The political economy of local energy policy:
Doing well by doing good
Gal Hochman and David Zilberman
Local environmental policy and the balance of trade

- Although local environmental policy reduces domestic consumption of an energy resource, it can increase exports of the resource and thus improve the country’s balance of trade and energy balance.
  - The net effect depends on elasticities.
- Because the United States is not a big player in the international oil markets (till 2012 it was a net importer of petroleum products), demand for US petroleum products is likely to be elastic and thus the effect on the US balance of trade large.
I) The political economy of policy decisions
Literature on the political economy of regulatory policies

• The “classic” political-economy literature:
  – Economic choices are determined by political systems as well as by markets
  – A large body of literature assesses how collective or public choices affect economic outcomes

USAEE 2014
Building on this literature

• We develop a dynamic political-economy framework

• The framework illustrates how political economic considerations are impacted by the influence asserted by those interest groups that are affected by the environmental policy.

USAEE 2014

• Key interest groups impacted by the policy:
Macro-level considerations

- Policy makers are judged by the impact of policy on key economic indicators as well as its effect on the economy as a whole.
- The President as well as the House of Representatives and Senate are very much concerned about the performance of the macro-economy.
II) Extraction and production of crude oil

USAEE 2014
Multiple resources

- Assume multiple types of fossil resources that differ from each other in the cost of extraction.
- For now, we do not assume differences in the carbon footprint among the different fossil resources.
The development of oil fields and the marginal cost
Production cost curve of oil
Moving from conventional crude to tight oil
us energy policy and the balance of trade effect
The balance of trade effect

• While focusing on US energy policy, we demonstrate our findings using the petroleum refining and coal industries as an example.

• Although biofuel and other "green" policies achieve only modest environmental improvements, they do result in substantial improvements to the US balance-of-trade and its energy balance.

USAEE 2014
Biofuel and the balance of trade

- Although in 2005, the US consumed 3.34 billion barrels of finished motor gasoline annually, in 2011 US consumption of finished motor gasoline declined to 3.19 billion of barrels annually.
Ethanol displacing gasoline
Growth in alternatives to fossil fuel

- Since 2007 total vehicle fuel consumption in the US declined from 185.5 billion to 171 billion gasoline equivalent gallons – a 7.8% decline

- However, during the same period, replacement fuels such as ethanol increased by 87.2% while alternative fuels such as compressed and liquefied natural gas increased by 24.4%.

- Since 2007 the decline of traditional fuels (i.e., petroleum fuels) by 14.7 billion gasoline equivalent gallons was met with 4.5 billion of gasoline equivalent gallons of replacement and alternative fuels. The remaining difference is the outcome of fuel efficiency regulation and spiking crude oil prices.
Estimated Consumption of Vehicle Fuels in Thousand Gasoline Equivalent Gallons, by Fuel Type, 2007 – 2011

USAEE 2014
Changes in energy consumption

- The average miles per gallon of light-vehicle fleet increased from 24.5 miles per gallon in 1999 to 29.6 miles per gallon in 2011.

- The average US retail price of all formation gasoline prices on 1/3/2000 was 1.272 but reached 3.265 on 11/4/2013.

These changes resulted in a ca. 8% increase in average fuel-efficiency, and reduced the amount of gasoline consumed.
The average miles per gallon of light-vehicle fleet increased from 24.5 miles per gallon in 1999 to 29.6 miles per gallon in 2011.
Corn exports and DDGS

- Biofuel led to an increase in the price of corn-ethanol, but to decline in amount of corn-exports (49 MMT in 2000 to 42 MMT in 2011).

- Using FAOSTAT trade data, as well as the IMF corn price index, the value of net-corn exports increased from 2000 USAEE 2014.
These effects are not unique

USAEE 2014
Coal: a victim of hydraulic fracturing and horizontal drilling but also of regulation

- In recent years, natural gas in the U.S. became an exception. While prices of other energy sources used by manufacturers were rising, those of natural gas declined.
  - Since 2007, production of natural gas in the United States increased rapidly because of newly discovered shale formations. These discoveries
Due to domestic natural gas production, natural gas imports fell by 23% in 2012 and net imports of natural gas as percentage of total natural gas consumed decreased to 6%.

USAEE 2014
Coal imports and exports

The United States is a net exporter of coal since at least 1955.

The most coal exported by the United States was in 2012, with 3.088 Quadrillion Btu being exported, and only 0.212 Quadrillion Btu imported.
Net exports of coal and natural gas in B Btu

- When combining amount imported and exported of both coal and natural gas, the US became a net exporter in recent years, with the change in trends beginning in 2007 – when extracting natural gas from shale formations began to boom

USAEE 2014
## Energy trade flows

### Natural Gas

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imported</td>
<td>4.723 Q Btu</td>
<td>3.216 Q Btu</td>
</tr>
<tr>
<td>Exported</td>
<td>0.830 Q Btu</td>
<td>1.633 Q Btu</td>
</tr>
<tr>
<td>Net Imports</td>
<td>3.893 Q Btu</td>
<td>1.583 Q Btu</td>
</tr>
</tbody>
</table>

### Coal

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>imported</td>
<td>0.909 Q Btu</td>
<td>0.212 Q Btu</td>
</tr>
<tr>
<td>exported</td>
<td>1.507 Q Btu</td>
<td>3.088 Q Btu</td>
</tr>
<tr>
<td>Net exports</td>
<td>0.598 Q Btu</td>
<td>2.876 Q Btu</td>
</tr>
</tbody>
</table>
To conclude:

doing well by doing good

- Macro-level aggregate considerations, in addition to special interests, guide policy.
- Macro-level aggregate considerations that are emphasized by the executive branch, yield substantial economic benefits to the economy. But this comes at the expense of...