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EMISSIONS TRADING: HOW TO DETERMINE THE EFFICIENT COVERAGE?

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Overview

During the last decade, market-based instruments such as emissions trading have started to replace or complement command and control policies when addressing environmental problems. With regard to global environmental challenges, such as climate change, emissions trading schemes have become increasingly important. In principle, emission trading utilises the market to achieve a given environmental target at minimum costs. Polluters who can abate at relatively low costs have an incentive to reduce their emissions and sell surplus allowances, while polluters whose abatement costs are relatively high have an incentive to buy allowances. Trading takes place until abatement costs of covered installations are equalized.

However, emissions trading schemes are designer markets and regulators must make numerous design choices when setting up such markets. A key design element is the appropriate incidence of regulation – that is, who will be trading and required to surrender emissions allowances (BETZ 2003). When the emission trading scheme is mandatory and implemented on a downstream basis[2], an issue arrises as to which sources to include in the scheme. Sources that have high emissions, and the ones that have high abatement cost should be included, to take advantage of the opportunities offered by emissions trading. Less clear is whether to include smaller sources, for which the fixed costs of participating in the scheme are likely to dominate any potential benefits from trading. These small companies might be more passive and not have the incentives to spend resources to identify and appraise emission abatement measures since emissions are relatively small compared to fixed costs of participating in the scheme. Under the European Union Emissions Trading Scheme (EU ETS), where companies started to trade in January 2005 more than 11,000 installations were covered in 25 EU member states. A high proportion of those covered installations are small that means around 50% of the covered installations only received less than 2% of the total allocated emissions allowances under the EU ETS. Moreover, the annual total costs for an averaged sized regulated company have been estimated to be in the range of 35,000 Euro for the private sector and 4,000 Euro per installation for the administration costs of the public sector (BETZ 2005; SCHLEICH and BETZ 2004). Thus, it is questionable that the coverage of a high number of small installations with a rather limited abatement contribution but significant participation costs is efficient from a welfare economics point of view. For these sources, it would appear more advantageous to abandon the mandatory participation in the scheme and regulate the sources through other policies such as a tax or standard, but to leave open the possibilities for opting-in of the scheme. At the policy level then, the question is how to

[2] An *downstream* approach requires fossil fuel users to acquire allowances compared to an *upstream* approach which requires allowances to be acquired by fuel producers.

make some determinations as to the cut-off point for mandatory participation in the emission trading scheme. In this paper we are conceptualising a model that could be used to determine such a cut-off point.

Methods

We explore the efficient coverage of sources under an emissions trading scheme taking into account transaction costs. The cut-off point is determined where marginal costs for including one further installation (which include both marginal transaction costs for the operator and the public regulator) equal marginal benefits of including this installation (efficiency gains from trading due to lower and more diverse abatement costs).

In this paper we subsume under the term transaction costs all transfers of property rights, goods and services whether externally within markets or internally within organizations. The latter also encompasses the political transaction costs in setting-up and running institutions. Thus, transaction costs include all costs, other than the costs of abatement (e.g. technical investment), which are borne by the institutions responsible for implementing the scheme in order to create the market for emissions allowances.

The theoretical premise is that policymakers would aim at maximising total social benefits net of total social costs from setting up an emission trading scheme. The cost that each potential participant in the scheme is facing is comprised of source specific cost of abatement, heterogeneity of which among sources is a key driver for the cost-effectiveness of the trading scheme, and of quasi-fixed costs of participating in the scheme. Based on this, total social costs from the emission trading scheme are increasing in the number of mandatory participants in the scheme at a non-decreasing rate, because of the fixed cost component. However, the total social benefits from the emission trading scheme are increasing at a decreasing rate, or can even be decreasing as the number of mandatory participants in the scheme increases. Thus, there will be some optimal number of mandatory participants (or equivalently represented through the emissions per source) where the social benefit from including one more participant would just be equal to the social cost of including that participant. The model presented in the paper derives the conditions for determining this point. Based on installation specific data two options for cut-off criteria are assessed: emissions thresholds and sectoral exclusion.

Results

The result is a theoretical model to demonstrate how the threshold can be determined. In addition, some empirical estimates and proposals for the EU ETS are derived based on the available data. The empirical findings show that a very high proportion of the covered installations are small emitters and support the hypothesis that the transaction costs of including those installations outweigh the benefits. Two options are assessed further to improve the efficiency of coverage. One is examining which sectors could be relieved from mandatory participation in the scheme. The other is focusing on the introduction of a more efficient threshold compared to the ones used in the EU ETS so far.

Conclusions

Based on the findings it can be concluded that regulators need to draw attention on the transaction costs of emissions markets in order to obtain the projected costs savings

from the instrument. Measures to reduce market transaction and administration costs need to be assessed as well as the introduction of more effective cut-off criteria. A twofold approach based on sector exclusion (e.g. ceramic industry) and historic annual emission threshold of 25,000 t CO_2 seems favorable to improve the EU ETS.

References

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