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MARKET FAILURE, GOVERNMENT FAILURE AND EXTERNALITIES IN CLIMATE CHANGE MITIGATION: THE CASE FOR A CARBON TAX

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SUMMARY

This article addresses possible approaches to solving the problem of climate change by reducing greenhouse gas emissions (GHGE). It considers some of the core science on climate change, leading to a discussion of market failure, government failure and externalities. The European Union's emissions trading scheme (ETS) is cited as an example of a failure in an environment of both market failure and government failure. The discussion then focuses on carbon costing and pricing, the design features of a carbon tax and the main advantages of a carbon tax over an ETS. Copyright © 2008 John Wiley & Sons, Ltd.

KEY WORDS — greenhouse gas emissions; emissions trading schemes; market failure; government failure; externalities; carbon tax

INTRODUCTION

Benjamin Franklin once said that in this world, nothing is certain but death and taxes. The climate change issue has become such a pressing issue that we are now facing a stark choice between the premature death of hundreds of millions of the people on this planet (from storm, flood, starvation, war or pestilence) and the use of taxation or other financial strategies to change the relative cost of carbon intensive sources of energy compared to the cost of 'green' sources of energy.

As all economists know, it is possible to influence the price of a commodity or its quantity, but not both. The management of prices is the best way to manage the quantity demanded and supplied, and the climate change issue is now such an urgent one that we need an approach that has an immediate impact on the relative price of carbon generating activities. This approach would aim to reduce the current subsidy to those fuels which are produced in such a way as to externalise many of their costs of production and gain a market advantage over those (renewable) energy sources which bear the full cost of production, which most of the green fuel alternatives to carbon-based fuels are forced to accept.

For over 200 years, we have had pollution from a range of industries which have never born the full cost of their production in the greatest example of market failure ever witnessed. We need an immediate solution to this problem which can only come from a carbon tax. Reliance on the market through a cap and trade-based emissions trading scheme (ETS) system to solve the greatest market failure ever seen would be the triumph of hope over experience.

The two alternatives to a carbon tax—agreed emissions targets and an ETS—have both been tried and have failed. Both could contribute to a solution, but both would have a slower and less certain impact than a carbon tax. The Kyoto Protocol provides for agreed emissions targets, but the evidence available to date indicates that most countries will not meet their targets. This is because of their need to sustain and grow economic activity. The immediate needs of economic growth seem to push the less immediate need to restrict greenhouse gas emissions (GHGE) into the background. The relevant sanctions will be hard to enforce against any sovereign country that does not wish to comply with the targets.

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The European Union's ETS is the best known example of a cap and trade approach. As with emissions targets, the results of the ETS are not encouraging. The evidence is of compliance problems which have destroyed the integrity of the initial attempt to operate the system (Betz and Sato, 2006; CAN Europe, 2006).

As Garnaut (2007, p. 10) argues:

> The essential differences between a well-designed and credible ETS ... and a well-designed and credible carbon tax are not as large as is often supposed. Many economists prefer a carbon tax because they hold the view that the alternative is not a well-designed and credible ETS, but a distorted one, surrounded by uncertainty about key parameters. It could be said that they have experience to date from the established carbon ETS on their side.

The significance of the differences and the considerable value of a carbon tax are addressed in this article.

SOME FACTS AND FIGURES ON THE SCIENCE INVOLVED

In summarising the relationship between climate change and weather, a working group contribution to the Fourth Report of the Inter-governmental Panel on Climate Change (IPCC, 2007—WG1 AR4, p. 105) records that

> While many factors continue to influence climate, scientists have determined that human activities have become a dominant force, and are responsible for most of the warming observed over the last 50 years. Human-caused climate change has resulted primarily from changes in the amounts of greenhouse gases in the atmosphere, but also from changes in small particles (aerosols), as well as from changes in land use.

Some of the major findings of the Fourth Report of the IPCC (2007) are that

- global temperatures have risen by 0.74°C (±0.18°) in the last 100 years;
- eleven of the last 12 years rank among the hottest 12 years ever recorded;
- snow cover has decreased in most regions, especially in spring and summer;
- the summer period has been extended by 12.4 days;
- the Arctic sea-ice decline is now 2.7% (±0.6%) per decade;
- sea levels rose by 1.9 mm (±0.5 mm) per year in the period 1961–2003.

The IPCC has estimated climate impacts for a whole range of GHGE scenarios ranging from the business-as-usual scenario to a scenario where there are drastic emissions reductions, where business invests heavily in a carbon-limited economy, where new technologies are born, where GHGs are stabilised at around the level of today, and where the planet experiences only moderate climate change in the future. But whatever we do, the world will continue to experience significant climate change; accordingly, the IPCC urges strong action to address the consequent problems.

Consistent with the IPCC's position, Stern (2006) records that before the industrial revolution GHGs in the atmosphere were 280 parts per million (ppm) compared to the current level of 385 ppm). The level should not rise above a range of 450–550 ppm, as any level above this range will greatly increase the risk of very harmful impacts such as crop failures, water shortages, flooding and cyclonic weather events.

The above material supports the need for action. It serves as necessary background and context for the rest of this discussion.

MARKET FAILURE

Features of the market

The whole GHG problem appears to have arisen from a dramatic case of market failure. For the past 200 years or more, firms have not met the full cost of their production and have imposed significant costs arising from pollution on society generally, and there has never been a comprehensive attempt to measure these costs. The idea of a cap and trade market for carbon and other GHGs is based on the idea that markets are the best way of allocating

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resources yet developed, and that markets tend to operate efficiently in the allocation of scarce resources. In general, this idea has been supported empirically in many market settings, and financial markets are the best current example of efficient markets in certain limited conditions and in the medium term. But financial markets have shown a clear tendency to over-react to any stimulus in the short run and to be distorted by short-run speculative activity, though large capital markets do tend to operate efficiently in the allocation of resources and as price setters in the longer term. Basically, capital markets deal in intangibles, as the intrinsic value of a security is a set of expectations, the present value of its expected future cash flows. In this sense, they can be compared with a market for GHGEs which also deals with intangibles and which would set prices based on expectations about the supply of, and demand for, carbon emissions credits.

But the current problem is the result of a dramatic case of market failure, where industrial organisations have failed to bear the full cost of their production by passing the costs of their pollution onto the community wherever possible. The cost of business has always been understated because of this, and it is not clear that a market-based solution is the best way to deal with an existing market failure. There are many sources of market failure and many of these problems would be evident in a cap and trade market for carbon emissions.

One of the best and most comprehensive expositions of the theory of market operations was published in the 1995 edition of the Asian Development Bank's *Asian Development Outlook* where it was argued that a perfect market has a number of features which are necessary for its operation. These are that there are no external effects, so that all parties bear the full cost and receive the full benefits of their production and consumption; that there are no unexploited economies of scale; that all parties know their own best interests and that there be no uncertainties or ambiguities involved in the relevant relationships and transactions. These are not the features of any market that exists at the moment. They raise questions about the capacity of any market to operate in an ideal manner.

Where one or more of the essential features of market perfection are absent, then a real world market will fail to achieve the efficiency that a perfect market promises to deliver. Given that we have never had a market that has all of the above features, and also that the greenhouse problem is a result of market failure, it is useful to consider the main causes of market failure before making a decision about the best way of changing the relative price of carbon-based energy sources.

Information problems

Many of the problems with market behaviour arise because of unequal access to information. The insider-trading problem is a direct result of asymmetric information access, where a person is able to make super profits from a market transaction because they have information which other market participants do not have. In such a case, the informed participant can make profits at the expense of other market participants, and this will produce sub-optimal market outcomes.

Incomplete information and information uncertainty are further aspects of the general problem because an efficient market requires complete, unbiased and certain information. Any market participants who have limited information or information that they are uncertain about will make sub-optimal decisions, and this will also reduce the overall efficiency of the market as an allocator of scarce resources. Information problems are at the heart of the failure of the first phase of the EU's ETS. Those market participants who have been aware of the faults of the scheme have been able to make big profits. Other participants have lost large amounts of money by not being as well informed as the insider group.

Market power

An efficient market requires a large number of informed buyers and sellers who are able to compete on price and quantity terms in the market. If there is only one producer in the market (a monopoly) or a few producers (an oligopoly), there will be attempts to extract super profits by setting prices higher than in a competitive market. This will result in less production, as a major source of market inefficiency.

The evidence from the EU is that many of the states participating in the ETS have used their market power, both political and economic, to extract a better deal for firms operating within their borders compared to other firms

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invariably operating in smaller states. Also, the system is characterised by the inclusion of some industries in the carbon limits imposed, while others are excluded. Only some GHGs are included in the limits imposed by the system. Methane and nitrous oxide are excluded, despite the fact that both of these gases are more damaging to the atmosphere than carbon.

Externality effects

The greenhouse problem stems from the failure of Western industry to pay the full cost of their production since the industrial revolution. Costs of pollution have been externalised wherever possible and thus born by members of the wider community. This has resulted in the costs recognised as part of product prices being less than full the cost of production to the community. In turn, this has resulted in more production than necessary because of the lower price of commodities and heavier exploitation of the scarce resources available.

Public goods

The environment is a classic public good in that it is not the exclusive property of any one person or group; thus, a large number of people enjoy the benefits of it even though they have not paid for it. Many people consume it without any need to compete with one another for the benefit and at nil or little cost to any of them. Because there is no cost and there has been an apparent abundance of air and water to consume at no cost there has been massive over-consumption of the environment. Over the past 200 years, Western industry has polluted air and rivers with little or no regard for the long-term consequences of this. There has been a massive degradation of air, land, rivers and forests, which is now unsustainable.

Economies of scale

Generally, if firms are not producing at an appropriate volume to exploit economies of scale, then their activities will not achieve allocative efficiency. This issue is directly relevant to the relative cost of participation in a cap and trade system as the costs borne by smaller firms will be proportionately higher than those of large firms which have the systems and personnel in place to manage participation in the market for carbon credits.

The 'second best' problem

Any market failure in one market will compound the inefficiencies present in any other related market because all markets are interrelated. This is relevant to a cap and trade system which is about correcting a distortion in one market by a system of indirect influences on the price of a commodity in the form of carbon credits. Those who can bear the cost of some budget limit on their output of carbon will be able to sell carbon credits to those with relatively higher cost structures. This kind of trade depends on perfect knowledge and a capacity to move production activities to take advantage of the relative cost of carbon. But the actual cost of carbon will not be known in advance, so those operators who are efficient will know neither the actual costs involved in production activities, nor the cost savings if they move from using, say, coal power to using gas, solar or wind power, thus producing a 'second best' outcome.

The 'free-rider' problem

Wherever there is dealing in a public good, such as the atmosphere, there will be 'free-riders', as seen in past attempts to address environmental pollution by business. Many firms are currently subject to government-imposed restrictions on their pollution activities. The restrictions include, for example, requirements to add pollution control devices to chimneys and other sources of pollution if they are located near a city or subject to the attention of a lobby group. Some firms, however, can still receive a free ride by virtue of their location, especially where they are out of sight of people affected by their activities or where they are able to lobby a government for special protection on the basis of exposure to competition or importance to the economy. The coal industry is largely protected from serious environmental controls because of its perceived economic significance.

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GOVERNMENT FAILURE

While there are market failures, there are also cases of government failure in the attempts by governments to regulate markets and allocate scarce community resources. There are a number of recognised reasons for government failure.

Information problems

The information adequacy and asymmetry problems that beset markets may also affect government attempts to regulate markets, as they may have as much difficulty in gaining access to real-time information as other market players. This can be seen clearly in the current attempts being made by governments to mop up the unforeseen consequences of the sub-prime loan fraud in the United States. Both the US Federal Reserve and the Bank of England have been forced to enter the market for collateralised debt obligations in a late attempt to prop up world financial markets. This has involved the purchase of many poor quality loan packages which have been securitised by various private financial institutions in a desperate move to insert liquidity into world financial markets as a first step towards restoring public and market confidence and trust. The US Federal Reserve seems to be buying 'junk' loans in its bid to prevent a financial meltdown in the US.

The first iteration of the EU's ETS failed largely because of information problems. Initially, there were difficulties in predicting the likely level of GHGE from each industry in each country, and then most countries were very late in providing information to the central authorities. It took some 2 years for the information problems to manifest themselves. This was too late for the EU administrators to address the problem and prevent the collapse of the market for emissions credits.

A mix of social and economic goals

Governments have a range of goals, with some being social and others economic. Basically, the modern ideology of most governments involves a recognition that markets are useful in the allocation of scarce economic resources and that over-regulation will reduce the efficiency of markets. But all governments seem also to recognise the need for some regulation to protect those in society that could be hurt by the unconstrained market behaviour of insiders with special knowledge which can be used in a zero sum game to benefit themselves to the detriment of other uninformed market participants. The mix of social and economic goals underlying attempts to regulate markets frequently results in incongruent activity—which, in turn, can result in market failures.

The mix of goals is likely to lead to sub-optimal regulatory activity, especially as the costs involved and the difficulty of acquiring suitably qualified people are likely to be further barriers to effective regulation. Any government failure here could be disastrous. This is because the market, in dealing with carbon credits as an intangible commodity, will stimulate the creation of derivatives such as futures, options and securitised packages. These packages are abstractions of the highest order. They comprise an ill-defined right to an intangible at some time in the future and in some form which is set down in the relevant agreement or to be determined in the future.

A mix of goals and consequent difficulties are relevant to the setting up of an ETS. An ETS requires a lot of government effort as the commodity being traded only has value because of a government dictated scarcity. Under an ETS, government needs to develop a registry of firms providing carbon credits and act as a guarantor of the validity of the credits sold without being able to audit all sellers on a regular basis. It also needs to establish and fund a GHG credit audit department, as well as an enforcement body with powers to ensure that the market works in an open and effective manner with the aim of minimising potential fraud in the market. It is inevitable that some of the sellers of emissions credits will try to sell credits that are not backed by any reduction in GHGs. It is also certain that some mistakes will be made, such as a tree plantation scheme that fails.

Poor management resulting from weak incentives

The public sector often suffers from not having a profit motive to drive performance. Good management is a scarce resource and the public sector may not be able to pay enough to recruit and retain appropriately trained managers, though some of the best people are motivated by a sense of duty. Public servants who manage carbon markets will

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need advanced capital market skills and the ability to second-guess the security of the operations of those market players who move too far down the spectrum of creating exotic financial instruments.

Regulatory capture

A feature of government attempts to regulate various markets has been the way the regulated have often been able to capture the regulators, such that the regulators come to represent the interests of those they are there to regulate. Many of the agencies set up to regulate industries come to feel an affinity for those they are regulating, and this weakens their regulatory capacity over time. In many cases, pressure groups will lobby for some special subsidy or tax break, often arguing that it is in the public interest even though it may be at the expense of some other group in the community. The market for carbon credits will depend on the strength of the registration, audit, enforcement and control activities of a group of people who are committed to a transparent, secure and fair market. The problem of regulatory capture could weaken the market over time.

EXTERNALITIES

For a long time economists and accountants have been aware of the externalities of modern industrial society. This is an important case of market failure whereby business acts within a market so as to affect people outside the market. Such activity is unlikely to produce outcomes which involve the most efficient use of resources. Since the industrial revolution business has operated in an environment where it did not bear the full cost of production because of its capacity to externalise some of its costs through the pollution of air and water (Stern, 2006; Allen Consulting Group, 2006).

There seems to be a new consensus that urgent action is necessary to curb the build-up of carbon in the atmosphere, but no global consensus on the urgency of the action required and the best way to deal with this problem (Australian Business Roundtable, 2006; Preston and Jones, 2006). Many governments seem to have accepted the need to impose a price on carbon emissions into the atmosphere as the way to generate a market-based adjustment to the relative cost of various sources of energy. But the developing consensus in favour of a cap and trade system of market adjustment may not be appropriate to deal with the present problem of global warming. It could adjust relative prices over time so as to produce a long-term result which is favourable to the environment, but it may act too slowly and with too much uncertainty to have the desired result.

A carbon tax on all fixed energy sources would be much simpler to implement and more certain in impact. If it is desired to have an immediate market-based impact on the level of emissions, it would be better to send a price signal through taxation which would address the cost of the externality imposed on society by polluters. A tax would be more appropriate than a market mechanism which is subject to all of the problems of market failure, being problems which have produced the carbon pollution problem.

THE EUROPEAN UNION'S EMISSIONS TRADING SCHEME

The EU's ETS commenced operation in January 2005 as the largest multi-country, multi-sector GHGE trading scheme worldwide. In the first phase of the scheme, a limited number and type of installations were involved, with the scheme being restricted to the monitoring and control of CO_2 only. Included were some 12,000 installations covering energy activities, production and processing of ferrous metals, the mineral industry and pulp, paper and board activities.

Under the EU ETS, the specified large emitters of GHGs must monitor and report their CO_2 emissions. In order to ensure that real reductions in CO_2 emissions occurred, EU governments were required to guarantee that the total amount of allowances issued to installations was less than the amount of CO_2 that would have been emitted under a predicted scenario of normal business operations. Each member state was able to allocate a quantity of certificates as set down in the Member State National Allocation Plan.

The ETS allows a regulated entity to use a carbon credit to comply with its obligations to return an amount of emission allowances to the government which is equivalent to the amount of the installation's emissions into the

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atmosphere during the year. The installations subject to this scheme may get the allowances free from their governments. Governments are expected to offer credits equivalent to 95% of expected emissions, with trading being possible in the other 5% of emissions. Installations are expected to purchase extra credits from other installations or traders, and are able to sell any excess allowances that they accumulate to anybody on the open market. A regulated entity can acquire carbon credits from any carbon reduction project that is certified as eligible to issue carbon credits by the host government or the clean development mechanism executive board of the EU.

Experience over the past few years has shown that European governments have been guilty of allowing their industries as much CO_2 as they could emit at little or no cost. Recently released data from the European Commission (2008) show that most member states granted their industries carbon emission allowances which were far too generous in the period 2005–2007, and that this resulted in the virtual collapse of the carbon market in 2007. The published figures indicate that actual emissions from installations covered by the ETS in 2005 were several million tonnes below the granted permits. This distorted the market and undermined the credibility of the ETS.

In the ETS's first year of operation, some 360 million tonnes of CO_2 were traded for a total sum of 7.2 billion Euros. During the first year, the price of emissions increased steadily to reach a peak of 30 Euros per tonne in April 2006, but the price began to fall rapidly soon after as it became clear that many countries had given their industries such generous emission caps that industries did not need to reduce emissions. This created a crisis of confidence in the scheme, with CO_2 prices falling rapidly over the next year to a trading price of 1.2 Euros per tonne in March 2007. The price eventually declined to 0.10 Euros per tonne by September 2007, which discredited the market and caused calls from many NGOs for more stringent restrictions on CO_2 and tighter allocations of emission credits in the next phase of the scheme (ECOFYS, 2006; CAN Europe, 2006).

The second phase of the ETS has begun and those involved are confident of not repeating the mistakes of the first phase. The allowances are said to be tighter and the scheme will include more greenhouse polluters, including the airline industry. It presently appears that December 2008 futures contracts for permits, which are known as European Union Allowances (EUA), are trading at around 24 Euros, and that a secondary market has developed whereby a financial intermediary will accept the risk of a guaranteed delivery of EUA for a price around 18 Euros. It is clear that a profitable industry may develop around the acquisition and sale of permits, and a number of exotic financial instruments have been developed to facilitate this. But the profits from this activity will go to traders and entrepreneurs who use the system to make money while having no commitment to GHG reductions. This may drain resources from the GHG abatement activity. It also means that there will not be enough money to compensate lower income groups for the cost of their contribution to GHG abatement.

The EU ETS should be a warning to all. It started well but almost collapsed because of the lack of transparency in reporting emissions from industries in certain countries. Also, there were several exclusions from the trading base, which produced huge fluctuations in the carbon price from time to time, with a limited overall impact on emissions.

THE COST OF CARBON AND ITS PRICING

Carbon markets have begun to boom over the last few years, offering firms some options for offsetting their emissions by trading them with cleaner firms. But critics of carbon trading contend that it is a distracting 'con game' that lets firms dump some carbon in one place while supposedly removing it elsewhere. Information, measurement and pricing are key issues in any market, and an efficient market requires well-informed players. An uninformed market will not produce optimal resource allocation decisions, and there is the real risk of free-riders taking advantage of market failures to dump carbon at a low cost or free of charge.

Determining the effectiveness of the new markets for carbon is sure to get harder as they grow and become international. The large number of players and different national regulatory regimes will likely produce chaos in the early stages of an uninformed international market. The very concept of carbon trading is an abstraction built on an abstraction. Being something like a hedge fund or a financial derivative, it is hard to visualise carbon in the air—unlike many other types of environmental pollution such as industrial smoke or other effluent. The pricing and trading of a certificate which represents this mostly invisible substance is hard to understand by most people. Even the more concrete efforts to reduce carbon are hard to measure effectively. Take the attempts to plant trees to

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develop carbon sinks, which are supposed to suck up the carbon in the atmosphere. Planting trees is a good thing to do and the trees look lovely, but it may be easier to count the trees than to measure their effectiveness as a way of absorbing the carbon in the atmosphere. Most of the scientific evidence indicates that new trees are net contributors of carbon into the atmosphere in their first couple of years, and only after that do they act as carbon sinks.

A generally understood measure of the cost of carbon from coal indicates that a price of around US$10 per tonne will make coal-fired power stations slightly more costly than gas-fired power stations. This would encourage the building of gas-fired power stations which are much less polluting than those which use black coal. To even the playing field with a range of green energy sources may require a cost of US$30–40 per tonne of GHGs generated by industry (Reidy and Diesendorf, 2003). There have been various estimates of the real cost of GHG pollution ranging from US$5 to 125 per tonne (IPCC, 2007, WG3 AR4). Clarkson and Deyes (2002) reviewed the available literature on the social cost of carbon emissions and suggested £70 per ton (within a range of £35–140 per ton) as the appropriate figure for the global damage cost of carbon emissions.

THE DESIGN OF A CARBON TAX

In designing a carbon tax, it is necessary to consider two key variables: the tax base and the rate. Clearly, the easiest tax base would be stationary energy suppliers which are large and highly visible. These suppliers could pass the cost of the tax onto both private and business users of their energy, thus having a broad enough spread to have a direct impact on the quantity of energy demanded and thus the amount of GHGs generated. This would encourage energy conservation strategies and a change in the relative price of the various energy sources—with green energy becoming relatively less expensive because it would not bear the carbon tax. The carbon tax base could start with the easy targets where evasion and avoidance were least likely, and then move to include a range of other industries. Transport would be the most likely target after the stationary energy providers because it is a significant GHG contributor and because it would be a relatively simple task to place a carbon tax on aviation and motor fuel.

The two big advantages of a carbon tax over an ETS are that the tax would be more transparent and visible and thus harder to evade or avoid, and that the revenue would flow to an accountable government which would be able to use the extra funds for a socially useful purpose such as providing access to green energy for low income households and to fund green energy sources. The revenue under an ETS flows to a range of market participants who are motivated solely by their economic interests and who are encouraged to develop a range of exotic market instruments with uncertain economic consequences over time.

The design of a carbon tax is likely to be much simpler than that of an ETS because the aim is to change the relative price of generating carbon into the atmosphere as a way of reducing the volume of GHGs. An ETS, by contrast, aims to change the price of GHGs indirectly by specifying a fixed quantity of such gases that can be generated in total. Business would face greater certainty under a carbon tax because the cost increase would be specified by the tax rate. The tax could start at a low level, equivalent to say US$10 per tonne of carbon, which is generally agreed to be too low to have a significant impact on business costs. It is unlikely in itself to drive investment decisions and, if there was a 10 year plan for it to be increased slowly, business would have time to adjust to a steady change in price, with the tax rate change being only one part of the change in total business costs.

CONCLUSION

In economic terms, a carbon tax and an ETS are virtually identical in so far as they both aim to raise the price of carbon, either directly through a tax impost or indirectly through a cap on the quantity of emissions. But a tax on carbon emissions would be simpler and more certain in impact than an ETS. Political fear of introducing a new tax seems to be the only explanation for the tax option not being adopted by many governments. As argued by Green *et al.* (2007, p. 4):

> Most economists believe a carbon tax (a tax on the quantity of CO_2 emitted when using energy) would be a superior policy alternative to an emissions trading regime. In fact, the irony is that there is a broad consensus in

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favour of a carbon tax everywhere except on Capitol Hill, where the 'T word' is anathema. Former vice president Al Gore supports the concept, as does James Connaughton, head of the White House Council on Environmental Quality during the George W. Bush administration. Lester Brown of the Earth Policy Institute supports such an initiative, but so does Paul Anderson, the CEO of Duke Energy. Crossing the two disciplines most relevant to the discussion of climate policy—science and economics—both NASA scientist James Hansen and Harvard University economist N. Gregory Mankiw give the thumbs up to a carbon tax swap.

There are several advantages of a carbon tax over an ETS. The impact and incidence of a tax would be more certain than with an ETS as the tax could be levied on the volume of emissions at a publicly announced rate. The impact would be gradual as a tax can be phased in with scheduled rate adjustments according to an announced timetable which would give industry time to adjust. The tax itself would be stable, in contrast to the price fluctuations that occur in an ETS market, as observed in the EU ETS. The economic effect, too, would be more certain because the increased cost of emissions would be stable. In addition, the revenue would be collected by the government and this would facilitate revenue recycling to low income families and GHG abatement projects, or it could be used to lower other taxes in a way that increased the equity and efficiency of the tax system.

There are other likely advantages as well. The instability of prices in an ETS market would add uncertainty and could adversely impact on investment decisions and the level of economic activity in the productive sectors of the economy. With a tax, there would be no need for a secondary market or a range of complex derivatives, which could distort the flow of revenue and economic activity and which would divert income from abatement activities to a small number of market players who were able to exploit the market volatility of an ETS. Clearly, the management of a carbon tax would be simpler than an ETS and could become the responsibility of existing institutions—unlike an ETS which requires a range of new institutions such as a registry and enforcement body, a monitoring authority and a new trading entity. The integrity of a tax would be far higher than an ETS because cap and trade systems are inherently more exposed to fraud and evasion, with some selling of permits which do not reduce emissions elsewhere, and with buyers not knowing about this fraud or mistake in such a time frame as to allow transactions to be unwound. Overall, an ETS is an artificial market created by a government for an intangible commodity, as it requires a government to create an artificial scarcity for the commodity to have value, whereas a carbon tax does not require any such economic fiction.

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