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A Note on Tradeable Permits*

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Abstract. This note offers a perspective on whether tradeable permits are a passing fad or an enduring trend. It does so in noting how various types of tradeable permit systems relate to conventional environmental permits, what are the unique requirements of tradeable permit systems, and why they might be preferred to alternative instruments. A final observation concerns the analogy between tradeable permits for environmental goods and private property in land.

Key words: emissions trading, environmental regulation, property rights, tradeable permits

JEL classifications: Q58, K32, D23

Environmental concerns are as old as Man, but tradeable permits are a relatively recent innovation in dealing with these problems. Barely forty years have passed since the basic idea underlying tradeable permits was stated by Coase (1960), who noted the reciprocal nature of harmful effects and suggested that their regulation might be accomplished as effectively and efficiently by a market as by the more conventional forms of regulation. Another decade would elapse before this insight was elaborated and applied specifically to environmental problems (Crocker 1966; Dales 1968; Montgomery 1972). For another two decades, economists promoted tradeable permits as a policy alternative, but the concept was generally regarded as impractical despite its theoretically attractive properties. Only in the last decade have tradeable permits been implemented and declared a success, mostly in the US, where they are still the exception, but also increasingly in Europe. An obvious question is whether the current enthusiasm for

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tradeable permits reflects a passing fad or a more enduring trend. This article seeks to provide a perspective that will enable readers to answer that question.

1. What Is a Tradeable Permit?

In its most general use, a tradeable permit can be defined as a transferable right to a common pool resource. A common application is individual tradeable quotas (ITQs) for fishing rights, which are granted in quantities to preserve the fishing stock and to avoid over-exploitation. In environmental applications, the common pool resource is air or water that does not contain concentrations of substances that harm human health or that degrade air or water quality in some manner. A narrower and more specific definition for environmental applications is then: a transferable right to emit a substance that can create pollution. Implicit in this definition, and in the concept of tradeable permits, is the notion that some level of emissions does not create pollution, just as some level of fishing does not constitute over-fishing.

The permits that implement command-and-control regulations, what I will call conventional environmental permits, are a type of operating permit that specifies conditions concerning discharges that must be met for a particular facility to operate, or for a vehicle to be sold and operated. These permits typically cover a variety of emissions and they may set standards for each, perhaps limiting emissions to some relatively low rate per unit of input or output, or prescribing certain technologies or practices, which will have the same effect. They are attached to the facility or vehicle; they aim at controlling substances that can contribute to pollution; and they implicitly grant rights to emit the substance so long as permit conditions are met. Tradeable permits differ from these conventional permits chiefly in focusing on a single discharge and being transferable. Transferability implies that the potentially polluting discharge can be identified and separated, or unbundled, from the underlying environmental permit. As such, transferability imposes specific requirements on tradeable permit systems that are not necessarily required for conventional environmental regulation.

2. Types of Tradeable Permits

Tradeable permits can be classified into three distinct forms – credit trading, averaging, and allowance trading – and distinguished by their relation to a conventional environmental permit.[1]

Credit Trading is the form closest to the conventional permit. A facility that does more than required to meet the conditions of its permit may get credit for its extra effort and that credit can be transferred to another facility that is thereby excused from fulfilling the condition of its permit in like amount. As the name implies, credit trading awards exemplary behavior and allows compensating regulatory relaxations of a common requirement. A distinctive feature of credit trading is certification, the process by which the regulator determines that credit-worthy activity has occurred and that the credit can be transferred. Certification has been a problem in that the regulator usually seeks to ensure that a facility will not receive credit for what it would have done "anyway," since granting credit in this case would lead to higher emissions by the firm to whom the credit is transferred. The transaction costs associated with certification have been high and have often overwhelmed the cost savings from the proposed trades. As a result, even when credit trading has been made a feature of environmental regulation, few trades have been observed. As noted by Shabman et al. (2002), credit trading is an extension of conventional command-and-control regulation that keeps firm-level abatement decisions in the hands of the regulator.

Averaging constitutes a further step away from the underlying environmental permit in dispensing with certification. It can be seen as automatic credit trading in which parties that do better than required in their permits automatically receive credits that can be used by others without any question from the regulator whether the firm generating the credit would have reduced emissions anyway. The pre-existing standard about which emissions are traded is still in place, but in dispensing with certification, the regulator no longer attempts to make the abatement decision at the level of the firm. The common standard or technology is simply a reference point or benchmark about which differences are traded. Although averaging is a more precise term to describe what actually occurs, European terminology tends toward various formulations containing the term "relative," which imply trading around a limit relative to input or output instead of under an absolute cap as in an allowance system.

Allowance Trading is also known as cap-and-trade, so called because of the absolute cap on emissions and the ability to trade emissions under the cap. Although a logical progression from credit trading and averaging, allowance trading is in several ways a radical departure. For one thing, the compliance requirement is entirely different. Instead of determining compliance by reference to a common standard and sanctioned or compensated deviations from it, firms are required to surrender a permit for *every* unit of discharge. Although the cap may be very constraining in the aggregate, no firm is expected to meet any specific standard. It must only obtain and surrender an allowance that can be readily bought or sold in the market. In

effect, allowances have become essential inputs into production subject to the same marginal cost calculations as other inputs.

Two consequences flow from the allowance trading form of tradeable permit. First, the regulator's task is not to specify an emissions standard, but a cap. This requires initial decisions concerning (1) an acceptable or optimal quantity of emissions and (2) the limits to trading, both spatially and temporally. Second, the rights to discharge are now explicit and must be allocated in some manner instead of being implicit and granted without question to the owners of the emitting facility.

These three forms of tradeable permits can be seen as a progression from a centralized system in which abatement decisions throughout the economy are the sole province of the regulator to a more decentralized, "property rights" system in which firms take over the abatement decisions subject to the constraints of the cap and its spatial and temporal dimensions, which only the regulator can (and should) decide.

3. Requirements for an Effective System

As the most evolved form of a tradeable permit system, allowance trading has prerequisites that differ in important aspects from what conventional command-and-control systems require. Some of the requirements of allowance trading are shared by averaging and credit trading systems, but not all or to the same extent. These prerequisites follow logically from the transferability of tradeable permits and from the nature of allowances and the cap in allowance trading systems.

Measuring emissions is perhaps the most radical requirement of tradeable permits for many, if not most, environmental programs do not determine compliance by the actual measurement of emissions. Compliance consists of installing and operating certain equipment, engaging in certain practices, or limiting certain inputs, all of which will reduce emissions, if enforced and implemented continuously. In contrast, tradeable permit systems require measurement and continuous monitoring of the regulated emissions; otherwise there is no way to determine compliance or to define what is to be traded.[2] Although obvious, measurement is not always feasible and the growth in tradeable permits is in part the result of changes in the ability to monitor, and the cost of doing so, that are associated with the late 20th century changes in information, control and sensing technology (Kruger et al. 2000).

Allocating emission rights is a prerequisite of allowance trading only, although rights to emit are implicit in both credit trading and averaging, as they are in conventional environmental permits. Deciding who is entitled toreceive these allowances is a matter of some consequence and great

controversy.[3] Allocation involves a two-level decision, first, whether to auction the permits or grant them gratis to various entities, and then how to distribute the auction revenues or permits, as the case may be. Claimants for this rent have not been wanting and a considerable literature has developed on the optimal use of the scarcity rent created by the cap.[4] The pros and cons of various methods of allocation is well beyond the scope of this paper, but the fight over prospective rents – which combines unadorned rent-seeking with high principles of equity and efficiency – can be both an obstacle and a means of gaining consensus, as evidenced most recently in the negotiations surrounding the proposed EU Emissions Trading Directive (Council of the European Union 2002). This controversy is largely avoided in credit trading and averaging because, ironically, the implicit assignment of the rent to the incumbent in the underlying command-and-control system of regulation is not raised and never challenged.

Defining pollution. All environmental regulatory systems presume some definition of pollution, but none are required to define it as specifically as cap-and-trade systems. Not only must the potentially polluting discharge be separately identified, but at least in theory the amount constituting pollution must be determined, as well as the spatial and temporal relation of discharges to the harmful effects. This requirement is faced by all environmental regulation, but the connection between emissions and the problem justifying the emission constraint is usually less direct. For instance, technology standards are prescribed not because they fit the problem but because they usually represent the ''best'' that can be done at the present, and that will contribute to the problem's solution, at the least, and perhaps eliminate it. While in theory the cap should be the level that will avoid harmful effects, an increasingly frequent solution is that the cap is set at a level that would be achieved if some ''best'' technology were to be required of all, or, especially in the case of greenhouse gas controls, at a level that is presumed to be a step in the direction of reducing emissions to some ultimate goal.

4. Why Tradeable Permits?

A fair question today in response to the attention being given tradeable permits is: Why? Or alternatively: Why not taxes or conventional regulatory measures?

By far the more common policy instrument for achieving environmental goals is what has come to called command-and-control regulation, namely, the mandating of specific technology or other emission standards that are presumed applicable to all sources. The reasons for relying on conventional regulatory measures heretofore are easy to enumerate. Both taxes and tradeable permits require emissions to be measured so that, if measurement is not feasible or it is costly, the only alternative is to prescribe the appropriate

abatement technology or set of practices and to set up the enforcement regime that will lead to acceptably continuous application. Then, in the early days of modern environmental regulation, the sources of pollution were easily identifiable in being mostly large and stationary, which made it easier to prescribe appropriate abatement. Also, when faith in the capability of expert government agencies was greater than it is now, there seemed less reason to question this approach.

Those circumstances are increasingly less applicable on both sides of the Atlantic. The ability to measure emissions at relatively low cost has been greatly reduced by improvements in sensing and information technology. The big, initial pollution problems have been satisfactorily addressed, and the problems now facing modern post-industrial societies are far more complex and less obvious. Finally, experience and the rise of public choice literature has diminished confidence in the efficiency and equity of direct government intervention and led to a search for more effective, efficient and equitable approaches.

As market-based instruments, environmental taxes have the same efficiency attributes of tradeable permits in leaving abatement decisions to firms, but they have been regarded as non-starters in the USA, and although more used in Europe, taxes are far from being the prevalent mode of environmental regulation. The reason for the apparent preference for tradeable permits instead of taxes probably resides in the domain of political economy. For one thing, taxes appropriate to the state the scarcity rent that is embodied in tradeable permits.[5] Moreover, the usual alternative to tradeable permits is not an environmental tax but some form of conventional environmental regulation, which has the merit – from the standpoint of incumbents – of unobtrusively endowing them with the entitlement to the scarcity rent. The title is not as secure and it is not separable from the facility for which the environmental permit applies, but better an encumbered entitlement than none at all, or one that has to be bought. From this standpoint, tradeable permits are worth considering, perhaps not so much because of their efficiency properties, but because they offer the possibility of unbundling the right from the facility and monetizing it directly.[6] If incumbent emitters had no voice in societal decisions, the choice of instrument would not be a matter of concern, but they do. In Europe, one should recall the frequent exemptions from energy or environmental taxes for energy-intensive industries, always because of "competitiveness" and what is invariably industry's willingness to accept equivalent, conventional, regulatory constraints that allow them to retain the scarcity rent. For these participants in the political system, taxes are the least preferred alternative and tradeable permits are acceptable, even in cap-and-trade form, if the scarcity rent that the inefficient, default command-and-control system would award them, is not disturbed.[7]

5. Whither Tradeable Permits?

Two different approaches have been taken in adopting and implementing tradeable permit systems. The first is what might be called the *de novo* approach whereby a new regulatory system is developed usually to deal with a new environmental problem, or at least one that is not dealt with directly by the existing system of environmental controls. The US Acid Rain Program and the proposed EU GHG Emissions Trading Programs are salient examples. These *de novo* programs invariably draw the most attention and their adoption is usually time-consuming and contentious for the very reasons that have been mentioned above. The nature of the environmental problem, the level of the cap, and the allocation of allowances are all likely to be matters of lengthy debate in any democratic society; however, once consensus is formed and a decision made, these programs can be implemented relatively quickly and effectively.

The other approach, which can be observed currently only in the US, is one in which a tradeable permit system supplants an existing conventional regulatory program. These programs arise when regulators realize that the goals of the conventional environmental program cannot be achieved, despite ample authority, usually because the specific targets of control are not as obvious as they were in the first wave of environmental regulation or because the economic and political costs of implementing the program as prescribed are too high, or even infeasible. Examples in the USA are the Northeastern NO_x Budget Program and the RECLAIM programs in the Los Angeles Basin, for both of which the caps are set at levels that would have been achieved, in theory, by the existing command-and-control systems. In recognizing the impracticability of the detailed regulation to reach these goals, the regulator opts to attain the environmental goal by abandoning the pretense of making firm-level abatement decisions. A notable feature of this path, which is implemented by regulatory agreement and not by legislation, is that the rights to emit are retained by the incumbents, as they would be, had the default command-and-control system been practicable. The end result is that the tradeable permit system quietly supplants the default command-and-control system.

6. A Familiar Analogy

The development of tradeable permits recalls a similar, much earlier common pool resource problem that all societies have had to confront: land. Like clean air and water, land was once freely available for the taking, but the increase of human activity made it scarce and all human societies have had to devise institutions to allocate the scarcity. Over the centuries, societies of widely differing historical and cultural traditions have devised institutions to

distribute the rights to the use of land, and the rents that go with them. For advanced industrial systems, hardly anyone questions that a decentralized system of private property rights provides a better allocation than any other practicable method of managing this scarcity. The initial allocation of these rights may have been coercive and unfair, but that ancient act is lost in the mists of history and no one really cares now, even though a significant portion of everyone's lifetime income is devoted to acquiring the right to call a small piece of the earth home. Until recently, private property rights in land were strongly contested by some and large societies have attempted to implement systems that would be manage the scarcity through centralized allocation, but they succeeded only in proving the incapacity of such an approach. The question now is whether the current common pool resource problem, the environment, can be dealt with any more successfully by centralized methods. If not, we should not be surprised to observe a similar decentralized, property rights system for the environment.

Notes

1. This typology is used and explained in greater detail with examples in Ellerman, Joskow, and Harrison (2003).
2. Credit trading could occur without measurement since the creditable reduction and the transfer depend entirely on regulatory determination. For instance, a regulator might allow a firm to meet a less stringent standard at one facility if it installs technology that is expected to reduce emissions more than required at another facility, without actually measuring emissions at either facility.
3. When trading is allowed, the receipt of the right is distinct from its exercise. If allowances are freely granted, or "grandfathered," to incumbents, the recipient and the user are often the same, but the two functions remain distinct. In deciding to use a grandfathered allowance, the recipient-user is incurring an opportunity cost and effectively paying himself as *rentier* for the use of the permit. Were he not to use the permit, he could sell the permit and collect the rent as income.
4. See, for instance, Harrison (1996), Goulder et al. (1999), and Dinan and Rogers (2002).
5. The Swedish NO_x emission tax is a notable exception that supports the point. The revenue from the tax on NO_x emissions is returned to incumbents on a basis other than current emissions.
6. The rents in conventional regulation are capitalized in the facility to which the permit is attached. This value accounts for a portion of the usual excess of the sale price over book value for many existing powerplants, refineries, and other industrial facilities.
7. Perhaps, no better current example exists that the recent (December 2002) compromise concerning auctioning and grandfathering in the EU Emissions Trading Directive. Despite strong arguments in favor of auctioning, at least 90% (i.e., not excluding all) of the permits will be grandfathered, that is, distributed gratis to incumbents.

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