
Determining the Tax Rate

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Tax Rate: Just One Step in the Process

Getting started

Define policy objectives and national circumstances

Compare policy options & determine whether to adopt a carbon tax

Design phase

DESIGN TAX

Tax base

Tax rate

Institutions

Revenue use

Avoiding unwanted effects

Evaluation phase

Evaluation & Improvement

Modeling to inform decision making
Tax Rate: Interrelated Decisions

[Diagram showing the interrelated decisions involving tax rate, tax base, revenue use, avoiding unwanted effects, and institutions.]

Note: MRV = Measuring, Reporting and Verification.
## Tax Rate: Observed Rates

<table>
<thead>
<tr>
<th>GOVERNMENT</th>
<th>PRICE IN 2015 USD PER TON OF CO$_2$e$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>22</td>
</tr>
<tr>
<td>Chile</td>
<td>5</td>
</tr>
<tr>
<td>Denmark</td>
<td>31</td>
</tr>
<tr>
<td>Finland</td>
<td>48–83</td>
</tr>
<tr>
<td>France</td>
<td>24</td>
</tr>
<tr>
<td>Iceland</td>
<td>10</td>
</tr>
<tr>
<td>India</td>
<td>6</td>
</tr>
<tr>
<td>Ireland</td>
<td>28</td>
</tr>
<tr>
<td>Japan</td>
<td>3</td>
</tr>
<tr>
<td>Mexico</td>
<td>1–4</td>
</tr>
<tr>
<td>Norway</td>
<td>4–69</td>
</tr>
<tr>
<td>Portugal</td>
<td>5</td>
</tr>
<tr>
<td>South Africa</td>
<td>8.50$^b$</td>
</tr>
<tr>
<td>Sweden</td>
<td>132$^c$</td>
</tr>
<tr>
<td>Switzerland</td>
<td>87</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>16</td>
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</tbody>
</table>
Setting the Tax Rate:  
Four Primary Approaches

- **The social cost of carbon (SCC) approach**: set the tax equal to the damages caused by a ton of emissions.

- **The abatement target approach**: set the tax to achieve a specific carbon abatement level.

- **The revenue target approach**: set the tax to achieve a specific level of revenue.

- **The benchmarking approach**: set the tax to approximate neighbors and trading partners.
To evaluate policy costs and benefits, many nations have estimated the externality costs of emissions. In most cases, the cost per ton is rising over time; e.g., in France, the SCC in 2030 is more than twice as high as in 2014. The estimates that nations use vary widely across nations.

Set the carbon tax ($T^*$ below) equal to SCC. The SCC approach internalizes the externality. Theoretically, this rate leads to efficiency. Can be difficult to estimate. Can require adjustments over time to reflect path of the SCC.

**Figure 16. SCC Values Used in Ex Ante Cost-Benefit Analyses of Public Policies**

- **Source:** Smith & Braathen 2015.
- **Note:** All amounts shown represent U.S. dollars.

**Setting the Tax Rate: The Social Cost of Carbon (SCC) Approach**

- **MAC** = Marginal Abatement Cost
- **MAB** = Marginal Abatement Benefit

**Note:** MAC = Marginal Abatement Cost; MAB = Marginal Abatement Benefit.
Many nations have nationally determined contributions (NDCs) under the Paris Agreement.

To achieve a target, nations can use the modeled marginal abatement cost (MAC) to identify the tax level ($T^*$) that will lead to the needed level of abatement.

Firms will abate at the level $A^*$, where the cost of abatement is less than the tax.

This approach requires reliable modeling results.
The tax revenue is calculated as $R = T \times Q$ (shaded area below).

- A tax on the carbon content of fuel raises the cost of supply and reduces the quantity consumed.
- Moving from a low tax (left) to a medium tax (center) can raise the amount of revenue.
- Moving to a very high tax (right) can reduce the revenue.
- If market supply and demand shift over time, it can lead to changes in revenue.
Setting the Tax Rate:
The Benchmarking Approach

Nations can set a tax rate similar to other nations or international pricing systems:

- Consider tax rates of immediate geographic neighbors to address “tax tourism.”
- Reference tax rates of trading partners to address competitiveness.
- Seek guidance from similar economies to benefit from their experience.
Dynamics of the Tax Rate

Multiple approaches to adjusting the tax rate over time:

- **Static/gradually increasing carbon tax rate:** tax rate follows predefined path.
  - Simple and predictable
  - Inflexible; initial introduction is abrupt

- **Matching the SCC:** tax rate matches the updated estimates of official SCC.
  - Principled; independent of political influence
  - Less predictable; requires clear approach for SCC estimation process

- **Tax adjustment formula:** changes based on formula reflecting key factors (e.g., fuel prices, abatement level, revenue).
  - Provides “predictable flexibility”
  - Formula can incorporate policy goals, social impacts, FASTER principles

- **Periodic review:** legislation stipulates procedures and responsibilities for periodic review with process for establishing adjustments.
  - Advantages of adjustment formula without predetermined weighting of factors
  - Less predictable

- **Ad hoc political intervention:** adjustments made as needed in response to political process.
  - Responsive to new priorities
  - Least predictable; may impede rational investment
Conclusions

1. There are many ways to determine the carbon tax rate. In practice there are a wide range of observed rates.
2. Political feasibility is critical. Carbon tax rates will likely be a result of compromise.
3. Carbon taxes can be adjusted over time. Adjustment processes built into original legislation increase predictability.
4. Modeling can support design and implementation. Reliable modeling can support the process of setting the tax rate and making adjustments over time.

Access the Carbon Tax Guide at: https://openknowledge.worldbank.org/handle/10986/26300