
I.35 Carbon taxes

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Abstract

A carbon tax is a unitary tax on a fossil fuel or other carbon-containing substance that is levied on the basis of carbon content. The advantages of a carbon tax over alternative climate policies fall roughly into three categories: economic efficiency, incentives for innovation, and ease of administration. The challenges facing carbon tax design include the regressiveness of a raw carbon tax with no revenue recycling, the political economy barriers to enactment, and possibilities that it might crowd out subsequent climate policies. One of the strengths of carbon taxes is also its downfall: the transparency of such a straightforward tax makes it extremely easy to visualize the costs. Ironically, other climate policies that are ultimately more costly make it more difficult to visualize the costs. However, these shortcomings of carbon taxation speak to the political challenges, not the normative question of whether it is an appropriate climate policy. Carbon taxation, while not necessarily a stand-alone solution, is a policy that is economically efficient, easily administrable, and one that induces innovation.

Keywords

Carbon tax, taxation, carbon pricing, Pigouvian tax

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I.35.1 Introduction

A carbon tax is a unitary tax on a fossil fuel or other carbon-containing substance that is levied on the basis of carbon content, on the assumption that all of the embedded carbon would be oxidized in combustion and released into the atmosphere as CO₂. A carbon

tax can be levied on any transaction point before combustion, from the early extraction or processing points (*upstream*) right up to the point immediately preceding combustion and CO₂ emission (*downstream*), or points in between. The carbon contents of fossil fuels extracted worldwide are known with reasonable certainty, so that a carbon tax scales with actual emissions quite accurately.¹ Even well-designed taxes rarely approach the theoretical ideal of a Pigouvian tax, which would exactly offset the marginal social harm of pollution,² but a carbon tax could provide a very close approximation. With minor administrative modifications, a carbon tax programme can be expanded to also incorporate non-CO₂ greenhouse gases.³

A carbon tax differs from other climate policies in that it imposes a constant, invariant price on greenhouse gas emissions. Other climate policies to reduce emissions might impose costs on emitters, but to the extent that the cost might vary from emitter to emitter or from place to place, such policies cannot be said to impose a true *price* on emissions. A price implies that a transaction is readily available, and that a commodity – in this case the right to emit a quantity of a greenhouse gas – can almost always be ‘purchased’. This can be contrasted with more traditional methods of air emissions regulation, which contemplates a series of administrative decisions made at the national or subnational levels leading to some standard being applied to a specific group of emitters or to an industry, thereby imposing an *administrative cost*, but not a price per se, on emissions. A carbon tax can also be contrasted a ‘cap-and-trade’ programme, in which an overall limit, or ‘cap’, is imposed upon all emitters within a jurisdiction, and all emitters buy and sell permits to emit. A cap-and-trade programme keeps the quantity constant – at the capped level – while allowing the price of emissions to be determined by market transactions; a carbon tax keeps the price of emissions constant – at the tax level – while allowing the amount of emissions to vary.

It is important to distinguish carbon taxes from other tax or quasi-tax instruments that may resemble carbon taxes in many respects, but fail to provide a non-distortionary, economy-wide price signal that scales with greenhouse gas emissions. For example, gasoline taxes are sometimes touted as carbon taxes because they scale linearly with vehicular CO₂ emissions,⁴ but they do not address non-vehicular emissions at all, and hence do not tax CO₂ emissions from electricity generation. Another false carbon tax is an energy consumption tax that fails to distinguish energy sources in terms of their greenhouse gas emissions. Such policies may not produce emissions reductions where they are needed most. One example of this is the failed proposal in 1993 by US President Bill Clinton to levy a Btu tax on energy sources;⁵ that tax would not have distinguished between carbon-intensive coal-generated electricity with natural gas, or even electricity produced from renewable energy. Fundamentally, a carbon tax, in order to avoid distortions, must be unitary and be based only on a quantity of carbon dioxide emissions

¹ USEIA, 2014.

² A Pigouvian tax is thus one that is exactly equal to the marginal social costs, and thus reflects the extent of negative externality of pollution. Baumol and Oates (1988).

³ Metcalf and Weisbach (2009).

⁴ Parry and Small (2005).

⁵ Omnibus Budget Reconciliation Act of 1993, HR 2264, 103rd Cong. § 14,241 (1993); HR Rep No 103-111 (1993).

or emissions of other greenhouse gases, if appropriately converted to carbon dioxide equivalents. This is not to say that such policies are undesirable, but because they do not track carbon dioxide emissions, they may miss better opportunities to reduce carbon dioxide emissions.

From a legal perspective, carbon taxation raises no novel issues. Carbon taxation would be a legitimate exercise of any country's plenary taxing power and that of states, provinces and prefectures that are granted them. Commonly, as is the case in the United States, a carbon tax must be the product of legislation, rather than administrative fiat. Once enacted, they have presented no constitutional or other significant legal controversies.

1.35.2 Where in the world is carbon taxed?

Broadly speaking, some form of a carbon tax exists in at least 15 countries.⁶ However, few of them adhere to the simple model described above. Norway, Sweden, Denmark and Finland all enacted national carbon taxes from 1990 to 1992. However well intentioned, these Scandinavian countries were constrained by their entrance and membership into the European Union, which imposes its own meta-rules for electricity production and taxation upon member states to prevent discriminatory trade practices.⁷ As well, entrance into the EU exposes domestic industries to competition from nearby countries, making it politically difficult to enact a perfectly neutral carbon tax. For example, Finland's carbon tax exempts fuels used for electricity generation.⁸ Such an apparently self-defeating policy can be better understood if one appreciates that the EU prohibits the differential taxing of energy imports, so that electricity imported into Finland must be taxed at the same rate (if at all), whether generated by coal or wind.⁹ Rather than handicap its coal-fired generators by taxing on the basis of carbon content, Finland opted to tax on electricity consumption, forfeiting some incentives for generators to switch to natural gas or renewable energies for electricity production.¹⁰ Sweden's carbon tax, the world's highest at about \$120 per ton of CO₂,¹¹ also exempts fossil fuels for electricity.¹² Other EU countries taxing carbon – Denmark, France, Iceland, Ireland, Norway and Switzerland – all exempt industries that are required to participate in the European Union Emissions Trading System (EUETS).¹³

Non-European countries also tax carbon in imperfect ways. Costa Rica charges a tax of 3.5 per cent of the market value fossil fuels, but that tax fails to distinguish between

⁶ World Bank (2004).

⁷ Genschel and Jachtenfuchs (2011).

⁸ Act on Excise Duty on Electricity and Certain Fuels of 30 December 1996 (1260/96) (Fin). See OECD (2013); Speck (2006).

⁹ Tikkanen (2006).

¹⁰ Duff and Hsu (2012).

¹¹ As of 12 March 2015, the Swedish Krona traded for \$0.116 US. With a carbon tax of 110 ore/kg CO₂, (see *Svensko Energi* 2014, printout on file with author), this translates into a carbon tax of \$116 US per ton of CO₂.

¹² Act on the Taxation of Energy (*Svensk författningssamling* 1994:1776) (Swed), http://www.riksdagen.se/sv/Dokument-Lagar/Lagar/Svenskforfattningssamling/Lag-19941776-om-skatt-pa-en_sfs-1994-1776/, accessed 11 May 2015. See also IEA 2013.

¹³ World Bank (2004). Switzerland is an exception, but it has its own trading system.

coal, natural gas and petroleum in terms of their environmental effects. Mexico taxes fossil fuels on the basis of carbon content *exceeding that of natural gas*. Natural gas is thus untaxed, but petroleum and coal are taxed as a carbon penalty for the excess emissions over those which would occur if natural gas had been used. This is a clever scaling mechanism distinguishing natural gas from more carbon-intensive fuels, but fails to incentivize renewable sources of energy. An even bigger failing is that the tax is capped at 3 per cent of the sales price of the fuel, so that coal, which has roughly double the carbon content of natural gas,¹⁴ does not truly suffer a penalty proportionate to its contribution to climate change.

The carbon tax that most closely scales with the contribution to climate change is that enacted by the Canadian province of British Columbia. The BC Carbon Tax Act¹⁵ was enacted in 2008 at an initial rate of approximately \$10 (Cdn) per ton of CO₂-equivalent emissions, ramping up to its current rate of \$30 per ton.¹⁶ The tax is levied mostly on retailers of 20 classes of fossil fuel products and other specified combustibles,¹⁷ and is based on their carbon content. As a provincial tax, it excludes or specifically exempts fuels exported from British Columbia and fuels used for inter-jurisdictional commercial marine and aviation purposes.¹⁸ The BC Carbon Tax was to be ‘revenue neutral’ and so was packaged with reductions in the marginal income tax rates of the lowest two tax brackets, as well as reductions in the corporate income tax rate.¹⁹ In addition, the Carbon Tax Act also contemplates additional ‘revenue measures’ and ‘adjustment measures’²⁰ to ensure that the province takes in less money in carbon tax proceeds than it doles out in the form of tax reductions and other handouts. In part because of a bizarre provision requiring the provincial Finance Minister to suffer a salary reduction if carbon tax outflows exceed revenues,²¹ the BC carbon tax has turned out to be consistently revenue-*negative*, taking in much less in revenues than it has cost the province.²²

1.35.3 Advantages of a carbon tax

While a carbon tax may not be a complete response to climate change, it clearly has several advantages that warrant it being a central aspect of climate policy. The advantages of a carbon tax over alternative climate policies fall roughly into three categories: economic efficiency, incentives for innovation, and ease of administration.

1.35.3.1 Economic efficiency

A carbon tax is an economically efficient way to reduce greenhouse gas emissions. Some industries are more carbon-intensive than others, and as a result are targeted

¹⁴ World Bank (2004).

¹⁵ Carbon Tax Act, RSBC 2008, c 40.

¹⁶ Carbon Tax Act, RSBC 2008, Schedule 1.

¹⁷ Carbon Tax Act, RSBC 2008, Schedule 2.

¹⁸ Carbon Tax Act, RSBC 2008, § 10.

¹⁹ Harrison (2013).

²⁰ Carbon Tax Act, RSBC 2008, § 2.

²¹ Carbon Tax Act, RSBC 2008, §§ 3–5.

²² See, e.g., Government of British Columbia (2015) (Table 1, showing revenue measures (outflows) exceeding revenues).

(appropriately) for regulation. Electricity generation, cement manufacturing, steel-making, and chemical manufacturing are industries that are targets of greenhouse gas regulation. But picking out certain industries for regulation, or for inclusion into a cap-and-trade programme, is a necessarily ad hoc selection process that carries with it substantial risk of mistake.²³ If traditional emissions standards are employed, the administrative process may produce standards that are too stringent or too lenient, in the sense that the environmental benefits may or may not outweigh the costs.²⁴ A carbon tax, by contrast, aggregates disparate pieces of information throughout the economy, transmitting a price signal at every stage in which there is fossil fuel usage, and transmitting it in proportion to the carbon emissions of the production process. As such, it provides an accurate signal as to the true carbon-intensity of various industries and activities.²⁵

A carbon tax is also economically efficient because it allows a great deal of flexibility for polluters. While other instruments may require specific emissions reductions at certain times, a consistent carbon tax allows emitters to choose the timing and means by which emissions are reduced. This is important because allowing flexibility in energy-saving or greenhouse gas-reducing investments incentivizes more of them. Carbon dioxide is a stock pollutant, so emissions in any given year is less important than long-term reductions, and long-term reductions are better served by flexibility.

1.35.3.2 Innovation

Greenhouse gas reduction opportunities are diverse and disparate, and so innovation in emissions reductions technologies and techniques are likely to come from a wide variety of sources, rather than taking the form of a single, spectacular, 'blockbuster' technological breakthrough. The way to incentivize such innovation is to establish a broad price signal. Pricing greenhouse gas emissions into energy prices sends a price signal that ripples throughout an entire economy, producing broad incentives in a wide variety of businesses and industries, and at various points in supply chains, all in an effort to gain a price advantage over competitors. Because of the nature of regulating point sources of emissions, regulation of greenhouse gas emissions under traditional regulation such as the Clean Air Act can only be applied to a handful of facilities. Depending on the programme, the same might be said about cap-and-trade, which must enforce requirements that emitters hold a sufficient number of allowances, and hence limit the number of parties covered by the programme. At the 25,000 tons-of-CO₂-per-year threshold level set by the cap-and-trade programme proposed under the Waxman-Markey legislation²⁶ (passed only by the US House of Representatives), only 1.3 per cent of all manufacturing facilities would have been covered.²⁷ Granted, this 1.3 per cent of all facilities accounted for over 80 per cent of the greenhouse gases emitted by the manufacturing sector, but from the standpoint of innovation, the loss is in failing to incentivize the other

²³ Hsu (2011) 29–33.

²⁴ *ibid* 32–34.

²⁵ *ibid* 29–33.

²⁶ The American Clean Energy and Security Act of 2009, HR 2454 (as passed by House, 26 June 2009).

²⁷ Nicholas Institute (2009) 6.

98.7 per cent, or 345,000 facilities, to also find ways to reduce emissions. Much might be learned from these other 345,000 facilities.

The development of new technologies also requires a consistent price signal. If a carbon tax can be maintained at a predictable level,²⁸ it encourages the development and emergence of new efficiency or emissions-reducing technologies. The continuing uncertainty of an administrative process, and even the price volatility of cap-and-trade, do not provide as stable a price signal.

1.35.3.3 Ease of administration

Every US state and most countries already collect a tax on motor fuels, most notably gasoline. Many jurisdictions collect excise taxes on fossil fuels.²⁹ A carbon tax has the advantage of building on existing tax-collecting infrastructures. For example, a carbon tax can be added at the fuel pump to capture vehicular emissions. The BC carbon tax has been easily implemented by the province of British Columbia: the budget for administering the BC carbon tax is less than \$1 million (Cdn), which covers an office staff of about eight, including a cabinet-level Climate Action Secretariat. By contrast, the cost of implementing a cap-and-trade programme in the United States was estimated in 2007 to be about \$1.7 billion from 2009 to 2013.³⁰ This is a manageable cost for a country like the United States, but could be much more troublesome for smaller or less developed countries. Both carbon taxes and cap-and-trade are less administratively costly than traditional regulation.

Ease of administration is an especially important advantage insofar as it forms a strong policy platform for an international agreement to reduce emissions. A carbon tax is a policy that can be replicated in almost any country that already collects sales taxes or excise taxes. Finally, if domestic climate legislation were to protect domestic industries by means of implementing a border tax adjustment – effectively levelling the cost of emissions across countries – a carbon tax would be a stronger basis on which to implement such a tax so as to withstand WTO challenge.³¹

1.35.4 Disadvantages of a carbon tax

Several countries around the world have a carbon tax, but several very important ones do not. There are obviously reasons why carbon taxes are not more broadly enacted as climate policy. Some of these reasons are explored in this section.

1.35.4.1 Regressiveness

A carbon tax is effectively a tax on fossil fuel-based energy consumption. For most residential energy consumers, the price-elasticity of energy consumption is generally quite low, up to a point.³² Infrastructure constraints can make short-term adjustments difficult. For example, transportation to and from a place of employment very often

²⁸ A carbon tax may rise over time to more closely match the increasing social costs of emissions. See, e.g., Nordhaus (2008).

²⁹ Federation of Tax Administrators (2015); Ifo Institute (2013).

³⁰ Congressional Budget Office (2008).

³¹ Hsu (2011).

³² See, e.g., Baker, Blundell and Micklewright (1989).

requires the use of a car, and using alternative modes such as transit or bicycling are often infeasible.³³ A carbon tax is regressive because energy tends to make up a larger share of a poorer household's budget than an affluent one, so that an increase in energy prices disproportionately affects poorer households.³⁴ Without more, a carbon tax is regressive, imposing a larger cost on poorer households than affluent ones. One possibility to address the regressiveness of carbon taxes is by using carbon tax revenues to offset some of the increased costs for poorer households. This is discussed below.

1.35.4.2 Political economy considerations

Politically speaking, a carbon tax is a very unappealing environmental policy instrument. Industries that stand to lose the most – coal-heavy utility companies, energy-intensive manufacturing companies, and oil companies – all spend an enormous amount of resources and political capital to oppose a carbon tax. The beneficiaries of a carbon tax – literally, everybody else in the entire world – benefit too little from a carbon tax to cause strong coalitions to form. Moreover, in North American jurisdictions, any policy bearing the word 'tax' begins with a very negative connotation.³⁵ There is even some empirical evidence highlighting the political economic problems for carbon taxes, suggesting that not only do low gasoline prices lead to high consumption (a common economic finding), but high consumption leads to low gasoline prices! This is because when gasoline consumption makes up a larger part of a population's household budget, that populace is more likely to express its concern over gasoline prices through their political preferences.³⁶

It should be noted that most political economy arguments against a carbon tax are not normative in nature, but are warnings about the political landscape facing carbon taxation. Were those challenges to be overcome, these objections say nothing about whether carbon taxation is better or worse than the alternatives. As is the case with regressiveness concerns, a response to political economy concerns may lie with using the carbon tax revenues to address certain economic or political issues.

1.35.4.3 Ineffectiveness

Some argue that a carbon tax will not work quickly or strongly enough to reduce emissions. Carbon taxes may not be the complete solution to climate change, but they will reduce emissions. Between 1990 and 2005, the Swedish economy grew by 36 per cent while carbon dioxide emissions declined by seven per cent.³⁷ Similarly, from 2008 to 2011, the province of British Columbia outperformed the rest of Canada in both economic growth and emissions reduction.³⁸ These cases do not *prove* that carbon taxes reduce emissions, but they do add to the weight of the literature suggesting that carbon taxes are effective in reducing greenhouse gas emissions. Perhaps more

³³ Fiore and Stafford (1995).

³⁴ See, e.g., West and Williams (2004) 551 (Table 3).

³⁵ Pugliese and Ray (2009).

³⁶ Hammar, Lofgren, and Sterner (2004).

³⁷ Government of Sweden (2007).

³⁸ Elgie and McClay (2013).

relevant is the vast economic literature measuring aggregate responses to changes in energy prices indicating that increased energy prices unambiguously lead to reduced consumption.³⁹

That said, there are certain instances in which predicted adjustments have not been made. Homeowners considering the purchase of new appliances have been surprisingly reluctant to consider energy-efficient models that would improve energy efficiency and have very short pay-back periods. In some cases, all that was needed was information showing prospective buyers how much money could be saved with energy-efficient appliances.⁴⁰ In other cases, the homeowner is a landlord that does not actually pay the electricity bills, and thus has little incentive to improve energy efficiency.⁴¹ Similarly, large organizations and government bureaucracies, at least in the past, have had budgeting procedures and practices that discouraged long-term thrift. Purchasing an expensive piece of equipment has, at least at times, been difficult to justify, even if it led to long-term savings.⁴²

I.35.4.4 Crowding out

There is reasonable cause to worry about the possibility that a carbon tax would ‘crowd out’ support for subsequent climate policies. Some experiments seem to support the notion that once people pay some sort of fee that is fixed and announced in advance – something like a tax – they are reluctant to either pay any more or support any policy that would require them to pay more. Once people have been ‘taxed’, they may feel that they have done their part and would just as soon limit their sacrifices to that tax. In fact, there is some empirical evidence that once people feel that they have been taxed, they become *more* likely to engage in that behaviour, as if the tax was simply a fee for a licence to emit as much as one could afford.⁴³ Importantly, this result has been replicated in an environmental policy context, finding that willingness to pay for reductions in greenhouse gas controls was lower after the imposition of a tax than for a command-and-control regulation.⁴⁴ If that result is generalisable, then it may be important to get a carbon tax level right the first time, or people will not support any subsequent measures to reduce greenhouse gases.

But this objection seems to demand too much from carbon taxation. It may simply need to be said that climate policy is unlikely to be a one-and-done proposition. Subsequent changes in carbon taxation levels may be necessary, and policies to deal with adaptation and geo-engineering may be required to complement emissions reductions efforts.

³⁹ Espey (1998).

⁴⁰ Newell, Jaffe and Stavins (1999).

⁴¹ Jaffe and Stavins (1994).

⁴² Gillingham, Newell and Palmer (2009).

⁴³ A study conducted at an Israeli child-care facility found that once parents were assessed a late fee for picking up their children late, the incidence of late pickups *increased*. Gneezy and Rustichini (2000).

⁴⁴ Goseschl and Perino (2009).

I.35.5 Distributive impacts of revenue recycling schemes

Whatever use is made of carbon tax revenues, there will be no avoiding claims that it is a redistribution. There is no true baseline against which a revenue recycling scheme could be objectively and uncontroversially measured. Given that reality, it is worth comparing some different revenue recycling schemes against each other.

Carbon tax revenues might be used to offset the regressive impacts of the tax, but they might also be used to address other fiscal or political issues. Revenues from a federal carbon tax could reasonably be used to accomplish many things. Two are examined here: (A) reducing taxes on capital, and (B) distributing carbon tax revenues in equal lump sum payments to all US households.

Of all of the options that have been seriously discussed, the most progressive use of carbon tax revenues is option B, returning all revenues in lump sum distributions to all households.⁴⁵ The intuition is simple: although energy makes up a larger part of a poor household's budget, it is still a smaller dollar number than it is for rich households;⁴⁶ a lump sum distribution is a much more meaningful infusion into a poor household's budget than it is for a rich household, not only compensating the poor household for increased energy expenditures, but providing more money left over for other goods. If reducing income inequality is the side objective to reducing greenhouse gas emissions, then option B is clearly the best one.

But option B may be the *least* effective in terms of economic efficiency.⁴⁷ If maximizing GDP growth is the objective, then option A, reducing capital taxes, may be much more effective.⁴⁸ The reason for this is that capital taxes are highly distortionary. A reduction in capital taxes would have the effect of stimulating investment, which would produce economic growth. Thus, the loss caused by the higher energy prices caused by a carbon tax would be at least partially offset by the productivity gains achieved through investment. In fact, option A results in small losses in the beginning, but actually results in small gains in GDP in later years, *without even counting the benefits of reducing emissions*. So from an economic standpoint, option A is almost costless. However, it is the most regressive option, actually making the poorest four income quintiles worse off while making the richest quintile better off.⁴⁹

One study analyzed the impacts not just across income groups, but across U.S. states. Option A actually makes the residents of Florida, Wyoming and Washington, DC (whose residents have the most investment capital) better off, while imposing the greatest losses on residents in Mississippi and West Virginia (the poorest states).⁵⁰ Under option B, residents in West Virginia, Mississippi and Kentucky fare the best, while residents of Wyoming and Connecticut fare the worst.⁵¹ This latter result is very interesting, because Kentucky and West Virginia are two states that are especially

⁴⁵ Williams, Gordon, Burtraw, Carbone and Morgenstern (2014) 14–24.

⁴⁶ Baker, Blundell and Micklewright (1989) 733 (Table 2, showing positive income elasticity for almost all income groups).

⁴⁷ Carbone, Morgenstern, Williams and Burtraw (2013).

⁴⁸ *ibid.*

⁴⁹ Williams, Gordon, Burtraw, Carbone and Morgenstern (2014) 14.

⁵⁰ *ibid.* 17.

⁵¹ *ibid.* 19.

invested in the coal industry, and have most vociferously opposed any climate policies whatsoever.

These studies highlight that it is possible to use carbon tax revenues to serve a variety of normative and political goals. Studies suggest that regressiveness can be remedied by a relatively small fraction of carbon tax revenues.⁵² However, it is not possible to address all of the redistributive concerns surrounding a carbon tax.

1.35.6 General lawmaking effectiveness

Finally, contrasting a carbon tax with other climate policies offers an opportunity to consider the nature of environmental regulation. Traditional regulation has tended to be prescriptive, combining prohibitions with certain safe harbours that provide some guidance for regulated parties. These prohibitions and safe harbours are usually the product of some form of negotiation or consultation which take place at the legislative stage and/or a subsequent rulemaking stage. But necessarily, these prohibitions and safe harbours are the product of a process involving a fairly small, manageable number of stakeholders. Necessarily excluded from such processes are countless other stakeholders and potential stakeholders, many of which might offer even better strategies for improving environmental outcomes than those embodied in the regulation. Necessarily, traditional regulation involves, to some extent, the picking of ‘winners’ by a relatively small group of stakeholders, to the potential exclusion of many other *better* winners.

An example of this in the United States is section 45 of the Internal Revenue Code, which provides for a production tax credit for certain renewable energy sources.⁵³ The history of this provision includes several changes to the list of renewable energy sources eligible for the credit. First enacted in 1992, the production tax credit only applied to wind and closed-loop biomass energy.⁵⁴ Over time, several renewable energy sources were added: open-loop biomass, geothermal, solar, municipal solid waste and, amazingly, refined coal.⁵⁵ Marine hydrokinetic energy was added in 2007.⁵⁶ There is something ad hoc about the way that the section 45 tax credit developed, with Congress adding on renewable energy technologies as they learned more about them. The late entrance in 2007 of marine hydrokinetic energy, for example, reflects not the merits of marine hydrokinetic energy, but its late entrance into the consciousness of Congress.

The record of government bodies for identifying the best energy technologies, and actually *solving* problems, is uninspiring. By contrast, the record of government for identifying social and environmental harms is relatively strong. A carbon tax, however politically unattractive, does not attempt to pick winners by creating more favourable conditions for one business, industry or technology. The point of a price signal is that it does not pick a winner, but allows markets to do that. By contrast, a carbon tax is an instrument that takes advantage of a government strength: identifying harms.

⁵² Wara, Cullenward, Wilkerson and Weyant (2013) 6.

⁵³ 26 USC §45(c).

⁵⁴ Energy Policy Act of 1992, Pub L 102-486, 106 Stat 2777 (1992).

⁵⁵ American Jobs Creation Act of 2004, Pub L 108-357, 118 Stat 1418 (2004).

⁵⁶ The Emergency Economic Stabilization Act of 2008, Publ L 110-343, 122 Stat 3765 (3 October 2008).

I.35.7 Conclusion

A carbon tax is a simple and straightforward way of reducing greenhouse gas emissions. While it remains politically unattractive in most of North America, it has taken root in a number of countries. It is impossible to prove the negative that those countries have escaped harm from carbon taxation, but the argument that carbon taxes cause economic ruin now seems implausible.

One of the strengths of carbon taxes is also its downfall: the transparency of such a straightforward tax makes it extremely easy to visualize the costs. Ironically, other climate policies that are ultimately more costly make it more difficult to visualize the costs. However, these shortcomings of carbon taxation speak to the political challenges, not the normative question of whether it is an appropriate climate policy. Carbon taxation, while not a stand-alone solution, is a policy that is economically efficient, easily administrable, and one that induces innovation.

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