A Network Analysis of Demand-Supply Equilibrium

of Taipei Area Taxi Market

under Competition and Regulations

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ABSTRACT

In a well-developed and highly urbanized metropolitan area, taxicabs play an essential role as paratransits in the entire transportation service system. However, due to the market's information asymmetry, suppliers' benefit and users' rights should be considered when a regulator sets the price level and numbers of taxis to achieve the market's equity and efficiency.

This paper applies the urban taxi network model proposed by Yang and Wang (1998) and constructs an economic model to solve the first-best solution under maximized social welfare and second-best solution under break-even. The event study of Taipei Area taxi market used the O-D surveys of Taiwantaxi company to analyze the cruising taxi market's hourly optimal price, operating vehicles and vacant taxi rate under different regulations and competition simulation.

The results show that whenever the price elasticity and waiting time elasticity were -1.4 and -0.2, respectively, the second-best market's price level will be \$370/hr and, with 9 working-hours a day, optimal licensed operation vehicles will be 42,325. Meanwhile, the optimal vacant taxi rate will then be 54.51%. Comparing to the real world, these results are far away from the status quo, 68,898 vehicles and \$640/hr. We also find that the existing vacant taxi rate will not sustain the drivers' reasonable wage even with a higher price; the market will also not reach it's maximized quantity of demand under existing vacant taxi rate though the waiting time is rather short. Finally we use the numerical results to design some pricing structure schemes, and suggest that the market's quantity ceiling should be lowered and the cost of getting an operating license should be raised.