Government Policies to Support Biofuel Production: Why and To What Effect?

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Overview

1. Background
2. Biofuels in the United States and Canada
3. Policy objectives
4. Economic consequences
5. Conclusions
International Trade Restrictions

• Cost of producing bio-fuels is much lower in Brazil, China, India, Philippines & Thailand.
  • Imports lower costs of consumption.
  • Imports provide development opportunities.

• But, import taxes are everywhere
  • US: tariff of 14 US¢/litre on ethanol from Brazil
  • Canada: 6 US¢/litre
  • Australia: 23 US¢/litre
  • EU: 10.2%
## U.S. Fuel Ethanol Imports, by Country
(millions of litres)

<table>
<thead>
<tr>
<th>Country</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>341.8</td>
<td>118.1</td>
<td>1,641.7</td>
<td>734.4</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>96.1</td>
<td>126.4</td>
<td>135.9</td>
<td>152.9</td>
</tr>
<tr>
<td>El Salvador</td>
<td>21.6</td>
<td>89.7</td>
<td>145.7</td>
<td>285.1</td>
</tr>
<tr>
<td>Jamaica</td>
<td>138.5</td>
<td>137.4</td>
<td>252.9</td>
<td>292.5</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>0.0</td>
<td>37.9</td>
<td>93.0</td>
<td>166.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>605.3</strong></td>
<td><strong>511.0</strong></td>
<td><strong>2,473.0</strong></td>
<td><strong>1,631.0</strong></td>
</tr>
</tbody>
</table>
The International Institute for Sustainable Development’s Global Subsidies Initiative (GSI) is a project designed to put the spotlight on subsidies and the corrosive effects they can have on environmental quality, economic development and governance.
BIOFUELS - AT WHAT COST?

Government support for ethanol and biodiesel in the United States
Biofuels – At What Cost?
(Global Subsidies Initiative)

- **Australia**
  - Spent $A 95 million in 2006-7
  - Could rise to several hundred million per year
  - Effective rate of assistance over 100%
- **Canada**
  - Transfers of about $C 300 million per year
  - Subsidies account for 20-70% of retail price of ethanol
- **China**
  - Subsidies of $US 115 million in 2006
  - About $US 0.40 per litre
Biofuels – At What Cost?  
(Global Subsidies Initiative)

European Union
- Total support for biofuels in EU in 2006 was 3.7 billion Euros
- Support for ethanol € 0.74 per litre, biodiesel € 0.50 per litre

United States
- Support for biofuels industry could be over $92 billion from 2006-2012
- Support could grow significantly as most subsidies are tied to output levels (which have been increasing rapidly)
World Production of Ethanol
1975-2008
## Annual World Ethanol Production, by Country, 2008 (millions of litres)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>35,010</td>
<td>Canada</td>
<td>925</td>
</tr>
<tr>
<td>Brazil</td>
<td>25,176</td>
<td>Thailand</td>
<td>350</td>
</tr>
<tr>
<td>European Union</td>
<td>2,885</td>
<td>Colombia</td>
<td>307</td>
</tr>
<tr>
<td>China</td>
<td>1,949</td>
<td>India</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Australia</td>
<td>101</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>67,678</strong></td>
</tr>
</tbody>
</table>

*Source: F.O. Lichts*
Rising Oil Price Provides Stimulus

Price of West Texas Intermediate Crude: NSA, Dollars Per Barrel
Ethanol Production in the U.S.
1980-2008
## Ethanol Plant Capacities in the U.S. As of November 11, 2009

<table>
<thead>
<tr>
<th>Status</th>
<th>Number</th>
<th>Billions of Litres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>202</td>
<td>46.4</td>
</tr>
<tr>
<td>Under construction or expansion</td>
<td>14</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>216</strong></td>
<td><strong>52.0</strong></td>
</tr>
</tbody>
</table>
Objectives of Biofuel Policy

- Enhance and stabilize farm incomes
- Rural development
- Lower greenhouse gases
- Energy security
Energy Security

The main goal in the U.S.

- State of the Union Address (Jan. 23, 2007)
  - "Twenty In Ten" plan to reduce gasoline usage by 20% in the next ten years.
Today we make a major step ... toward reducing our dependence on oil, confronting global climate change, expanding the production of renewable fuels and giving future generations of our country a nation that is stronger, cleaner and more secure.

Canada is a net exporter of energy:

- Oil, Natural gas, Uranium, Hydro-electricity, Coal etc.

### Graph:

- **Exports**
- **Imports**

### Table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Exports</th>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td></td>
<td></td>
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<tr>
<td>1996</td>
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<td>2000</td>
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<tr>
<td>2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
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</table>
Reducing Greenhouse Gas Emissions

- Modern agricultural practices use fossil fuels
- Fuel also needed to process biofuels
- Life cycle studies show:
  - 20-40% ↓ from cereal-based ethanol
  - 70-90% ↓ with cellulosic ethanol
  - 40-60% ↓ with canola for biodiesel
Achieving GHG Reductions Through Biofuel Use is Expensive

- GSI studies:
  - Abatement costs via corn ethanol
    - $200 to $400 per tonne of CO₂ equivalent in Canada.
    - More than $500 in the US
  - In the European Union
    - €575 – 800 per tonne from sugar beets
    - €600 per tonne for biodiesel from canola
  - Abatement costs via most economic means
    - $30 per tonne of CO₂ equivalent.
Environmental Gains or Losses?

- Several environmental benefits from biofuels
- Focus is on lower greenhouse gas emissions
Negative Environmental Consequences

- Shifting marginal land into crops
- Increased fertilizer and chemical use
- More nutrient leaching
Negative Environmental Consequences

- More monoculture and soil erosion
- Increased demand for water
  - 1 litre of ethanol requires 4-8 litres of water
- Deforestation
  - Habitat losses could endanger several animal species
What about Rural Development?

- Local employment opportunities
- Few permanent jobs created:
  - Iowa: 35 new jobs at 190 million litre plant
  - Lloydminster: 26 new jobs for 130 ml/year
- New biofuel plants may reduce employment and economic activity elsewhere:
  - ↑ local wage rates
  - ↓ livestock production, processing, transport
- Net gains in employment and economic activity usually less than gross gains
Grain and Oilseed Prices Increased 2006-8
## Fluctuating Grain Prices

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</thead>
<tbody>
<tr>
<td><strong>Corn</strong>, CBOT future, next-nearest month, <em>in C$ per bushel</em></td>
<td>C$3.62</td>
<td>C$7.17 (↑ 172%)</td>
<td>C$2.64</td>
</tr>
<tr>
<td><strong>Soybeans</strong>, CBOT future, next-nearest month, <em>in C$ per bushel</em></td>
<td>C$8.85</td>
<td>C$15.46 (↑ 132%)</td>
<td>C$6.66</td>
</tr>
<tr>
<td><strong>Oats</strong>, CBOT future, next-nearest month, <em>in C$ per bushel</em></td>
<td>C$2.39</td>
<td>C$4.21 (↑ 103%)</td>
<td>C$2.07</td>
</tr>
<tr>
<td><strong>Barley</strong>, WCE future, next-nearest month, C$ per tonne</td>
<td>C$118.00</td>
<td>C$254.40 (↑ 112%)</td>
<td>C$120.00</td>
</tr>
<tr>
<td><strong>Hard Red Spring Wheat</strong>, MGEX future, next-nearest month, C$ per bushel</td>
<td>C$5.20</td>
<td>C$10.02 (↑ 97%)</td>
<td>C$5.09</td>
</tr>
</tbody>
</table>
Impacts on Cattle Feeding Activities
## Corn Supply and Use in the U.S.

*Source*: USDA, WASDE

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Production (billion bushels)</td>
<td>10.535</td>
<td>13.074</td>
<td>12.085</td>
</tr>
<tr>
<td>Ethanol for fuel (billion bushels)</td>
<td>2.117</td>
<td>3.000</td>
<td>3.675</td>
</tr>
<tr>
<td>Ethanol for fuel as a proportion of production</td>
<td>20%</td>
<td>23%</td>
<td>30.4%</td>
</tr>
</tbody>
</table>
U.S. Corn Used for Ethanol, 1980-2009

Source: USDA
Will Higher Grain Prices Lead to Improved Net Farm Incomes?

- Gross income ≠ net income
- Capitalization of higher grain prices into higher prices for inputs:
  - Fertilizer and machinery prices ↑
  - Farm land prices ↑
- Fertilizer and farm machine companies have enjoyed much higher profits.
- **Winners are land owners**
  - Not tenants or farm workers
Crop Land Prices Rising

<table>
<thead>
<tr>
<th>Year</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$4,468/Ac</td>
</tr>
<tr>
<td>2007</td>
<td>$3,908/Ac</td>
</tr>
<tr>
<td>2006</td>
<td>$3,204/Ac</td>
</tr>
<tr>
<td>2005</td>
<td>$2,914/Ac</td>
</tr>
</tbody>
</table>
Farm Land Prices Rising in Canada

2008: **11.5% nationally**

- 5.4% in BC
- 9.0% in AB
- 14.5% in SK
- 10.5% in MB
- 6.6% in ON
- 11.5% in QC
Conclusions

- Biofuels have become a growth industry with worldwide production more than doubling in the last few years.
- Many measures have been used to stimulate production and consumption.
- Policies have had the objectives of:
  - Increasing energy security
  - Reducing greenhouse gases
  - Increasing and stabilizing farm incomes
  - Promoting diversification and rural development
Conclusions

- Main effects of policies to increase biofuel production
  - Tiny increase in energy security in some countries (at high cost)
  - Minimal reduction in greenhouse gases (at high cost)
  - Short run (but not long run) increases in net farm income
    - Grain and oilseed farmers have benefited
    - Livestock producers have suffered financially
    - Land owners have benefited most
  - Minimal impact on rural economic diversification (but some communities gain)

- Cost reducing technological changes are important to make biofuels industry more competitive
  - Second generation biofuels still far from competitive but research is bringing down their costs