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## Second-best Toll Policies in Poly-centric City

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### Summary

This paper analyses the effects of cordon pricing and area pricing in the poly-centric city model. We also take a general equilibrium approach: product, labor and land markets are considered. Modal choice between automobile and railway is also incorporated. *The main purpose of this paper is to investigate not only short-run effects such as travel behavior but also long term effects such as the change of residential and employment distributions.* The analytical model is based on Anas and Xu (1999)<sup>†</sup> in which a city is composed of finite number of zones and idiosyncratic tastes to commuting arrangements exist. In each zone, firms produce zone-specific composite goods. Due to the idiosyncratic tastes, a wasteful commuting, which is a commute from the suburb to the other suburb traversing the central area, could occur at equilibrium.

Since solving the model analytically is not possible, policy implications are obtained through numerical simulations. The main results are as follows. The efficiency gains from cordon pricing are 1.46% of total disposable incomes in a city and the efficiency gains from area pricing are 1.6% (the efficiency gains from first-best congestion pricing are 2.76%). With the introduction of cordon pricing or area pricing, a toll area becomes more attractive as a place of residence but less attractive as a place of work. The toll policies promote short distance commuting but discourage use of public transport in toll-free commutes. There is also theoretically interesting finding that in non-monocentric city, compactness is not always desirable.

*Key words:* Cordon pricing; area pricing; poly-centric city; congestion; modal shift; nested logit

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<sup>†</sup> Anas, A and Xu, R. "Congestion, Land Use and Job Dispersion: A General Equilibrium Model," *Journal of Urban Economics*, 45, 451-473, 1999.