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Thesis Advisor: Professor Gunnar S. Eskeland

The green optima

by

Amanbir Grewal

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Abstract

Pollution has become a major cause of concern for large cities in most parts of the world giving rise to increased health costs. The thesis tries to study pollution taxes and how they are theoretically justified in being used as effective policy instruments. It tries to analyze the general theoretical construction of the externality tax and proposes certain revisions that planners can consult. The control of fuel markets is linked to such pollution and allowing reform will reduce such inefficiency and externality costs through the free market mechanism. Also, the constitutional framework for putting together this reform is entirely based on the valuation of the externality and the good by a state and its people.

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Introduction

Air quality in large urban settlements is often found to be below optimal levels or what is defined as harmful to its population. City councils work toward achieving cleaner air so as to avoid the detrimental health effects from the presence of pollutants in the atmosphere. Such public bads are produced from the consumption of commodities that include an externality. The thesis examines the case of transportation fuel consumed by citizens which is a main contributor to such pollution. The task of controlling single or even groups of large industrial polluters has a growing extent of literature that can be consulted for answers. Very often such commodities that are consumed by a large cross section of the population are taxed to control the level of such public bads. This thesis makes an attempt to look at the construction and working of such a tax as an instrument of public policy. It ventures beyond the ideas of bargaining and contracts which are thrown up intrinsically in certain situations. After all, the very concept of intervention is to intervene, such that the discrepancy, which causes the intervention in the first place, is resolved. Bargaining is best without a trace of doubt, but non-universal as its assumptions are usually hard to find in reality and particularly so in cities with large populations which are difficult to organize into groups.

The naive question is thus - what is the extent of this intervention, so that it resolves and does not exacerbate the problem further. A helpful aide in this fray is that this public bad must be done away with as quickly as possible all over, leaving planners with imperfect information and ineffective administrative abilities better off not having to deal with inter-temporal and inter-spatial tradeoffs. If either one or both these conditions are present, then the public bad needs a more sophisticated analysis. The thesis also avoids the idea of strict substitution and technologies being used currently are assumed to have a lock-in effect. Another thought that must be harbored throughout the analysis is that such external costs are merely accounted for in a proper way as the whole process is ex-post unlike a project design.

What this thesis intends to do is to revisit the externality or green tax (the terms will be used interchangeably to avoid the mundane and cause some distraction) and examine the framework on which it is built. The effort is not to defeat or undermine preconceived notions, but more along the lines of reinvigorating and reconstructing what is considered an effective policy instrument as we check it for deficiencies. It tries to enrich and bring about some color and texture to the fabric of an externality tax. How it can further be fine tuned to achieve maximum gains for society is another spillover. There are glaring empty spaces that one can stare into and find little, but the effort is to try and proceed with caution to see what happens when the green tax is implemented and what should've happened. Was it the right green tax and if yes, did it work, and if yes again, what made it. The tricky business with taxes is that it is difficult to know the right amount ex-ante, whereas the whole process of internalizing is best before the damage is done.

The thesis opens with a discussion on what lessons can be drawn from economic theory to deal with public bads. This is followed by a section on how markets with externality behave with price control or specifically subsidies. The next section then discusses a free market and how the elusive optima we seek through taxation is achieved or not. The green tax is then redefined and checked for efficiency followed by a section which discusses the constitutional arrangements for it before the essay is finally rounded off.

Lessons from theory

The price-quantity equilibrium is allowed to hold in this analysis ignoring the quality dimension, which is extremely important and if included can offer best insights. But for now, the analysis is limited. Information, competition and authority are assumed to be perfect for no reason other than easing the constraints of the problem. Au contraire, this does not really generalize or trivialize the discussion for even imperfections tend to affect all the control variables and not some specific ones. Making Pareto improvements from a utilitarian perspective is the biggest sticky note, and quite tricky to define correctly, as is with a free market which is already on the efficiency frontier. Resorting to some form of lump sump compensation to restore surplus, the form of which is irrelevant is quite natural. It must be mentioned here that this is a direct consequence of the market mechanism and not a normative position, not that this thesis won't tilt toward normative analysis at some juncture.

Taxes, as the thesis examines, can be distributed equally over markets, or markets can be distorted equally by unequal taxes. It calls for determining which ones are crucial, and which are not? Naturally, the crucial ones will in their interest resist high or even equal tax rates. The discussion is still working within a state versus market framework where the state has little interest in the market apart from taxation. In welfare terms, comparatively advantageous markets could be distorted less. Efficiency in terms of how the elasticity of a good determines the tax is irrelevant. This follows from the textbook definition of efficiency, which measures what is termed as a deadweight loss (the thesis also refers to it as a *distortion*) from price or quantity control, but it should not be used to propose such instruments unless the desired consequence justifies it. As an example of flawed central planning, it needs little elaboration. The bounds that construct such triangular inefficiency losses can be easily manipulated to show that price control in cases of technical or physical constraints in an economy can cause greater distortion.

For example, the case of toll taxes on roads that are additional to what makes an optimal price for the rate of return on the investment or for avoiding congestion. The road would have to be narrowed down to accommodate the change in traffic when such taxes are levied. This is the case of a non-zero slack or a zero shadow price. But it is an interesting trail to follow if one is into the science of designing future transport networks.

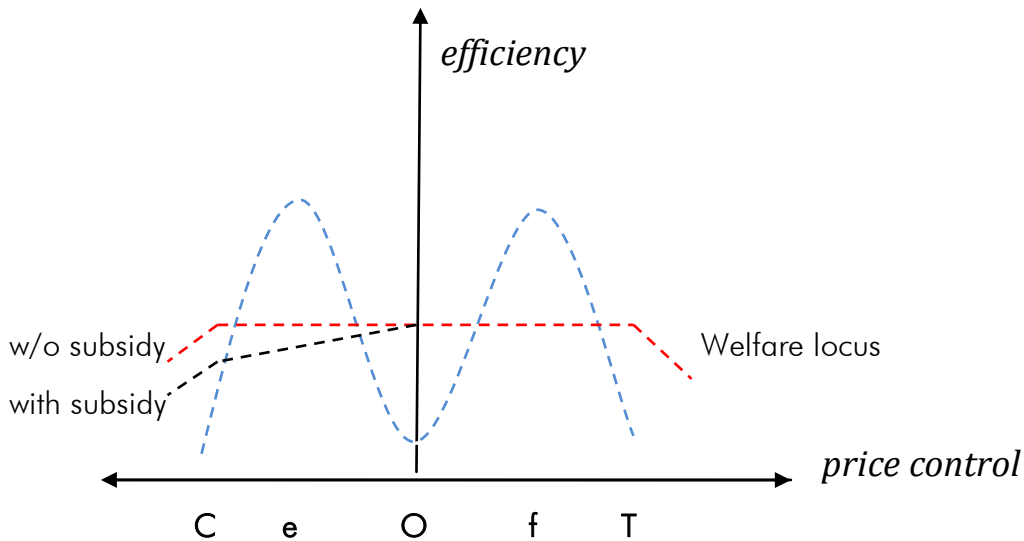
The results from maximization of surplus in standard cases yield an additive tax that should reflect the relative price of a goods utility and its disutility across all consumers. While it is theoretically sound in its conclusions, it may or may not be accurate in its beginnings. This depends on how and in which context it has been created. The argument for driving innovation through constraints like taxes holds only when the agent in question feels the constraint, thus making the agent more critical than the constraint. Heavy taxation is not necessarily the mother of invention and neither is controlling prices below their optimal level. The theory of the second best where close attention must be paid to the relationship between the good in question and other goods that will be affected by a policy instrument leads well but delegates more authority than what planners usually deserve. The spillover effects from policy action can be accounted for better if the design is objective as will be seen in the next few sections.

Markets and price control

Price control as defined here will be the exogenous setting of the price level of a commodity that differs from what the aggregate demand-supply equilibrium would suggest. This is set by a state or a regulatory body with perfect authority and information. The underside to such price controls is again a market distortion with benefits being the avoidance of extreme macroeconomic scenarios such as high inflation. They are usually good instruments in times of economic and political volatility providing much needed reliability but considered to be stifling to economic growth in the long run. And in ordinary circumstances, it is quite natural to see that the only way such prices can be rigidly maintained is for this state to control the production and sale process or else a willing seller will find a willing buyer in spite of such regulations. But if this were not the case, then the state transfers to the seller the power to select buyers, which it does through habit or preference. And such controls are also most successful in imperfect markets with few players, making enforcement and the ability to ration easier. Most transportation fuel markets fit this definition. Price controls serve the state, the sellers and buyers, but do they serve the market.

However absurd that may sound, as the market *is* made up of buyers and sellers, it is of importance to us as to what it falls short of doing is allocating such resources efficiently, which a market is precisely meant for. The surplus required to maintain price controls, or subsidies more commonly, is met by placing the burden on other sectors of the economy. And consumer surplus being extraordinarily high when the market price of the good is under arbitrary control, gives little incentive to invest or innovate or expand such sectors. Lay men on a hunt would call this a sitting duck. So while such sectors do not expand naturally they do cause distortions to other sectors. The only plausible explanation of this is inefficient price control, not so much in terms of total surplus, but in terms of distribution which causes such redundancy.

The equilibrium that exists in such situations is Pareto efficient but the distribution of resources is not. And what effect does this have on the externality? While society consumes more of this good, it also suffers higher costs of pollution.

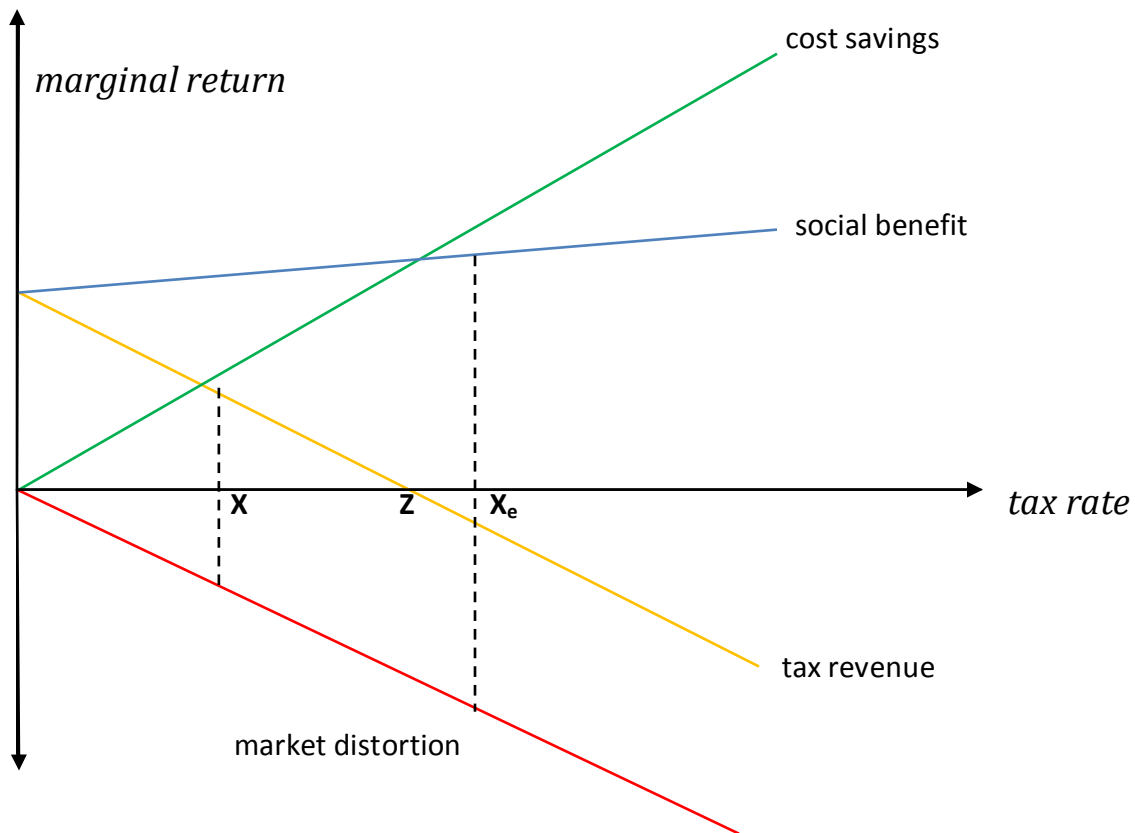


The above diagram, derived again from a (p, q) space, shows how the distributional efficiency varies with price controls where C, O and T indicate a price ceiling, the market price without tax and price after a green tax respectively. We also see that there are two points E and F, where price controls achieve maximum efficiency. Welfare has been superimposed in this space although it is not measured in the same units, an error, but done so only to facilitate comprehension. It must be mentioned that any movement both ways from O does not offer Pareto welfare gains but only internalizes costs, leaving the question of how they should be distributed, hence the above analysis. But if point C is a subsidy, then the welfare loss from such a transfer shows up through excessive environmental degradation. Increasing prices or moving toward O-T then offers *Pareto improvements* through a rise in environmental quality and market surplus.

The case of the missing optima

In this section, the idea is to try and analyze the behavior of tax rates and the impact of a simple tax on the *free* market. There are no major assumptions other than a market with demand, supply and an externality; all linear in their nature in terms of marginality (any other case is extreme and thus has easy and obvious solutions). In a simple $\{x, f(x)\}$ representation in Euclidean space, the different marginal returns against the tax rate are plotted. A tax causes distortion, generates revenue and allows cost savings in terms of marginal damage from the externality. What then should be its optimal structure? A logical conclusion would be to have a tax that maximizes revenue and cost savings while minimizing distortion at the same time. Keeping this in mind it can be seen that –

The welfare maximizing tax rate may not coincide with the revenue maximizing tax rate, with or without an externality.



A few points that explain the above illustration-

- a) Social benefits (SB) are a sum of revenue (R) and cost savings (CS), working within a welfare state wherever it is possible.
- b) Market distortion (MD), revenue and cost savings are measured as a function of the tax rate within their traditional definitions and derived from the (p,q) space
- c) X and X_e are the welfare maximizing tax rates without and with an externality and Z is the revenue maximizing tax rate
- d) Marginality obtains the maxima for the aggregate welfare function W
- e) The incidence on market surplus is of a standard nature and does not interfere with the analysis, being again, a redistributive feature

Let t be an arbitrary tax rate;

Let m_x be the slope of the demand-supply-externality curve;

Let c_x be arbitrary constants of such curves;

The point Z is obtained from maximizing R w.r.t t

The point X is obtained from maximizing $W = (R - MD)$ w.r.t t

The point X_e is obtained from maximizing $W = (R + CS - MD)$ w.r.t t

Where;

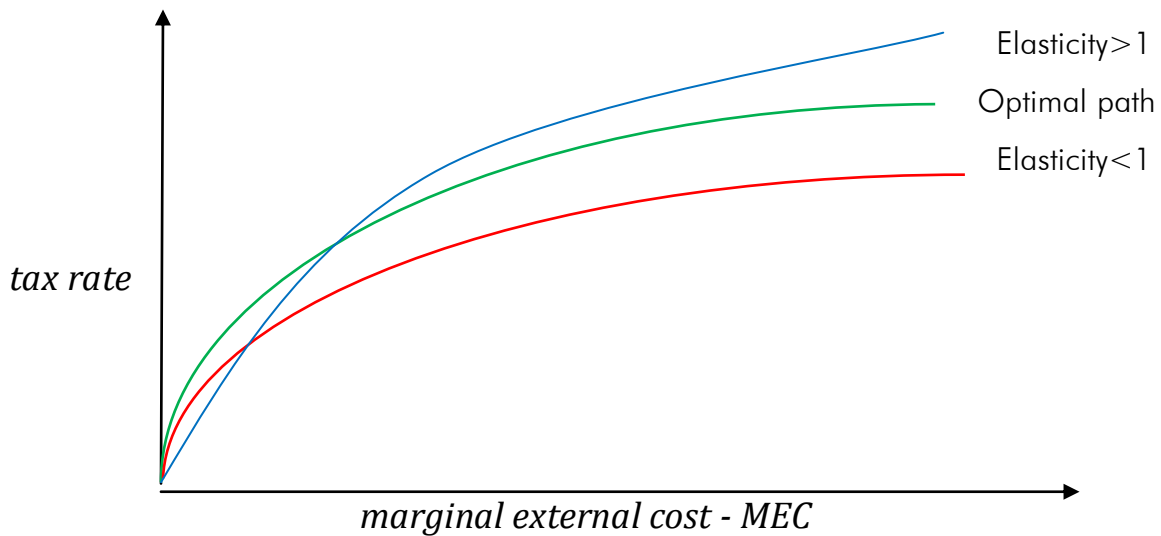
$$MD = \frac{t^2}{2(m_1 + m_2)};$$

$$R = \left(\frac{c_1 - c_2 - t}{m_1 + m_2} \right) t;$$

$$CS = \frac{m_3}{m_1 + m_2} t(2(c_1 - c_2) - t);$$

Also —

The green tax rate may not be optimal or neutral for a wide range of elasticities and extent of the social damage as shown below.



The elasticity here is derived purely from the sum of producing and consuming the good, indicating a society's valuation, technological capabilities and inertia, and kept basic for illustration. What this analysis does provide, is a theoretical revision of this tax. The tax as it does turn out, may be lower than necessary (as is the case for $E < 1$ and for $E > 1$ with a minimum MEC) if it truly intends to maximize social welfare or otherwise. For ordinary cases, the standard tax being used is weak and could be ramped up.

Let t_1 be the standard tax rate;

Let t_2 be the optimal tax rate;

Let m_x be the relative slope of the demand-supply-externality function;

Let C_x be arbitrary constants unique to the case;

Then :

$$t_1 = \frac{\Delta c m_3}{m_1 + m_2 + m_3};$$

$$t_2 = \frac{\Delta c (1 + 2m_3)}{(m_1 + m_2)3 + 2m_3};$$

To check for the relative magnitude of the two taxes, equate and solve to get;

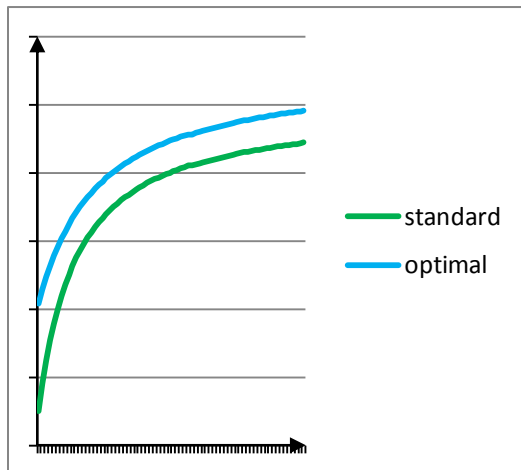
$$2x^2(k - 1) + (k - 1)x - k = 0;$$

X and K are now the tax rate and sum of elasticities respectively.

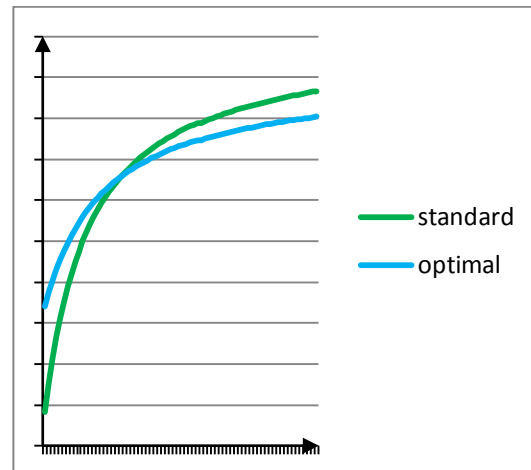
The above function is depicted below in the two diagrams with K=1 being a critical point.

The two cases are shown separately.

(1) $E < 1$



(2) $E > 1$



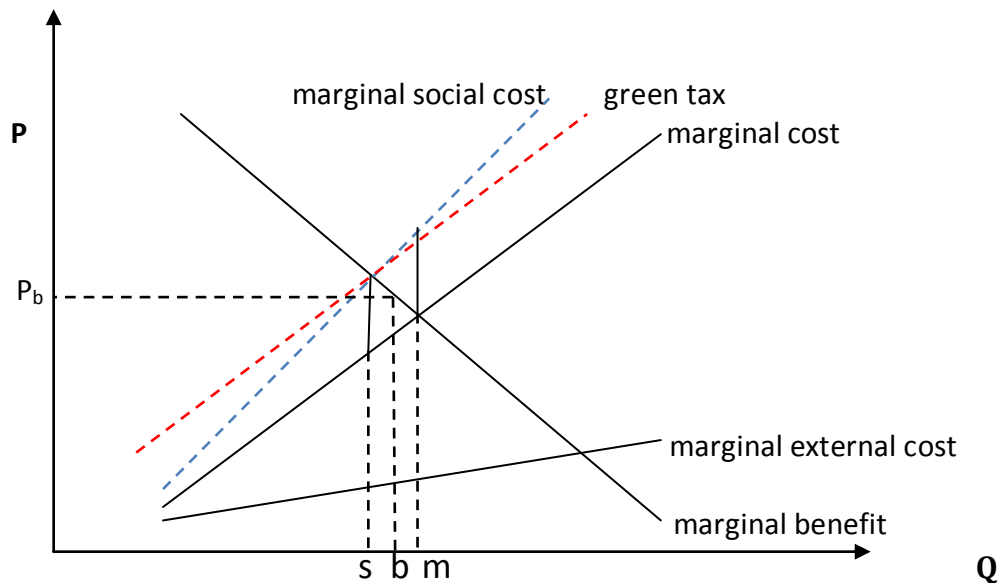
The present situation would follow the first case, making the green tax weaker than what is meant to be considering constant returns to scale and the valuation amongst populations.

The green tax

We have seen how the nature of an externality tax varies according to the nature of the state that is taxing the good and the external cost in the preceding section. We now try and study the standard green tax, where revenue is not a concern. A simple green tax is calculated from the intersection of marginal benefits and marginal social costs giving us a desired combination of (p, q) . For every additional quantity, society as a *'whole'* is worse off. However, there is another point (p^*, q^*) , more and cheaper, where the marginal social cost equals the marginal distortion. Thus, the *true tax* should emerge from the intersection of the marginal social cost and the marginal distortion it produces. The point being that the cost savings may be distributed over a larger portion of the population than the market distortion. A is greater than B , but A/x may not be greater than B/y if x is much larger than y . This also follows from the fact that the tax is meant to correct the market and for no other purpose and that the *aggregate* does not represent the *individual*.

What is generally thought to be a neutral tax must incorporate distributional efficiency (distribution here does not refer to how the tax impacts individual income groups but to the division of costs between the market in question and those affected from the externality) in addition to the assumed accountability it brings about. The green tax offers a combination of (p, q) for the benefit of society that may not maximize the interests of all. Its simplicity is its biggest strength *and* its biggest weakness. It sets an optimal level of pollution and *then* declares a fee. The correct way would be to approach the optimum level of pollution as the fee is levied. This is because it is difficult to really know what an optimal level is in the first place. The point where marginal benefits equal marginal social cost is not representative for the consumer at that point unlike the (p, q) equilibrium where marginal benefits equal marginal private cost.

It is thus not the equilibrium, but tuned to look like one, what we call an *apparent* equilibrium, much like the concept of apparent depth for any optics enthusiast who happens to be reading this. This is even more so the case when quality is an additional dimension but we avoid the complexity. In other words, the tax proposed *only* to reduce the public bad, is heavy, if traditional analysis is pursued. The argument that the proposed green tax eliminates the alternative once the tax is decided such that no comparison can be sought between the two optima's is strong but disappears as quickly as it arises. A tax does not alter reality and the processes and events that are part of it, it only alters their distribution. The entire concept is dependant on how many gain and how many lose from price controls. The more the numbers diverge, the more the need to revise the standard green tax. The diagram below tries to illustrate this point.



M is market optimum and S is social optimum derived from imposing external costs on the marginal cost curve of producing the good. But there is a point B such that any apparent improvement toward M reveals social costs/ $y >$ market surplus/ x ; and any improvement toward S reveals market distortion/ $x >$ social cost savings/ y ; where x is number of market participants and y is the total number of stakeholders, and $x \leq y$, if the marginal benefits and external cost are not distributed over all market participants equally. For example, a cyclist suffers from pollution but does not contribute to it.

The following calculations are of little practical significance but nevertheless interesting. The point B is where the social costs incurred equal market distortion;

$$\int_b^s MSC - \Delta = \int_b^m \Delta - MC$$

To solve for b we equate the area in the two triangles and rearrange to get:

$$\frac{MSC_b - P_b}{P_b - MC_b} = \frac{Q_m - Q_b}{Q_b - Q_s}$$

Where;

$$Q_s = \frac{c_1 - c_3}{m_1 + m_3} \quad ;$$

$$Q_m = \frac{c_1 - c_2}{m_1 + m_2} \quad ;$$

The above equation reduces to a quadratic upon substitution.

$$(m_3 - m_2)b^2 + 2(c_3 - c_2)b - \frac{(c_1 - c_3)^2}{m_1 + m_3} - \frac{(c_1 - c_2)^2}{m_2 + m_1} = 0;$$

$$Qb = \frac{1}{2} \frac{(2c_1 - c_3 - c_2)}{m_1 + m_2} \quad \text{for } m_3 = m_2;$$

$$Qb = \sqrt{\frac{(c_1 - c_2)^2}{(m_3 + m_1)(m_2 + m_1)}} \quad \text{for } c_3 = c_2;$$

The external costs are assumed to be increasing but not radical. In cases where external costs escalate rapidly beyond a certain limit, regulation in the form of command and control is more useful as can be seen in a number of situations. This is most important for what the tax means to infra-marginal consumers, where the willingness to pay may be overshadowed by the ability to pay. The *true tax* is, in this case, obviously, lower than the proposed externality tax. If the market is society itself ($x=y$) or close to it, then the social optimum S holds as in a standard case but as x and y differ more from each other- large cities with many people who do not own or use vehicles, the optimum shifts towards M, or markets with even more vehicles.

This is a classic public bad situation which needs a regulatory body for intervention and redistribution which becomes a normative issue for obvious reasons. In other cases, Point B, being a quadratic function of aggregate demand and supply, reduces to a simple arithmetic or geometric mean of the two optima's, depending on the nature of the externality being a constant cost or an increasing cost function of the good, just for plain kicks. The second case would also mean that the tax is equal to the marginal external cost for all (P, Q) and not uniform. Non linear taxation is not unheard of. We have assumed that the commodity in question is not taxed apart from this particular environmental tax. Note that this result is in contrast to the one obtained above where the green tax is generally found to be below par.

The divergence of the results from the above two cases arises from the definition of the tax. Is it used in addition to a basic commodity tax or is it a solitary tool for a specific purpose? If it is additional, then the green tax is a little off-the-mark in both directions but usually weak and if it is meant to check only the externality, then it is abstract and heavy. The former is a more realistic case but this optimal is difficult to achieve as the actions would again not be Pareto efficient. Few governments duly supported by producers, which is the state itself in most cases, would go ahead and increase tax rates if they are at the maxima because of environmental concerns in spite of it being in the greater interests of the people. The irony being that the dismal perception of a tax increase by citizens allows the state to sit pretty. The assumption that revenue is not a concern is where we go awry. It usually is. If the government is truly of, by and for the people, it is similar to undergoing surgery without an anesthetic but with a little courage.

Constitutional clockwork

It is evident how markets may be inefficiently controlled and how the green tax may or may not be theoretically optimal and the reasons for being so. We now proceed to see whether the green tax is efficient and if not, why. We also study the effects of imperfect authority and competition.

Indirect market based instruments like the one we're discussing here are set by planners in the best interest of society. The market price of fuel - diesel and gasoline, show a great degree of variation across different states with little correlation to income although richer states have relatively higher taxes and eventually higher prices, but the direction of causality is difficult to underline. Can they afford high taxes or is it a purposeful ethic. Such questions are difficult to answer in a generalized fashion as each state is a unit of its own. Certain relatively poorer states also manipulate the price of fuel by placing a premium but most of them subsidize it. Some states go as far as manipulating the quality of the good in the market by imposing taxes on the initial purchases of motor vehicles and its technical specifications; clearly driving its population into what it feels is the right car. This again reminds us that fuel consumption by consumers and the externality cost is mostly a matter of public policy. The concept of political feasibility then plays an important role into who gets what and why.

The state assumed is endowed with perfect information and authority in the previous section with perfect competition in the market. But it could be that the above tax rate will further will be influenced by monopolies or lobbies causing further disturbance to the optima. The authority of the state is then compromised. Competition and authority go hand in hand. A state loses credibility when it promotes one over another, and this usually occurs most of the time.

Price controls result in inefficient allocation but further examination of what happens when one stakeholder has an advantage over others is useful. The shifting of welfare surplus from buyers to sellers or vice-versa is attached to organization – or the cohesion of many into one. For states where consumer surplus is high, any shock to this equilibrium will obviously result in unrest. For a monopoly, the externality cost is low but only at the expense of the market. The good is not adequately provided and poor in quality. There is no escaping the transparency and accountability that a free market offers by keeping stakeholders from colluding.

This would suggest that another set of institutions, apart from the taxing body, be created to check for deviations when we don't have conditions for perfect competition and authority. In other words, the presence of non-discriminatory laws and their enforcement in a society may be required when the taxing body is not free from interference, from the multitude or the monopolist. This could go on and on forming a closed loop (which only an exogenous shock can redefine into the free flowing atomistic state, which is even more costly as history teaches us) because this new institution must again be objective. The existence of rational expectations from these new institutions when the body that should function objectively in the first place is not doing so is truly a tough knot to untie and this thesis is not meant for that purpose.

It can be safely concluded that taxation becomes costly in situations where objectivity is not coveted than where it is. *The free market and the objectivity of the state cannot be separated.* To simplify, what is considered as politically feasible is entirely the prerogative of the state and its people. If it is objective, then the market works, if it is not, then it doesn't. This does not imply the absence of the state or the absence of planning, but merely the absence of bias. What makes the rule of law immune from the same plague that affects planning is a tough question to answer because rent seeking feeds on power seeking, and reaches the source of authority, be it a minister or a bureaucrat. There isn't any further need to elaborate how the rule of law can be twisted to serve interests, if it *has to be* done.

The delivery of objectivity requires a state, whose form is again irrelevant. It could be a set of reasonable laws, social contracts and tacit norms, or it could be a benevolent planner. On how to diffuse objectivity such that markets which reflect willingness to pay begin to function properly is to dive into culture and philosophy, alterable through education and learning, and that is that.

Returning to the efficiency of pollution control, a combination of instruments, technical control and taxation, has proven to be most useful as far as comparing a set of alternatives goes. There is also evidence that the externality tax has performed cost effectively as compared to other direct instruments like command and control. That leaves us little to choose from, the only difference being that the externality tax will perform better than its alternatives when the state is not benevolent, but at its best when it is. The reasons are the flexible response that it faces and sound planning, respectively. Abatement does become a cheaper exercise when a tax is levied over the regular options of implementing standards. The cost of implementing the tax which we have ignored so far could further reduce its efficacy. But this is universal such that monitoring and administration costs are to be found in all states. Implementation is not related to principle. It has a lot to do with acquiring skills from discipline and training.

Revaluing social benefits could also be done by imposing costs of externality on marginal benefits as compared to imposing it on the costs of producing it. This can also be achieved by altering valuation amongst citizens by social awareness programs, the media and education. All of this does need a choice mechanism that explains how the state will plan such that the market is efficient, making both the state and the market a set of wheels that belong to the same cart.

Conclusion

Some general ideas we derive from the essay are summarized in this section. The costs of an externality are merely to be distributed between stakeholders, through the best way of measuring willingness to pay. A market is well suited to solving this problem, making public policy an integral exogenous part of this system to carry out this function. When such markets are controlled or subsidized, it is done so in the best interests of the stakeholders who control such prices while incurring large costs through the externality. A revenue maximizing government may under tax a public bad if it is a serious one, and may overtax a potentially trivial one. In any other case, the result may be optimal, albeit that the desired outcome was not planned but unknowingly occurs. The difficulty here could be with trying to achieve the Pareto point, which does need the increasing return axiom to hold. The standard externality tax may be theoretically questionable as it is directly imposed on the private costs of supplying the good, in spite of it being marginally different for the city's citizens. The externality tax works well in cases where the state is not entirely dedicated to welfare and best when it is. The smartest but again tedious way to go about preserving air quality or smoother traffic would be to revise the valuation of consumers and increase awareness.

What is most surprising is the compelling need that is felt to condense and inscribe in stone certain principles being used to serve our needs better, while this in itself drives them into a form of fundamentalism. This propensity for worship and religious belief, as conformism is known to be, can work the other way, restricting freedom of thought and liberal scholarship. Excessive use of theory, in principle or in measurement, is resorting to fundamentalism and the challenge remains to answers questions without losing perspective.

For example, this thesis is irrelevant and completely worthless if a state functions well and society is completely egalitarian and rational in decision-making, though strictly with payoffs as a determinant, again extreme and fantastical, and so is our marginality assumption, for cases of zero tolerance. To be honest, such a condition is not entirely as pleasing as it seems and irrationality does have a silver lining of its own, but we leave it aside for now. So the theoretical implications from it also apply under a set of preconditions, none of which are the extraordinary just to confirm again, and it could be subject to an identical or more extreme examination than it offers.

What does reduce the work load for planners, being typically inadequate, irrational and inept, is that the challenge of pursuing a certain narrow interest under a shadow of doubt is absent, or if present, will lead to further inefficiency whose costs are usually high in accordance with the hazard it bears. There is the cake and only the cake to deal with and this has to be done without any magic, a luxury only she enjoys and shares with us on a good day. That shouldn't however stop them from probing further as there is certainly a need for maintaining the status quo if not for improvement, and lest we forget, building cleaner cities.

References

Dixit A, 1996. "The Making of Economic Policy, A Transaction – Cost Politics Perspective", *The MIT press*

Eskeland GS, 1993, "Presumptive Pigouvian Tax on Gasoline: Analysis of an Air Pollution Control Program for Mexico City", *WBPR Working Paper 1076*

Federal Ministry for Economic Cooperation and Development (BMZ), 2009, "International Fuel Prices 2009", *Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Transport Policy Advisory Services*

Galbraith JK, 1946, "Reflections on Price Control", *The Quarterly Journal of Economics*, Vol 60 (4), pp 475-489

Margulis S, 1992, "Back-of-the-Envelope Estimates of Environmental Damage Costs in Mexico", *WBPR Working Paper 0824*

Olson M, 1965, "The Logic of Collective Action: Public Goods and the Theory of Groups" *Harvard University Press*

Pindyck RS and DL Rubinfeld, 2009, "Microeconomics", *Pearson Prentice Hall*

Sørgard L, 2006, "Competition and Welfare: The Norwegian Experience", *Konkurransetilsynet, Norwegian Competition Authority*

Sandmo A, 1975, "Optimal Taxation in the presence of externalities", *The Swedish Journal of Economics*, Vol. 77(1), pp 86-98

Singh B and E Hope, 1995, "Energy price increases in developing countries: case studies of Malaysia, Indonesia, Ghana, Zimbabwe, Colombia and Turkey", *WBPR Working Paper 1442*

Spence AM, 1975, "Monopoly, Quality, and Regulation", *Bell Journal of Economics, The RAND Corporation*, Vol. 6(2), pp 417-429,

Sullivan M, 2005, "College Algebra", *Pearson Prentice Hall*