

CARBON TAXES: THE WAY FORWARD?

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Yale University's William Nordhaus is arguably the most notable climate economist in the world. He has certainly not been afraid to make the case for a carbon tax, particularly advocating a tax that rises gradually as atmospheric concentrations of carbon dioxide increase. The tax is designed to increase in response to an increase in the shadow price of CO₂ – in response to the supposed increase in damages to global society from rising CO₂ levels.

The Case for a Carbon Tax

In a September 2010 policy piece in *The Economists' Voice* (Berkeley Electronic Press, www.bepress.com/ev), Nordhaus (2010) argues that the “desirable features of any tax are that it raises revenues in a manner that has minimal distortionary effect on the economy and reinforces other objectives of national policy.” A carbon tax is particularly relevant at this point in history because, in the wake of the 2008-2009 financial crisis, it can be used to raise revenues to tackle the burgeoning U.S. debt, which is estimated to reach some 65 to 72 percent of U.S. GDP by 2015. A carbon tax has the following advantages:

- It has the potential to raise substantial revenue.
- It is well understood.
- It increases economic efficiency as it tackles undesirable CO₂ emissions.
- It has potential health benefits, because reducing emissions of CO₂ will also reduce emissions of other harmful pollutants, assuming nothing else changes.
- It displaces regulatory inefficiencies associated with attempts to regulate greenhouse gas emissions, and useless subsidies to produce ethanol or protect standing forests, for example, when both these policies have been shown to have little or no impact on overall greenhouse gas emissions (due to release of other greenhouse gases and/or leakages).
- A carbon tax can be harmonized across countries, reducing overall distortions.
- A tax can enable the U.S. to meet international CO₂-emission reduction targets.
- A carbon tax is preferred to emissions trading because it captures the economic rents that are lost to government when a grandfathered cap-and-trade scheme, reduces transaction costs associated with emissions trading, and it leads to fewer opportunities for corruption.

Some of the claims that Nordhaus makes in favor of a carbon tax are dubious (e.g., “substantial public health benefits”). However, his main purpose in advocating a carbon tax is because it can help reduce U.S. budget deficits. It will not hurt citizens any more, and probably much less, than any other deficit-reduction policy. Nordhaus' calculations regarding the ideal tax ramp and

budget implications are derived from his DICE model and are provided in Table 1 below. The present value of the tax revenues over the period to 2030 is 15% (discounted at 5%) of 2010 GDP, or 35% if discounted over the period to 2050. Therefore, the carbon tax can be expected to make a significant contribution to reducing the U.S. budget deficit and debt.

Table 1: Ideal Carbon Tax Ramp and Budgetary Implications for the United States

Year	Tax rate (\$/t CO ₂)	Revenues (2010 \$×10 ⁹)	Year	Tax rate (\$/t CO ₂)	Revenues (2010 × 10 ⁹)
2005	0.00	0 (0.0%)	2025	63.00	282 (0.9%)
2015	25.00	123 (0.6%)	2030	89.80	386 (1.0%)
2020	39.70	184 (0.7%)	2035	128.10	528 (1.1%)

Notes: Adapted from Nordhaus (2010). Results assume inflation and real GDP growth of 2.5%. Revenues as a proportion of GDP are provided in parentheses.

The Adverse Aspects of a Carbon Tax

Nordhaus also makes the case that the income redistributive effects of a carbon tax are minimal, or at least no worse than those associated with a value-added tax or payroll tax for social security purposes. The average household in the U.S. consumes 12,000 kilowatt hours (kWh) of electricity annually and pays an average of 10¢ per kWh. If this power is generated solely by coal-fired plants, Nordhaus argues the annual cost to a household would rise in 2015 from \$1200 to \$1500, or by 25% (\$300). However, based on data provided in Table 2, this seems highly optimistic. From data in Table 2, a carbon tax of \$25 per tCO₂ would increase the price that a household pays for electricity by 150%, or from \$1200 to \$3000 annually (assuming no reduction in use). The price of gasoline would rise by 15.1% adding nearly 14¢ to a gallon of gasoline and not the 7¢ indicated by Nordhaus.

A carbon tax is probably the best instrument that governments have in their policy arsenal. Yet, based on PEW surveys (<http://stewards.net/aTGcfV>) and a survey by *The Economist* (July 4, 2009, pp.24-25) that indicated the majority of people would oppose climate change mitigation policies if these cost them \$175 or more per year, it is unlikely that citizens would willingly accept a carbon tax. Rather, they would view it as another attempt on the part of politicians to pay for wrongheaded policies related to the 2008-2009 financial crisis, and perhaps financing of the Iraq and Afghan wars, that led to the growing U.S. debt.

Further Discussion

There is absolutely no way for the United States or Europe, or any other country, to reduce their emissions of carbon dioxide by 80 percent by 2050 and retain a standard of living even close to that which it has today. The same is true for 50% reductions in CO₂. Reductions in CO₂ on that scale are simply not achievable within a forty year timeframe. Even reductions as little as 25% will be difficult to achieve, and will be costly. They will require huge investments in nuclear power generation, massive changes in transportation infrastructure, and impressive technical breakthroughs in everything from biofuels to battery technology. As argued in the next several chapters, it will be extremely costly to reduce CO₂ emissions and the potential for government (or policy) failure will be great, which will increase costs even further.

Table 2: The Effect of Carbon Taxes on Various Fuels, United States, 2010

	Coal	Oil	Natural Gas
CO ₂ emissions ^a	2.735 tCO ₂ /t coal	0.427 tCO ₂ /barrel	1.925 tCO ₂ /m ³ ×10 ³
Average price ^b	\$45.50/t coal	\$70.69/barrel	\$423.78/m ³ ×10 ³
<i>Carbon tax per unit of fuel</i>			
\$10 per tCO ₂	\$27.35	\$4.27	\$19.25
\$30 per tCO ₂	\$82.05	\$12.81	\$57.75
\$100 per tCO ₂	\$273.50	\$42.70	\$192.50
<i>% increase in price of fuel from carbon tax</i>			
\$10 per tCO ₂	60.1%	6.0%	4.5%
\$30 per tCO ₂	180.3%	18.1%	13.6%
\$100 per tCO ₂	601.1%	60.4%	45.4%
<i>Carbon tax as % of tax-adjusted fuel price</i>			
\$10 per tCO ₂	37.5%	5.7%	4.3%
\$30 per tCO ₂	64.3%	15.3%	12.0%
\$100 per tCO ₂	85.7%	37.7%	31.2%

Notes:

^a Source: <http://cdiac.ornl.gov/pns/convert.html> (viewed May 26, 2010)

^b Source: U.S. Energy Information Administration <http://www.eia.doe.gov/> (viewed May 26, 2010). Coal price is average price for U.S. utilities in generating electricity in 2008; oil is the world price of crude at Texas gulf, late May 2010; and natural gas price is for U.S. residential customers, May 2010.

Yet, even if the western countries are successful in reducing their emissions of greenhouse gases, the impact on climate change will be small. Growth in emissions by developing countries, especially China, India and Brazil, will easily and quickly exceed any reduction in emissions by rich countries (see Chapter 12). Fossil fuels are abundant, ubiquitous and inexpensive relative to alternative energy sources; therefore, any country would be foolish to impair its economy by large-scale efforts to abandon them. As we show in the next chapters, many schemes to remove carbon dioxide from the atmosphere or reduce CO₂ emissions will yield a less-than-anticipated reduction in the carbon footprint while imposing higher social costs than proponents envisioned. Further, the efforts of any one country to tackle climate change are for naught, while developing countries are not about to jeopardize their development prospects for unproven benefits that might only accrue one hundred years or more in the future.

It does not matter what rich countries do to reduce their emissions of carbon dioxide. Their efforts will have no impact on climate change, but they will have an adverse impact on their own citizens. Whether the climate change story is real or not, whether the climate model projections are accurate or not, fossil fuels will continue to be the major driver of economic growth and wealth into the foreseeable future. Hence, we now turn to efforts to change the CO₂ balance of the atmosphere.