Journal of Environmental Economics and Management 63 (2012) 51–65

Contents lists available at ScienceDirect

Journal of Environmental Economics and Management

journal homepage: www.elsevier.com/locate/jeem

Cap-and-trade, taxes, and distributional conflict

Ian A. MacKenzie [a], Markus Ohndorf [b,*]

[a] Center of Economic Research, ETH Zürich, Zürichbergstrasse 18, 8092 Zürich, Switzerland
[b] Institute for Environmental Decisions, ETH Zürich, Weinbergstrasse 35, 8092 Zürich, Switzerland

ARTICLE INFO

Article history:
Received 9 March 2011
Available online 27 May 2011

Keywords:
Cap-and-trade
Environmental tax
Rent seeking

ABSTRACT

Enacting market-based environmental regulation, such as emissions taxes and cap-and-trade programs, often create rents that are contested by agents. In this paper, we create a framework that compares social welfare from alternative market-based environmental policy instruments under the presence of rent seeking. We show that, contrary to the commonly held view, non-revenue-raising instruments (NRRIs) are in many cases preferable over revenue-raising instruments (RRIs). We find that the choice of instrument depends on the size of a potential revenue-recycling effect and the level of preassigned rents.

1. Introduction

In the last four decades, environmental regulation has progressively moved from traditional 'command-and-control' policies towards market-based instruments [2]. For market-based instruments, a distinction is usually made in terms of whether a policy generates revenue or not. Emissions taxes and tradable-permit auctions generate revenue for the government and are commonly referred to as revenue-raising instruments (RRIs). In contrast, instruments such as freely allocated tradable permits do not generate fiscal funds and are hence known as non-revenue-raising instruments (NRRIs). One feature among all instruments, irrespective of a revenue distinction, is the creation of scarcity rents that may be susceptible to (socially) costly appropriation activities. For RRIs, appropriation activities appear as competition for fiscal privileges, as observed under the German green tax reform [4]. With NRRIs, rent seeking manifests itself in appropriation activities over initial permit endowments—something clearly visible in most cap-and-trade schemes, including the US SO_2 market and the EU Emissions Trading Scheme [31,57]. Given the prevalence of market-based environmental regulation in most developed economies, there is a need to better understand the efficiency of these instruments under the context of rent creation and capture. Taking into consideration appropriation activity, are RRIs preferable to NRRIs?

In absence of rent seeking, the conventional economic view argues for the use of RRIs. Revenue that is generated can be used to reduce distortionary taxes and hence improve welfare—a 'revenue-recycling' effect [27,28,46]. The use of NRRIs forgoes this possibility and is associated with a social opportunity cost [50].

When rent seeking and the associated appropriation costs are considered, the existing debate, again, continues to favor RRIs. It has been argued that NRRIs (e.g. freely allocated permits) may exacerbate a rent-seeking culture [14,29,52]. For example, Hepburn et al. [29, p. 143] argued that "auctioning more of the allowances reduces the volume of free assets open to lobbying, and therefore reduces the 'rent scrap' of these allocation negotiations." Given the value of pollution permits reflects a scarcity rent, it is highly plausible that free allocation triggers investments in socially wasteful rent seeking. Hence, *prima facie*, the potential for rent seeking seems to strengthen the case of choosing RRIs instead of NRRIs. However,

* Corresponding author. Fax: +41 446321042.
E-mail addresses: imackenzie@ethz.ch (I.A. MacKenzie), ohndorfm@ethz.ch (M. Ohndorf).

0095-0696/$ - see front matter © 2011 Elsevier Inc. All rights reserved.
doi:10.1016/j.jeem.2011.05.002

this conclusion would be based on the implicit assumption that rent seeking does not arise under RRIs. Yet, while the existence of rent seeking is surely more obvious in the case of NRRIs, this does not necessarily imply its absence in the case of RRIs. In fact, in the literature on Public Choice, there exists a long tradition in analyzing rent seeking over common public funds [13]. Hence, when comparing both types of instruments, potential rent seeking arising in the context of RRIs should not be neglected.

The existence of rent seeking for public funds establishes the case for an interesting potential trade-off. If the scope and potential rewards of rent seeking are larger under RRIs than for NRRIs, this would lead to higher aggregated appropriation costs under RRIs. This would be the case, for example, if legal provisions delimiting the contestable rent are sufficiently stricter under free permit allocation than for public funds. For these cases, the question arises how large a potential revenue-recycling effect would have to be for RRIs to remain preferable on the grounds of efficiency. To investigate this trade-off, we provide a formal analysis to compare the relative efficiency of both instruments under rent seeking.

To reflect rent seeking in the context of RRIs, we follow an approach similar to Katz and Tokatlidu [33] and Wärneryd [55], where rent seeking is modeled as a two-stage game. In stage one, two groups (polluting and non-polluting) compete for the rent created by the environmental policy. In stage two, agents compete for the rent won by their group in stage one. To compare social welfare between RRIs and NRRIs, we initially assume that rent-seeking activity for rents created under NRRIs are contested only at stage two (polluters engage in rent seeking). This approach highlights the potential differences between RRIs and NRRIs. For RRIs, it is possible that significant rent seeking may occur between both polluting and non-polluting groups, whereas for NRRIs, the contest for scarcity rents is primarily among the regulated actors. After deriving the basic model, we then extend our analysis to include rent seeking for NRRIs in both stages. Our findings show, for both frameworks, NRRIs are often preferable to RRIs.[1]

Our argument is rooted in two strands of literature. The first strand is the analysis of environmental policy instruments. Comparisons between RRIs and NRRIs have focused on many areas including, among others: cost effectiveness; enforcement; and the incentive to adopt and innovate new abatement technologies [12,14,21,29,38,49]. Generally, these comparisons of policy instruments are ultimately based on an efficiency criterion, on which a normative judgment on the relative preferability of instruments is based. The normative stance taken is the one of a benevolent dictator maximizing social welfare. On these grounds, the majority of this literature tends to favor the properties of RRIs, but generally abstracts from the very real problem of costly rent-seeking activities. Similar to this literature, we attempt an efficiency comparison of RRIs and NRRIs that does, however, take rent-seeking costs under both instruments into account.

The second strand of literature is the political economy of environmental policy (for literature reviews, see Oates and Portney [44] and Stavins [53]). Recently, the political economy of revenue generation (and recycling) has become a prominent area of investigation. Within this literature, three main approaches can be distinguished. The first branch views revenue as a tool to reduce political opposition for the specific policy [15,22]. For example, in Cremer et al. [15], the revenue refunding decision is set by a welfare-maximizing regulator who induces the median voter to accept the environmental tax. A second branch focuses on the endogeneity of the refunding rule. In Aidt [1], the revenue refunding rule as well as the tax rate are endogenous outcomes of a political process. The third branch, and closest to our argument, views revenue generation as subject to costly rent-seeking activities [16,39]. In Dijkstra [16], the timing of instrument choice and revenue division was shown to be important in understanding the implementation of environmental policy instruments. In contrast to Dijkstra [16], our focus is on the social welfare consequences of both RRIs and NRRIs, where both instruments create rents.

In the tradition of the above-cited literature, we build on a positive analysis of rent seeking. On this analytical level, rent-seeking costs are dependent on two different layers of political decision making. First, there often exist specific rules, codified within superordinate legislation, which restrict the political decision on how to distribute newly created rents. Hence, part of the rent associated with each policy instrument is often *ex ante* preassigned for specific regulatory causes, which reduces its contestability. For example, legislative rules can act as a precommitment device for the legislator to allocate a part of the environmental tax revenue for a specific use, like balancing the budget [36,51].[2] In our approach, this institutional context is reflected by exogenous preassignment parameters. Second, actors decide on their rent-seeking activity given a political decision on how to distribute the remaining share of contestable rent. Here, NRRIs and RRIs are likely to differ with respect to the potential beneficiaries. While the rent from NRRIs can only be contested by the regulated industries, RRIs create fiscal funds that can be contested by a larger set of interest groups, of which the regulated industries are only a subset.

Our contribution is thus the formulation of an additional criterion to compare RRIs and NRRIs. In particular, we concentrate on a rent-seeking perspective, noting that rents from both policy instruments are susceptible (perhaps, unequally) to appropriation activities. We, therefore, are able to focus on a previously overlooked discussion on instrument choice, in that we highlight potential social losses stemming from the implementation of RRIs (as well as NRRIs).

[1] Fullerton and Metcalf [24] also argue that NRRIs may provide similar welfare effects to RRIs. However, their approach focuses on a pre-existing labor tax distortion that worsens given privately retained scarcity rents. Lai [37] finds the level of aggregate emissions may be higher under RRIs than NRRIs.

[2] There exists a prominent strand of literature analyzing the efficiency of preassigned use of fiscal revenues, referring to the latter as 'earmarking' [3,7,9–11,26,40]. Yet, in the public perception, the term 'earmarking' seems to refer rather to a result of appropriation activities by interest groups than a device to prevent them [36]. We hence refer to the non-contestable part of the rents as preassigned rents, a term borrowed from Kahana and Nitzan [32].