

The Polluter-Profits Principle

A Note on the Grandfathering of CO₂ Emission Rights in Lax-Cap Trading Regimes

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Abstract: Grandfathering is currently the main principle for the initial allocation of tradable CO₂ emission rights under the European cap-and-trade scheme. Furthermore, political feasibility often requires non-restrictive emission caps. Grandfathering under lax cap is unjust, biased and brings polluters unintended windfall profits. Still, in any post-Kyoto international CO₂ regime, lax caps may be critical in coaxing binding emission targets out of more countries, especially those in the less-developed world. This paper argues that there is a certain quantity of emission rights between the initial and the optimal emissions, the grandfathering of which brings polluters zero windfall profits or zero windfall losses. Our theoretical concept of zero-windfall grandfathering can be used to demonstrate the windfall profits that have emerged at company level during the first EU trading period. It might thus encourage governments to embrace auctioning, and to combine it with grandfathering as a legitimate tool in the initial allocation of emission rights in later trading regimes.

Key words: cap-and-trade; climate policy; CO₂ allowance; emissions trading; initial allocation; grandfathering; polluter-pays principle; tax threshold; windfall profit

Abbreviations: BAU – business as usual; MAC – marginal abatement cost

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Introduction

The governments of the EU member states have embarked on the creation of the biggest company-level emission-trading system in the history of environmental policy. The main objective of the scheme is to encourage governments to comply with their national greenhouse gas commitments under the Kyoto Protocol, and to provide several thousand polluters with an instrument that facilitates least-cost implementation. Within the regulatory domain are several countries whose Kyoto commitments are rather loose – either as a result of the ‘burden sharing’ inspired by the EU’s cohesion policy towards its less-developed members, or because their Kyoto commitments were explicitly designed to be purely symbolic, as in most East European countries, who were coaxed into signing the Protocol in the midst of the economic crisis that followed the collapse of their socialist economies in the 1990s. The EU CO₂ cap-and-trade programme in such countries is likely to bring about lax emission caps, which suggests, in the light of an emerging emission market, that these countries would be net sellers.

Being a net seller means reaping net benefits, and the beneficiary in a net seller country should, by default, be the government. It is the state that is given greenhouse gas emission rights under an international accord (the ‘assigned-amount units’). If the country is a net seller of emission rights, it should be relatively easy for the government to collect the net income of unused emission rights on behalf of the state. However, within the EU CO₂ trading scheme, it seems to be next to impossible.

The EU’s common regulation of CO₂ emissions trading stipulates that a government should determine the emission caps for polluters in accordance with the Kyoto commitment of that country, and should then distribute emission allowances to polluters free of charge, leaving a very limited proportion of the cap for possible auctioning. Therefore, in the case of a lax cap, this principle allows the polluters to profit directly from the introduction of the environmental instrument.

In the first section of this paper we present theoretical and policy arguments on the initial allocation of emission rights to companies through grandfathering under the EU

scheme, and demonstrate, using two extreme design patterns, that far from being the ultimate answer, grandfathering produces new dilemmas that must be resolved. Then, in the second section, we introduce our concept of zero-windfall grandfathering, which is the theoretical identification of the break-even level of free emission rights that avoids direct losses or profits being made by polluters from grandfathering. In the third section we place our concept of zero-windfall grandfathering within its suggested theoretical environment, and in the fourth section we seek some valid policy implications under the EU trading regime and beyond.

1. The grandfather in the details

Ever since emissions trading joined the arsenal of environmental policy instruments there has been a heated debate over the initial allocation of emission rights. In this section, we first briefly summarize the arguments for and against an initial allocation of emission rights by grandfathering. Then we provide an insight into some disturbing details of the seemingly clear-cut programme of grandfathering.

1.1 Why to grandfather?

The theoretical argument for grandfathering is based on three solid pillars. The first was established by Coase (1960), who argues that the allocation of initial emissions rights has no effect on the outcome of emissions reduction, if certain assumptions hold (well defined property rights, zero transaction costs and no wealth effect).¹ Secondly, it was demonstrated by Baumol and Oates (1988) that emission rights will be used by polluters with high emission-reduction costs, while polluters with low-cost abatement options will tend to reduce their emissions – an outcome that provides a least-cost solution. Thirdly, as proved by Montgomery (1972), whether the allocation of emission rights is for free or for money has no effect on the cost-efficiency of the overall emission reduction, because rational polluters consider the opportunity cost of free permits as well. Hence, the feasibility argument for the free allocation of initial emission rights is an argument with sound theoretical support and attractive policy appeal.

As several authors have pointed out, political feasibility requires that the harmful impacts of environmental regulation on profits and equity values are minimized (Bovenberg and Goulder 2000; Woerdman 2000). Although there is an ongoing debate among researchers on the long-term effects of environmental regulation on firms' competitiveness, short-run competitive positions can be damaged by the imposition of pollution constraints on companies.² Concerns about changes in relative competitiveness are raised typically from the perspective of firms that are inside, rather than outside, an emissions-trading regime (i.e. firms within the domain of the EU cap-and-trade scheme and their competitors in the rest of the world). If there is a new cap-and-trade regime implemented for some of the polluters, so the argument goes, the decline in their competitiveness can be offset by the grandfathering of initial emission rights to those polluters.

And finally, the most common argument for the grandfathering of emission rights to polluters is that the new CO₂ regulations mean polluters must submit an amount of allowances equal to their total emissions in every period, even though they could not have considered emerging CO₂ costs when they invested in their present technologies. Therefore, if CO₂ emission rights cease to be free overnight, then incumbent polluters would incur sunk costs – a fact that justifies compensation and grandfathering alike (Harrison and Radov 2002).

1.2 Why not to grandfather?

It is hard to see, however, if grandfathering really tackles the challenges of the initial allocation of emission rights as it is claimed. Firstly, the bias of international competitiveness is inevitable, even within the EU, because the Kyoto targets for member states are unevenly restrictive compared to their uncontrolled emissions, making it very unlikely that member states will implement equally restrictive emission caps for their polluters within the emissions-trading scheme. Thus, among sectoral competitors within the grandfathered domain of the EU, some firms will continue to enjoy free rights to unlimited emissions, while others will receive free allowances only for restricted rates of their emissions. Secondly, even polluters under the same national sector emission cap will find that, in practice, grandfathering damages the status quo of relative competitiveness, because free-allocation methods create

dissimilar conditions for firms with different technology and abatement options (Bohm 1994b in Fisher *et al.* 1995; Ackerman *et al.* 2001; Harrison and Radov 2002). So, surprisingly, instead of avoiding any competitiveness bias, it is the very principle of grandfathering that triggers unexpected competitiveness effects.

Moreover, the free distribution of initial emission rights raises further competitiveness issues that fuel the arguments against grandfathering. Firstly, there is the concern that incumbent polluters will be eligible for free emissions rights, while new entrants will have to pay for them. The usual policy answer is to set up a pool of emission rights to be freely provided to new entrants, just as in the EU scheme. Unfortunately, the policy that gives incumbent polluters an edge over new entrants cannot be rectified merely by the administrative free allocation of 'new entrant reserves' of set-aside emission allowances. Once pollution is constrained for new entrants, a scarcity value emerges for access to emission rights. Not only would grandfathering fail to allocate the limited reserve of new-entrant allowances efficiently, but, as overbooking is inevitable, it would have to be watered down to some kind of administrative restraint (e.g. an individually limited rate of free allowances, or grandfathering on a first-come-first-served basis).

As for the sunk-cost argument, this seems to present a stronger case for grandfathering. However, incumbent polluters are not doomed to bear sunk costs if the CO₂ emission allowances are distributed by methods other than grandfathering. Product markets will swiftly adjust to the new era of limited CO₂ resources. Product prices will shift to reflect the new marginal production cost including the marginal producers' CO₂ abatement and emission costs. Thus, the incumbent polluters, who tend to be sub-marginal producers, will see some or most of their CO₂ costs offset by increasing product prices.

Also, in any assessment of the sunk-cost argument, it is important to consider the welfare effects for both the polluter and the rest of society. The rest of society will have to bear the windfall costs of climate change, regardless of the CO₂ control policy that is implemented. Aside from the growing private costs of climate change (e.g. for insurance or agriculture), public goods will also suffer climatic effects (i.e. river flow, nature reserve areas, species migration, disease patterns) and governments will have to find the fiscal resources to tackle mitigation and adaptation.

If the state distributes the emission allowances free of charge, it passes the scarcity rent of CO₂ emission rights to the incumbent polluters. Cramton and Kerr (1999) argue that this is not merely a distributional issue. If the CO₂ scarcity rent becomes state revenue, that might provide sufficient resources for the government to realign the demand or supply (e.g. by tax reduction) and thus offset the social deadweight loss of CO₂ regulation. Furthermore, carbon rents can generate continuous revenue for the state, thanks to their anticipated permanent nature and their huge volume (since carbon-dependence of the economy is long-term and significant), which makes it possible to reduce other taxes that have a distorting effect. If the government recycles enough carbon revenues to compensate for the deadweight loss caused by carbon scarcity, then the carbon instrument will be able to provide state revenue without subsequent distortion. In such an allocation regime, polluters, instead of tax-payers, would eventually have to pay for climate-change adaptation efforts.

In the following sections we take a closer look at two extreme solutions for grandfathering, and thus introduce our concept of zero-windfall grandfathering.

The logo for REKK (Regionális Energiagazdasági Kutatóközpont) is located in the background of the text. It features a stylized orange and white graphic on the left, resembling a sun or a flame, and the letters 'REKK' in a large, grey, sans-serif font on the right.

1.3 *Grandfathering Business-as-Usual (BAU) emissions*

The conventional way of interpreting grandfathering is to allocate emission allowances for free on the basis of past activity (Kerr 2000). This implies that polluters will need to discharge the 'usual' amount of pollutant in order to continue their operation after the new environmental regulation is introduced. This way of determining the grandfathered volume of emission rights seems to provide polluters with exactly the quantity of allowances they need to prevent some of their fixed costs from sinking because of the unforeseen CO₂ control policy. However, polluters will depart from their 'usual' emission path after the tradable CO₂ allowances are distributed and a secondary market emerges, even in the case of BAU grandfathering. As Montgomery (1972) proved, price-taking polluters in a large emissions market may incur significant opportunity cost if they hold onto all the grandfathered allowances. So polluters will reduce their initial emissions and only keep the optimal amount of allowances, the case when the marginal cost and the marginal revenue of selling their allowances is equal.

By reducing their usual emissions to the optimal level, polluters will harvest a windfall profit by selling the super-optimal part of the grandfathered allowances because the total revenue minus the total cost of abatement and selling will be positive. This extra windfall gain emerges over and above the scarcity rent granted by free grandfathering of optimal emission allowances. It is important to note that this windfall profit is provided by the grandfathering regime to the detriment of the rest of society, which bears the opportunity cost of giving out super-optimal allowances for free instead of selling them.

1.4 Grandfathering optimal emissions

In line with the argument above, it is tempting to draw the conclusion that, since grandfathering is inevitable on the grounds of political feasibility, the appropriate interpretation of grandfathering should be free distribution of allowances up to the level of optimal emissions – a huge rent transfer anyway – rather than free distribution of BAU emissions. Thus, no windfall gains would emerge as a result of the initial distribution of emission rights. This claim is correct but hard to implement.

The polluter will reduce its original emissions to the optimal level, irrespective of the volume of grandfathered emission allowances. If the allowance market is large and liquid the polluter will decide whether to change its usual emissions on the basis of abatement costs versus pollution costs. So the grandfathering of optimal emission rights gives the inherent scarcity rent to the polluter free of charge, but entails windfall losses through the abatement costs of super-optimal emissions. These windfall losses are a direct result of the new policy instrument. Moreover, the optimal free allowances may not be seen as a rent transfer, but rather as a liability, because enough allowances must be surrendered to meet emissions. Thus, overall, grandfathering of optimal emissions is likely to be viewed by polluters as very negative because of the immediate windfall loss caused by the initial allocation of emission rights.

In the following section we suggest a purely theoretical solution to overcome the extremes of BAU versus optimal grandfathering, by showing that there is a level of emissions that, if grandfathered, results neither in windfall losses nor in windfall profits for the polluters.

2. The concept of zero-windfall grandfathering

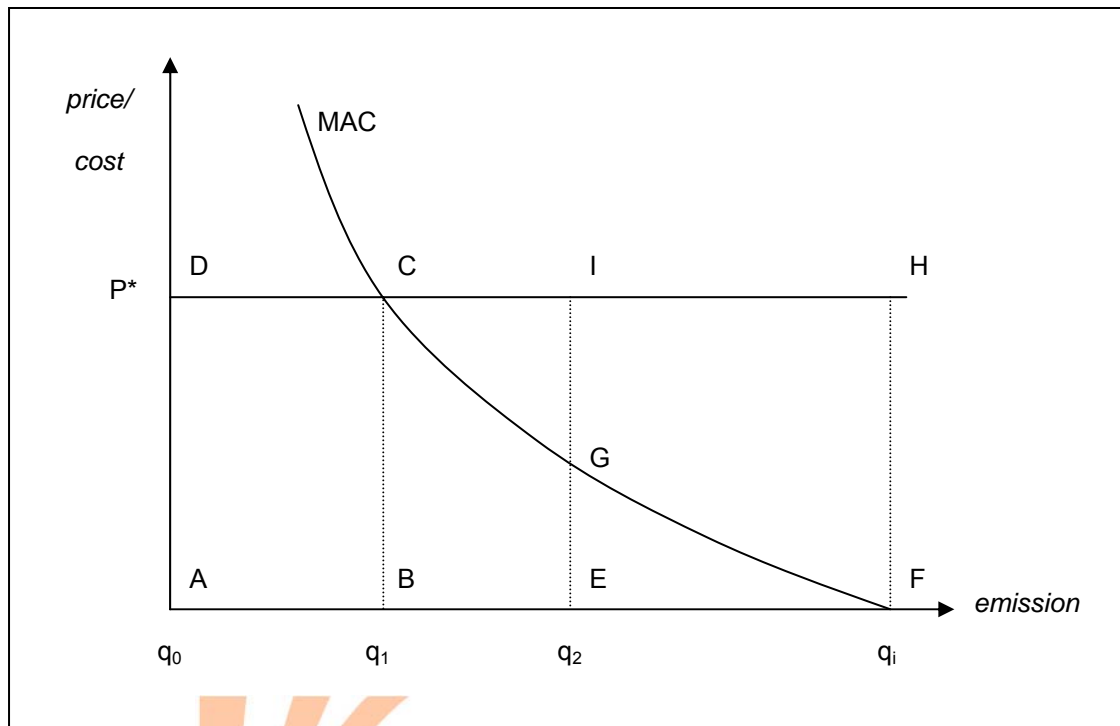
Under lax emission caps, allocation of initial rights by grandfathering poses follow-up challenges for the policy makers. The conventional way of applying grandfathering on the basis of past activity provides polluters with windfall profits from the sale of super-optimal emission allowances. It is a redundant regulatory welfare transfer, just like the sunk cost of polluters when no more than optimal emission allowances are distributed for free.

It is interesting to recognize in this argument that, theoretically, there must be a break-even point: a unique level of grandfathering that causes the polluter no windfall gains and no windfall losses.

Figure 1 below shows a hypothetical marginal abatement cost curve for a polluter as a function of emissions. The polluter is considered to be a price-taker in a relatively large, highly liquid European allowance market, as represented by the flat price curve with no flexibility regarding the emission level of the polluter. We assume, for the sake of simplicity, that polluters do not face any transaction costs related to their abatement-technology investments or allowance trading. We also assume that the set of technology options available to the polluters, and the related costs, do not change during the relevant implementation period, and that the allowance price is stable and can be perfectly estimated.

The marginal abatement cost curve $MAC(q)$ shown in the diagram is a continuous, monotonically decreasing function of the level of emission q for an individual polluter (we assume that $MAC'(q) < 0$ and $MAC(q)'' > 0$).³ Reducing emissions (more abatement) entails higher marginal costs, as empirical data usually show. We assume that the firm has no negative-cost abatement opportunities.⁴

Figure 1. The concept of zero-windfall grandfathering



Legend:

MAC: marginal CO₂ abatement cost of the polluter;

q_0 : zero emission;

q_i : the initial emission level before CO₂ regulation;

P^* : the CO₂ allowance market price experienced by the individual polluter;

q_1 : the optimal level of CO₂ emission;

q_2 : level of grandfathering with zero windfall profits;

When the polluter receives business-as-usual emission rights equal to its initial emission (q_i) the value it gets from the government is represented by the square $AFHD$. Because of the perceived opportunity cost, the polluter will abate its emission to the point where $MAC(q) = P^*$ (at emission level q_1), which costs the polluter an amount equal to BFC . The firm keeps only q_1 amount of the total grandfathered q_i allowances to back up its remaining emissions, and by selling the $(q_i - q_1)$ amount it earns the revenue of the square $BFHC$. Thus, the firm profits the area FHC , a windfall profit transferred from the state for free. If grandfathering is not more than the optimal level, the polluter still gets $ABCD$ value of allowances, but it will hold onto it in

order to continue its operations. It will not purchase more allowances, but will decide to abate $(q_i - q_1)$ emissions. Thus emerges the windfall loss BFC incurred by the polluter.

In order to find the 'zero-windfall' level of grandfathering, both windfall gains and windfall losses must be avoided or, more precisely, netted out. If q_2 is selected, so that GIC equals GEF , then grandfathering q_2 amount of emission allowances has zero windfall effect on the polluter.⁵ So, we are looking for q_2 , where

$$(BEIC - BEGC) - GEF = 0, \text{ or}$$

$$GIC - GEF = 0.$$

This is equivalent to the condition:

$$(q_2 - q_1) * P^* = \int_{q_1}^{q_2} MAC(q) dq$$

The q_2 amount we seek can be expressed as:

$$q_2 = \frac{\int_{q_1}^{q_2} MAC(q) dq}{P^*} + q_1$$

3. Theoretical implications

Pezzey (2003) shows that implicit theoretical assumptions about price and quantity instruments are inconsistent, and that reassessment of the assumptions provides a strong case for auctioning. He gives a comprehensive critical appraisal of the literature, focusing on why emission taxes with thresholds and grandfathered tradable permits conventionally receive asymmetric valuation regarding their long-term efficiency in allocating emissions. As he points out, there is basically unanimous agreement in the literature that tradable permits can be provided for free, because that would not harm the allocative efficiency of the instrument, and that emission

taxes should be kept 'pure' – that is, without thresholds – because only with a zero tax threshold can emission taxation be efficient. A threshold of a positive value is seen as a subsidy, which would attract a rush of investments to the industry to reap the profit of free pollution, and thus would lead to too much emission. On the contrary, free emission permits are regarded more as an endowment to be guaranteed to incumbent polluters by the state. The underlying approach to free permits is that they are a kind of property-rights payment; as opposed to the same amount of tax threshold, which is regarded as a subsidy. Pezzey spots that the difference in the underlying assumptions explains the asymmetric conclusions.

This theoretical inconsistency is fixed if it is accepted that the CO₂ scarcity rent is independent of the choice of instrument. CO₂ scarcity rent emerges whether CO₂ taxes or CO₂ cap-and-trade instruments are implemented. So the 'subsidy' that is conventionally attributed to tax thresholds is the same free rent redistributed by the state to incumbent polluters, as the free rent of grandfathered tradable emission rights. Accordingly, optimal rate Pigouvian taxes without thresholds bring incumbent polluters sunk costs, as do fully auctioned emission rights.

We note a remarkable difference in the welfare effects, though. In the case of emission taxes, any socially acceptable rate of an emission tax is likely to be less than the socially desirable full-incentive rate and thus it results in sunk costs for the polluters and higher than optimal emissions for the rest of society at the same time. In the case of tradable emission rights, however, there is a solution with better welfare payoffs, as we argue in this paper. There is a q_2 amount of emission rights to be grandfathered without sunk costs for the polluters and no more than optimal emissions for the rest of the society.⁶ So our solution for q_2 as the socially desirable level of grandfathering seems to be more advantageous, theoretically, than the less-than full-incentive rate emission tax, because, under lax emission cap, the socially desirable level of grandfathering is socially acceptable, as well. Thus the concept of zero-windfall grandfathering as suggested by this paper might add to the theoretical merits of emissions trading in cases when the instrument of choice would be a tax at first place but the socially acceptable rate is less than optimal.

4. Policy implications

There might be some real policy implications of the theoretical solution presented in this paper, though the authors do not intend to suggest it as a blueprint for designing allocation rules governing the initial distribution of tradable emission rights. The zero-windfall level of grandfathering cannot be quantified before the introduction of CO₂ emissions trading because it requires information on the marginal abatement costs of polluters and the equilibrium price of emission allowances *ex ante*. If the government knew that much, an equally cost-efficient command-and-control regime could be set up. The very advantages of cap-and-trade instruments are the relatively minor involvement of government administration, restricted data requirement, avoidance of firm-specific regulation and, last but not least, cost-effective emission reduction through the use of market forces.

Nevertheless, as is shown by this paper, windfall gains and losses do emerge under certain grandfathering regimes, and those can be estimated *ex post*, after data become available on optimal emission levels and the secondary market price of emission allowances. The zero-windfall level of emissions elaborated in this paper can be used as the break-even point to distinguish windfall gains and losses in empirical research. It will be interesting to see if the first trading period 2005–7 is a case study of the polluter-pays principle, or rather that of the polluter-profits principle.

Such policy analysis will be much awaited by governments of countries that are likely to become net sellers in a unified European allowance market. They will soon have to undertake the initial allocation of CO₂ allowances for the second trading period 2008–12. Our paper suggests that grandfathering business-as-usual emissions would bring the polluters windfall profits that could be regarded as undue state support and in conflict with the ‘polluter pays’ principle. The empirical presentation of windfall profits might encourage governments to embrace auctioning as a legitimate tool for the initial allocation of emission rights, at least up to the rate of 10%, as approved by the EU.⁷

Lax cap is not just a peculiarity of countries with loose Kyoto targets. Most countries in the European CO₂ emissions-trading scheme have grandfathered tradable emission caps less restrictive than their specific national Kyoto commitment, often very close to BAU emissions (Ecofys 2004). Moreover, governments will have to

reconsider whether they really do not want to receive any revenue from the valuable national assigned-amount units that they transfer to private companies by the creation and grandfathering of CO₂ allowances in 2008. The auction revenue could be used to mitigate the unavoidable effects of climate change and to reduce tax distortions by revenue recycling. This adds to the appeal of emissions trading regimes under lax-cap.

Conclusion

CO₂ emissions-trading regimes are likely get implemented with lax caps for the sake of political feasibility. Lax cap may be the key to involving developing countries in a post-Kyoto agreement, in the same way as the ex-socialist countries were brought into the Kyoto Protocol. However, in such lax-cap regimes, the principle of grandfathering for the initial distribution of emission rights among incumbent polluters turns into a 'polluter-profits' principle. We note that in order to design an efficient national CO₂ policy the ratio of grandfathering should be more than zero but less than 100% of the total initial emissions.⁸ Many think that this level is best set by political rather than economic efficiency. In this paper, we have proposed a way to theoretically determine the level of free permits that can be allocated without producing windfall profits or sunk costs for the polluters under static circumstances, and have provided a tool to empirically analyse how the polluter profits from the full implementation of grandfathering. In a dynamic analysis, moreover, it is important to consider that the incumbent polluter can profit not only *directly* from selling super-optimal allowances, but also *indirectly* from the increasing product prices, which will rise to the extent that the marginal producer can pass on its emission cost to the consumers.

Notes

¹ And, as Hahn (1984) later showed, if there is no market power.

² On the subject of induced innovation, see, for example, Newell, Jaffe and Stavins (1998), Milliman and Prince (1989), Jaffe, Newell and Stavins (2000; 2002), and, on the debate on long-term

competitiveness and environmental regulation, see Porter and van der Linde (1995); Palmer, Oates and Portney (1995); Mohr (2002).

³ We use this curve shape in our figure to make the results easier to see; the actual MAC curves that polluters face are typically step functions specific to the particular technology at installations.

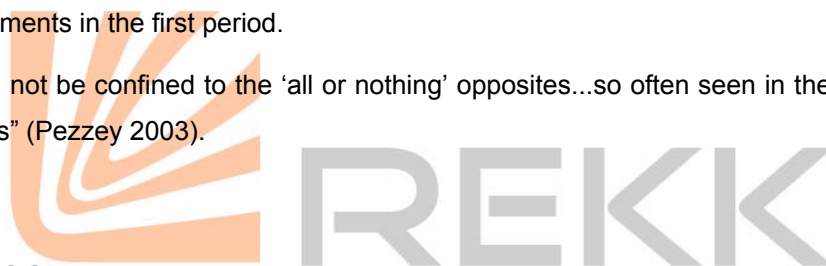
⁴ The existence of abatement options at negative cost is seriously debated in the literature. See Jaffe and Stavins (1994a; 1994b). One does not have to take sides in this debate to proceed with our argument.

⁵ Let q_1 be considered as a rent and liability simultaneously. The value of $ABCD$ is first obtained and then surrendered by the polluter.

⁶ As long as the total amount of emission rights is set to the social optimum.

⁷ The EU directive leaves a very limited amount of emission allowances to be possibly auctioned by the national administrations: no more than 5% and 10% of the total allocated amount in the periods between 2005–7 and 2008–12, respectively. Even this small advantage has been mostly eschewed by national governments in the first period.

⁸ “And it should not be confined to the ‘all or nothing’ opposites...so often seen in the literature as the only alternatives” (Pezzey 2003).



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