

A Cost-effectiveness Analysis of Policies for Abating Mobile Source Emissions

Yen-lien Kuo*

Abstract

The objective of this study is to evaluate the cost-effectiveness of electronic road pricing (ERP) and automobile ownership policy that can abate the mobile source emissions at the central business district (CBD) of Taipei. Under ERP, the trips entering the CBD and intra-CBD trips will be charged. In order to internalize external costs, the fare rates of vehicles are proportional to the vehicle's private car unit (PCU). Under the automobile ownership policy, each household in Taipei can't hold more than one automobile. The result shows that automobile ownership policy is worthwhile to be adopted. Because it will result in 4,856 tons air pollution abatement and 6,342 million NT\$ of time-saving benefit which is much larger than its 571 million NT\$ cost per year. Suppose the road pricing fare for a motorcycle is NT\$50, NT\$100 for a car and a taxi, and every public transit user is subsidized with NT\$10 per day, it'll result in 31,984 tons air pollution abatement. The net cost of ERP is the sum of implementation cost and reduced consumer surplus minus time saving benefit. ERP's net cost-effectiveness of air pollution abatement is NT\$151,600 per ton that is lower than many other vehicle emission reduction policies such as more stringent emission standards and automobile inspection program.

Keywords: automobile ownership policy, electronic road pricing, mobile source, cost-effectiveness

* Master of Institute of Natural Resource Management, National Taipei University