Effects of market power on Pigouvian tolls and permits markets: the case of slot management at congested airports

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Air transport delays are an acute problem globally. For example, Ball et al. (2010) estimate that the cost of US air transportation delay in 2007 was $16.7 billions to passengers, $8.3 billions to air carriers, and that it reduced the 2007 US GDP by $4 billion. Not surprisingly, policies aimed at reducing airport congestion costs have gained increased attention from governments, policymakers and researchers. Solutions to solve the airport congestion problem have been intensively discussed in the literature. Besides increasing the capacity of congested airports, the two main approaches to deal with airport congestion are optimal (congestion) pricing and slot management.

In the context of airports, the recent literature has recognized the importance of air carriers’ market power (Brueckner, 2002; Pels and Verhoef, 2004; Basso, 2008) and has shown that the socially optimal airport charge should account for two counteracting effects: the airlines’ incentives to contract output in order to increase profit –the market power effect– and the lack of full congestion internalization, which leads to output levels that are higher than optimal. As a result, the efficient airport charge consists of the marginal congestion cost imposed on the other airlines and of a subsidy which induces a lower marginal cost to stimulate traffic and neutralize the market power markup. Since optimal pricing requires massive amounts of information and charging differentiated tolls to airlines, it is quite clear that implementing first-best prices may be quite controversial and complex.

The rationale behind the slot mechanisms is that setting the efficient number of slots solves the congestion problem and implementing a secondary market leads to the efficient distribution of slots. This would require less information and would not be perceived as inequitable, which enhances its feasibility, especially compared to optimal pricing. In fact, the FAA proposed a move in this direction for the three New York airports, which are among the most congested and delay prone in the US, although the idea was eventually defeated (see Bernardino, 2009). In addition, the current allocation system in Europe is in the process of being adapted towards having the possibility for secondary slot trade (European Commission, 2011). However, the exact way in which slot auctioning would take into account both congestion and, specially, the market power effect is unclear. Intuition borrowed from the input-preemption literature may help to show how market power might lead to inefficiencies if slots are auctioned: since slots are an essential input for production, it is clear that for any available slot that may
become available, a monopoly incumbent carrier can outbid an entrant, since monopoly profits are higher than duopoly profits, leading to decreased competition.

Brueckner (2009) recently showed analytically that first-best congestion pricing and slot auctioning are equivalent in terms of both the amount of traffic generated and total social welfare, as long as the fixed number of slots is optimally chosen; however, in Brueckner’s model airlines did not have market power. Subsequent work by Verhoef (2010) shows, in a duopoly model, that indeed one airline can leave the other out of the market but in his model it is optimal –from the social planner’s point of view– to actually allow only one airline (the cost efficient one) to operate. He notes that by having a monopoly owning all the slots, the monopolistic outcome arises if there is no service obligation imposed, which can be significantly worse than the laissez-faire equilibrium.

In this paper we study the efficiency of slot auctions in the presence of more general sources of inefficiency. First, using a duopoly model of competition, we study whether auctioning slots can lead to an inefficient distribution of slots among the two airlines in the cases where it is optimal to have both present in the market. Using a general model for the airlines’ demand and costs we characterize the cases where slot auctioning leads to outcomes that are worse from a welfare point of view than the laissez-faire. Second, using an oligopoly model, we show that slot auctioning can lead to a number of airlines present in the market that is lower than in the first-best, thus leading to inefficient market foreclosure. Furthermore, in that case, slot auctioning can also lead to a number of active airlines that is lower than in the laissez-faire, leading to decreased welfare.

We conclude that there is a large scope for slot-auctioning to be worse than the laissez-faire, that is, implementing the policy (which is costly) may well end up decreasing welfare. It follows that a general policy of slot auctioning at airports does not seem a wise policy path to follow without a clear analysis of the situation of the airlines using the airport and their market power (on a route by route basis).

References


