



## Review

Taxing virgin natural resources: Lessons from aggregates taxation in Europe<sup>☆</sup>

Patrik Söderholm

Economics Unit, Luleå University of Technology, 971 87 Luleå, Sweden

## ARTICLE INFO

## Article history:

Received 7 January 2011  
 Received in revised form 26 April 2011  
 Accepted 12 May 2011

## Keywords:

Virgin natural resources  
 Environmental taxes  
 Recycling  
 Aggregates

## ABSTRACT

The objective of this review paper is to analyze the efficiency of environmentally motivated taxes on virgin raw materials. We analyze both the economic–theoretical foundations of virgin natural resource taxation, and the empirical experiences of aggregates taxes i.e., taxes on, for instance, gravel, rock, stone, etc. in three European countries. These include Sweden, Denmark and the United Kingdom. The theoretical analysis indicates that taxing natural resource output or use typically represents a ‘second-best’ policy alternative, which can be used when, for instance, the monitoring of non-point source emissions is difficult or efficient property rights regimes cannot be established. The empirical analysis shows that the European aggregate taxes have assisted in reducing virgin resource use in spite of the relatively low own-price responses. However, generators of recycled materials typically have few incentives to enhance their waste sorting activities in the presence of a tax on virgin materials. Unless additional policies to increase the supply of recycled materials are implemented, supply will not increase much even in the presence of high demand. Finally, although second-best taxes are sometimes motivated by the desire to keep administration costs low, they could come at the cost of improper incentives and of limited policy legitimacy.

© 2011 Elsevier B.V. All rights reserved.

## Contents

1. Introduction .....	911
2. The economics of taxing virgin natural resources .....	912
2.1. Taxing virgin natural resources for non-environmental reasons .....	912
2.2. Taxing virgin natural resources for environmental reasons .....	913
3. Taxing aggregates: experiences from European countries .....	915
3.1. The Swedish tax on natural gravel .....	916
3.2. The Danish tax on certain raw materials .....	917
3.3. The aggregates tax in the United Kingdom .....	918
4. Concluding discussion .....	920
References .....	921

## 1. Introduction

Since the late 1980s environmental policy makers have shown an increased interest in market-based instruments (e.g., Speck and Ekins, 2002). This new focus on economic instruments such as taxes, charges, tradable permit schemes, and deposit refund sys-

tems stems partly from the fact that traditional regulations often have failed to provide cost-effective and flexible tools for emission reductions (Stavins, 2000). Another reason is that contemporary environmental policy has typically paid increased attention to non-point source emissions (e.g., emissions from road traffic and products), and these types of pollutants are hard – or at least very costly – to control on a source-by-source basis.

In the past many market-based instruments have addressed emissions of harmful substances and waste, but during the past decade increased policy attention has been paid to the issue of whether it would be desirable to extend the scope of the use of market-based instruments in environmental policy. Not the least taxes on virgin raw materials such as minerals, metals, and

<sup>☆</sup> The research undertaken in preparation of the paper has formed part of the multi-disciplinary research program “Towards Sustainable Waste Management”, hosted by the IVL Swedish Environmental Research Institute Ltd. Financial support from the Swedish Environmental Protection Agency is gratefully acknowledged as are helpful comments from two anonymous reviewers. Any remaining errors, however, reside solely with the author.

E-mail address: [patrik.soderholm@ltu.se](mailto:patrik.soderholm@ltu.se)

forest products are put forward as potential candidates. The European Commission has strongly advocated an increased use of market-based instruments among Member States; in the EU Thematic Strategy on the Sustainable Use of Natural Resources (European Commission, 2005) the Commission calls for greater decoupling of material use from economic growth and increased resource productivity, which could be achieved through, for instance, properly designed taxes and charges. The Member States have also shown interest in using market-based policy instruments for these purposes. For instance, the Swedish Environmental Protection Agency argues that new taxes on virgin natural resources should be seriously considered (SEPA, 2002); it is stressed in particular that taxes on raw materials production and use can be compatible with so-called *integrated product policies* (IPP), which aim at encouraging the diffusion of environmental management techniques along the entire supply chain of a product (rather than focusing on end-of-pipe solutions).

Still, before extending the scope of the environmental tax base – with an increased focus on virgin natural resources – one needs to address at least two important questions. *First*, what may motivate the use of such taxes and are there alternative regulatory approaches that could be more efficient? Most notably, a virgin resource tax may be an appropriate option if it is not feasible – or too expensive – to provide efficient price incentives at the waste stage, or if there are other (not waste-related) environmental problems that call for discouraging the use of the resource (e.g., Oosterhuis et al., 2009). It is particularly important that the relevant ecological impacts are closely correlated with the taxed production activities. *Second*, what lessons that can be learnt from the countries that already have implemented these types of taxes? This question concerns how the policies have been designed, how they work in practice, but also in what way the taxes interact with other policy instruments (e.g., waste taxes, recycling regulations, etc.). In this paper we attempt to shed some light on the above questions.

The main purpose of this paper is therefore to review and discuss the efficiency of environmentally motivated taxes on virgin raw materials. We provide analyses of both the economic–theoretical foundations of virgin natural resource taxation, as well as the empirical experiences of aggregates taxes, i.e., taxes on, for instance, gravel, rock, stone, etc., in three European countries. These include Sweden, Denmark and the United Kingdom. The paper provides primarily a critical perspective on these types of taxes. Our intention is however not to suggest that virgin natural resource taxes should be either rejected or adopted. Instead we highlight important trade-offs between adopting efficient incentives on the one hand and acknowledging the presence of high implementation costs as well as any political constraints on the other. Both complementing and substituting policy instruments are discussed in the analysis.

Before proceeding some important limitations of the paper need to be outlined. The use of taxes is motivated for several reasons. These include: (a) the raising of revenues to finance public consumption and investment; (b) the redistribution of incomes (e.g., from the poor to the rich and/or over the lifetime of a person); and (c) the desire to affect behavior in any way (i.e., incentive taxes). Many taxes on natural resources (in particular in developing and post-communist countries) can be related to the first of these motives (Söderholm, 2004), but in this paper we focus on the third motive, and more specifically on environmentally related taxes that aim at influencing environmentally damaging behavior (e.g., reducing pollution, waste, avoiding landscape disturbances, etc.).<sup>1</sup> Still,

<sup>1</sup> It is worth noting that a group of experts from the European Commission, Eurostat and the OECD defines an environmental tax as: “a tax whose tax base is a physical unit (or proxy of it) that has a proven specific negative impact on the environment”

the distinction between environmental taxes and revenue-raising (fiscal) taxes is not always clear-cut. Taxes for which fiscal and environmental objectives are combined or inseparable are therefore also addressed in the paper, and we briefly discuss the differences in designing taxes for environmental and fiscal purposes, respectively.

The paper proceeds as follows. In the next section we discuss the economics of taxing virgin natural resources, and address, for instance, resource scarcity issues, the presence of environmental externalities as well as some of the interactions with other policy instruments. Section 3 provides a synthesis of the documented environmental and economic impacts of aggregate taxes by drawing from the experiences in Sweden, Denmark, and the UK. We discuss policy motives, tax design issues and the impacts of the tax on both the industry and the environment. The tax policies pursued in practice are also confronted with some of the theoretical results. Finally, a summarizing section provides some concluding remarks and general implications.

## 2. The economics of taxing virgin natural resources

From a public policy perspective the implementation of specific taxes on virgin natural resources can be motivated by both fiscal and environmental arguments. However, as will be stressed in this section, such a combined motivation may be confusing and misleading. Based on economic efficiency criteria the designs of fiscal and environmental taxes, respectively, will typically differ a lot, and an efficient environmental tax may be a very inefficient fiscal tax. Before proceeding, it is also important to note that natural resources may be taxed in many ways (e.g., Heaps and Helliwell, 1985); for instance, the land (i.e., property tax) or the rent may be taxed. Given our prime focus on environmentally related taxes we discuss solely taxes levied on the production (extraction) or the use of virgin natural resources.

### 2.1. Taxing virgin natural resources for non-environmental reasons

From an economic efficiency point of view the main aim of fiscal taxes is to raise sufficient revenues without distorting economic activities too much. In practice this implies that goods for which demand is relatively price inelastic should be taxed higher than goods whose uses are more sensitive to own-price changes. Quite often natural resources fall into the former category of goods. The demand for natural resources and virgin materials tends to be own-price inelastic, especially in the short-run. For instance, empirical studies typically indicate that the demand for metals and minerals is relatively own-price inelastic (Radetzki, 2008). This is partly because: (a) few substitutes to the resource exist; and (b) the processing of natural resources often is very capital intensive (e.g., metal smelting or pulp and paper production) and substitution to other inputs may therefore be costly and take a considerable amount of time. In addition, the demand for natural resources is typically a *derived* demand, i.e., we seldom demand natural resources directly but instead we demand a very large number of consumer goods that are produced with the help of these resources. Natural resources form the basis of economic activity and are likely to continue to do so in the future. As such – similar to labor inputs – even the long-run price elasticity of demand may be low and natural resources can thus represent a very stable tax base for the government.

A similar argument can be made for the *supply* of natural resources. Natural resource extraction gives rise to so-called Ricardian (ECOTEC, 2001). However, for the purpose of this paper this definition is too wide as it refrains from considering the motive behind the tax.

Download English Version:

<https://daneshyari.com/en/article/1063444>

Download Persian Version:

<https://daneshyari.com/article/1063444>

[Daneshyari.com](https://daneshyari.com)