Downtown Parking Supply, Work-Trip Mode Choice and Urban Spatial Structure

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Abstract

Traffic congestion is sometimes seen as a sign of a city’s economic and social health and vitality. However, economists have long recognized that congestion tends to exceed economically efficient levels because auto commuters do not bear the full cost of their use of the roads and parking facilities. In heavily trafficked areas such as downtown areas, each additional vehicle causes additional traffic delay on all the other auto users. Yet no auto user is charged for this negative externality. The result is that traffic delay slows economic activity and can reduce some of the agglomeration benefits that characterize central business districts.

In recent years planners have given increasing attention to the possibility of reducing downtown use of cars by controlling parking- either by restricting the number of spaces available, or by charging users to park or through parking cash-out initiatives. After all, empirical evidence has shown that parking prices and parking availability are two of the key factors in auto users’ decision on whether to drive to work or use public transportation (Shoup 2005). Among the possible benefits of these auto-restraint schemes are reductions in traffic delay costs, air pollution and energy consumption (STHC Report 2009; Kodransky and Hermann, 2011; Weinberger et al., 2010).

This paper examines the effects of changes in downtown parking supply on urban welfare, modal choice decisions and urban spatial structure using a spatial general equilibrium model of a closed monocentric city with two transport modes, endogenous residential parking and a form of bottleneck congestion at the CBD. Our analysis shows that parking reforms at the CBD that increase delay congestion costs in the short-run such as parking supply limits can be welfare improving if other commuting externalities such as air pollution can be reduced. In addition, because parking limits can also change location decisions such as where to live and invest they may complement anti-sprawl policies efforts by leading to a more compact urban spatial structure in the long run. We also show that changes in
downtown parking supply can have different spatial impacts on the market supply of residential parking by affecting urban residents’ location decisions. Finally, we discuss the role of parking pricing as a complementary tool of congestion pricing to combat congestion in central areas and investigate whether the self-financing theorem of transportation economics holds within the context of our spatial urban model.

**Key words:** Downtown Parking, Bottleneck Congestion, Urban Form, Modal Choice