

Pigouvian principles of externalities and cap and trade

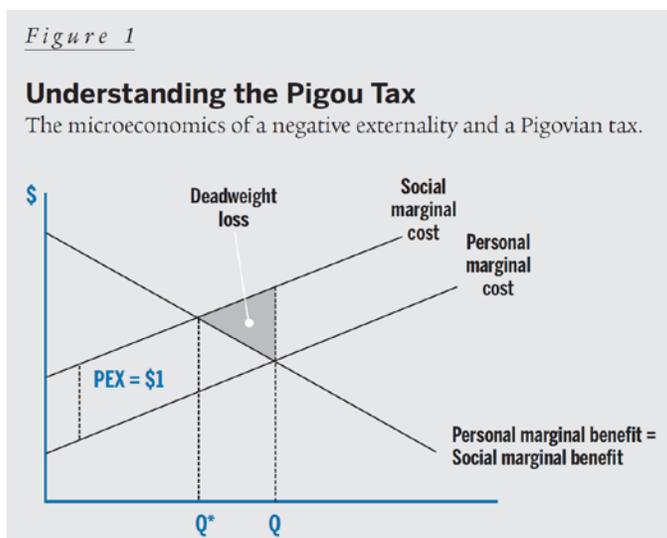
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EPA ozone policy – and environmental policy, generally, is a mix of Pigouvian principles and policy objectives. But the combination of those can have unanticipated distortionary effects.

To begin with, it is important to understand the economic nature of the problem of externalities. In the graph, the market equilibrium obtains at the intersection of marginal benefits and marginal costs. But with externalities, the marginal *social* cost is greater than the marginal *personal* cost, reflecting the fact that the externality affects others more than oneself.



Since the marginal personal cost of the activity is lower than the social cost, more persons consume the good at a lower cost than if the two marginal costs were the same.

The policy issue, therefore, is how we price to the marginal social cost in order to reduce consumption. The solution originally offered by Arthur Pigou in his 1920 work *The Economics of Welfare*. In that work, Pigou recommended that consumption be taxed so that the price of the good rose, with the goal that the price and quantity of consumption reach P-star and Q-star, the non-externality equilibrium. In that case, the personal marginal cost would equal the social marginal cost so that the consumer would bear the full cost of the externality.

The problem, of course, is that in order to use this framework for policy one must settle on Q-star and/or P-star in order to set the policy goal.

In his classic 1960 Journal of Law and Economics article “The Problem of Social Cost,” Ronald Coase, therefore, questioned the reliability of using Pigovian estimates to craft real-world regulation. His core argument is usually stated as:

In a world of costless bargaining, well-defined property rights, and very low transactions costs, the various parties will negotiate until a jointly maximizing outcome is reached. No taxation is necessary or desirable in this world.

Coase’s argument is still relevant, however, even when transactions costs are positive. But in a world of positive transactions costs, some Coasian transfers may take place that partly mitigate the harm of an externality. Unless the Pigovian tax collector can fully account for all those existing bargains and transfers, any estimate of an appropriate tax based solely on the size of the externality – without accounting for other remedial measures – will overstate the optimally efficient tax level because those already make up some of the distance between P and P-star.

Thus, in the presence of regulations that have bearing on the supply of the externality-causing activity (even if not directly tied to the externality itself), we would need to estimate the difference between the real-world level of the activity and the hypothetically efficient level of the activity, that is, Q and Q-star. Absent such an estimate, simply knowing the size of the externality itself gives us no clue about the appropriate tax or its optimal level.

Moreover, even in a strictly Pigovian world in which both the possibility of Coasian bargains and the indirect effects of regulation on the equilibrium supply of the externality-producing good are assumed away, the *optimal* Pigovian taxes are likely to be lower than the standard Pigovian rate if there are *other* taxes in the economy.

That is, the Pigovian tax rate estimated in a partial equilibrium setting is likely to be too high in a general equilibrium setting in which a variety of distortionary excises already exist, even if those taxes were not explicitly designed to cope with externalities.

Furthermore, taking into account regulations that are substitutes for Pigovian taxes further moves the optimal tax level away from the standard Pigou solution and makes it likely that applying a straightforward Pigovian tax in addition to existing taxes and regulations is inefficient and even counterproductive.

Now, let’s look at some of this through the lens of current ozone and air quality policy.

Problem 1: What is Q*?

Establishing either P* or Q* is quite difficult in practice. P* debates often take place in economics. For instance, Harvard's Gregory Mankiw has informally aggregated those concerns in his calls for a Pigou Club of economists who identify themselves by their support for a gasoline tax. On his website, Mankiw argues for an additional \$1-a-gallon tax on gasoline in the United States, implemented over a 10-year period.

But it is unclear how that would be implemented. For instance, gas taxes would "take inadequate account of heterogeneity" by taxing drivers in rural, sparsely populated areas as heavily as those in denser urban areas where accident externalities are likely to be greatest. But in fact, this is a secondary issue. The real point is that a rigorous analysis would have to take into account all taxes and regulations that have any effects on driving and congestion. It would then have to demonstrate that a tax would be welfare-improving at the margin, especially given the distortions that a uniform tax on both congested and non-congested drivers would necessarily create.

Q* debates often take place in science. One only need to look at the climate science debate over CO2 to see the difficulty of establishing a universal CO2 emissions goal, notwithstanding the climate science "consensus" much touted in the press. Similarly with respect to ozone, local scientists have pointed out that the lower ozone thresholds among the EPA's policy options lie below those naturally occurring in the Baton Rouge region.

Thus, while there is theoretically a P* and Q* out there, knowing even one of those parameters with sufficient precision around which to build coherent policy is often difficult or impossible.

Notwithstanding the difficulty of setting P and/or Q, EPA policy seems to be "as low as you can go" with little acknowledgement of climatological constraints. Such a goal is not economic or scientific policy, but political policy. But more importantly from the economist's perspective, a Q-star goal of zero creates dangerous economic distortions.

Look at stagflation in the 70s for an example.

Look to US housing policy for another.

Another example is target risk levels for banks today.

The point is that an absolute or unrealistic goal is potentially more dangerous than no goal.

Problem 2: What is the optimal tax policy?

We know from Coase's work that the combination of taxes and other policies matters to the level of Q-star.

Rules such as:

- emissions inspections,
- environmental regulations on the refining of gasoline,
- restrictions on the siting of gas stations,

- publicly funded programs that provide incentives to drive less or to use public transportation,
- limitations on parking or roadways, and
- subsidies to live near the downtown area

...can be seen as aspects of a political set of Coasian bargains that shift the relevant supply and demand curves. As a result of all of those policies, total driving is reduced to some intermediate Q that lies between the optimal Q^* and the no-tax Q .

In such circumstances, a Pigou tax would be justified but the size of the tax cannot by definition be established. Yet many academic papers still try. The point is that regulations and market imperfections affect the actual Q that is observed – which is, in fact, the intermediate Q referred to previously.

Moreover, who do you tax? Sometimes, the social benefit is conferred upon someone geographically removed from those experiencing the social cost. Pollution is spread far a wide by the winds and waters. In such circumstances, taxing those experiencing the effects of the externalities will not affect the producers of the externality.

Similarly, while economic applications of the “turnpike theorem,” – the idea that those passing through do not invest in reputation or long-term health of a region – suggest that transportation corridors also present special problems. Auto routes, railroads, and waterways are through ways that benefit others at the cost of local economies. Again, accounting for such effects is paramount in solving the externalities left behind in such activities.

Where do market solutions (cap and trade) fit in?

There is clear evidence that many of the proponents of Pigou taxation would not be satisfied by changes in behavior that result from a Pigou tax. As noted, the run-up in gasoline prices in recent years have eclipsed estimates of gasoline taxes that are estimated to restrain consumption to Q^* , yet almost none of the advocates of either carbon credits or Pigou taxes seem close to satisfied with current levels of gasoline usage or carbon emissions.

That suggests that policymakers either do not accept the logic of the Pigou literature, or else *their concern with emissions and pollution is independent of attempts to reach an efficient solution.*

If that is the case and numerical targets are the politically desirable ends (regardless of efficiency), then tradable credits may be the most reasonable second-best way of reaching those goals. But then advocates should be upfront about their belief that they “know” what the right level of pollution should be and are willing to reach those levels, even at prohibitive cost. Of course, this cuts against the grain of the cost-benefit tradeoff that underlies the desire to estimate the optimal Pigou tax.

Problem 3: Overshooting

If the combination of the social bargain and taxation creates transactions costs so that P greater than P^* or Q less than Q^* , we have overshoot.

If we can't establish Q-star and P-star to begin with, how can we tell if we have overshot? While we probably can't tell definitively, we can make inferences over the possibility of overshooting from the presence of market regulations, market crises and breakdowns, and adverse economic performance relative to other unregulated regions.

Compliance costs and overhead in ozone markets are growing fast as regulation spreads. Compliance is the largest growing sector in the financial services industry, and it is booming in the environmental sector as well. The CO2 compliance industry, including consulting, trading, and portfolio management already amount to billions of dollars worldwide... and prices of CO2 permits are acknowledged by all to remain too low to deter output.

Moreover, those markets present risks to the global economy that have already been demonstrated, worldwide. The Interpol Environmental Crime Programme now lists ten classifications of carbon crimes that have already occurred throughout the world and continue to remain a threat. Those include:

- Manipulating measurements to fraudulently claim additional carbon credits (Additionality);
- Sale of carbon credits that either do not exist or belong to someone else;
- False or misleading claims with respect to the environmental or financial benefits of carbon market investments;
- Exploitation of weak regulations to commit financial crimes;
- Tax Fraud;
- Securities Fraud;
- Transfer mispricing;
- Money laundering;
- Internet crimes and computer hacking to steal carbon credits; and
- Phishing/Theft of personal information or identity theft.

We have already seen many of these. As carbon markets grow, the carbon fund market – and investor fraud – has grown as well. Carbon funds – like mutual funds with stocks or bonds – accept private and public investor money to purchase carbon permits. According to the latest survey by Carbon Finance, a carbon market data service published by Environmental Finance, over 2008-09, funds under management grew by 20 per cent to \$16.1bn (£9.8bn, €10.7bn).

Mark Nicholls, editor of Environmental Finance, who published the survey noted that, “thirty-eight of the 88 funds listed are governmental carbon purchasing vehicles, or are run by multi-laterals either for governments or emitting companies, or a combination.... The majority of the remainder are open to institutional investors.” Most of the recent funds to have launched have been private sector vehicles.

The returns can be lucrative. The European Carbon Fund, run by French bank Natixis says that “based on its net asset value at the end of 2008, the fund has generated an annual return of 27.8 per cent since its inception in April 2005.”

The problem is that such returns quickly attract fraudulent schemes.

Interpol reported that in 2009 and 2010, an Australian investment firm ran an aggressive telemarketing strategy advertising false connections to legitimate organizations and environmental standards. Potential investors were offered a high return investment opportunity in carbon credits. The firm is estimated to have defrauded Australian victims of \$3.2 million.

A firm called “Enviro Associates” was selling voluntary carbon credits for investment purposes, all the while warning that:

Voluntary Carbon Credits were not designed to be purchased for investment purposes; for that reason Carbon Credits (VERs) are not for all specifications of Investors due to its high risk and undeveloped market landscape and uncertainty...

Individuals should be aware if they are purchasing for speculative means that there is little or no liquidity at present in the market which in turn would affect your ability to sell/exit from a holding at this time. This may change in the future.

Enviro Associates claims to be a “clearing member” of Gemmax Solutions, a payments and clearing service. Britain’s Financial Conduct Authority warns, however, that:

Several unauthorized firms promoting and selling carbon credits are telling investors that carbon Neutral Investments Limited (CNI) or Gemmax Solutions, firms authorized by us, will handle money in their investment. We believe this is done to suggest investors will be protected as though they are dealing with an authorized firm. But this is incorrect.

Without investor protection and regulatory oversight, carbon schemes continue to proliferate, and ozone schemes will follow.

Britain’s Financial Services Authority summarizes warnings to investors about carbon frauds and emphasizes that they do not regulate carbon credits in the same manner as shares of stock. Still, investors flock to these green “investment” opportunities. In November 2013, Britain’s FSA reported that it had shut down nineteen companies in the past fifteen months for bilking roughly 1,500 investors out of 24 million pounds (\$38.7 million) through selling carbon credits to individual investors.

The FCA in September released the findings of a survey of 125 carbon investors, showing not one had made any money from investing in the credits. The FCA has put some 183 carbon firms under investigation since 2011.

In the U.S., carbon schemes have prompted several States Attorneys General, including those of California, Vermont, Arkansas, Delaware, Maine, Mississippi, Oklahoma, Illinois, Connecticut and New Hampshire, to back efforts by the Federal Trade Commission to investigate consumer fraud in the carbon offsets market.

Clean Development Mechanism (CDM) projects generate carbon credits based on the extent to which the project resulted in fewer emissions than would otherwise have occurred, which sometimes results in corporate fraud. Dan Welch, of The Guardian, wrote, “Offsets are an imaginary commodity created by deducting what you hope happens from what you guess would have happened.”

Companies, therefore, have an incentive to either inflate the estimate of emissions that would have occurred without the project or claim that the project will reduce emission by more than it actually does. There is no reason to believe that with the expansion of regulation, NOX and VOX estimates will not be similarly skewed.

In order to constrain firms from mischaracterizing their projects, the CDM mechanism requires third-party validation and verification before a project receives carbon credits. Third-party verification is carried out by Designated Operation Entities (DOEs) certified by the CDM Executive Board.

Even independent third party auditors, however, may be susceptible to bribes or collusion to manipulate the results. According to Transparency International, bribery is most common at the project approval stage. “Although kickbacks to officials have not been reported, a Russian agency reportedly asked for direct monetary payments. In South-east Asian countries, it is fairly common for developers to invite the authorities to workshops (with attractive per diems) before submitting projects for approval. In China, it is not uncommon for project developers to invite experts reviewing their projects to dinner.”

But even independent verification agencies are not immune to manipulation. In 2008 and 2009 respectively the UN temporarily suspended two independent organizations – Norwegian company Det Norske Veritas and Swiss firm SGS – after “spot checks found flaws in their methodologies.” Investigations showed that both companies had approved projects without sufficient review.

“The UN inspection found one company had a flawed review process, inadequate preparation and training of their auditing staff, and an overall failure to assign auditors with the proper technical skills. The other was suspended after an inspection raised concerns about staff qualifications and the quality of its internal reviews.”

In a follow-up review in 2009, the five largest DOEs’ validation processes were scored on an A-to-F scale. None received a score higher than a D.

There are already many examples of counterfeit carbon permits being sold to unwitting buyers.

In one infamous and convoluted example, in March 2010, the Hungarian government took possession of two million carbon credits which had been surrendered to them by Hungarian businesses.

The rules of the EU-ETS allowed the Hungarian government to legally sell these carbon credits to others because Hungary anticipated being below its Kyoto Protocol target. However, the EU rules prevented these credits from being re-used within the EU. Thus, Hungary sold the carbon credits to Hungarian Energy Power, “with restrictions that they were ineligible for use in Europe and notified the European Commission of the sale.” “Hungarian Energy Power then sold the credits to a British trading company, which resold them to a firm in Hong Kong. The Hong Kong firm, however, then put those same recycled carbon credits on BlueNext, a Paris carbon exchange, where a number of European brokers and banks purchased them not knowing the carbon credits had already been used in Europe.”

When BlueNext discovered the credits were ineligible for use in the EU, the exchange “immediately suspended trading sending the spot price for CERs spiraling downward.” After shutting down for three days to isolate the problem credits, BlueNext facilitated “swap backs,” in which the sellers bought back the credits. Prices rose to their previous levels when trading reopened.

While the European Commission has now closed the loophole that allowed the credits to re-enter the EU-ETS, the episode highlights the importance of “strong regulations for monitoring the transfer of carbon credits through several foreign exchanges, particularly cross-checking between those exchanges.”

Carbon permits are also the target of theives. A hacking attack in November of 2010 resulted in the theft of 1.6 million carbon credits (valued at €23.5 million) from the Romanian registry account of Holcim Ltd., the world’s second largest cement-maker.” Holcim immediately posted the identification numbers of the stolen credits on its website and law enforcement efforts between Romania and Liechtenstein were able to track and return 600,000 of the stolen credits. Still, while the unique identification number of the carbon credits allowed them to be tracked, not all the credits could be returned to Holcim. As it turned out, some “jurisdictions required the holder to return the stolen credits to the legal owner at the holder’s loss, while other jurisdictions allowed the buyer to keep them, with the original owner carrying the loss.”

In another high-profile incident, the European Union’s emissions trading system was shut down for a week after cyber-thieves stole emissions allowances worth €7m (\$9.4m) from an account in the Czech Republic, while criminals also hacked into trading accounts in Austria, Poland, Greece and Estonia. “The Commission proposed tighter security measures in 2010 after discovering that hackers had broken into the registries where allowances are stored,” but member states have repeatedly claimed they cannot afford the improvements. It is easy to imagine a similar situation arising in U.S. markets where states would have to bear such unexpected costs.

It is already apparent that economic growth differentials among attainment and non-attainment regions are significant. The Baton Rouge region lags growth in New Orleans, Lafayette, and Shreveport over the period 2000-2013, posting lower per capita income, lower per capital income growth, and higher unemployment growth than those regions. I am currently researching growth differentials in other regions of the US, as well as isolating differentials to communities on the boundaries of non-attainment areas. The results continue to be stark.

Summary and Conclusion

The main point is that the way in which ozone policy has come about has created dangerous distortionary effects for Baton Rouge and other areas in non-attainment. Now those effects are being expanded to other areas.

Concerns about the desirability of Pigou taxation are important, but the current policy debates are really about particular distortions and distributional consequences of taxing some goods and not others. *That proponents focus on minimizing the quantity of output rather than efficient levels of emissions show that the calls for taxes really reflect proponents' distaste for a particular set of externalities rather than the inefficiency itself.*

The relevant *economic* issue is not how much pollution/externality remains, but whether the activities causing the externality are at their socially optimal level. *In the end, most calls for Pigou taxes are simply misguided attempts to condemn a particular activity as undesirable without consideration of the true workings of the market.*

Most apparently, there [exists] a conflict between the desire to attain the optimal efficiency level and the desire to attenuate pollution, congestion, or carbon emissions directly. From a pure economic perspective, the goal is to push us to the efficient Q^* , but a great deal of policy seems concerned with reducing the size of the social externality itself.

The two goals [naturally and fundamentally] conflict. As carmakers develop less polluting automobiles or gas suppliers discover better refining techniques, the principle of Pigou taxation would require that the gas tax be lowered, yet there is no mechanism for monitoring when taxes are too high. A call for a U.S. Pigou tax would require symmetric calls for reducing European tax levels if we are concerned about global welfare. Indeed, an efficient Pigou proposal would also have built-in rules to determine when the tax should be lowered.

We should be wary of simplistic solutions to very difficult economic and environmental problems. Often as in this case, they are not what they seem.

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