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The political economy of pollution markets: Historical lessons for modern energy and climate planners

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ABSTRACT

This article explores some of the central economic and political problems with the use of tradable permits to solve environmental problems. Drawing from transaction cost economics, political economy, and market theory, it does so by looking at the history of three programs for curbing pollution in the United States—the Clean Air Act, the leaded gasoline phase-out, and water permits in Wisconsin. The article begins by briefly summarizing the history of each of these programs before looking at a host of challenges related to political compromises in program design, transaction costs, spatial distortions (such as geographic sensitivity and wrong-way trading of credits), temporal distortions (such as the episodic nature of pollution and volatility of market prices), and market abuses. These concerns are raised with an eye for how historical experience may inform the current debate about how to design effective market mechanisms to respond to climate change and other forms of energy-related environmental degradation.

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1. Introduction

Many times someone rides in a taxi, smokes a cigarette, purchases alcohol, orders fish at a restaurant, or loads a ream of paper into a printer, they are participating in a system that uses market mechanisms to ration a given quantity of resources. The past few decades have seen the advent of auctions, pollution and effluent charges, tradable permits, emissions reductions credits, licenses, taxes, offsets, and cap-and-trade systems to regulate transportation, food and agriculture, pharmaceutical drugs, forestry, ambient air quality, water quality, wildlife management and biodiversity protection. The idea is that a system of transferable property rights enables a planner to choose an "optimal" level of pollution by setting a number of pollution licenses or allowances. In turn, the buying and selling of licenses engenders an open market and establishes an explicit price for the pollution right. The market "automatically" ensures that the reduction in harmful activity occurs at least possible cost and over time, as the price of pollution rises, it becomes economically disadvantageous for firms to continue to pollute. Undeniably, a long list of esteemed scholars have hailed these market based instruments as being more effective, dynamic, and efficient than other public policy tools and "notoriously sluggish" bureaucratic procedures (see [8,9,36,39,86,23] for a small but essential sample).

The driving force behind such mechanisms is the belief that they are more cost-effective and efficient than alternative forms of "command and control regulation" which basically pick winners by dictating explicitly policy goals to be achieved or the methods to achieve them [21]. As economist Dales [19] proclaimed, "If it is feasible to establish a market to implement a policy, no policymaker can afford to do without one." Economists Cropper and Oates [18] tell us that by giving participants direct control over compliance strategies, tradable permits and quotas often improve efficiency. Jan-Peter Voß [89] writes that tradable credits have become their own "regime" on the international stage and "something of a global standard in environmental governance." Law professor Adler [3] states that "the empirical evidence shows quite clearly that ecological concerns are better cared for when incorporated into market institutions." Donald [51] concludes, "There is a better way to manage natural resources… the ideal approach is to establish well-defined, enforceable, and transferable property rights."

To undertake a critical review of any of these mechanisms is a daunting task, as the literature on them is voluminous and growing by the day. Yet while the task may be arduous, it is also essential that those designing new market mechanisms for climate change and other environmental problems learn from the past, and that key insights from the problems with early market based measures are not forgotten [76]. Thus, this article explores some of the central economic and political problems with the use of tradable permits to solve environmental problems in the United States. It does so by drawing on concepts from transaction cost economics, political economy, and market theory to look at the history of three market-based programs. These three programs were selected because they cover different sectors (electricity, transport, and water), geographic scales, and time periods: national emissions trading under the Clean Air Act, a regional leaded gasoline phase-out, and a local water permit scheme in Wisconsin. Such programs are also three of the oldest in existence, meaning we now have decades of data and experience concerning their performance.

The article begins by briefly introducing readers to key concepts and summarizing the history of each of these programs. It then investigates a common host of challenges facing such programs related to political compromises in program design, transaction costs, spatial distortions (such as geographic sensitivity and wrong-way trades), temporal distortions (such as the episodic nature of pollution and market volatility), and market abuses. It proceeds to discuss three policy implications—planning for bias, preparing for incomplete knowledge, and acknowledging politics—before offering a conclusion that tradable permit schemes must be treated with care.

2. Conceptual insights from economics, market theory, and political economy

To ground the discussion to come in academic theory, this review draws from three key sub-disciplines: transaction cost economics, market theory, and political economy. Because these sub-disciplines are vast, this section presents only the points most central to the review of tradable permit schemes to come. Readers wishing to see further elaboration are instructed to collect and browse many of the references in these sub-sections, as they reflect seminal and highly cited works.

2.1. Transaction cost economics

Transaction cost economics is a subfield of economic theory investigating the costs involved in making economic exchanges or participating in a given market. In classical economic theory, it was thought possible that market exchanges could occur instantaneously and without cost [48]. This, of course, is wrong: participating in markets, and measuring and enforcing contracts, entails costs, sometimes significant ones [17,60]. Indeed, transaction costs have been shown to impede the efficacy of energy markets in tasks as diverse as the transmission of electricity and dispatching of power plants [70], household and industrial investments in energy efficiency [11,41], and the adoption of renewable sources of electricity [75]. Three key concepts have emerged from this field to help explain why the pollution markets studied here suffer from so many problems: asymmetric production and consumption of information, bounded rationality, and opportunism.

First, the production of information is subject to asymmetries—to information failure and the adverse selection problem. Akerlof [4] demonstrated that the existence of "lemons" in the automobile market revealed the problems inherent with information distribution; bad cars sell at the same price as good cars since it is impossible for a buyer to know the difference. A supplier of air conditioners will have better information than the buyer, so she can deceive customers, leading to a reluctance of consumers to trust even an honest seller's high efficiency claims. Or, sometimes sellers lack information. Stigler [82] argued that prices change with varying frequency in all markets, and unless a market is completely centralized, no one will know all the prices that various sellers quote at any given time. Price dispersion is in this way a manifestation and measure of ignorance in the market.

Second, we are limited in our ability to process information. Simon [71,72] offered his concept of "bounded rationality" as an explanation. He argues that when we make decisions, there are very real limitations that exist to set "boundaries" on what type of information