TAXING ENERGY USE

A Graphical Analysis of OECD Energy Use & Taxation
ENERGY USE & TAXATION

» Energy use:
  – Critical to modern economies & living standards
  – Key source of carbon emissions & pollution

» Energy taxation:
  – Tool to influence energy use & thus climate change, air pollution, social cost of vehicle use
  – Source of many explicit & implicit fossil fuel tax expenditures
  – Important source of government revenue - on average, 69% of environmentally related tax revenue is derived from energy taxes
ENVIRONMENTALLY-RELATED TAX REVENUE (2011)

<table>
<thead>
<tr>
<th>Source</th>
<th>OECD-EEA database of instruments for environmental policy</th>
<th>* 2010 figure</th>
<th>** 2009 figure</th>
</tr>
</thead>
</table>

% of GDP

Source: OECD-EEA database of instruments for environmental policy | * 2010 figure | ** 2009 figure
TAXING ENERGY USE

» First systematic comparison of the taxation of all energy use across & within OECD countries

» Considers taxes on fuels as effective taxes on energy & on carbon emissions, highlighting the price signals sent by taxes on different fuels & fuel uses

» Provides a graphical profile (a “map”) of the structure of energy use & taxation in each of the 34 OECD countries

www.oecd.org/tax/tax-policy/taxingenergyuse.htm
GRAPHICAL PROFILES

» Tax base – energy use – shown on horizontal axis:
  – Expressed in common units – alternately, energy content & carbon emissions
  – Divided into three macro categories (transport, heating & process use, electricity)
  – Subcategories reflect tax structure of each country

» Tax rates on energy consumption shown on vertical axis:
  – Converted to effective tax rates based on energy content or carbon emissions
  – Reported tax expenditures are included
  – Where relevant, interaction with emissions trading schemes, or selected sub-national tax rates are shown
EXAMPLE – ENERGY MAP FOR KOREA

Source | OECD | Taxing Energy Use | 2013
EXAMPLE – CARBON MAP FOR THE UNITED KINGDOM

Tax rate (GBP per tonne of CO2)

- Gasoline: road
- Biodiesel & biocetanol
- Diesel & LPG: road
- Heavy fuel oil & kerosene: ind., comm., ag., [P]
- Diesel: ind., comm., res., [P]
- LPG: ind., comm., res., [P]
- All oil: heat, energy transf., [A]
- Natural gas: ind., comm., [P]
- Natural gas: res.
- All gas: heat, energy transf., [A]
- All coal: heat, energy transf., [A]
- Commercial & industrial, [A]
- Residential & transport, [A]

[A] = all subject to the ETS
[P] = partially subject to the ETS

Source | OECD | Taxing Energy Use | 2013
CROSS-OECD ANALYSIS

Underlying data structure (differentiated by user & energy source) identical for OECD countries

Permits comparison across OECD countries:
- Base sizes in both energy use & carbon emissions
- Effective tax rates (ETRs):
  - Economy-wide
  - Major user groups
  - Fuel specific
  - Snapshot of energy use & taxation
- Carbon intensity & effective tax rates
EFFECTIVE TAX RATES ON ENERGY USE

Country-wide ETR on energy (LHS)  Country-wide ETR on carbon emissions from energy (RHS)

EUR per GJ  EUR per tonne CO₂

Source | OECD | Taxing Energy Use / 2013
EFFECTIVE TAX RATES BY USE

» Transport fuels are most commonly taxed & are taxed most heavily across the OECD

» Heating & process use & electricity generation are taxed at lower rates & are in some cases untaxed

» Substantial variations in tax rates exist within each category of fuel use, based on:
  – The fuels used (e.g. coal vs. natural gas);
  – The users of fuel (e.g. road vs. non-road transport)
## EFFECTIVE TAX RATES BY USE

### OECD Simple Average

<table>
<thead>
<tr>
<th>Energy USD/GJ</th>
<th>Transport</th>
<th>Heating &amp; process</th>
<th>Electricity</th>
<th>All fuels</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
<td>3.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Carbon emissions USD/tonne CO₂</th>
<th>Transport</th>
<th>Heating &amp; process</th>
<th>Electricity</th>
<th>All fuels</th>
</tr>
</thead>
<tbody>
<tr>
<td>161</td>
<td>12</td>
<td>13</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>
FUEL USE IN TRANSPORT

» All OECD countries tax transport fuels & almost all do so at higher rates than other categories of fuel use

» Road fuels are taxed more heavily than non-road fuels
  – May be reasons for higher taxation given additional externalities associated with transport (e.g. noise, accidents, congestion)
  – Oil products are most commonly taxed & taxed at higher rates:
    – Diesel is taxed at lower rates than gasoline in 33 countries

» Tax preferences commonly include domestic aviation, rail & marine use, & in some cases, heavy transport

» CO₂ taxes tend to account only for small proportion of total tax rates
HEATING & PROCESS FUEL USE

» Taxed at significantly lower rates than transport use

» Effective tax rates on carbon send very different signals to different fuels and users
  – Coal for these purposes is often untaxed
  – 16 OECD countries tax industrial use more lightly than residential & commercial use

» Some fuels or users may be untaxed or taxed at low rates due to distributional or competitiveness concerns
  – Impacts can be addressed in other ways that do not implicitly subsidise energy use
  – The price set by the EU ETS is not included but is shown in the maps. In 2012 this was around EUR 6-9 per tonne of CO₂
<table>
<thead>
<tr>
<th></th>
<th>Diesel</th>
<th>Fuel oil</th>
<th>Natural gas</th>
<th>Coal</th>
<th>All fuels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy EUR/GJ</strong></td>
<td>3.4</td>
<td>1.3</td>
<td>0.7</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Carbon emissions EUR/tonne CO&lt;sub&gt;2&lt;/sub&gt;</strong></td>
<td>46</td>
<td>17</td>
<td>13</td>
<td>5</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: OECD | Taxing Energy Use | 2013
TAXATION OF FUELS FOR HEATING & PROCESS USE

Source: OECD calculations based on Taxing Energy Use 2013

Coal mean rate: 2.58 EUR per tonne CO₂
Gas mean rate: 5.14 EUR per tonne CO₂
Oil mean rate: 11.77 EUR per tonne CO₂

Cumulative % of heating & process energy from each fuel.
ELECTRICITY GENERATION

» Both the consumption & generation of electricity can be taxed, with consumption being more commonly taxed.

» The range of fuels used to generate electricity is more diverse than for transport use (primarily oil products) & heating & process use.

» Carbon content of electricity generation varies significantly, impacting implicit tax rates.

» Taxes on the consumption of electricity provide no signal in terms of the underlying fuels used to generate electricity.
ELECTRICITY GENERATION

Source: OECD calculations based on Taxing Energy Use / 2013
SNAPSHOT OF ENERGY TAXATION

Effective tax rate (EUR per tonne CO₂)

Source | OECD | Taxing Energy Use | 2013
ETR'S ON CARBON & CARBON INTENSITY

Implicit tax rate per tonne of CO₂

OECD country + OECD country with explicit CO₂ tax

Source: OECD | Taxing Energy Use | 2013
OECD-WIDE CONCLUSIONS

- Effective tax rates on energy vary widely & there are substantial non-neutralities in effective tax rates for different fuels, users & uses

- Tax preferences & low rates mean many sectors don’t face an adequate price signal – little incentive to adopt low-carbon approaches or to innovate
  - Road fuel: commonly a substantial tax preference for diesel relative to gasoline
  - Concessions are common for fuel use in certain sectors (e.g. aviation, rail, marine, agriculture, fishing & forestry)
  - Among heating & process fuels: natural gas often under-taxed relative to oil products; often low or zero tax on coal despite significant environmental impact
  - Low rates & concessions often driven by distributional & competitiveness concerns, but often less environmentally damaging ways of addressing these goals
Signals sent by OECD tax systems in terms of carbon emissions are uncoordinated & unclear

Other policy instruments should be considered in conjunction with energy taxes in order to better address externalities (e.g. congestion), distributional impacts or competitiveness concerns

Differences in tax rates between different fuels & users often do not seem to reflect deliberate policy choices

Reappraisal of country tax settings is warranted to ensure energy taxation meets environmental, fiscal & distributional goals
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