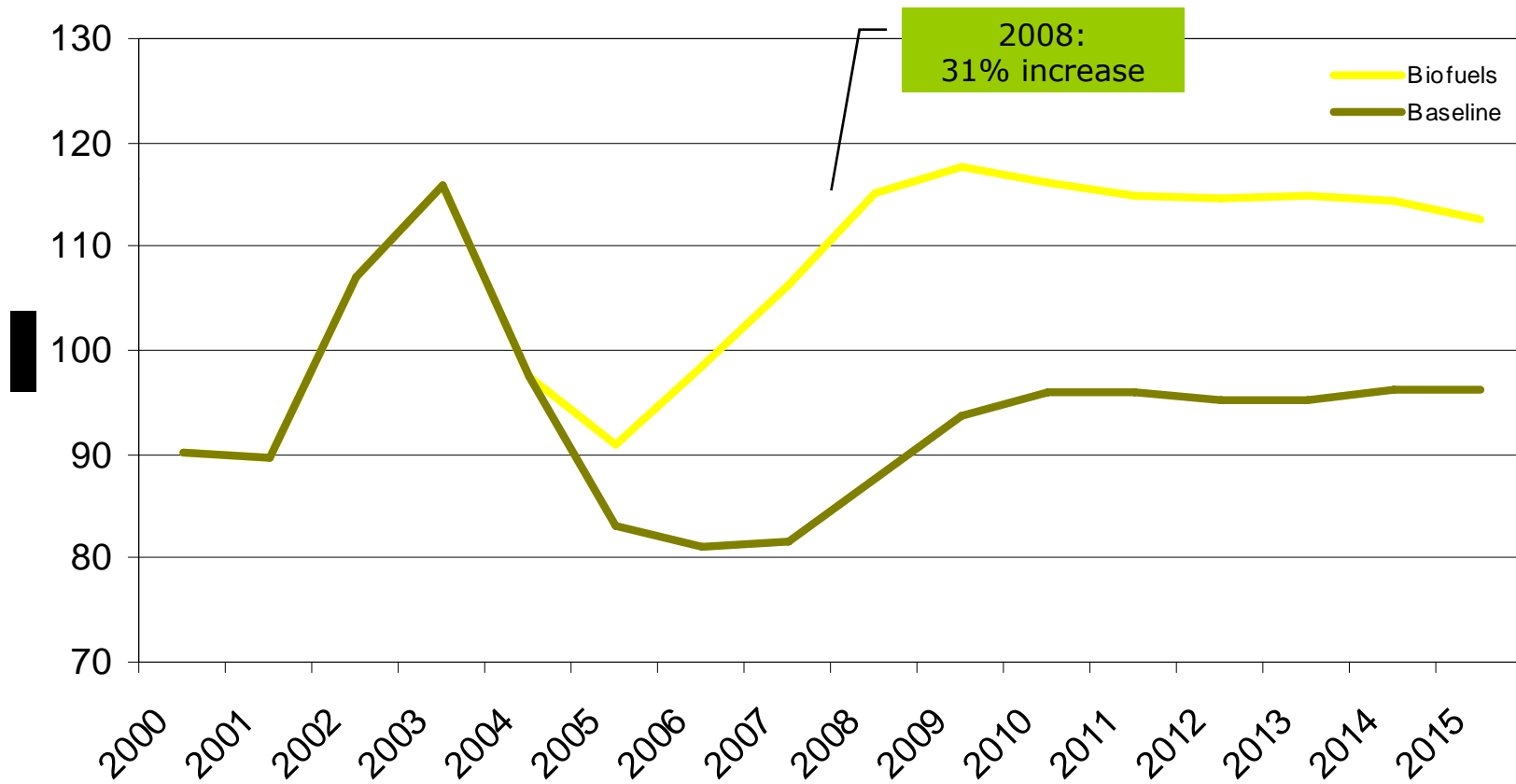
□ Oilseed crush demand

$$\begin{aligned} \text{LN}(OS_{CR}^{CAN}) = & \alpha + \beta_1 * \text{LN}((\text{PRICE}_{OM}^{CAN} * \text{YLD}_{OM}^{CAN} + \\ & \text{PRICE}_{OL}^{CAN} * \text{YLD}_{OL}^{CAN}) / \text{GDP}^{CAN}) - 0.9 * \beta_2 * \text{LN}(\text{PRICE}_{OS}^{CAN} / \text{GDP}^{CAN}) \\ & + \beta_3 * \text{LN}(OS_{CR(-1)}^{CAN}) + \text{LN}(R.OS_{CR}^{CAN}) \end{aligned}$$

□ Bumping the crush automatically adjusts the oil meal markets

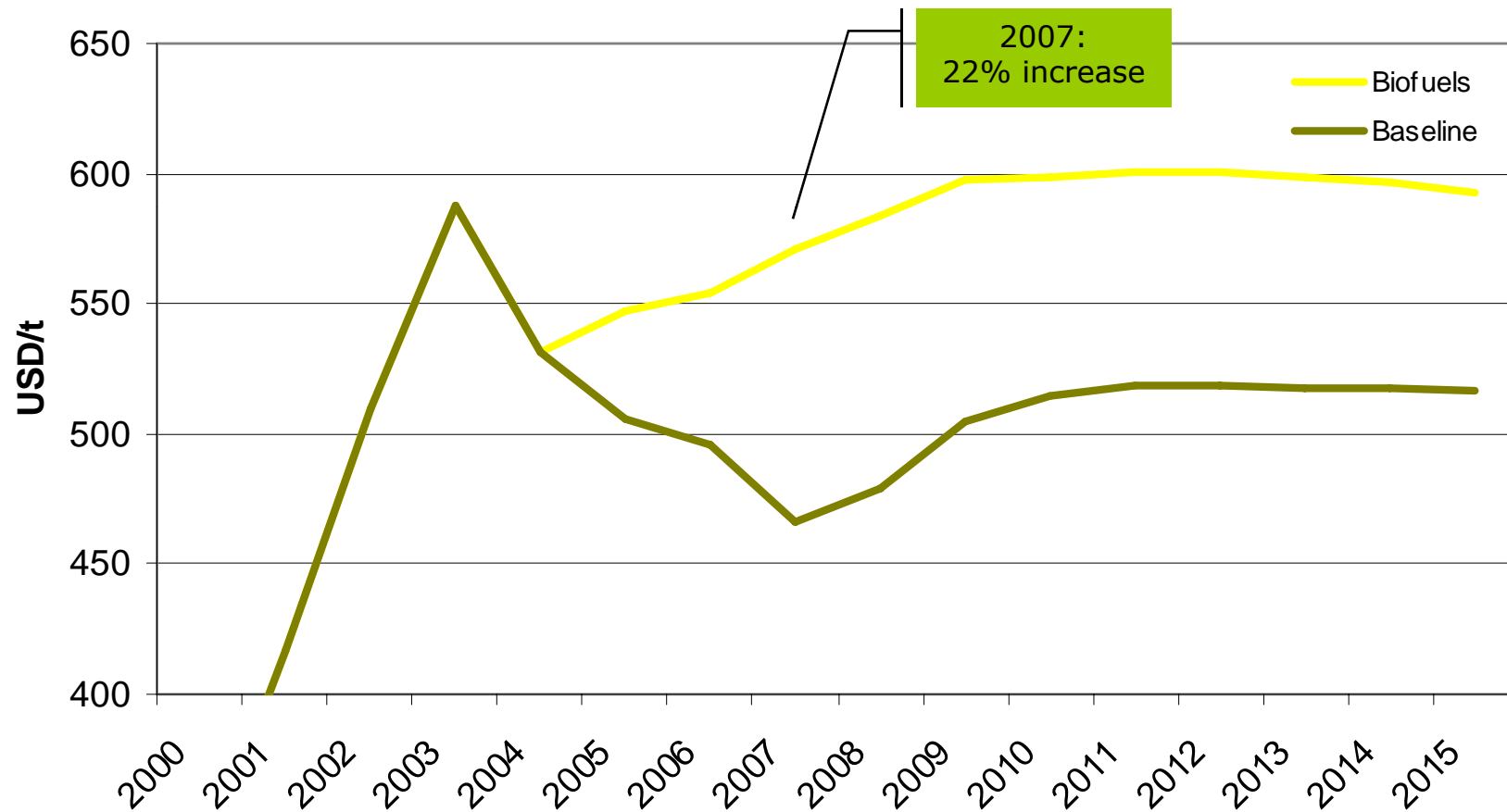
Price Impacts

World Corn Market



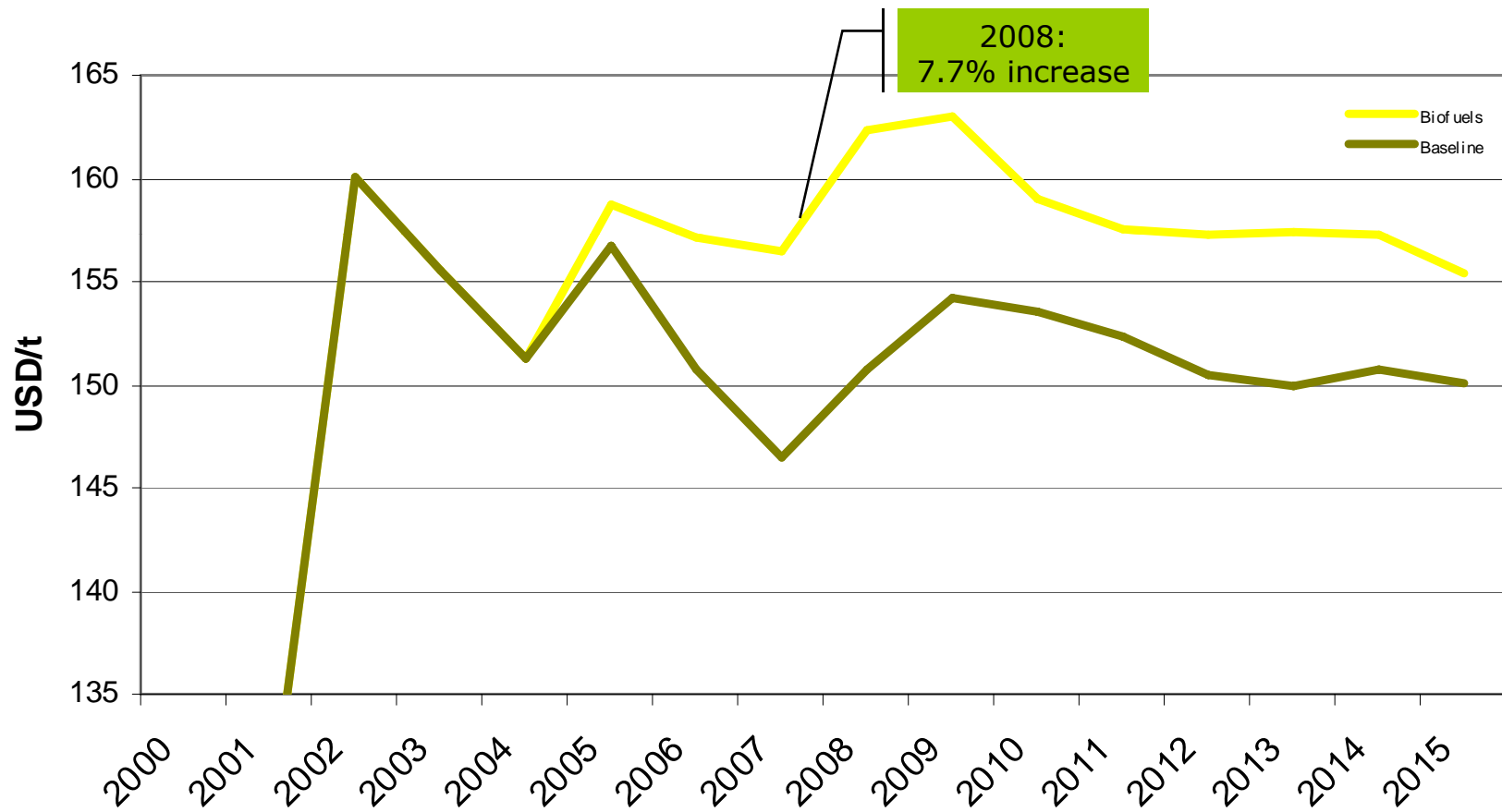
Price Impacts

World Vegetable Oil Market



Price Impacts

World Wheat Market



European Union 25

- ❑ Coarse grain exports fall by 5%
- ❑ Beef exports drop by roughly 9%
- ❑ Oilseed imports remain fairly constant
- ❑ Vegetable oil net trade declines by over 50%

Trade Impacts

United States

- ❑ Coarse grain exports decline nearly 50%
- ❑ Beef and veal exports of live animals and meat decrease by roughly 3%
- ❑ Oilseed exports fall by approximately 3%, with another 62% decrease in vegetable oil net trade
- ❑ Wheat exports drop by 14%

Canada

- Oilseed net trade decreases by 2.5%
- Wheat net trade falls by 11%
- Pork meat exports fall by roughly 5%
- Beef and veal net trade averages a decline of 1%, with increasing losses
 - Feed expenditures increase by an average of 15% over the projection period

Trade Issues

- ❑ How should biofuels be classified under WTO definitions?
- ❑ Blending requirements: national treatment?
- ❑ Cross-subsidization?
- ❑ Effects of reducing current trade barriers?
- ❑ Increased regional trade agreements?



CATPRN

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