

Emissions trading and competitiveness: pros and cons of relative and absolute schemes

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Abstract

Emissions trading is a hot issue. At national as well as supranational levels, proposals for introduction of emissions trading schemes have been made. This paper assesses alternative emissions trading schemes at domestic level: (1) schemes where the total level of emissions is fixed (absolute cap-and-trade), (2) schemes where the allowable level of emissions per firm is related to some firm-specific indicator (relative cap-and-trade), and (3) mixed schemes which combine elements of the above alternatives. We present a quantitative assessment of these alternatives for climate change policy in the Netherlands. It is concluded that while relative cap-and-trade would avoid negative effects on competitiveness, it would not reduce emissions at the lowest costs. Besides, the addition of a trade system to existing relative standards does not result in additional emission reduction; it should be combined with other policy measures, such as energy taxes, in order to realise further reduction. Absolute cap-and-trade leads to efficient emissions reduction, but, implemented at the *national* level, its overall macroeconomic costs may be significant. The mixed scheme has as drawback that it treats firms unequal, which leads to high administrative costs. We conclude that none of the trading schemes is an advisable instrument for domestic climate policy.

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1. Introduction

The European Commission has proposed a strategy to meet the targets on greenhouse gas emissions agreed upon in the Kyoto Protocol. One element is the implementation of a EU-wide greenhouse gas emissions-trading scheme (EC, 2001). According to the Commission, a European scheme should start in 2005.¹ In the years up to 2008, the scheme would cover only carbon dioxide gases; afterwards, other greenhouse gases may be included. Several difficulties have to be solved before a European trading system is able to start.

These difficulties include the initial distribution of permits and sector coverage.

The Dutch government is in favour of a European emissions trading system, but it has also developed a national emissions trading scheme, to be introduced when the initiative of the European Commission would fail (Commission CO₂-trade, 2002). The Social Economic Council (SER), a rather influential advisory body to the Dutch government, advises to implement a national system when a European system is not realised within eight years time (SER, 2002).

The key issue in the debate on national emissions trading systems is their likely effects on competitiveness of industries operating on international markets. The Dutch Commission that studied the possibilities of national emissions trading, therefore, proposed to give internationally 'exposed' firms a special treatment (Commission CO₂-trade, 2002). According to its proposal, sectors being exposed to international competition should be subject to relative caps, while other sectors, being sheltered from that type of competition,

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¹European environment ministers approved of the groundrules of the Commission's proposal, see ENDS, Environment Daily 1346, 09/12/02.

should be subject to an absolute ceiling on their aggregate emissions. The SER has noted, however, that a system treating different sectors differently would generate relatively high transaction costs. The SER suggests that in a national trading system *all* firms should be subject to relative caps instead of one aggregate absolute cap.

This paper assesses the advantages and disadvantages of alternative national emissions trading schemes. Questions that will be answered are:

- How large is the danger of adverse economic effects in case of an absolute ceiling of emission permits?
- Is a relative cap-and-trade scheme able to realise significant environmental effects?
- Could a mixed system combine positive elements from both absolute and relative cap-and-trade?

The answers to these questions are based on a brief survey of theoretical literature on international trade and environmental policy and on a model analysis for the Netherlands.

The structure of this paper is as follows. Section 2 discusses literature on the relation between environmental policy and international trade. Theoretical aspects of emissions trading under a relative cap-and-trade scheme are dealt with in Section 3. Section 4 assesses the effects of the three alternative emissions trading schemes in the Netherlands. The variants are (a) a relative cap-and-trade system combined with (higher) energy taxes, (b) an absolute cap-and-trade system, and (c) a mixed emissions-trading system with both absolute and relative caps. Section 5 concludes by systematically comparing the effects of the three alternative policy variants.

2. Emissions trading and international competitiveness

2.1. Environmental policy in an open economy

What are optimal environmental standards in an open economy? If a government adjusts environmental standards to avoid international trade consequences, it is in effect using an environmental policy instrument not only for environmental purposes but also for trade policy purposes (to avoid trade consequences of its environmental policies). So the question of optimal environmental standards can always be rephrased to the question whether it would be advantageous in particular circumstances to use trade policy instruments (import tariffs, export subsidies, and the like).

In the case of a perfectly competitive industry without international market power the theory of international trade suggests that it is not efficient or welfare improving for a government to deviate from free trade

(see, for a classic exposition, Markussen, 1974). Hence there is no need for trade policy instruments and there is no need to deviate from the first-best rule in environmental standard setting, which is that marginal costs of abatement should be equalised over all individual sources so that the cheapest abatement options will be selected.

Böhringer and Rutherford (2002) discuss a number of complexities that might potentially justify differentiated standards across industries. One such complexity is the tax-interaction effect, i.e. the impact of environmental taxes on the distortionary impact of existing taxes. Differentiation of environmental taxes might correct distortions in the existing tax structure. Böhringer and Rutherford note, however, that in the European and US contexts, the existing tax structure strongly discriminates *in favour* of energy-intensive sectors. Hence, if the tax-interaction effect would be considered as a good reason to differentiate environmental standards, standards for energy-intensive industries should be *stricter* than for other sectors. Another complexity is distributional concern for workers and capital owners in the, potentially, affected industries. While this is a legitimate concern, differentiation of environmental standards is a *very costly way* to meet distributional objectives (Böhringer and Rutherford, 2002).

A first extension to the simple model of perfect competition is to allow competitive industries to exercise market power on the international market, that is, the supply (and demand) of the industry can affect world market prices of goods (and intermediates). In this case, there might be a rationale for tariffs (and differentiated standards) for two reasons (Markussen, 1974).

The first reason is connected to the traditional optimal tariff argument. The optimal tariff argument, however, would require that environmental standards for exporting firms should be *stricter* than the first-best rule, not *more lenient* (Rauscher, 1992). The reason is that by making its exports more expensive, the country improves its *terms of trade*, i.e., the prices of its exports rise in relation to the prices of its imports.

The second reason is that by the impact of supply (or demand) of the domestic industry on world prices, the industry's supply (or demand) decisions have an indirect influence on foreign emissions. In the case of carbon dioxide emissions, this effect is called *carbon leakage*. Carbon leakage might provide a rationale for relaxing standards for exporting firms.

2.2. International competitiveness and relocation

Matters become more complicated if the assumption of perfect competition is abandoned. High set-up costs, increasing returns to scale and other market imperfections, give rise to economic rents, that can be shifted across borders (and appropriated) through strategic

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