Revenue-Neutral Carbon Tax: Design Issues

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Stanford University

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Background

- American Clean Energy and Security (ACES) Act passed by the House of Representatives on June 26, 2009; was not voted on in the Senate

- In the 113th Congress, seven carbon-pricing proposals have been introduced or released in draft form
  - Six would establish a tax; one would establish a cap-and-trade program

- Since ACES Act, several regulatory measures aimed at reducing GHG emissions have been proposed or finalized
Regulatory Measures Finalized or Proposed Since 2009

- CAFE standards for 2012-2016 vehicles finalized April 1, 2010
  - Raise average fuel economy for new vehicle fleet to 34.1 mpg in 2016
  - Reduce GHG emissions to 163 grams per mile and raise average fuel economy for new vehicle fleet to 49.6 mpg in 2025 (54.5 mpg if GHG limit met by solely by improved fuel economy)
- Clean Power Plan (CPP) for electricity generators proposed on June 18, 2014
  - Projected to reduce emissions from power sector by 30 percent relative to 2005 levels by 2030
  - Sets state-specific rate-based goals based on building blocks: more efficient coal boilers, increased use of natural gas, more clean energy, more efficient use of energy
  - Allows states flexibility in how to meet those goals
- State emission-reducing programs, such as California’s cap-and-trade program and increasing use of renewable portfolio standards
Design Issues and Considerations for a Carbon Tax:

- How would the tax interact with existing regulations and state programs?
- What would be the initial level of tax, and how fast would it rise?
- How much revenue would it raise?
- How would it effect the economy?
- How would costs be distributed across households and businesses?
- How would various uses of the revenue affect distributional outcomes and economic efficiency?
Interaction with Existing Regulations and State Programs

- Would the tax replace existing and proposed programs?
  - The CPP
  - State and regional cap-and-trade programs
  - State renewable portfolio standards

- Effects if the tax is layered on existing programs or if entities in states with existing programs were exempt from the tax
  - Marginal cost of reducing emissions would vary across states
  - Revenue would be less than if federal program superseded state programs
    - Amount of revenue reduction would be greater if entities in states with existing programs were exempt from the tax than if tax was layered on existing programs
Level of a Tax and Rate of Increase
Similarities and Differences from Cap-and-Trade Programs

- Under cap-and-trade, price of allowances and rate of increase determined by the cap and by firms’ decisions about banking and borrowing allowances.

- For ACES Act, CBO estimated that the initial price of allowances would be $15 and that price would rise at 5.6 percent annually.

- In contrast, policymakers would choose the initial tax and the rate of increase. Could be based on:
  - Initial tax and rate of increase expected to achieve desired emission reduction
  - Initial tax and rate of increase expected to equal marginal benefits of emission reductions
  - Other factors
Levels if Tax Set at Interagency Working Group’s Estimate of Social Cost of Carbon

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>5 Percent</th>
<th>3 Percent</th>
<th>2.5 Percent</th>
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<tbody>
<tr>
<td>SCC (2011 dollars)</td>
<td></td>
<td></td>
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<tr>
<td>2015</td>
<td>12</td>
<td>39</td>
<td>61</td>
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<td>2020</td>
<td>13</td>
<td>46</td>
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<td>2045</td>
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<td>2050</td>
<td>28</td>
<td>76</td>
<td>104</td>
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Average Rate of increase in SCC, 2015–2050

| Average Rate of increase in SCC, 2015–2050 | 2.6 | 2.0 | 1.6 |


The efficient level of the tax is not necessarily equal to the SCC and depends on numerous considerations, including existing regulations, the use of the revenue, projected offsetting increases in emissions overseas, and potential co-benefits.
Revenue Potential: Example from CBO’s Budget Options

Billions of dollars

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<tbody>
<tr>
<td>Change in Revenues</td>
<td>63</td>
<td>98</td>
<td>100</td>
<td>103</td>
<td>107</td>
<td>111</td>
<td>114</td>
<td>118</td>
<td>121</td>
<td>125</td>
<td>1060</td>
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</table>

Sources: Staff of the Joint Committee on Taxation; Congressional Budget Office.

Based on a tax of $25 per metric ton of CO₂, which takes effect in January 2014 and rises at a real annual rate of 2 percent
Not Accounting for the Revenue, Carbon Tax Would Have Negative Economic Effects

- Tax on Carbon Content of Fossil Fuels or on Carbon Dioxide Emissions
- Increase Prices of Fossil Fuels
  - Increase Cost of Producing Goods and Services
  - Increase Prices of Good and Services, Lowering Real (Inflation-Adjusted) Wages
  - Reduce Supply of Labor
- Changes in mix of goods and services produced and in methods of production alter relative demand for labor and physical capital
- Increase Cost of Producing Physical Capital
  - Reduce Profits on Investment
  - Reduce Amount of Investment
- Lower Output
- Compound the Negative Economic Effects Caused by Existing Taxes on Individual and Corporate Income

Legend:
- Purple = Primary Cost (Output Effect)
- Blue = Primary Cost (Substitution Effect)
- Gray = Tax-Interaction Cost
Using Revenue to Reduce Deficits Would Offset At Least Part of the Economic Cost of the Tax

- The effects of deficits in the long run, if the economy is at its maximum sustainable level
  - Crowd out private-sector investment
  - Require rising interest payments
  - Restrict ability to use fiscal policy to respond to unexpected challenges
  - Increase the probability of a sudden fiscal crisis

- Effects if revenue was used to reduce deficits,
  - Long-term effect on output would depend on the relative size of the negative effect of the tax and the positive effect of lower deficits; CBO has not quantified those effects
  - Earlier CBO analysis found that eliminating certain tax cuts would boost output in long run
  - If the carbon tax was more costly than the changes in taxes considered in that analysis, the increase in output would be smaller, or negative
Using Revenue to Reduce Existing Marginal Tax Rates (a “Tax Swap”) Would Also Lower Economic Cost

- Current taxes on individual and corporate income reduce the supply of labor and capital, lowering output
- CBO has not examined the effect of carbon tax swaps; other researchers have found variety of effects
  - Tax swaps could significantly lower the economic cost of carbon tax, but not enough to raise output
  - Tax swaps that lower tax rates on capital would increase output but ones that lower tax rates on labor would not
- Different studies reach different conclusions for several reasons
  - Details of the tax swaps examined
  - Use different measures to evaluate swaps
  - Differences among models
Distributional Effects of a Carbon Tax

- Effects on various households would depend on
  - How they use their income and the mix of goods and services that they consume
  - The area of the country in which they live (e.g., electricity price increases will vary)
  - The source of their income (wages, investments, transfer income)
  - The industries in which they work and invest (transitional effects)

- The ultimate effects on households would depend on how the revenue from a carbon tax was used
Researchers Have Used a Variety of Methods of Examining Distributional Effects

■ Most studies primarily focus on effects caused by differences in *uses* of household income
  – Assume tax increases overall price level and changes relative prices
  – Estimate how higher prices increase the cost of purchases for households in different income groups

■ Some studies examine effects caused by differences in both *sources and uses* of income:
  – Determine how the tax would affect households’ income (assuming that the tax lowers wages and returns to capital)
  – Adjust households’ burdens to reflect differences in consumption and changes in relative prices

■ Studies rely on different measures of households’ ability to absorb the tax, typically annual income or consumption
Based on a Variety of Methods, Most Studies Find a Carbon Tax Regressive (not accounting for use of revenue); Degree Varies

Ultimate distributional effects depend on how policymakers use the revenue
Questions About Potential Uses of the Revenue

- What share of low-income households would benefit from that use of the revenue?
- Would that use provide a proportionally larger benefit for lower income households (offsetting the regressivity of the tax itself)?
- Would that use entail significant administrative costs?
- Would that use reduce the aggregate economic cost of the carbon tax by encouraging people to work and invest?
- Would that use undermine incentives to reduce emissions?

Tradeoffs are likely
## Selected Policy Options Demonstrate Trade-Offs

<table>
<thead>
<tr>
<th>Policy Option</th>
<th>Percentage of Lowest Quintile Affected</th>
<th>Larger Benefit for Lower Income?</th>
<th>Significant Increase in Administrative Cost?</th>
<th>Increase Incentives to Work or Invest?</th>
<th>Reduce Incentive to Cut CO₂ Emissions?</th>
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</thead>
<tbody>
<tr>
<td>Income Tax Credit</td>
<td>74</td>
<td>Yes</td>
<td>Yes*</td>
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<td>Income Tax Rate Cut</td>
<td>30</td>
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<td>No</td>
<td>Yes</td>
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<tr>
<td>SNAP Supplement</td>
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<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Increase LIHEAP</td>
<td>7</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

SNAP = Supplemental Nutrition Assistance Program
LIHEAP = Low Income Heating Assistance Program

* If fully refundable

For a more complete discussion and list of options, see Dinan (2012).
Summary

- Revenue and efficiency effects of a carbon tax could vary depending on how it interacted with existing state programs and proposed federal regulations.

- A carbon tax would effect economy in complex ways; the ultimate effects would depend on how the revenue is used.

- A carbon tax would affect households in many ways; no measure of distributinal effects captures them all.
  - Sources versus uses
  - Regional effects
  - Transitional effects

- Most studies find that the carbon tax itself is somewhat regressive, but the ultimate effect depends on use of revenue.
  - Individual uses of revenue typically entail tradeoffs between competing objectives.
  - Policymakers could use revenue in a combination of ways to achieve multiple objectives.
References


