Reforming Road Pricing: A General Equilibrium Approach to Model Road User Charges

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Abstract

Fuel excise has long served as the primary instrument for pricing road use and funding road infrastructure. However, the rapid uptake of electric vehicles and ongoing improvements in fuel efficiency are eroding fuel-tax revenues, raising concerns about the long-term sustainability of road funding. We develop a computable general equilibrium (CGE) framework for modelling road user charges by extending the existing dynamic CGE model VURMTAX, and explicitly model road use as a derived demand from vehicle-use services with road users distinguished by user type (households versus commercial users), vehicle class (light versus heavy), and propulsion technology (internal combustion engine versus electric vehicles). This structure enables a consistent treatment of transport electrification and road pricing within a unified modelling framework. Using this framework, the paper examines the macroeconomic and sectoral impacts of introducing road user charges, evaluates allocative efficiency by estimating the associated Marginal Excess Burden (MEB), and discusses the policy implications in an economy undergoing rapid transport electrification in Australia.

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