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An empirical analysis of airport slot trading in the United States

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ABSTRACT

The purpose of this paper is to examine whether the manipulative or strategic behaviors of slot-holding carriers have resulted in restricted market entry and service expansion by other carriers, especially rival carriers, at the four US airports that have secondary slot markets. Airport congestion and flight delays at many major airports have become a serious problem. It has been suggested that a secondary slot market is one of the most practical options for addressing airport congestion, which would increase the possibility of competitive entry and efficient use of scarce resources. A secondary slot market would work in the same manner as a congestion toll system or an auction system, provided that carriers' manipulative or strategic behaviors do not have serious effects on slot trading. However, the empirical effects of slot markets have not been investigated systematically. This paper examines empirically whether carriers' manipulative or strategic behaviors have impeded effective functioning of slot markets. Slot transfer data from four US airports between 1994 and 1999 were examined using regression analysis. Results of the analysis are mixed, suggesting that the most effective way of congestion management depends on conditions unique to each airport, and that subsequent interventions should reflect those conditions.

1. Introduction

The lack of adequate runway capacity has been a common concern at many major airports, and it has become necessary at these airports to establish an effective congestion management system that can promote competition while ensuring the efficient use of scarce resources. It has been suggested that introduction of market mechanisms such as congestion pricing, secondary slot[1] trading and slot auctions would increase the possibility of competitive entry and generate an efficient outcome. Although all these mechanisms have their own advantages and disadvantages, this paper focuses on an analysis of a secondary slot market because, as Brueckner (2009) convincingly argues, a well-functioning slot market would have not only the potential to work in the same manner as congestion pricing and a slot auction, but also be simpler to operate. In addition, even if a slot auction were successfully implemented, a secondary slot market would still be expected to adjust to recurring fluctuations in slot needs (Kasper (2008) stresses this point). However, in spite of a history dating to 1986, secondary slot markets in the United States have not been investigated on a systematic basis. As a result, it is not clear to what extent, if any, a secondary slot trading system[2] has facilitated the competitive entry and efficient use of scarce resources. Thus, this paper attempts to examine slot

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[1] In the United States, slot means the operational authority to conduct one IFR (instrument flight rule) landing or takeoff operation each day during a specific hour or 30 min period at one of the High Density Traffic Airports. Instrument flight rules operation means any flight operated by referring only to the aircraft instrument panel for navigation.

[2] Secondary slot trading has occurred at congested European hubs such as Heathrow, but it has long been a "gray market" secondary trade (cf., Mott MacDonald and European Commission, 2006). Indeed, the EU Slot Regulation, i.e., Council Regulation (EEC) No. 95/93, has been silent on the question of exchanges of slots for monetary and other consideration. However, on April 30, 2008, the European Commission announced that slots could be exchanged for monetary and other consideration in EU countries (Commission of the European Communities, 2008).

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transactions at four airports in the United States: National Airport in Washington, DC, Kennedy and LaGuardia Airports in New York, and O'Hare Airport in Chicago.

The paper is organized as follows. Section 2 describes the historical background of the slot buy/sell rule. Section 3 reviews previous studies on slot trading in the United States and discusses the hypothesis to be tested in the paper. Section 4 describes the data used in the paper. Section 5 tests the hypothesis, and Section 6 provides a conclusion.

2. Background

In the United States, slot markets have been implemented under the High Density Rule (HDR). Effective April 1, 1986, slots could be bought, sold or leased for any consideration and any time period.

This system generated intense opposition from new entrants, suggesting that the slot markets did not facilitate new entry. Therefore, on August 23, 1994, Congress enacted the Federal Aviation Administration Authorization Act of 1994, which authorized the Department of Transportation (DOT) to grant exemptions from the HDR. The DOT was initially reluctant to approve exemptions. However, on October 24, 1997, in response to requests from members of Congress and other stakeholders, the DOT issued Order 97-10-16, which loosened its criteria for approving exemptions. Subsequently, on April 5, 2000, Congress enacted the Wendell H. Ford Aviation Investment and Reform Act of the 21st Century (AIR-21). AIR-21 phased out slot restrictions entirely after July 1, 2002 at O'Hare and after January 1, 2007 at Kennedy and LaGuardia. At the same time, AIR-21 liberalized slot exemption access at the four HDR airports.

Because of this legislation, congestion and delays increased dramatically at LaGuardia and O'Hare. Thus, at LaGuardia and O'Hare, the FAA placed temporary limitations on flight operations to prevent congestion-related delays. Furthermore, because congestion also increased at Kennedy and Newark in 2007, the FAA published orders that established temporary limitations on the number of scheduled operations at both airports.

Urged by these circumstances, the FAA proposed to establish procedures to address congestion in the New York City area by annually auctioning off a limited number of slots at Kennedy, LaGuardia and Newark. Subsequently, the FAA announced their intention to conduct an auction for two slots at Newark on September 3, 2008. The final rules to address congestion at LaGuardia, Kennedy and Newark were published on October 10, 2008. However, the auctions were suspended due to the legal challenges mounted against the proposal by carriers (cf., Berardino, 2009). The FAA finally proposed rescinding the final rule that contained provisions for slot auction on May 14, 2009.

While it is uncertain whether slot auctions would be proposed and considered again, slot markets have been resurrected under the orders that established temporary limitations on flight operations at Kennedy, LaGuardia, Newark, and O'Hare.

3. Review of previous studies

The US slot trading system has caused debate on the question of whether it has facilitated competitive entry and effective use of slots at the four airports. In 1990, the General Accounting Office (GAO) examined data on slot holdings and uneven transfers.[3] The GAO stated in its report that the major airlines have the ability to limit access to routes beginning or ending at any of the slot-controlled airports and that allowing airlines to buy and sell slots has not produced the active market for slots envisioned in the buy/sell rule (GAO, 1990). This conclusion was reaffirmed in subsequent GAO reports (GAO, 1996, 1999). New entrants have often indicated the same view (e.g., AirTran Airways).

Overall, the GAO and new entrants painted a negative picture of the slot markets, alleging that control of slots by slot-holding carriers resulted in restricted opportunities for other carriers (especially rival new entrants) to operate as competitors in the HDR airports. In this paper, this allegation is referred to as "the anticompetitive slot trading hypothesis".

On the other hand, others have noted that concentrations in the slot markets were not leading to anticompetitive behavior. Kleit and Kobayashi (1996) and FTC (1994) attempted to test the anticompetitive slot hoarding hypotheses by examining slot ownership and usage data for 2 months (May–June 1990 at O'Hare and September–October 1993 at the four airports, respectively). Their conclusion was that the evidence did not imply that concentrations in the slot markets were resulting in anticompetitive behavior; rather, that the evidence was consistent with the hypothesis that efficiency considerations were generating concentrations. Incumbents have often expressed the same satisfaction with the existing markets (e.g., TWA).

Concentration of slots among a few carriers may reflect an efficient use of slots (Starkie (2008b,c) stresses this point). Nevertheless, as Kleit and Kobayashi themselves admit, it is practically impossible to judge what pattern of slot allocation would result in a surplus-maximizing use of slots (Kleit and Kobayashi, 1996; cf., Borenstein, 1988). Even if an efficient (surplus-maximizing) slot allocation were achieved at some point, it might be only temporarily efficient because of subsequent changes in the demand for airport access. Therefore, although it is no doubt an important policy question whether the dominant slot-holding carriers have used slots in an efficient (surplus-maximizing) way, the equally important policy question is whether slot-holding carriers have intentionally and discriminatorily restricted the opportunities of other carriers, especially rival carriers, to search for more efficient ways of using slots.

Kleit and Kobayashi (1996) and FTC (1994) do not sufficiently address this latter point. The two analyses are limited to data on daily slot ownership and usage, making it impossible to examine whether the slot markets have been abused by slot-holding carriers to force other carriers, especially rival carriers, to accept unfavorable terms of trade. Only GAO (1990) exam-

[3] Uneven slot transfers are defined as slot transfers that are not on a one-for-one basis at the same airport.