Subsidized Parking and Neighborhood Nuisances: A Supplement*

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Instead of exogenous price of private parking in Merriman’s (1997) model, this supplement generates a more realistic result with an endogenous price of non-university parking. The spillover effect under a flexible price of private parking would be more serious than that of perfect elastic supply of private parking. In other words, Merriman may underestimate the spillover effect of a subsidized-parking policy.

KEYWORDS: Parking, Spillover effect, Nuisances

The purpose of this supplement is to re-examine the rationality of Merriman’s (1997) model, which indicates that an increase of one subsidized parking vacancy may attract several potential parkers, but only one of them can take the vacancy. Consequently, those who do not get the vacancy will have to park in the neighborhood lots or streets and therefore deteriorate the neighborhood’s traffic situation.

Similar to the university case in Merriman’s paper, many urban universities with several thousands students may have critical parking situations. The quantity of parkers and the price of parking in the surrounding areas may be affected by those high parking demand. An unrealistic assumption in Merriman’s paper is that non-university parking is perfect elastically supplied at a price \( \bar{P} \). A deeper look would demonstrate that if non-university parking prices are endogenous instead of exogenous, then the equilibrium quantity of parkers is

\[
P^* = \left[ \frac{Q^* - Q_s}{Q^*} \right] \bar{P} \left( \frac{Q^* - Q_s}{Q^*} \right) + \left[ \frac{Q_s}{Q^*} \right] P_s
\]

(1)

are simultaneously determined, where \( \bar{P}(\cdot) \) is the price function of non-university parking, and \( \bar{P} > 0 \), because \( (Q^* - Q_s)/Q^* \) represents the ratio of excess demand for private lots. Thus, let

\[
Q^* = f(P^*) = f \left( \left[ \frac{Q^* - Q_s}{Q^*} \right] \bar{P} \left( \frac{Q^* - Q_s}{Q^*} \right) + \left[ \frac{Q_s}{Q^*} \right] P_s \right).
\]

(2)

where \( f(\cdot) \) is the demand function for parking. Totally differentiate (2), then the equation turn out to be

\[
dQ^* = f' \cdot \left\{ \bar{P} \left[ \frac{(Q^* - Q_s)}{Q^*} \right] + \left[ \frac{(Q^* - Q_s)}{Q^*} \right] \bar{P} + P_s \left[ \frac{Q_s}{Q^*} \right] dP_s \right\}.
\]

(3)

After some rearrangements, the above equation can be written as

\[
dQ^* \over dQ_s = -1 \left( \frac{1}{f' \cdot \bar{P} (Q^* - Q_s)/Q^*_2} \right) > 0.
\]

(4)

If \( \bar{P} = 0 \) (i.e., exogenous \( \bar{P} \)), then (4) will reduce to Eq. (2) in Merriman’s paper. Since \( f' < 0, \bar{P} > 0, Q^* > Q_s \), then \( f' \cdot \bar{P} (Q^* - Q_s)/Q^*_2 < 0 \) and the whole denominator of (4) is negative (recall that \( \epsilon < 0 \)) and thus \( dQ^*/dQ_s > 0 \). That is, the more subsidized parking space, the more parking demand in equilibrium.

Due to \( f' \cdot \bar{P} (Q^* - Q_s)/Q^*_2 < 0 \), it is then

\[
\left. \frac{dQ^*}{dQ_s} \right|_{P=0} \geq \frac{dQ^*}{dP_s} \right|_{P=0}.
\]

(5)

Equation (5) implies that the induced parking demand after an increase of subsidized parking space in this supplement is greater than that of in the Merriman’s model. As reflected in reality, a subsidized-parking policy may result in a higher parking pressure and raise the equilibrium parking prices in the neighborhood. The intuition behind this result is that the increase of subsidized parking space induces more parkers (more than Merriman’s prediction) into a given university’s parking lot, and more parkers will be forced to park on private lots and consequently deteriorate the neighborhood’s traffic situation. In other words, Merriman (1997) may underestimate the spillover effect of a subsidized-parking policy.

REFERENCE


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