Reducing of price uncertainty in a tradable permit system

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Abstract

The outcomes of this research are actual and well-timed to the discussion of designing tradable permit system as a market instrument that allows reaching ecological purposes with minimum costs. High price uncertainty of tradable permits is particularly typical for the countries where the market instruments have never been applied. Exactly future permit price uncertainty as a consequence of aggregate emissions and environmental investments (such as investment in abatement technology) of many regulated firms which made their abatement decisions before actual emission levels and real market permit prices are certainly known, may become one of the serious reasons of non-acceptance of this environmental policy instrument.

If there is not asymmetric information problem and an economy operates under full certainty both ecological taxes and tradable permits are equivalent. However the reality is full of uncertainty causing the dichotomy between taxes and tradable permits. The choice between these instruments depends on the position of the marginal damage function (MD) and the marginal abatement cost function (MAC) that are under influence of some factors (for example, kind and volume of polluting substances, economies of scale, technologies and ways of pollution reduction, etc.). Taking into account the factor of permit price uncertainty let us to estimate costs and benefits of social welfare and to make a choice between these two instruments or combine them.

The author conducted graphical and analytical analyses of specified instruments. The conclusions are as follows. (1) Under high abatement costs uncertainty welfare losses will be less under a tradable permit system if the marginal damage function is steep and non-linear but the marginal abatement cost function is sloping. In the opposite case taxes will be preferable. In cases when both of functions are either steep or flat instrument mix would be preferable in terms of economic efficiency. (2) A mechanism of a permit price limitation, that is a tax in a tradable permit system, allows reducing permit price uncertainty and avoiding double financial burden that would be in the case of parallel operating of ecological tax and tradable permit systems. (3) Under abatement costs uncertainty combination of taxes and tradable permits will be worthwhile if the marginal damage function is steep and the marginal abatement cost function is either steep or flat because it allows reducing social welfare losses. At that welfare gain is as bigger as higher uncertainty. If uncertainty is small it is not recommended to complicate environmental payments system.

Keywords: tradable permit system, price uncertainty, ecological tax, marginal damage function, marginal abatement cost function.