



**Slot Allocation Methods in  
Liberalized International Aviation:  
Recommendations to Improve Secondary Trading**

**June 2009**

**Japan International Transport Institute**

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## Section I: Background

In recent years, the concept of the liberalization of international aviation is gaining popularity throughout the world. If this trend continues, there would be more airlines that are interested in adding new routes. This would be accompanied by more demand for access to major international airports. The “access to airports” consists of access to slots<sup>1</sup>, terminals, parking, and other related items. Access to slots is a very important aspect of access to airports. As many of the big airports follow the IATA guidelines and are categorized as “Level 3” airports, without slots airlines could not depart or land at the airport. With liberalization, more demands for slots are expected.

However, capacities are limited at most major international airports in the short run because of the lack of financing for constructing additional runways and/or for upgrading air traffic control systems. In such major international airports, with liberalization, there would be more demand than the available supply of slots.

Therefore, this report aims to explore slot allocation methods that would balance increasing demand with the limitation of slots. First, the report supports a market-based approach to achieve efficient allocation of slots. Second, the report discusses reasons for focusing on secondary trading; as well as the need to improve secondary trading. Third, the report discusses problems associated with the current negotiation-style secondary trading and presents recommendations for improvement.

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<sup>1</sup> In this report, slots are defined as the scheduled time of arrival or departure for allocation by, or as allocated by, a coordinator for an aircraft movement on a specific date at a coordinated airport.

## **Section II: Market-Based Approach for Efficient Slot Allocation**

### **1. Slot allocation should be within capacity limits.**

As the liberalization of international aviation continues, there will be more airlines that will enter into new routes. As routes at major international airports such as Narita International Airport and London Heathrow Airport are deemed profitable, such routes would be popular ones for new entry. Unfortunately, the majority of such airports are categorized as “congested airports” (Level 3) under the IATA World Scheduling Guidelines (WSG). “Congested airports” (Level 3) are defined in the WSG as airports where:

- the demand for airport assets exceeds availability during the relevant period.
- attempts to resolve problems through voluntary schedule changes have failed.
- airlines must have been allocated slots before they can operate at that airport.

It is important that qualified airlines are given as many opportunities as possible to enter such major airports with fewer restrictions within the airport capacity limits. However, if slots are allocated to new entrants without limit then as a result the total number of slots allocated would go beyond the limit; and, operational delay would be generated which can negatively impact passengers’ needs.

To avoid such situations, certainly it is necessary that slot allocation at congested airports should be conducted within the airport capacity limits. In other words, slot allocation should manage both the increasing demand to enter into major international airports and the limits of slots.

## **2. Slot allocation methods should achieve efficiency.**

Considering that slots are scarce due to capacity limits but that demand is increasing, it is essential to ensure that slots are used and allocated “efficiently.” “Efficiency” consists of (1) allocative efficiency, “slots are used for those destinations which are highly valued by society” and (2) productive efficiency, “the total number of slots at each airport is maximized and each slot is being used to move the maximum amount of passengers possible, or to produce the maximum numbers of revenue passenger kilometers.”<sup>2</sup>

The question then arises of whether or not the current slot allocation system achieves efficiency. Under the IATA WSG, slots are essentially awarded on a first-come first-served basis. After being allocated, slots remain assigned to the same airlines as long as they prove that the rate of use of each of their slot is more than the established threshold over the course of each season year. That baseline threshold is currently 80% under the IATA WSG. Given the value of slots and the access they can continue to provide in the future, such a system has an incentive for airlines to use slots sub-optimally. For example, airlines can use a small aircraft such as a Cessna plane to keep their existing slots; effectively holding on to the slot just to meet the 80% baseline.

As slot allocation should be within capacity limits, an effective slot allocation system needs to be one that ensures “efficiency” so that it can maximize consumers’ benefits.

## **3. A market mechanism would be more efficient than an administrative approach.**

In an administrative method, slots which are not utilized efficiently would be taken from the airline on a mandatory basis by the

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<sup>2</sup> Mott MacDonald. Study on the impact of the introduction of secondary trading at community airports. Volume I, November 2006, from 2-4 to 2-5.

government and be placed into a slot pool for allocation to other airlines. Possible methods to improve efficiency by using an administrative approach might include strengthening the threshold of the “use it or lose it” rule under the IATA WSG (e.g. from 80% to 85%), or imposing regulations on aircraft size, and/or on-time performance. For this purpose, however, the slot coordinator or the government would need to set uniform criteria regarding “what constitutes an inefficiently used slot.” This would be an extremely difficult task because defining efficiency would involve various aspects such as the number of passengers, seasonality, market size and profitability of each route, and other factors.

A market-based mechanism achieves efficiency in slot allocation through a price mechanism that either facilitates an airline to use their slot more efficiently or facilitates slots to be transferred to other airlines that would use them more efficiently. If a price mechanism were introduced, those airlines who put the highest possible value on a slot would obtain that slot, enhancing allocative efficiency. This would also enhance productive efficiency by encouraging airlines to fully utilize their slots (e.g., utilization of bigger aircrafts, increase in passenger numbers, and more distant destinations), as they pay for a slot directly, or as they become aware of how valuable a slot is based on the market price.



### **Section III: Secondary Trading as a Market Mechanism**

The slot auction system<sup>3</sup> as discussed in the U.S. is viewed as a means to ensure a certain degree of liquidity (availability of slots) by administrating an expiration of existing slots. On the other hand, this is also viewed as “confiscation” of slots by others. This means a termination of the use of a slot against the will of slot holders which could be a serious problem.

Auctions, as a market mechanism, can be transparent. Auctions are also consistent with economic theory because the highest bidder can be expected to efficiently utilize the slot. Therefore the concept of an auction is a good method but the confiscation of a slot is problematic. Secondary trading<sup>4</sup>, as will be discussed in this report, has the ability to avoid these problems.

Still, secondary trading has yet to develop satisfactorily as described below. Thus far, there have been two cases of interest where secondary trading has been carried out in the real world. But their trading methods are negotiation-style and they are not formalized.

In the EU, secondary trading has occurred at the London Heathrow Airport (LHR). After UK judicial authorities approved Air UK’s monetary slot transfer to British Airways in 1997, they gained attention from the aviation community. However, these transactions by secondary trading

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<sup>3</sup> Auctions sometimes involve slots that are newly available by voluntary return and/or through airport capacity expansion. But as this report deals with how to facilitate airlines to use the slot they are holding more efficiently, this paper focuses on auctions which involve expiration of existing slots that are already held by airlines.

<sup>4</sup> Secondary trading is defined in this report as exchanging or transferring slots by monetary or other considerations once such slots are allocated either administratively or using a market based mechanism such as an auction. A market for secondary trading of slots would allow buyers and sellers with different valuations of slots to trade: low value sellers would sell to high value buyers to the point where no more welfare enhancing trades could be made. In this way, those airlines who put higher value on a slot would obtain a slot, improving allocative and productive efficiency.

have been carried out in a negotiation-style and without a detailed rule regarding transparency being established<sup>5</sup>.

In the U.S. case, secondary trading had been implemented under the Buy-Sell<sup>6</sup> rule between 1986 and 2000. Like the EU, this rule did not require transparency.

To summarize, the secondary market is not formalized. Governments do not have adequate rules and improvement is necessary. In this current negotiation-style trading because of such issues as ambiguity of property rights and the issue of lack of transparency, the secondary market has many uncertainties. Airlines cannot be sure of what they are trading, and furthermore airlines are unaware of what transactions have occurred, and/or at what prices. Additionally, some airlines do not learn that a slot was even available on the secondary market. If such problems of the secondary market are addressed, liquidity would increase and secondary trading would become more vibrant.

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<sup>5</sup> In April 30, 2008, the E.U. Commission approved Secondary-Trading without however establishing a formal rule. Similarly, the Buy-Sell Rule in the U.S. also did not establish a rule.

<sup>6</sup> The rule started in April 1986 at high density airports (ORD, DCA, LGA, and JFK). In 2001 in conjunction with the expiration of the High Density Rule, the Buy-Sell Rule also expired.

## Section IV: Problems with Current Secondary Trading Methods<sup>7</sup>

### 1. Ambiguity of the Definition of Property Rights

In the US Buy-Sell Rule, a slot is defined as an “operating authority.”<sup>8</sup> In the EU secondary trading, a slot is defined as a “permission” to use the airport infrastructure<sup>9</sup>. Such definitions do not make it clear that seller airlines have ascertained property rights i.e., something to sell that sellers would need to have in trading.<sup>10</sup> Therefore, because of the lack of a common understanding of what they are selling or buying, it becomes difficult for sellers and buyers to reach to an agreement on the aspects of a trade such as a price of a slot. To achieve effective secondary trading, it would be necessary to establish and define slot property rights.

### 2. Ambiguity of the Duration of Slots and Repeated Regulatory Changes

In the U.S. Buy-Sell rules and the E.U. secondary trading, buyers are not warranted a duration for the slot. Under this situation, buyers are obliged to bear the risk that their use of slots can be terminated

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<sup>7</sup> This report covers not only outright sales of slots but also leases of slots. Although only the terms “buyers” and “sellers” are used in the report, in a lease, “buyer” means “lessee” and “seller” means “lessor” respectively.

<sup>8</sup> The High Density Rule in the U.S. defines a slot as an “operational authority to conduct one instrumental flight reservation landing or take-off operation each day during a specific hour or 30 minutes operation” (14 CFR § 93.213).

<sup>9</sup> E.U. Regulation 2004/739 defines a slot as “the permission given by a coordinator in accordance with this Regulation to use the full range of airport infrastructure necessary to operate an air service at a coordinated airport on a specific date and time for the purpose of landing or take-off as allocated by a coordinator in accordance with this Regulation.” [Article 1 (1) (a)].

<sup>10</sup> The High Density Rule in the U.S. states that a slot does not represent property rights (14 CFR § 93.223).

Regarding the E.U., the following articles interpret that a slot is not a property right:

- (1) Wit, J. de & Burghouwt, G. Slot allocation and use at hub airports, perspectives for secondary trading. *European Journal of Transport and Infrastructure Research*, Vol.8, (2) (2008), p. 155.
- (2) Czenry, A. et al. *Airport Slots: International Experiences and Options for Reform*. Ashgate, (February 2008) p. 42.

against their own will when the government decides to change the slot system. In addition, because there is uncertainty regarding the duration of a slot, it is difficult for sellers and buyers to reach an agreement on the duration of the slot. The duration of the slot is one of the important factors for sellers and buyers to reach an agreement on the price. Governments could have further contributed to this problem above by repeatedly changing approaches related to slot allocation such as through the introduction of slot exemptions in the U.S.<sup>11</sup>.

### **3. Lack of Transparency**

In the U.S. Buy-Sell rules and the EU secondary trading, transactions by secondary trading have been carried out in a negotiation-style which does not require transparency. As a result, detailed information on the available slots (time of the particular slot, duration, etc.) was not disclosed to prospective buyers. The sellers were able to decide who would be the buyers before the transaction was finished. Further, no information was available publicly regarding past transactions.

Such negotiation-style slot trading brings about the following problems. First, such a system would not provide equal opportunities to all the prospective buyers. Some prospective buyers would not even be aware that a slot is available for a transaction; only the predetermined buyers would be able to participate. Second, such a system fails to provide information that is necessary for the prospective buyers to decide whether to participate in the trading of the slot. Third, because of the lack of such benchmarks as the details of past transactions, it would be difficult for sellers and buyers to determine prices.

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<sup>11</sup> The US Department of Justice. *Congestion and Delay Reduction at Chicago O'Hare International Airport*. (May 24, 2005) p. 9.

#### **4. Tendency of Incumbent Carriers to Limit Availability to Competitors**

Under the current system, those incumbent carriers holding slots would be inclined to limit competition rather than allowing entry by selling their slots to competitors.

In this situation, the open identity of the prospective buyer would be a problem. First, if the sellers know that the prospective buyers are their competitors, they would never want to sell their slots to them. Second, another difficulty prospective buyers face is that other incumbent carriers may also view them as competitors. Such incumbent carriers would be inclined to prevent competition by outbidding the new entrant for the slot.<sup>12</sup>

#### **5. Political Means to Obtain Slots**

There is a strong likelihood that carriers would not utilize secondary trading to obtain slots if they are able to obtain slots by other methods outside the market without a monetary payment. For example, using politics in order to increase the number of slots or even to abolish the cap of slots would be such a method. This would be a problem not only for the effectiveness of secondary trading but also for keeping the number of slots equivalent to the capacity limit to avoid congestion.

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<sup>12</sup> The US Department of Justice. *Congestion and Delay Reduction at Chicago O'Hare International Airport*. (May 24, 2005) p. 6-8.

## **Section V: Recommendations for Effective Secondary Trading<sup>13</sup>**

The following points are actions which could be taken to establish an effective secondary trading system to improve efficient allocation of slots.

### **1. Conduct a Technical and Procedural Analysis to Determine the Number of Hourly Slots Available (Airport Capacity)**

For the purpose of avoiding the problem of an arbitrary change in the number of slots by political means, it would be necessary to ensure that decision-making on the number of slots be conducted in a transparent manner based on an adequate technical and procedural analysis.

### **2. Clarify Property Rights and Grandfather Existing Operations**

It would be necessary to ensure that each airline would be accorded a property right in relation to arrival or departure at a time as stipulated by the slot to ensure that sellers have a defined object to sell. Such a property right would need to be clarified in terms of the legal nature of the right. Additionally, the duration of time in which an airline can exercise the right would also need to be clarified. Furthermore, for the purpose of avoiding adverse impacts due to the termination of existing airlines' service, it would be necessary to grandfather existing operations to existing airlines at an airport.

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<sup>13</sup> Some would point out that secondary trading would facilitate selling of slots that are used for essential air services (EAS) that are not profitable and would adversely affect EAS. The report assumes that this is not a problem associated with secondary trading itself. It assumes that this is an issue of whether government authorities require airlines to keep EAS or not. For this reason, the report does not discuss this matter.

### **3. Establish a Transparent, Blind, Equitable, Vibrant Secondary Market**

#### **(1) Disclosure of Information on Slots Being Traded**

In secondary trading, detailed information of the available slot (such as time of day, length of availability, etc.) would need to be disclosed. If the slots have some operational conditions such as gate, schedule, and terminal information, it should be clearly specified and made available in a transparent way.

#### **(2) Disclosure of Information on Past Transactions**

If information on past transactions is disclosed in detail then sellers could recognize the value of their slots and determine prices to sell their slots. Therefore, the seller could decide if it is in their best interest to sell their slot. The buyer also could get important information to judge the value of the slot. Therefore, past purchase and sales information should be disclosed to ensure that the secondary trading market mechanism works well.

#### **(3) Ensuring the Anonymity of the Buyer's Identity**

For the purpose of avoiding a buyer's difficulty in purchasing slots from competing sellers, secondary trading would need to be conducted in a "blind" manner in which the buyer's identity would be kept anonymous.

#### **(4) Determine the Successful Bidder on the Basis of "Highest Bid Gets the Slot"**

In secondary trading, if market principles based on price competition are to function well, those who bid the highest price should get the slot. This rule is very simple and transparent. Therefore, the transaction of the slot ensures transparency and

fairness in secondary trading.

Another consideration is that secondary trading already has been conducted with negotiation, and monetary considerations have not been the only factor. Therefore, for the purpose of increasing liquidity, a hybrid system<sup>14</sup> could still be debated further, in which negotiation is combined with the concept of “the highest bidder wins.”

#### **4. Monitoring Anticompetitive Activities**

Secondary trading might result in dominance by buyers causing harm to competition. This could result in a significant reduction in consumers’ benefits. Secondary trading should be monitored by governments to prevent the reduction of consumer satisfaction. In secondary trading, it would be necessary to facilitate a higher level of compliance to antitrust laws.

In order to monitor activities, first, it would be appropriate to ensure that government agencies collect information on all transactions and monitor them closely. Anticompetitive activities tend to take place in hidden environments. Participants would stop anticompetitive activities if they were to face more possibilities in which such activities would be discovered. Second, it would also be appropriate for government agencies to establish guidelines specifying examples of possible anticompetitive activities. It is very hard for companies to distinguish whether their activities are illegal under anticompetitive laws. With such guidelines, participants would be able to assess their activities and avoid anticompetitive activities.

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<sup>14</sup> The “rule based on market mechanism” that we refer to here was the so-called “blind buy and sell” carried out at Chicago O’Hare since 2005. In this rule, the FAA established the bulletin board, the buyers were identified as anonymous, and the highest bidder had an opportunity to purchase the slot. This rule also approved trading through negotiation as well.



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