Malaysian Aviation Commission
Suruhanjaya Penerbangan Malaysia
MAVCOM

# TECHNICAL PAPER

**MANAGING AIRPORT DEMAND: THE ROLE OF AIRPORT SLOTS** | **DECEMBER 2019**

**This Technical Paper is published with the WAYPOINT December 2019 report and discusses issues on the role of slots in managing airport demand.**

## EXECUTIVE SUMMARY

A slot is a permission given to airlines to utilize the full range of airport infrastructure that is related to their take-off or landing operations. Slot allocation is widely used to address airport congestion. An airport is classified as congested when its infrastructure is incapable of coping with the demand at almost all times (Level 3) or during peak periods (Level 2). This classification is based on the International Air Transport Association (IATA) Worldwide Slot Guidelines (WSG), which is the primary document guiding slot allocation internationally. Globally, there are approximately 200 Level 3 airports, 12 of which are in Southeast Asia.

For Malaysia, only KUL is classified as a Level 3 airport. However, nine other airports also face terminal capacity constraints, handling more passengers than their terminals' respective design capacities. In addition, there are also concerns over efficient infrastructure utilization due to constraints on aircraft movements in airports such as KUL. Certain congestion issues may require infrastructure expansion as a long-term solution. However, other solutions such as increasing airports' operational efficiency, upgrading air traffic management system, and improving slot allocation practices should first be exhausted.

Slot allocation in Malaysia is carried out by the National Slot Coordination Malaysia (NSCM) in accordance with the WSG. However, the WSG only provides key principles for slot allocation. As done in other jurisdictions, Malaysia should develop accompanying guidelines to the IATA WSG to prescribe complementing metrics on the application of the key principles and enhance slot allocation practices, considering the local aviation environment.

The Malaysian Aviation Commission (MAVCOM), as the economic regulator of the civil aviation industry, is responsible for supervising the slot allocation. MAVCOM is responsible for monitoring the management of the slot allocation process, as well as, ensuring that the practices are not anti-competitive, given its authority over competition matters in aviation services. Slots related measures are also relevant as possible remedies in competition applications or cases, such as in exemption applications or mergers.

In addition to slots, airlines services are also subject to the availability of air traffic rights (ATRs). The exchange of ATRs between States, allocation of ATRs and slots to airlines, and application for landing permits are undertaken separately. In this regard, MAVCOM has developed the Aerofile system as a 'one-stop' centre for airlines for landing permit filings, integrating the processes of the NSCM for slot allocation, MAVCOM for ATR allocation, and the Civil Aviation Authority of Malaysia (CAAM) for technical approval.

# ABBREVIATIONS

| Abbreviations | |
|---|---|
| ACA | Airports Coordination Australia |
| ACCC | Australian Competition and Consumer Commission |
| ACI | Airports Council International |
| ACL | Airport Coordination Limited |
| Act 771 | Malaysian Aviation Commission Act 2015 |
| AECFA | Slot Coordination – Spanish Airports |
| Aena | Aena SME, S.A. |
| APC | Australia Productivity Commission |
| ASA | Air Services Agreement |
| ASEAN | Association of Southeast Asian Nations |
| ATR | Air traffic right |
| AUD | Australia Dollar |
| BAA | British Airports Authority |
| BMI | British Midlands Airways Limited |
| BSC | Belgium Slot Coordination |
| CAA | Civil Aviation Authority |
| CAAM | Civil Aviation Authority of Malaysia |
| CAB | Civil Aeronautics Board |
| CAD | Canada Dollar |
| CAPA | Centre for Aviation |
| capex | Capital expenditure |
| CCCS | Competition and Consumer Commission of Singapore |
| CMA | Competition and Markets Authority, UK |
| COHOR | Airport Coordination France |
| DOC | Department of Commerce, US |
| DOJ | Department of Justice, US |
| EC | European Commission |
| EEC | European Economic Community |
| EU | European Union |
| EUMR | European Union Merger Regulations |
| EUR | Euro |
| FAA | Federal Aviation Administration, US |
| FAC | Federal Airports Commission, Australia |
| FCC | Federal Communications Commission, US |
| FHKD | Airport Coordination Germany |
| FSC | Full-service carrier |
| GBP | Pound Sterling |
| GoM | Government of Malaysia |
| HAL | Heathrow Airport Holdings Limited |
| IATA | International Air Transport Association |

| Abbreviations | |
|---|---|
| ICAO | International Civil Aviation Organization |
| JSAG | Joint Slot Advisory Group |
| LCC | Low-cost Carrier |
| MAHB | Malaysia Airports Holdings Berhad |
| MAS | Malaysian Airlines System |
| MAVCOM or the Commission | Malaysian Aviation Commission |
| MyCC | Malaysia Competition Commission |
| NSCM | National Slot Coordination Malaysia |
| OA | Operating Agreement |
| OFT | Office of Fair Trading, UK |
| SGD | Singapore Dollar |
| SPWG | Slot Policy Working Group |
| TFEU | Treaty on the Functioning of the European Union |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UK DOT | Department for Transport, UK |
| US | United States of America |
| US DOT | Department of Transportation, US |
| USD | United States Dollar |
| v.v. | vice versa |
| WSG | Worldwide Slot Guidelines |
| WWACG | World Wide Airport Coordinators Group |

# AIRPORT CODES

| Abbreviations | |
|---|---|
| ADL | Adelaide International Airport, Australia |
| AOR | Sultan Abdul Halim Airport, Malaysia (Alor Setar) |
| AMS | Amsterdam Airport Schiphol, The Netherlands |
| BHX | Birmingham Airport, UK |
| BKI | Kota Kinabalu International Airport, Malaysia |
| BKK | Suvarnabhumi Airport, Thailand (Bangkok) |
| BNE | Brisbane Airport, Australia |
| BTU | Bintulu Airport, Malaysia |
| CAN | Baiyun International Airport, China (Guangzhou) |
| CDG | Charles de Gaulle Airport, France (Paris) |
| CGK | Soekarno-Hatta International Airport, Indonesia (Jakarta) |
| CNS | Cairns Airport, Australia |
| DAC | Shahjalal International Airport, Bangladesh (Dhaka) |
| DCA | Ronald Reagan Washington National Airport, US |
| DMK | Don Mueang International Airport, Thailand (Bangkok) |
| DRW | Darwin International Airport, Australia |
| EWR | Newark Liberty International Airport, US |
| FUK | Fukuoka Airport, Japan |
| FRA | Frankfurt am Main Airport, Germany |
| HKG | Hong Kong International Airport, Hong Kong |
| HND | Haneda Airport, Japan (Tokyo) |
| IPH | Sultan Azlan Shah Airport, Malaysia (Ipoh) |
| JFK | John F. Kennedy International Airport, US (New York City) |
| JHB | Senai International Airport, Malaysia |
| KBR | Sultan Ismail Petra Airport, Malaysia (Kota Bharu) |
| KCH | Kuching International Airport, Malaysia |
| KUA | Sultan Haji Ahmad Shah Airport, Malaysia (Kuantan) |
| KUL | Kuala Lumpur International Airport, Malaysia |
| KUL-T1 | Kuala Lumpur International Airport Terminal 1, Malaysia |
| KUL-T2 | Kuala Lumpur International Airport Terminal 2, Malaysia |
| KTE | Kerteh Airport, Malaysia |
| LAX | Los Angeles International Airport, US |
| LBU | Labuan Airport, Malaysia |
| LCY | London City Airport, UK |
| LDU | Lahad Datu Airport, Malaysia |
| LGA | LaGuardia Airport, US (New York City) |
| LGK | Langkawi International Airport, Malaysia |
| LGW | Gatwick Airport, UK (London) |
| LHR | London Heathrow Airport, UK |
| LMN | Limbang Airport, Malaysia |

| Abbreviations | |
|---|---|
| LTN | London Luton Airport, UK |
| MAN | Manchester Airport, UK |
| MCO | Orlando International Airport, US |
| MEL | Melbourne Airport, Australia |
| MKZ | Melaka International Airport, Malaysia |
| MYY | Miri Airport, Malaysia |
| MZV | Mulu Airport, Malaysia |
| NRT | Narita International Airport, Japan (Tokyo) |
| OOL | Gold Coast Airport, Australia |
| ORD | O'Hare International Airport, US (Chicago) |
| PEN | Penang International Airport, Malaysia |
| PER | Perth International Airport, Australia |
| PVG | Pudong International Airport, China (Shanghai) |
| SBW | Sibu Airport, Malaysia |
| SDK | Sandakan Airport, Malaysia |
| SEA | Seattle-Tacoma International Airport, US |
| SIN | Singapore Changi Airport, Singapore |
| SFO | San Francisco International Airport, US |
| STN | London Stansted Airport, UK |
| SYD | Kingsford Smith Airport, Australia (Sydney) |
| SZB | Skypark Terminal Sultan Abdul Aziz Shah Airport, Malaysia (Subang) |
| TGG | Sultan Mahmud Airport, Malaysia (Kuala Terengganu) |
| TWU | Tawau Airport, Malaysia |
| XSP | Seletar Airport, Singapore |

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## INTRODUCTION

An airport slot is valuable as it enables airlines to undertake operations between airports, particularly at congested airports, where the demand for the use of infrastructure exceeds the supply. Slots play a crucial role in managing airport demand. As such, a slot is defined as:

*"a permission given by a coordinator for a planned operation to use the full range of airport infrastructure necessary to arrive or depart at a Level 3 airport on a specific date and time".*[1]

The attempt to match airport demand and supply poses several regulatory and policy challenges. In terms of supply, capacity enhancement requires airports to improve the operational efficiency and expand or build new infrastructure. However, airport expansion is fraught with various financial, legal, and environmental challenges. Therefore, slot allocation is widely used as an interim mechanism to manage the demand for scarce airport infrastructure.

Slot allocation practices worldwide are generally guided by the IATA WSG, either through direct adoption or incorporation into local laws. The WSG outlines the key principles involved in the allocation of slots to ensure consistency in slot allocation practices and the smooth functioning of global air travel. In Malaysia, Article 67 of the Malaysian Aviation Commission Act 2015 (Act 771) empowers MAVCOM to regulate slot allocation, which is currently undertaken by NSCM.

This Technical Paper discusses the role of slots in managing airport demand. Reference is made to International Civil Aviation Organization (ICAO) and IATA principles, as well as, local rules and regulations on slot allocation and competition. This Technical Paper is organized as follows:

- **Section 1** describes how congestion at an airport occurs and how it can be addressed through several measures.
- **Section 2** provides an overview of airport slots and slot allocation rules, describing the role of the WSG and local laws in selected jurisdictions.
- **Section 3** focuses on the effectiveness of existing slot regulations, highlighting the challenges associated with the WSG. This section also discusses possible market solutions to overcome slot scarcity.
- **Section 4** discusses various competition issues that arise from slot allocation practices and the applicability of competition law in slot allocation practices in selected jurisdictions.
- **Section 5** analyzes key developments and future trends relating to slot allocation, highlighting the continuous investments in technology and infrastructure needed alongside increasing air transport liberalization.
- **Section 6** concludes.

[1] IATA (2019a).

# SECTION 1: AIRPORT OPERATIONS AND CONGESTION

An airport can be defined through its physical infrastructure. In planning for the design of an airport, both physical infrastructure and airspace considerations are factored in to determine the volume of passengers that an airport can accommodate to. However, given that an airport can be constrained due to various factors such as increasing air traffic and limitations in air traffic control, increasing airport demand can lead to congestion.

This Section looks at the definition of an airport in terms of its infrastructure and discusses airport congestion, specifically its sources and solutions.

## What is an Airport?

According to the ICAO, an airport is a type of aerodrome. An aerodrome refers to a defined area of land that is utilized for the operations of an aircraft. Meanwhile, an airport refers to the aggregation of infrastructure within an aerodrome that is used together with the operations of an aircraft. Therefore, an airport can be viewed as being a subset of an aerodrome. Other types of aerodromes may include, for example, airstrips.

In Malaysia, Act 771 defines an aerodrome in the same manner as that of ICAO. Additionally, Act 771 defines airports as:

*"the aggregate of the lands comprised within an aerodrome including buildings, aircraft hangars, storage, facilities, roads and car parks used or intended to be used in whole or in part for the purposes of or in connection with the operation of such aerodrome".*

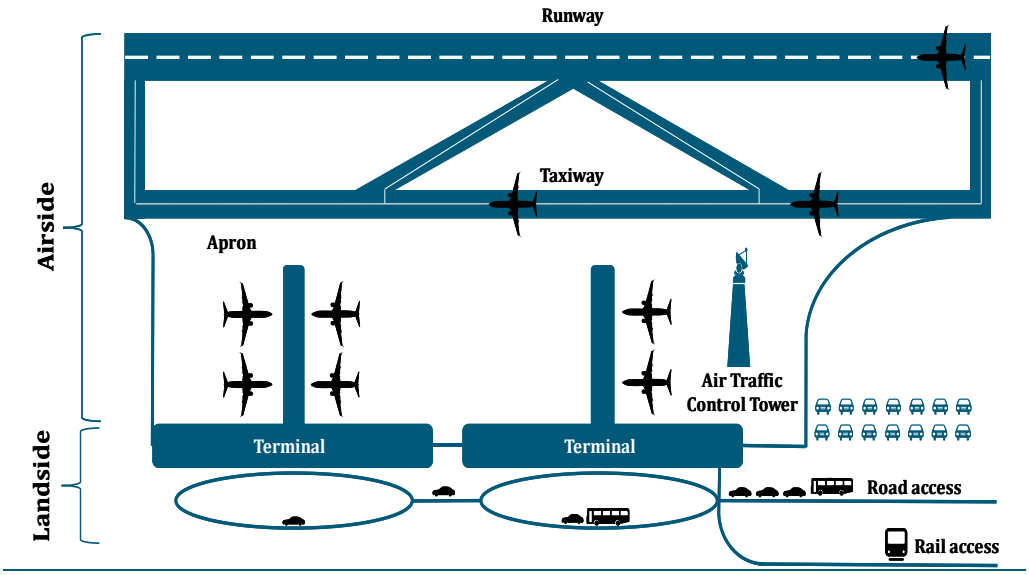
### Airport Planning

#### *Physical Infrastructure*

Airports generally consist of landside and airside areas. The landside area includes the entry area of an airport such as access roads and other ground transportation connections. The airside area is a secure part of an airport that includes the runway, taxiway, apron, and part of the terminal building—generally the areas after immigration clearance such as the departure gate. The terminal consists of the arrival and departure sections. It serves as intermediary and provides a controlled access between the airside and landside areas. The terminal also houses functions such as check-in, security clearance, and baggage handling.

Figure 1 depicts the general layout of an airport.

**Figure 1: Layout of an Airport**




*Source: MAVCOM*

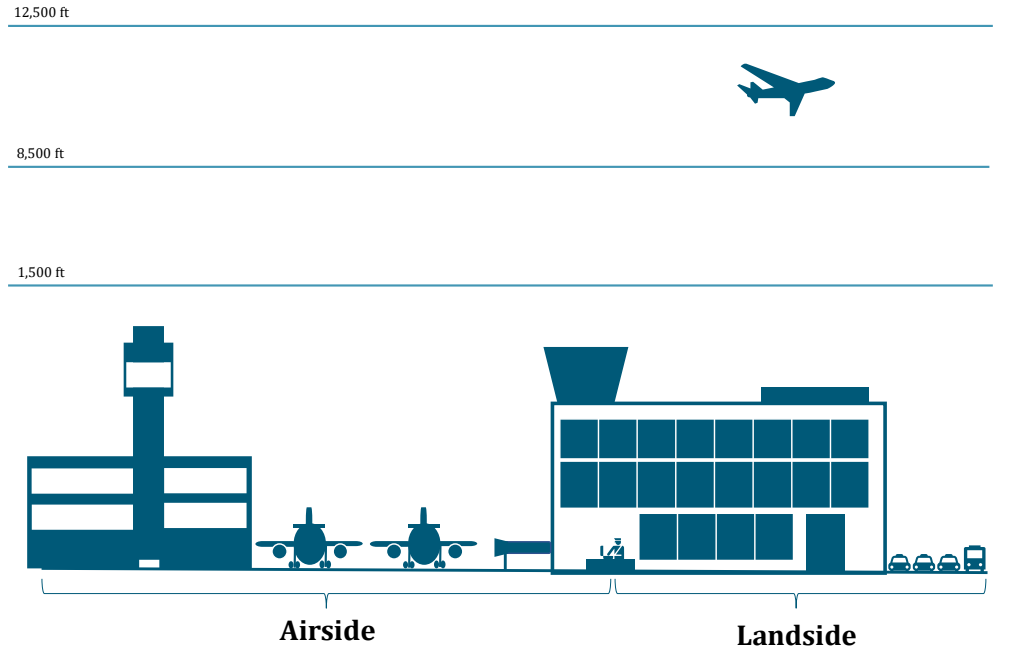
### *Airspace*

Airspace capacity is also a factor in airport operations. Airspace is usually monitored and managed actively by air traffic controllers according to international rules set by ICAO. Entry into the airspace of an airport, which includes landing and take-off operations, requires an aircraft to request permission from the controllers.

Airspace congestion may restrict the capacity of an airport, and thus it is important to undertake adequate airspace management to ensure that an airport can be utilized efficiently. Airspace classification is provided by ICAO for each State to consider in its airspace design. The classification divides an airspace by classes, with each class involving different interactions between an aircraft and air traffic control services, as well as, differing altitudes.

Figure 2 depicts an example of the levels of airspace in a State.

**Figure 2: Airspace Layout Against Airport**




*Source: MAVCOM*

## Airport Congestion

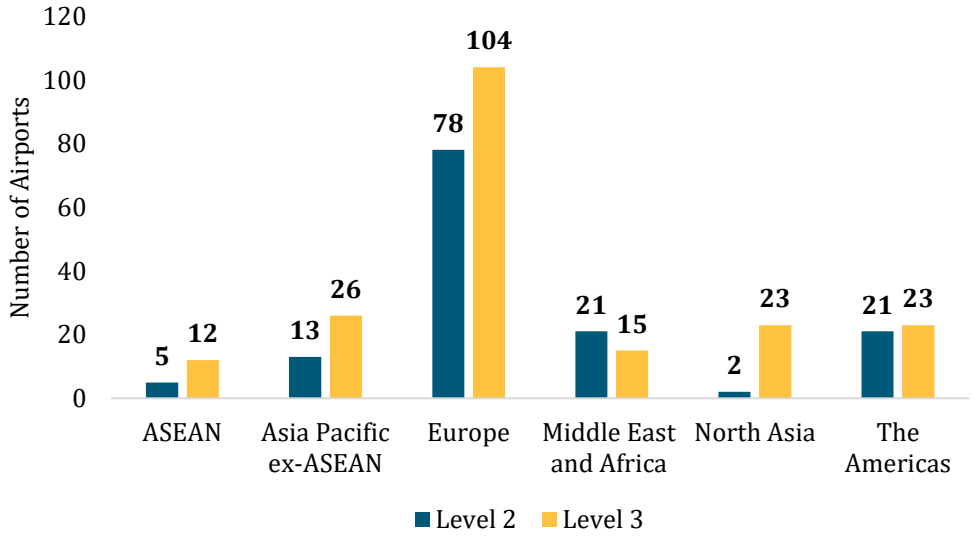
### Classification of Airport Congestion

According to WSG standards, airports can be classified into three categories based on different levels of congestion:

- **Level 1:** airports where the infrastructure is always capable of coping with demand
- **Level 2:** airports where the infrastructure is capable of coping with demand at most times. Level 2 airports may be congested during certain times of the day, week, or season
- **Level 3:** airports where the infrastructure is incapable of coping with demand most of the time. Level 3 airports are congested owing to very high demand or a lack of physical infrastructure

Level 3 airports (e.g. FRA, LHR, SIN) are usually located in major cities worldwide and attract a significant number of airlines, while Level 1 and Level 2 airports are typically located outside major cities. Figure 3 depicts the number of Level 2 and Level 3 airports by region for the IATA Summer 2019 season[2].

**Figure 3: Number of Level 2 and 3 Airports by Region for the IATA Summer 2019 Season**




*Source: IATA (2019b)*

There were 140 and 203 airports globally at Level 2 and 3, respectively, for the Summer 2019 season. A majority of these airports (56% and 51% of Level 2 and 3 airports, respectively) were in Europe, highlighting the level of congestion faced by European airports. Meanwhile, airports in the Association of Southeast Asian Nations (ASEAN) made up 4% and 6% of Level 2 and 3 airports worldwide, respectively. The number of airports in the Level 2 and 3 categories can differ between the IATA Summer and Winter seasons, as the lower demand for air travel in the Winter season would usually result in fewer congested airports.

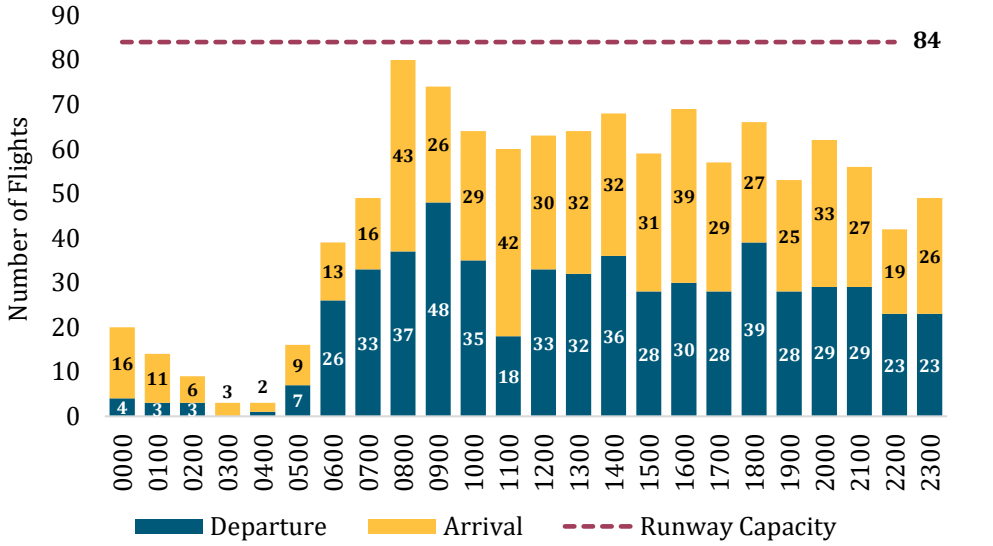
In Malaysia, only KUL was designated as a Level 3 airport. Other airports in the country have not been classified by IATA owing to either the lack of congestion or that these airports have not undergone a capacity declaration exercise. According to IATA, airport operators are recommended to periodically assess the capacity at airports to consider the changes in all forms of infrastructure. The capacity declaration exercise can be undertaken in consultation with, but not limited to, air traffic control authorities, ground handlers, and immigration authorities.

The infrastructure assessed should be wide-ranging, including aircraft parking bays, runway capacity, and check-in counters. Therefore, an airport's capacity may not necessarily be constrained by one form of infrastructure.

[2] The IATA Summer season is between the last Sunday in March and the eve of the last Sunday in October. The Winter season is between the last Sunday in October to the eve of the last Sunday in March the following year.

For example, the declared hourly aircraft movement capacity at KUL is only 84. This is despite KUL having a three wide-spaced parallel runway system which can accommodate more than 100 aircraft movements per hour and 161 aircraft stands.[3] This may indicate that there are constraints in other infrastructure at KUL. Figure 4 depicts the flight distribution at KUL against the maximum hourly runway capacity.

**Figure 4: Flight Departure and Arrival Distribution at KUL Against Maximum Hourly Runway Capacity, IATA Summer 2019 Season**




*Source: AirportIS*

The classification of airport congestion is dynamic. For example, Level 2 airports may be reclassified as Level 3 airports when demand outstrips capacity at most times. Conversely, it is also possible for a Level 3 airport to be reclassified as a Level 2 airport if infrastructure expansion takes place to alleviate congestion or there is a decline in demand. Furthermore, as mentioned earlier, the classification of airports may also differ between seasons.

IATA recommends that a demand and supply capacity analysis be undertaken at Level 2 and Level 3 airports twice yearly to ascertain its classification. Additionally, for Level 3 airports, periodic consultation must take place with all stakeholders to affirm its classification. For Level 1 airports, a demand and supply capacity analysis can take place as and when required. The capacity declaration resulting from this analysis serves as the basis for determining the number of slots available at an airport.

## Sources of Airport Congestion

### *Increasing Air Traffic*

A leading cause of airport congestion is the increasing demand for air travels, arising from airlines' hub-and-spoke business model and the liberalization of Air Service Agreements (ASAs) between States.

[3] MAVCOM (2019).

The hub-and-spoke business model of airlines—mainly full-service carriers (FSCs)—has resulted in passengers preferring to travel at convenient times of the day to minimize the waiting time for connecting flights. As a result, a high number of passengers would arrive or depart within a short period of time. Additionally, the liberalization of ASAs between States has resulted in a vibrant aviation market with intense competition between airlines, thus, increasing congestion at airports.

In Malaysia, passenger traffic had increased from 65.3mn in 2011 to over 100mn in 2018. The increase in passengers led to capacity constraints in ten of the 42 airports in Malaysia. For example, KUL-T1 experienced a terminal utilization rate of 113.2% in 2018 as it handled 28.3mn passengers in a terminal designed for 25mn passengers annually.

### *Constraints in Air Traffic Control Services*

Airport congestion can also be caused by constraints in air traffic control services. Air traffic control authorities, which are responsible for airspace management in a country's airspace, facilitate aircraft movements at airports. Like airports, airspace can also experience congestion when demand exceeds capacity. In this regard, the central role of air traffic control is to promote the safe, orderly, and expeditious flow of air traffic.[4] In Malaysia, air traffic control services are provided by CAAM.

Despite KUL having three runways, the declared hourly aircraft movement capacity is only 84, whereas LGW can operate 55 aircraft movements per hour with only one runway.[5] KUL's relatively low hourly aircraft movement (despite a theoretical limit of 108 movements) may be attributed to constraints in air traffic control services. Recognizing this, the Eleventh Malaysia Plan stated that the Communication, Navigation and Surveillance, and Air Traffic Management systems will be upgraded to improve the efficiency of air navigation services, especially at KUL.

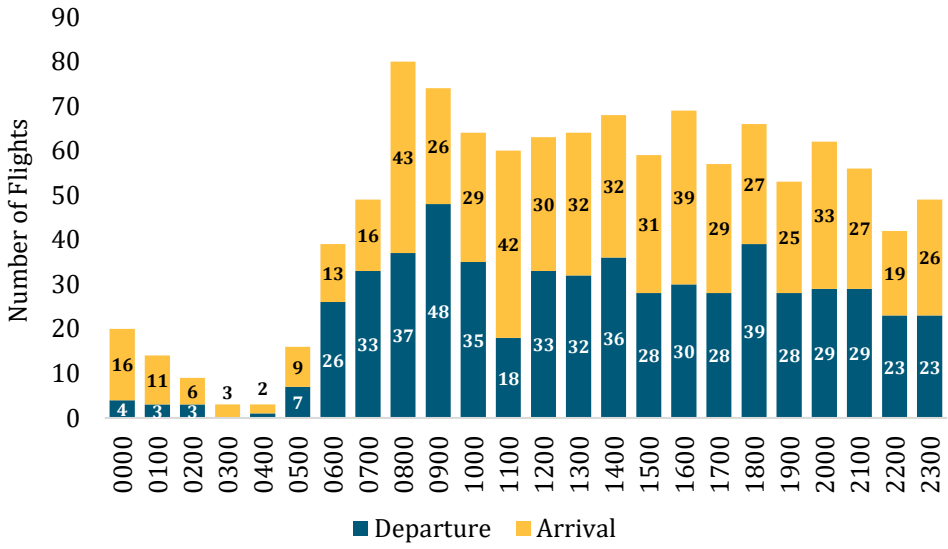
### *Airlines' Preferences in Scheduling*

Airlines, particularly at hub airports, prefer to schedule flights around certain times of the day to reduce waiting times for onward connections. This preference is closely linked to their network structure, which offers passengers greater options in terms of destinations and connections. As such, airlines may schedule many flights to depart or arrive within minutes of each other[6] to minimize waiting time for passengers. This would lead to certain peak hours of operations at an airport, which can exacerbate congestion.

[4] CAAM (2015).
[5] ACL (2016).
[6] This wave of flight departures and arrivals is called bank structure. Different airports may have different bank structures, depending on the type of airlines operating at the airport.

Figures 5 and 6 depict the bank structures at KUL and BKI, respectively. At KUL, aircraft movements peak period can be observed to be between 0800 and 1000, as well as, between 1400 and 1600.

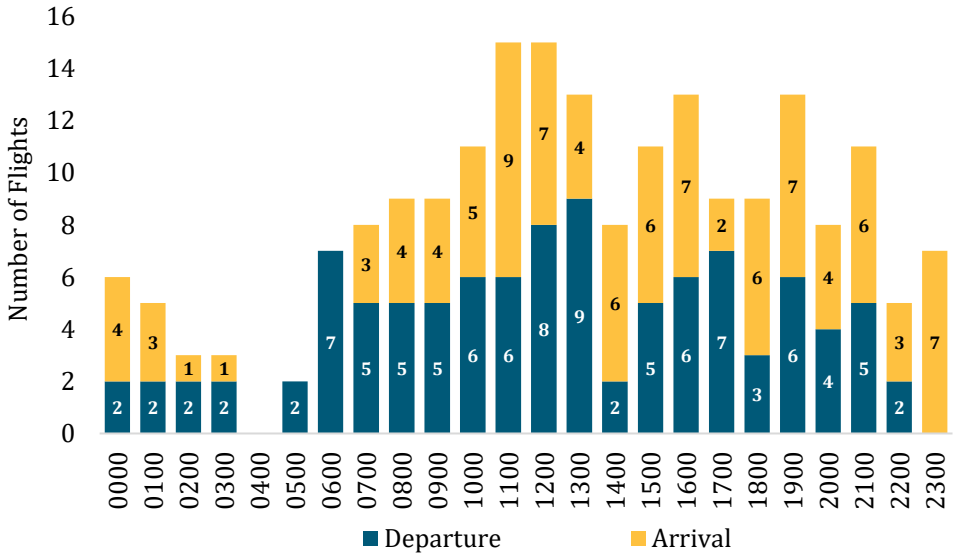
**Figure 5: Flight Departure and Arrival Distribution at KUL, IATA Summer 2019 Season**




*Source: AirportIS*

Meanwhile, at BKI, the peak periods can be observed to be between 1100 and 1300, and between 1900 and 2100.

**Figure 6: Flight Departure and Arrival Distribution at BKI, IATA Summer 2019 Season**




*Source: AirportIS*

## Solutions to Airport Congestion

Airport congestion may be addressed through different measures, such as infrastructure expansion, congestion pricing, and slot allocation.

### *Long-Term Solution: Airport Infrastructure Expansion*

The expansion of airport infrastructure is a long-term solution to airport congestion. It increases the airport capacity to enable a higher number of aircraft movements and passenger traffic. The expansion of infrastructure could involve terminals, runways, and aprons, among others.

A recent example of airport expansion is in Thailand. The Thai Government's decision to adopt a three-airport policy in Bangkok signifies its desire to address current congestion and meet future demand. DMK was the main international airport in the country until 2006 when BKK was opened to overcome DMK's congestion. In 2016, IATA highlighted the serious risk of congestion at BKK, citing safety concerns pertaining to the runway tarmac, taxiways, and the apron area.[7] As a result, a third runway and a new terminal are being constructed in BKK to expand its capacity. As a longer-term solution, the Thai Government also decided to invest in airspace improvements and air traffic management upgrades to complement the infrastructure expansion. It is also considering the construction of a new airport in Bangkok in addition to BKK and DMK.[8]

Similarly, in Singapore, the growth of passenger traffic at SIN over the years led to the ongoing development of a third runway and a fifth terminal. This could potentially double the airport's capacity to 135mn passengers annually upon its completion in 2030. This move aims to maintain SIN's hub airport status in Southeast Asia and Asia Pacific, as well as, to capture the increasing passenger traffic in the region.[9]

However, the expansion of existing infrastructure or the construction of new facilities are subject to several challenges, as follows:

- **Lack of available surrounding land:** the expansion of existing airports may depend on there being surrounding vacant land and the consent of the neighboring community. For example, in 2018, the United Kingdom (UK) Government recommended the expansion of LHR to cater to the growing aviation market.[10] However, the expansion of LHR would entail the expropriation of surrounding residential areas and will increase noise and air pollution around the airport. Despite the offer of a generous compensation to all those who would lose their homes and the imposition of a noise limit and a daily flight curfew, local authorities in London and environmental groups objected to the expansion. Legal challenges are expected to continue, possibly delaying the commencement of the project.

[7] Reuters (2016).
[8] CAPA (2018).
[9] Changi Airport Group (2017).
[10] Financial Times (2019).

- **Long lead time for construction:** it may be difficult for airport developers to plan for appropriate airport infrastructure due to uncertainty regarding future passenger traffic and the long lead construction time. Changes in airline business models, aircraft technology, and other developments in aviation technology may significantly alter the demand of an airport. If design flexibility is not factored in, airports may not be able to respond to the changing demands of the aviation industry.

- **Constraints in airport funding:** airport developments are costly endeavor. Hence, they need to be governed by clear regulatory frameworks. In Malaysia, the Operating Agreement (OA) between the Government of Malaysia (GoM) and Malaysia Airports Holdings Berhad (MAHB) governs these arrangements. Development capex—including airport expansions—falls under the responsibility of the GoM. MAHB may incur its own development capex, subject to approval from the GoM.

- **However, in practice, the delineation of responsibilities over development capex has been unclear;** for example, the construction of KUL-T2 undertaken by MAHB. While the GoM is contractually obligated to compensate MAHB for such development capex, there is a lack of clarity over processes, procedures, or timelines for such compensation to take place. Further exacerbating this issue is the limited financial capacity of the GoM and MAHB to fund airport development projects. Additionally, there is no formal allocation of funding responsibilities for certain categories of airport infrastructure, such as air traffic control, customs, immigration, and quarantine facilities, as well as, meteorological towers.

  Constraints over airport funding are not unique to Malaysia. Concerns remain over the funding ability of Heathrow Airport Holdings Limited (HAL) towards LHR's proposed third runway. Estimated at a cost of GBP14bn[11], EU state aid rules have limited the ability of the UK government to provide funding to private companies such as HAL. Increased borrowings may affect the financial standing of HAL, which could lead to higher charges for passengers or airlines to finance the construction cost, or a bailout by taxpayers.

### *Price-Based Solution: Congestion Pricing*

Given the challenges associated with infrastructure expansion, some countries have adopted demand management mechanisms such as congestion pricing to address airport congestion. Congestion pricing entails the imposition of congestion fees to airlines for using the airport infrastructure throughout different times of the day. A congestion fee represents the marginal cost of landing on a runway at a certain time.[12]

[11] Financial Times (2018).
[12] Schank (2005).

As demand for airports is high during peak hours, the marginal cost of landing operations would be the highest relative to other periods of the day, which denotes that airlines would have to pay more for the right to land during peak periods. This is to incentivize some peak traffic to shift to non-peak hours when the congestion fee is relatively lower, thus, alleviating airport congestion.

However, congestion pricing is subject to several challenges:

- **Penalizes airlines:** congestion pricing may not provide airports with the incentive to improve or expand existing infrastructure as the cost of the congestion is borne by airlines. Additionally, an airline may also be charged a higher congestion fee as a result of arriving during peak hours due to an earlier delay from the departing airport, even though the delay was not caused by the airline.

- **True value of the congestion may be difficult to determine**: congestion pricing may be challenging to calculate as the true value of airport infrastructure to each airline may be difficult to determine. Congestion pricing assumes that all landing or take-off times are valued equally by each airline. However, information asymmetry between airport and airlines may prevent an airport from pricing congestion fees accurately as airlines have different considerations in setting their flight schedules. These may include the airlines' bank structure that allows passengers arriving or departing from one airport to access their onward flight connections throughout certain periods of the day.

  This information asymmetry can lead to congestion pricing being set too low—negating the effect of congestion pricing in the first place—or result in high prices, which would raise the costs for airlines, disincentivize business expansion at the airport, and even lead to an airline withdrawing operations at an airport altogether.

Countries such as the UK and Australia adopted congestion pricing between the 1960s and 1990s. Box 1 describes the details and the complexities of the congestion pricing mechanisms implemented in the past.

*Box 1: Congestion Pricing in the UK and Australia*

*Congestion pricing in the UK*

In the UK, the then British Airports Authority (BAA) implemented a congestion pricing policy in 1972 through the imposition of a surcharge that varied with the time of the day and with seasons.[13]

[13] Schank (2005).

Between 1972 and 1984, the landing fees at LHR were altered numerous times, with each change incorporating different elements to the way landing fees were calculated (see Table 1).

**Table 1: Changes in Pricing Structure in LHR, 1972 – 1984**

| Year | Change |
|---|---|
| 1972 | Landing charges imposed based on distance and passenger count charges in addition to the pre-existing weight charge |
| 1976 | Peak passenger charge introduced<br>Geographical classifications changed to five distance-based classifications |
| 1977 | 50% rebate during off-peak periods introduced |
| 1978 | Distance-related element eliminated<br>Peak aircraft parking charges introduced |
| 1980 | Peak operations charge eliminated, replaced by fixed element in weight charge |
| 1984 | 50% off-peak rebate eliminated |

*Source: Schank (2005)*

However, United States (US) carriers opposed the introduction of the distance charge and accused the BAA of penalizing them unfairly. This charge was replaced by a peak period charge in 1978. However, US carriers continued to feel unfairly penalized and subsequently sued the BAA which eventually resulted in the case being settled out of court in favour of the carriers and the revised fee withdrawn.

The BAA then introduced higher peak landing charges and was again met with even stronger resistance by US carriers. The carriers took the BAA to international arbitration in 1988, which resulted in the carriers being awarded USD29.5mn in compensation. The BAA then moved to a new method in determining landing charges, one that would not discriminate against airlines. The arbitration had noted that the BAA's method of ascertaining marginal cost to determine the congestion price had been imprecise, highlighting the challenges associated with determining congestion pricing.

### *Congestion pricing in Australia*

In 1991, the Federal Airports Commission (FAC) of Australia introduced a peak period landing and take-off surcharge of AUD250 at SYD.[14] Additionally, a 'shoulder surcharge' around the peak periods daily was also imposed, priced at AUD200 per landing and AUD100 per take-off. These surcharges were introduced to regulate the demand for airports by discouraging smaller aircraft from operating during peak periods, freeing up scarce airport capacity.

[14] APC (1998).

Table 2 shows the increase in landing charges for selected aircraft sizes before and after the imposition of a peak period surcharge at SYD.

**Table 2: Landing Charges Before and After the Imposition of Peak Period Surcharge at SYD for Selected Aircraft Size**

| Aircraft type | No. of seats | General landing charge (AUD) | Peak period surcharge (AUD) | Increase in landing charges with surcharge (%) |
|---|---|---|---|---|
| B747-400 | 397 | 2,271 | 250 | 11.0 |
| B737-400 | 137 | 359 | 250 | 69.6 |
| Fokker F27-500 | 52 | 119 | 250 | 210.1 |
| Saab 340A | 34 | 73 | 250 | 342.5 |
| Cessna 210 | 5 | 28 | 250 | 892.9 |

*Source: APC (1998). Peak period surcharges applied between 1991 and 1998.*

Despite the surcharges, the demand for slots during peak periods at SYD was still found to be high in 1998. The Australia Productivity Commission (APC) noted that the difference in peak and off-peak surcharges were insufficient to deter aircraft from operating during peak periods. Subsequently, the FAC removed the peak and shoulder period surcharges. Notably, Qantas argued that the introduction of peak period pricing obscures the need for airports to improve airport facilities in response to increased demand by wrongly focusing on capacity management instead. The congestion pricing also affected general aviation operators, as they faced higher charges and were left with limited alternative locations to establish their operations.

The FAC subsequently increased the minimum landing and international terminal charges at SYD. The new pricing regime was not linked to the use of scarce capacity at SYD, rather it provided airports with more funding to increase overall capacity. The Australian Government also introduced slot management legislation at SYD, which further helped to manage congestion.

At present, some airports implement higher charges according to, for example, the time of the day or season, in addition to weight or aircraft-based charges. The challenges to congestion pricing such as the perception that it penalizes airlines unfairly and assumes all landing or take-off operation times to be perfect substitutes continue to impede its effectiveness.

*Quantity-based Solution: Slot Allocation*

Rather than deciding the congestion prices to be charged on airlines, a slot allocation system allows airport authorities to decide on the number of available slots at each airport, given its capacity, through the application of standardized rules. The slot allocation solution allows airlines to know the congestion level at all airports upfront, which enables them to make appropriate business decisions in terms of flight scheduling or establishing operations. Slot allocation has been widely adopted by many airports worldwide to manage increasing demand for the use of airport infrastructure. Slot allocation is discussed further in the following sections.

# SECTION 2: AIRPORT SLOTS

A slot is a permission for airlines to utilize the range of infrastructure at an airport. Slot allocation is viewed by IATA as a temporary demand management solution to airport congestion:

*"Coordination is not a solution to the fundamental problem of a lack of airport capacity. In all instances, coordination should be seen as an interim solution to manage congested infrastructure until the longer-term solution of expanding airport capacity is implemented."*[15]

Slot allocation is based on international, regional, and national rules and regulations. As mentioned, the primary point of reference for slot coordinators and airlines worldwide is the WSG, which is developed by IATA to provide a consistent set of principles for managing slots at congested airports. Generally, governments have either adopted, enhanced, or customized these standards to suit their local environment. In Malaysia, slot allocation is undertaken at all airports and adheres to the WSG principles. The origin of the IATA WSG, its governance, and recent developments are discussed below.

## The IATA Worldwide Slot Guidelines

### Origin of the IATA Worldwide Slot Guidelines

In the decades that followed the Chicago Convention, growing passenger traffic necessitated the need to coordinate slot allocation at airports worldwide in a transparent and standardized manner. IATA, founded in 1945, led the efforts to coordinate and codify slot allocation practices worldwide culminating in the publication of the first WSG in 1974. Since then, the WSG has been treated as a 'living document' to adapt to the dynamic nature of the aviation industry. It has since been revised numerous times, with the latest edition (10th edition) being published in August 2019. It is adopted by nearly all Level 3 airports worldwide.

### Governance of the Worldwide Slot Guidelines

Airlines, airports, and slot coordinators play different roles in the slot coordination process. Airlines are responsible for operating and planning their schedules in accordance with the timelines of the WSG. Airports are required to declare their capacities and agree on coordination parameters with the relevant stakeholders. Meanwhile, slot coordinators are primarily responsible to allocate slots in a neutral, transparent, and non-discriminatory way in accordance with WSG principles. In addition, all parties are also required to undertake slot performance monitoring.

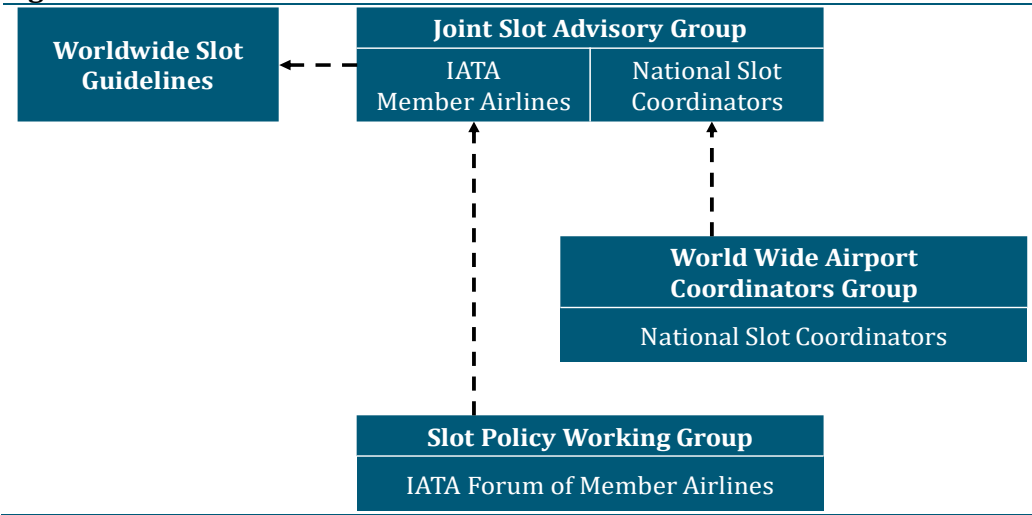
[15] IATA (2019a).

Amendments to the WSG are developed by the IATA Slot Policy Working Group (SPWG), which is a committee made up of IATA Member Airlines. Its membership is limited to a maximum of 20 airlines.[16] These amendments are then brought to the Joint Slot Advisory Group (JSAG), which comprises IATA member airlines and airport coordinators.[17]

The JSAG primarily acts as a platform to discuss the amendments to the WSG and to provide guidance on related slot matters. The JSAG is made up of a maximum of 14 members[18] (of which seven are part of the SPWG, with the remaining seven being representatives from slot coordinators), with an equal split between IATA member airlines and airport coordinators, chosen based on geographical representation and airlines of different business models. Changes to the WSG are proposed at the IATA Slot Conference by the JSAG and presented to the Heads of Delegates for endorsement. IATA member airlines that are part of the JSAG are also part of the Slot Policy Working Group (SPWG).[19]

The Slot Coordinators that are part of the JSAG are representatives from the World Wide Airport Coordinators Group (WWACG), an organization outside IATA that represents airport coordinators worldwide. WWACG performs a similar function to the SPWG, but from the slot coordinators' perspective. The WWACG is made up of national slot coordinators from 80 countries, coordinating 427 airports worldwide, including the NSCM.[20] Figure 7 depicts the current governance network of the WSG.

**Figure 7: WSG Governance Network**




*Source: MAVCOM, IATA (2019a)*

[16] Current members (2019 – 2022) are Air China, Air New Zealand, American Airlines, All Nippon Airways, Avianca, British Airways, Delta Airlines, DHL Express, Fedex, flydubai, Hong Kong Express, KLM Royal Dutch Airlines, Kuwait Airways, LATAM Airlines, Lufthansa, Qantas, TUIfly, Turkish Airlines, United Airlines, Virgin Atlantic.
[17] IATA (2017).
[18] Current members (2017 – 2019) are made up of airline representatives from All Nippon Airways, British Airways, Delta Airlines, Hong Kong Express, KLM Royal Dutch Airlines, Qantas, United Airlines and slot coordinators from Australia, Austria, France, Japan, Germany, Norway, and the US.
[19] IATA (2017).
[20] WWACG (2019).

### Key Principles of Slot Allocation at Level 3 Airports

According to the WSG, the term 'slot allocation' only applies to Level 3 airports, where airlines would have to apply for slots from the slot coordinator. On the other hand, airlines only need to notify the handling agent of their planned operations for Level 1 airports or facilitators pertaining to the use of airport facilities for Level 2 airports.

Despite the IATA guidance, countries differ in terms of their management of slots at Level 1, 2, or 3 airports. For example, the NSCM in Malaysia—owing to a government directive issued to the previous slot coordinator—undertakes slot allocation at all airports (Level 1 and 2 included) even though IATA only requires it to be undertaken at Level 3 airports. For the purpose of this Technical Paper, the discussions in the following sections will largely concern slot allocation undertaken at Level 3 airports.

The WSG provides the key principles of slot allocation at Level 3 airports. These key principles provide, among others, that:

- slots can only be allocated to airlines or other aircraft operators[21];
- these slots must be allocated to airlines prior to operating at a Level 3 airport;
- an airline is entitled to keep a series[22] of slots for the next equivalent season if the slots were utilized at least 80% of the time (also known as the 80-20 rule, or the use-it-or-lose-it rule);
- slots may be transferred or swapped between airlines; and
- slot coordinators must be functionally and financially independent of any party and act in a neutral, transparent, and non-discriminatory manner.

Essentially, the WSG spells out the guidelines of slot allocation at Level 3 airports worldwide. Slot coordinators may adopt these principles in whole or adapt it to suit their local aviation environment.

Given that these key principles in the WSG do not include specific details, it is imperative for slot coordinators to develop complementing metrics, such as the rules governing slot transfers or swaps, and the determination of airlines' historic rights based on the 80-20 rule. The WSG is not too prescriptive as slot coordinators need to balance the objective slot rules against the dynamic nature of the aviation industry.

[21] This does not imply or recognize that airlines own the slots. In some jurisdictions, slots can also be owned by financial institutions such as banks. See Section 3 of this Technical Paper for further details on issues pertaining to slot ownership.
[22] A series of slot refers to at least five consecutive slots allocated for approximately the same time of the same day-of-the-week operation in an IATA season.

An airline's historic right[23] is important to determine its slots for the next equivalent IATA season as it serves as a reference. As such, slot allocation rules largely favor incumbent airlines, so long as these airlines maintain the use of a series of slots at least 80% of the time. Slots that are not utilized for at least 80% of the time are returned to the slot pool, where WSG rules stipulate that 50% of these slots should be allocated for new entrant requests.[24] This rule is meant to encourage competition in the market by attracting new entrants.

### Latest Developments of the Worldwide Slot Guidelines

IATA initiated a Strategic Review of the WSG in November 2016 to bring it in line with the developments in the aviation industry.[25] The Strategic Review made efforts to improve access to congested airports and imposed better requirements to assess airport capacity, among others. Together with the Airports Council International (ACI) and the WWACG, working groups assessed the following aspects of the WSG:

- Access to congested airports
- Airport classifications
- Historic rights determination
- Slot performance monitoring

Amongst the changes made are revisions pertaining to the determination of airport capacity. Specifically, airport capacity would now have to be declared before each IATA season, and that the factors in determining the capacity must specifically include any airspace limitations set by local air traffic control authorities or constraints on runway or parking apron.

In improving access to congested airports, the WSG now recommends that national slot coordinators work closely with airport authorities and airlines in obtaining information on their respective business priorities and development plans. These provisions are aimed at assisting the coordinators in obtaining a holistic view of the business plans, priorities, and operational constraints of airports and airlines, as well as, how the available capacity may be best allocated.

IATA had also changed the definition of a 'new entrant' by increasing the slot threshold from five to seven slots per day at a given airport. This move is expected to benefit more new entrants by increasing their access to the slot pool at airports. Additionally, where a 50-50 balance of allocation between new entrant and non-new entrant requests cannot be undertaken in a single IATA season, the slot coordinator can attempt to achieve this balance in the next equivalent season(s).

[23] An airline is entitled to historic rights if it operates a series of slots for at least 80% of the time.
[24] Defined as air carriers that would hold less than seven slots in a day at an airport.
[25] ACI (2018).

Administratively, IATA will also implement a new governance structure for the WSG, which is expected to take place in the first quarter of 2020. The new structure, among others, establishes working groups for the continuous enhancement of the WSG. The structure also ensures global representation of airlines, airports, and slot coordinators to undertake comprehensive reviews of the WSG, moving forward.

The first key enhancements were made in the ninth edition of the WSG published in January 2019. More revisions were included in the 10th edition (published in August 2019).

### Slot Conference

The IATA Slot Conference is the main platform for airports and airlines to coordinate slot requests. The Slot Conference brings together slot facilitators or coordinators (for Level 2 and 3 airports, respectively) and airline schedulers. Non-IATA member airlines can also attend the conference, subject to a fee, higher than that paid by IATA member airlines.

The Slot Conference takes place in June and November annually for the next IATA Winter (of the same year) and Summer seasons (for the following year), respectively. A range of activities occurs before, during, and after each Slot Conference (see Table 3).

**Table 3: Slot Conference Calendar of Activities**

| **Pre-Slot Conference** | | |
|---|---|---|
| Activity | Timeline | Description |
| Slot Historical List | 57 days prior to Slot Conference | • An airline's historic slots for the IATA season in question are confirmed by the slot coordinator |
| Agreed Historical Deadline | 40 days prior to Slot Conference | • Any dispute on the historic slots between the airlines and the slot coordinator must be resolved by this deadline<br>• This deadline also involves the confirmation of the slot coordination parameters and the declaration of available capacity at Level 2 and 3 airports |
| Initial Submission Deadline | 33 days prior to Slot Conference | • Airlines must submit their initial slot requests to the respective slot coordinators<br>• Submissions after the deadline will not be given priority |
| Slot Allocation List | 12 days prior to Slot Conference | • The slot coordinators must provide an initial reply (first draft of the slot allocations) |

| Slot Conference | | |
|---|---|---|
| • The Conference is a platform for slot allocation at Level 3 airports, as well as, schedule discussion and adjustment at Level 2 airports | | |
| **Post-Slot Conference** | | |
| Slot Return Deadline | 15th of January/ August | • Reallocation of slots may occur, and any slots allocated to airlines that are not intended to be used in the forthcoming season must be returned by this deadline |
| Use-it or Lose-it Calculation | 31st of January/ August | • Once the slots are confirmed, they are considered as part of an airline's historic slots. This list is then used as the basis for determining the eligibility for historic precedence for the next equivalent season<br>• Ad hoc changes to an airline's slots may still be made during each season. If an airline obtains a new slot during the season and has utilized it at least 80% of the time, these slots may be eligible to be considered as part of its historic slots |

*Source: MAVCOM, IATA (2019a)*

As mentioned earlier, the Slot Conference is a platform for airlines to obtain slots in order to establish operations at airports worldwide. However, airlines also need to obtain the authorization to exercise the ATRs in accordance with the relevant ASAs. Box 2 provides a background of ATRs and their relation to airport slots.

### *Box 2: Slot Allocation and Air Traffic Rights*

#### *Background*

Air transport access between States is maintained through the conclusion of bilateral and multilateral ASAs, which are:

*"treaties entered into by States to govern international air transport and define the commercial rights granted by the States to their airlines to fly over and within their territories".*[26]

ASAs contain provisions on ATRs, capacity, tariffs (prices), designation, ownership and control—amongst others—for scheduled services only. The granting of ATRs grants the designated airlines of a State the right to enter another State's airspace and access the latter's airports at an agreed frequency and capacity. If a designated airline of a State does not possess the ATR to access the airspace of another State, it cannot operate to any airports there. Additionally, even if an airline of a State possesses ATRs, it may be limited by capacity, frequency, and the type of aircraft that can be utilized in its operations.

[26] MAVCOM (2018).

*Air Traffic Rights and Slots are Obtained Separately*

The exchange of ATRs between States is undertaken separately from the allocation of airport slots. Furthermore, airlines must obtain airport slots from the respective national slot coordinators, independent of the ATR allocation process. This is in line with the WSG's key principles for slot allocation for Level 3 airports that state slot allocation should be independent of the assignment of ATRs. There have been instances where airlines are not able to obtain additional airport slots despite being granted increased ATRs to another State.

For example, the US Department of Commerce (DOC) noted that the increase in ATRs negotiated between the US and China had not been met with commensurate growth in the availability of airport slots in China, particularly at major airports such as PVG. Notably, the US DOC highlighted that the Chinese military places limits on Chinese airspace for commercial operations. The increased use of limited airspace for military operations resulted in an inefficient airspace structure—limiting the creation of new slots despite infrastructure enhancements—and flight delays.

*Air Traffic Rights Allocation in Malaysia*

In Malaysia, MAVCOM is responsible to administer, allocate, and manage the ATRs exchanged in bilateral and multilateral air services arrangements with dialogue partners, as obtained by the Ministry of Transport. MAVCOM considers a range of factors in allocating ATRs, including the availability of ATRs, the performance of the airlines in providing air transport services, the benefits of allocating ATRs to two or more applicants, competition between the airlines in providing air transport services, and the effect on consumers, the industry, and public interest.

## Slot Allocation in Selected Jurisdictions

As mentioned earlier, some jurisdictions may adapt the WSG principles based on their respective local aviation environments. Australia, the European Union (EU), the UK, the US, and Singapore are examples of jurisdictions that have adapted several WSG principles into local laws and regulations, whilst Malaysia applies the WSG principles without enacting it into any local law or regulations.

Additionally, a slot may refer to the use of different segments of airports infrastructure. For example, this may include runway use (landing or take-off times) or arrival at the gate (aircraft wheel chock-on or chock-off times[27]).

[27] This refers to the time that wheel chocks are placed (arrival) or removed (departure) from an aircraft's wheel at the airport gate. Chocks are placed for safety to prevent any accidental movement of an aircraft. Chocks are removed to allow an aircraft to begin its movement to the taxiway (also known as 'pushback').

## Slot Allocation in the European Union

### *Background*

Following the establishment of the EU single market through the Single European Act of 1986, attempts were made to create a European single aviation market. A series of Acts were enacted by the European Parliament from the late 1980s to the early 1990s to integrate national aviation markets into a single, EU-wide market which resulted in a single aviation market.[28] The EU first began to regulate the allocation of slots in 1993 through the European Economic Community (EEC) Regulation No. 95/93.

Over the years, the EEC 95/93 was amended several times—in 2002, 2003, 2004, and 2009—to allow for more flexible airport slot coordination practices considering ever-increasing airport constraints in the EU and external developments[29]. The temporary amendments in 2002, 2003, and 2009 took place due to the September 11 terrorist attacks, the Severe Acute Respiratory Syndrome outbreak in Asia, and the 2008 global financial crisis, respectively. In these instances, the 80-20 rule was suspended to allow incumbent airlines to maintain their historic slots arising from a significant number of flight cancellations, which would have led to the non-utilization of historic slots.

### *Slot Allocation Practices*

The EU regulations define 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".*[30]

This definition is consistent with that of the WSG, although the 2004 amendment also detailed new rules to allow more flexibility in the slot allocation system in the EU. For example, the 2004 amendment introduced and provided guidelines on the concept of slot trading between airlines to allow greater slot mobility at congested airports. The amendment also widened the definition of new entrants to allow for more airlines to qualify to encourage greater competition, and empowered slot coordinators in EU Member States to compel airlines to provide operational information in order to impose sanctions for slot abuse.

[28] European Parliament (2019).
[29] Truxal (2014).
[30] Regulation (EC) No 793 (2004).

Table 4 provides examples of the penalties in place in EU Member States for slot abuse. It must also be noted that economic sanctions such as fines are imposed by coordinators only as a last resort to slot abuses.

**Table 4: Examples of Sanctions for Slot Misuse in EU Member States**

| Coordinator | Basis for penalties for misuse of slots | Maximum penalty |
|---|---|---|
| Airport Coordination Limited (ACL) United Kingdom | • UK Airport Slot Allocations Regulations 2006<br>• Misuse of Slots Enforcement Code | • GBP20,000 per offence |
| Slot Coordination - Spanish Airports (AECFA) | • Articles 49 and 55 of Aviation Safety Law (Law 21/2003) | • EUR90,000 per slot series not returned |
| Belgium Slot Coordination (BSC) | • Article 14a in Chapter II of the Law of 27 June 1937 amending the law of 16 November 1919 on the regulation of air navigation | • EUR20,000 per infringement<br>• Up to one-year imprisonment |
| Airport Coordination France (COHOR) | • Decree no 2007-863 of 14 May 2007, Ministry of Transport | • EUR40,000 per infringement |

*Source: ACL, AECFA, BSC, COHOR*
*Note: Penalties for a single offence/infringement, not accrual.*

## Slot Alocation in the United Kingdom

### *Background*

Slot allocation in the UK is governed by the Airport Slot Allocation Regulations 2006, which is based on the European Council Regulation (EEC) 95/93 and as amended by the European Council Regulation (EC) No. 894/2002, European Council Regulation No. 1554/2003, European Council Regulation (EC) No. 793/2004, and European Council Regulation (EC) No. 545/2009. As an EU Member State, the UK adopts the same definition of slots as stated in the EU Council Regulations.

Slot allocation in the UK is undertaken by the ACL. Box 3 further discusses the ACL's roles and functions.

*Box 3: Roles and Functions of the ACL*[31]

Established in 1992, the ACL is currently the slot coordinator for 41 airports in the UK and Canada, Ireland, United Arab Emirates, Luxembourg, New Zealand, and Poland, among others. Prior to the establishment of the ACL, slot allocation in the UK was undertaken by British Airways. British Airways was responsible for slot allocation at BHX, LGW, LHR, and MAN, at the request of the other airlines operating at these airports.[32] The airport operators of these airports funded the cost of the slot allocation operations undertaken by British Airways.

Subsequently, in 1991, the slot management function within British Airways was separated from the airline to form the ACL. The EU had also begun to express concerns about biases in slot allocations by British Airways and sought to reform the slot allocation at European airports to enable the liberalization of the air transport market in the EU following the creation of the Single Market.[33] Today, the ACL coordinates slot requests and schedule movements at both global hubs (i.e. Level 3 airports) and smaller, regional airports (i.e. Level 1 and Level 2 airports), respectively.

*Ownership of ACL*

The ACL is a private body that receives financial contributions from seven airlines[34] in the UK. The ACL carries out a public function (i.e. slot allocation) in the UK, as delegated by the UK Government. The seven airlines are not involved in slot allocation decisions, which are undertaken according to WSG principles and with the other UK and European slot regulations. The contribution of these seven airlines avoids the need for any financial allocation from the UK Government, which can ensure that airlines receive high-quality and efficient slot allocation services. To address issues pertaining to transparency, four board members of the ACL are independent, non-executive directors.

*Operations of ACL*

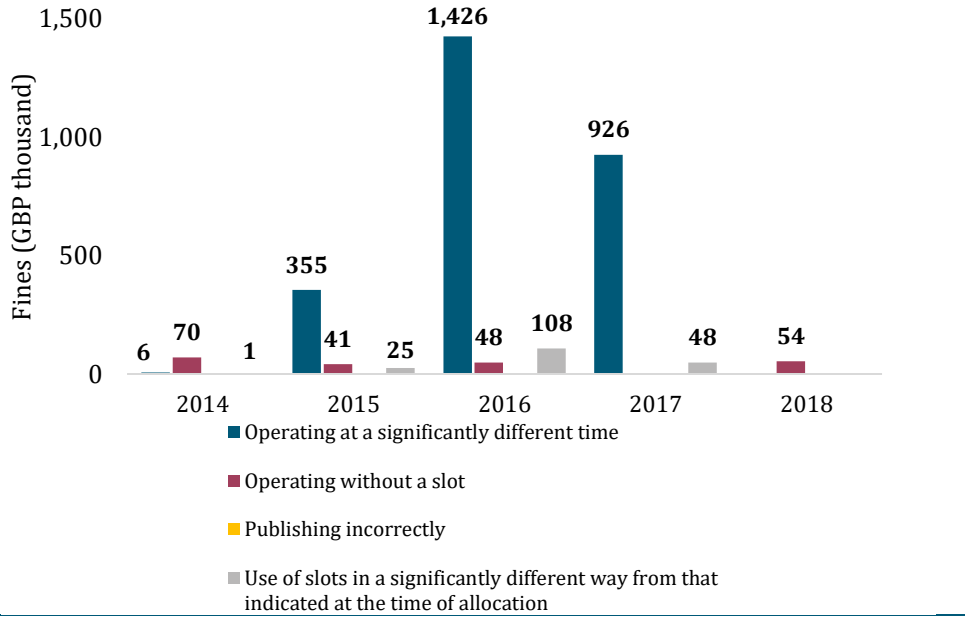
Besides allocating slots, the ACL also works closely with other airport stakeholders such as air traffic controllers, airport operators, airlines, and local regulators to improve passenger traffic and aircraft movement. For example, in 2017, passenger traffic and aircraft movements at all airports whose schedules or slots were managed by the ACL witnessed an average increase of 6% and 3%, respectively, as a result of improved operational efficiency.[35]

[31] ACL (2019a).
[32] ACL (1998).
[33] Ibid.
[34] British Airways, Easy Jet, Flybe, Jet2, Thomas Cook Airlines, TUI Airways, Virgin Atlantic.
[35] ACL (2019b).

The ACL also facilitates secondary trading of slots between airlines. In the EU, given that Regulation (EC) No. 793/2004 allows for slots to be transferred between airlines, the ACL oversees these exchanges and confirms if the exchanges conform to existing slot regulations. However, the ACL does not supervise any effects the slot trades have on competition between airlines, which is left to the national competition regulator.

Despite being a private corporation, the ACL also has the delegated authority to monitor and administer fines on airlines that misuse their allotted slots. For example, in the UK, the Airport Slot Allocation Regulations 2006 and additionally, the Misuse of Slots Enforcement Code (2016) provides the ACL with the basis to impose fines on airlines found to be intentionally misusing or abusing their allocated slots in the UK[36]. Figure 8 shows the total annual fines according to the type of slot misuse at ACL-coordinated airports.

**Figure 8: Total Annual Fines by Type of Slot Misuse at ACL-Coordinated Airports, 2014 – 2018**




*Source: ACL*

[36] Applies to certain airports only i.e. BHX, LCY, LGW, LHR, LTN, MAN, STN.

## Slot Allocation in the United States

### *Background*

Slot allocation rules in the US began in 1968 when the Federal Aviation Administration (FAA) introduced the High Density Traffic Airports Rules to reduce delays at five major US airports (DCA, EWR, JFK, LGA, and ORD).[37] This rule limited the number of hourly arrivals and departures at these five high-density airports, which meant that airlines would have to obtain slots prior to operating their flights. Over the following decades, this rule has been occasionally relaxed by the FAA. For example, slot controls at EWR were suspended between 1970 and 2008 as the airport became less congested.

US airlines initially organized scheduling committees through which slots allocation was undertaken. Antitrust concerns did not arise as these airlines were granted immunity by the then Civil Aeronautics Board (CAB). After the Airline Deregulation Act was passed in 1978, increased competition amongst airlines led to the breakdown of the scheduling committees. Consequently, the FAA took over the role of allocating slots and introduced a use-it-or-lose-it rule, where airlines would have to utilize their allocated slots at least 65% of the time to prevent slot hoarding. This was subsequently raised to 80% in 1992.

The FAA also introduced secondary trading of slots in 1986 to provide new entrants with more access to these high-density airports. Slots were also allocated to airlines operating new routes at these high-density airports. However, complaints about the lack of available slots for new entrants persisted and in 2000, the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century was passed. Although this Act was enacted primarily over safety concerns in the US aviation industry due to several fatal aviation incidents in the 1990s, it also includes provisions on consumer protection and competition where, among others, it compelled the FAA to remove the High Density Rule at EWR by 2002 and JFK and LGA by 2007.

### *Slot Allocation Practices*

In anticipation of the removal of the High Density Rule at certain airports, the FAA explored other regulations to manage the congestion at high-density airports. Following discussions between FAA and IATA representatives, WSG key principles were then applied at JFK and EWR, given significant international flight operations at these airports. Subsequently, WSG key principles were applied to LAX, ORD, and SFO. At present, only JFK is currently designated as a Level 3 airport by IATA while EWR, LAX, MCO, ORD, SEA, and SFO are designated at Level 2.[38]

The High Density Rule is still applied at DCA, where slot control rules befitting that of a Level 3 airport are applied during slot-controlled hours (i.e. periods of high airport usage). Seasonal WSG allocation rules do not apply. Therefore, at present, the US applies a dual system of WSG key principles and local regulations in terms of slot allocation at airports nationwide, depending on the airport in question.

[37] US Government Accountability Office (2012).
[38] IATA (2019).

In addition to coordinating slot allocation and monitoring the usage and secondary trades of allocated slots, the FAA also lists the use of an international slot for domestic operations as a violation and may enforce penalties against any airline that do so.[39]

## Slot Allocation in Australia

### *Background*

In Australia, a slot is defined as *"a permission to take off or land at an airport at a specific time on a specific day".*[40] SYD is the only airport in Australia where slot management is governed by legislation; other congested airports offered to undertake voluntary runway demand management schemes to avoid being legislated like SYD. The administration of slot management activities at SYD is placed under the Sydney Airport Demand Management Act 1997 and several subordinate legislations that give effect to the Act, such as the:

- Sydney Airport Demand Management Regulations 1998
- Sydney Airport Compliance Scheme 2012
- Sydney Airport Slot Management Scheme 2013

The Slot Management Scheme at SYD came into being after the APC found that the peak period surcharge imposed in 1991 by the FAC was not a viable mechanism to cap demand at SYD.[41] Subsequently, the evidence submitted by the FAC after consultation with the airlines operating at SYD motivated the switch to the Slot Management Scheme and abolishing the peak surcharge scheme, therefore moving from a price-based regulatory regime to a quantity-based mechanism.

The Sydney Airport Demand Management Act 1997 stipulates the limitation of aircraft movement at SYD and determines the maximum movement limit to no more than 20 aircraft movements in a 15-minute period (i.e. 80 aircraft movements per hour). The capping of aircraft movements is intended to regulate noise levels and limit environmental impact. The Act also empowers a Slot Manager to develop and administer the Slot Management Scheme at SYD. Eight airports in Australia—ADL, BNE, CNS, DRW, MEL, OOL, PER, and SYD—are slot coordinated airports as all are classified as Level 3 airports by IATA.

### *Slot Allocation Practices*

The Minister for Infrastructure, Transport and Regional Development appointed Airports Coordination Australia (ACA) as the Slot Manager at Australian airports. The ACA was formed in 1997 and is currently financed through a composition of local airline remuneration, in the form of a fee per slot.

[39] FAA Order 2150.3C (2018).
[40] APC (2019).
[41] Australia Parliament (1999).

ACA's Board of Directors consists of representatives from Qantas, Virgin Australia Airlines, the Regional Association of Australia, Sydney Airport Corporation Limited, and is led by an independent Chairman. At present, ACA allocates slots at the eight Australian airports that are designated as Level 3 airports, as well as, airports located in Abu Dhabi, Oman, the Philippines, and Saudi Arabia.[42]

Slot coordination activities at SYD is aligned to the WSG, as also specified in the Sydney Airport Slot Management Scheme 2013. This Scheme spells out the preparation of slot allocation before each scheduling season (i.e. Winter and Summer), specifying the Slot Historic List Deadline and Initial Submission Deadline, as well as, detailing the activities involved pre- and post-IATA Slot Conference.

However, slot allocation activities at SYD are unique as the respective legislations include several deviations from the WSG[43]:

- Guaranteed slots for airlines providing regional air transport services to New South Wales:
    - Reserves several slots for airlines operating regional services to or from SYD, with separate slot pools available for both peak and off-peak services
    - This regulation was also ring-fenced to prevent airlines from swapping peak period regional slots for non-regional slots out of the peak period, as well as, to prevent the conversion of non-regional slots into regional slots during peak periods.
- The 'size of aircraft test':
    - This test addresses whether the size of the aircraft used by airlines in their operations corresponds to the size of the aircraft stated in a slot application by the airlines.
    - This aims to ensure that capacity at SYD is utilized efficiently by preventing airlines from manipulating slot rules via utilizing smaller aircraft in their operations, which can occur in other jurisdictions.

### Slot Allocation in Singapore

#### *Background*

The aviation industry in Singapore is regulated through two main Acts of Parliament – the Air Navigation Act (1966; revised 2014) and the Civil Aviation Authority of Singapore Act (2009; revised 2014). The former provides for the control and regulation of the aviation industry. The latter legislates for the establishment of the Civil Aviation Authority of Singapore.

[42] ACA (2019).
[43] APC (2019).

The Civil Aviation Authority of Singapore Act was proposed to be amended to establish airport capacity management scheme so as to further optimize airport capacity. This is due to SIN being a slot coordinated airport i.e. a Level 3 airport as classified. In Singapore, an airport slot is defined as:

*"the permission to use the full range of airport infrastructure (such as the runway, terminal, apron and gate) necessary for any aircraft flight operation at a coordinated airport on a specific date and at a specific time."*[44]

### *Slot Allocation Practices*

Clause 20 of the Civil Aviation Authority of Singapore Act introduces measures to penalize airlines for slot misuse. It compels airlines to comply with the slots allocated to them and allows the imposition of fines of up to SGD100,000.[45] This penalty would apply at airports which are either slot-coordinated (i.e. Level 3) or schedule-facilitated (i.e. Level 2). The Act includes infringements to Level 2 and Level 3 airports in anticipation of growing congestion at the newly opened XSP.

The Civil Aviation Authority of Singapore Act spells out the types of infringement that would be subject to the penalty at coordinated airports. These include:

- Failure to comply with the directive issued by the slot coordinator pertaining to slot allocation[46]
- Failure to provide the documents and information in a timely manner pertaining to the proper functioning of the slot coordinator
- Operations at different times than the slot allocated

The Act spells out that the Minister of Transport has the authority to declare an airport to either be a slot-coordinated or a schedule-facilitated airport and allow the appointment of a body to manage the slots at a slot-coordinated or schedules-facilitated airport. The slot coordinator for SIN is Changi Airport Group.

[44] Aviation (Miscellaneous Amendments) Bill (2018).
[45] Civil Aviation Authority of Singapore Act (2009).
[46] Ibid.

## Slot Allocation in Malaysia

### *Background*

In the past, work on slot allocation was undertaken by the then Malaysian Airline System[47](MAS). Currently, slot allocation is undertaken by MAHB via an internal department, the NSCM. The NSCM, established in September 2014, is a unit under MA Sepang Sdn. Bhd., which in turn is a subsidiary under MAHB. The NSCM had been appointed as the slot coordinator for Malaysia by the then Department of Civil Aviation Malaysia[48] due to concerns over MAS's role in allocating slots, given that it is also an incumbent airline. The NSCM measures slot use in Malaysia as the chock-on or chock-off time of an aircraft at the airport gate.

### *Slot Allocation*

The NSCM undertakes slot coordination and schedule facilitation at airports in Malaysia based on the WSG principles. Owing to previous CAAM directives, the NSCM undertakes slot coordination at all airports in Malaysia, regardless of the level of congestion. The NSCM adopts the definition of slots as per the WSG principles and allocates them by taking into consideration several parameters such as airside and landside facilities at Malaysian airports:

- Aircraft parking stands or gates
- Airport operating hours
- Local rules (e.g. night-, noise-, jet-curfew)
- Runway capacity
- Terminal capacity or passenger flow per hour

Since January 2017, NSCM began monitoring slot use, considering information obtained from the following sources:

- Flight schedule filed by airlines to the Flight Operation Center
- Published information (mass or online media)
- Ticket information as published on the airline's website

[47] Malaysian Airlines System was delisted from Bursa Malaysia following its post-restructuring programme in 2014 and ceased operation on 31 August 2015. Malaysia Airlines Berhad was established as part of the Malaysian Aviation Group on 1 September 2015.
[48] The DCA was corporatized and is now known as the CAAM since 19 February 2018.

The NSCM does not impose any fines for slot misuse at present. The monitoring that is undertaken by the NSCM is for the purposes of assessing adherence to the 80-20 rule in determining historic slots for airlines. Common slot abuses observed by the NSCM include:

- Operations at a time different than the allocated slot
- Operations with no corresponding slot
- Slot held but not operated
- Use of a slot in a significantly different way than allocated (e.g. different aircraft type and size from the approved slot)

Complementing the NSCM's slot allocation principles, the economic regulation of slot allocation for Malaysia is provided for by Part VIII: Air Traffic Right and Slot Allocation of Act 771:

*67. (1) The Commission shall have the powers to do any or all of the following:*

*a) supervise and monitor the slot allocation by any person;*

*b) issue directions to such person relating to the slot allocation;*

*c) prescribe regulations setting out the principles and procedures for slot allocation;*

*d) determine any dispute relating to slot allocation.*

*(2) Any aircraft operating at an aerodrome shall not intentionally—*

*a) operate air services at times significantly different from the allocated slots; or*

*b) use slots in a significantly different way from that indicated at the time of allocation, where such use causes prejudice to aerodrome or air traffic operations.*

*(3) For the purposes of this section, "slot allocation" means*

*a) the allocation of time slots for the purpose of granting aircraft access to aerodrome facilities for landing and taking-off at specific dates and times.*

It is worth noting that slot allocation in Act 771 refers to the usage of aerodrome facilities as the only parameter whereas the NSCM refers to a wider set of parameters, as mentioned earlier. Comparing this definition to the WSG definition and the NSCM's slot allocation parameters, the definition of slots in Act 771 can be considered as narrow, given that it is only for access to the aerodrome facilities for landing and taking-off (i.e. airside) as opposed to the full range of airport infrastructure.

The role of MAVCOM also extends to the allocation of ATRs. As previously discussed, air traffic rights and airport slots are obtained separately. Malaysian designated airlines would apply to MAVCOM for the allocation of ATRs in accordance with the applicable air services agreements. Following the allocation of ATRs, airlines would then be required to seek approval for flight services that they wish to operate through a process commonly referred to as 'filing'. The Aerofile system developed by MAVCOM acts as a 'one-stop' centre for airlines for landing permit filings, integrating the processes of the NSCM (verification of approved airport slots), MAVCOM (ATR allocations), and CAAM (technical approval).

Both Malaysian and foreign carriers wishing to exercise their respective ATRs are required to undertake filing prior to commencement of services. Slot applications for operations to or from all Malaysian airports are submitted to the NSCM, where the slots are verified based on the WSG principles before approval. Once the slots are verified, the application of the airline to commence operations is forwarded to MAVCOM for economic evaluation. The evaluation criteria differ between scheduled, non-scheduled, and business jet services, as well as, between domestic and foreign carriers.

# SECTION 3: EFFECTIVENESS OF SLOT ALLOCATION PRACTICES

Given that infrastructure expansion may be subject to financial, environmental, and planning constraints, slot allocation has become increasingly important to accommodate growing demand. This Section outlines the advantages and disadvantages of the current slot allocation system and highlights potential solutions to address the disadvantages.

## Advantages of the Current Slot Allocation System

### Continuity and Wide Adoption

As mentioned earlier, the current slot allocation system is guided by the WSG which is a decades-old guideline that is adhered to by most jurisdictions. As such, the slot allocation system's primary strength is its worldwide adoption—airlines would experience little to no difference in slot allocation practices from one jurisdiction to another.

### Increased Certainty for Airlines

The current slot allocation system also provides airlines and airports with certainty as regards flight changes from one IATA season to another. As grandfathering rights bestow upon airlines the right to slots from one season to another, airlines will be able to minimize flight changes over time, providing certainty to them and their passengers. This also allows airports to invest in their infrastructure to meet the demands of airlines, as airports are certain of the airlines' future flight plans.

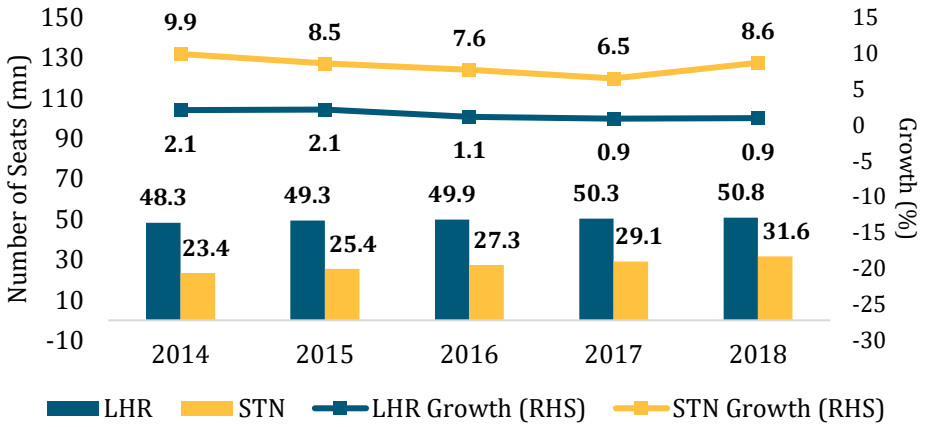
Additionally, the current slot rules—for example, in allowing an airline to retain historic slots even if up to 20% of its flights are cancelled in a season, or the lack rule on maintaining the same aircraft type to be used throughout a season—provide flexibility for airlines to adjust their business plans in-season. This flexibility may help airlines to adjust their schedules in response to that of their competitors or take advantage of special occasions (for example, operating larger aircraft for a major sporting event).

### Opportunity for New Entrants to Obtain Slots

The allocation of slots via the WSG does not reflect the scarcity value of slots, as it allows new entrants the opportunity to operate flights at peak periods by allocating 50% of slots from the slot pool to new entrants. If slots were to reflect their scarcity value and allocated based on an auction system, airlines with a strong financial position would be able to obtain peak period slots instead, leaving little opportunity for smaller airlines or other new entrants to obtain these slots.

An unintended benefit of the current slot allocation rules is that they have supported the growth of secondary airports. As mentioned earlier, grandfather rights favour incumbent airlines. At a congested airport such as LHR, very few slots are returned by incumbent airlines to the slot pool annually. The increasing demand for air travel and the lack of slots available have encouraged the growth of secondary airports that allow new entrants to establish services, such as Ryanair at STN. STN's higher growth relative to LHR is illustrated in Figure 9.

**Figure 9: Seat Capacity in Absolute Terms and Growth Rate at LHR and STN, 2014 – 2018**




*Source: AirportIS*

## Disadvantages of the Current Slot Allocation System

Despite the WSG's principles of transparency and non-discrimination in the allocation of slots, opponents have argued that the WSG adds to the mismatch between airport capacity and airline traffic, thus, exacerbating congestion at airports.[49] It has also been argued that the WSG slot allocation methods may not lead to airport de-congestion as current slot rules are unaccompanied by measures of efficiency to ensure that the airlines that receive the slots utilize them the best.[50] Additionally, new entrants may also find the current slot allocation mechanism as disadvantageous to them as they are competing against a system that benefits incumbent carriers through grandfather rights.

Consequently, the lack of slot availability at congested airports would also negatively impact consumers. At congested airports, the demand for seats greatly exceeds the supply provided by airlines, resulting in higher airfares. A study estimated the congestion premium—defined as the extent to which the slot shortage provides airlines with the ability to raise airfares—at LHR to be at GBP34 per passenger for short-haul flights and GBP217 for long-haul flights in 2019.[51] In other words, the congestion premium reflects the scarcity at LHR, showing the additional airfares that passengers are paying relative to a scenario without capacity constraints at LHR. This may incentivize airlines to hoard slots.

[49] Guiomard (2018).
[50] de Wit and Burghouwt (2008).
[51] Frontier Economics (2019).

### Inefficient Practices due to Grandfather Rights

#### *Entrenches Incumbency*

Once the historic slots have been established, the WSG prescribes that slot coordinators may then proceed to establish a slot pool, which includes any newly created slots and the slots released as part of the use-it-or-lose-it rule.

However, the eligibility of new entrants to request for the slots in the slot pool is not exclusive as other smaller incumbent airlines may also request for them under the new entrant rule. The WSG prescribes that 50% of the newly created slots must be allocated for new entrants, meaning that the remaining 50% can still be allocated to other airlines. A study on airport slots in the EU found that only 0.4% and 0.7% of total slots were allocated to new entrants at LHR and CDG, respectively, between 2006 and 2010.[52] The intended effect of the new entrant rule can be negated if too few slots are either newly created or returned by incumbent airlines into the slot pool, resulting in the limited participation of new entrants at some airports.

#### *Promotes Slot Hoarding*

Incumbent airlines can abuse the slot allocation system by hoarding their slots in order to impede competition from new entrants. This imposes a high barrier to entry for new entrants, as they may not have access to a congested airport at all or to the best-timed slots in a day. A study undertaken on US airports found that despite the efforts of the US Government to encourage slot transactions that can increase competition between incumbent airlines and new entrants, the concentration of incumbent airlines at four slot-coordinated US airports (DCA, EWR, JFK, LGA) increased between 2007 and 2017.[53]

In extreme cases, airlines may also be incentivized to object to any airport expansion plan to prevent the creation of new slots that will be made available to new entrants. In response, new entrants—unable to establish a foothold at the major airports—may turn to secondary airports to commence their services or establish their hubs. However, these secondary airports may lack connectivity in terms of flight routes relative to primary airports and links with other modes of transport, which can be a disadvantage for airlines operating at these airports.

#### *Encourages Inefficiency*

Thirdly, with grandfather rights, the historic use of a slot will have precedence over the value of the service offered by an airline. Given the lack of airport infrastructure and capacity, other airlines and new entrants may face more challenges to obtain slots at a congested airport even though they may offer better services. This also distorts the investment and scheduling activities of incumbent airlines, as grandfathered slots would not reflect their scarcity value.

[52] Steer Davies Gleave (2011).
[53] Ball, Berardino, and Hansen (2017).

Because all slots obtained through grandfather rights will most likely result in perpetual holdings (subject to the use-it-or-lose-it rule or any forms of slot trading or misuse), incumbent airlines have strong incentives to hold on to these slots, even if it means—in extreme cases—operating empty flights to fulfill the use-it-or-lose-it rule

### Manipulation of the Use-It-or-Lose-It Rule

#### *An Inefficient Measure of Slot Utilization*

The use-it-or-lose-it rule is not accompanied by further rules that measure the efficiency of slot utilization by airlines. Slot coordinators generally do not allocate slots to airlines based on the economic performance (for example the number of passengers carried) of flight operations. From an efficiency perspective, it may be less efficient if slots, particularly at peak hours, are allocated to airlines that operate smaller aircraft relative to other airlines. As slots are inherited from one IATA season to another based on their historic utilization, airlines may resort to hoarding slots by operating flights with fewer seats or lower load factors in order to utilize the slots allocated. In extreme cases, airlines may even fly empty aircraft ('ghost flights') to hoard slots.

This may compromise the efficient utilization of airport capacity. For airports, it is more profitable if a scarce slot is utilized by a larger aircraft with more passengers. Similarly, the utilization of a priced slot for the operation of a long-haul flight may bring more benefits—in terms of financial gains and connectivity—to an airport compared to a short-haul flight. A study on slot control in the US airport system found that the three airports (DCA, EWR, LGA) in the period of study with the lowest load factors were all slot-controlled. [54]

In principle, slot utilization is not linked to the efficient use of airport capacity. Thus, slot coordinators have focused on defining the efficiency of slot utilization from a technical rather than an economic perspective.[55] From a technical perspective, slot utilization efficiency may simply be defined as the series of slots held on the Historical Baseline Date in the IATA Summer and Winter seasons. This definition is void of accompanying efficiency measures with regard to aircraft size or distance of flight (i.e. short- or long-haul).

In contrast, from an economic perspective, the efficiency of slot utilization may be measured by the resulting value or benefits brought by the airlines to the airports. For example, the utilization of a scarce slot for a long-haul flight may be prioritized over a short-haul flight, or for the use of a larger aircraft over a smaller one. At present, Australia implements the size-of-aircraft test at SYD to ensure that airlines do not manipulate the system by utilizing smaller aircraft for their operations. This test illustrates how an efficiency measure is applied together with the use-it-or-lose-it rule to improve slot utilization efficiency.

[54] US Government Accountability Office (2012).
[55] de Wit and Burghouwt (2008).

### *Disadvantageous to Airports*

The 80-20 rule may also be detrimental to airports by restricting their business sustainability during economic downturn. As mentioned earlier, the 80-20 rule can be suspended temporarily during an economic downturn to allow incumbent airlines to maintain their historic slots considering significant number of flight cancellations, which would have led to the non-utilization of historic slots. However, this may come at the expense of airports, as they are unable to attract new entrants due to a lack of available slots as, despite the flight cancellations, incumbent airlines still hold the slots. Unlike airlines, airports have limited flexibility in adjusting their fixed infrastructure to accommodate changing business needs, relative to how airlines can.

### *Subject to Manipulation*

The use-it-or-lose-it rule can also be easily manipulated by incumbent airlines to maintain their historic slots. This can be done by switching from a highly utilized slot series to a slot series with poor utilization. Based on the WSG, the cancellation of periods of less than five consecutive weeks does not reduce the period eligible for historic precedence, provided that the total number of cancellations is less than 20% of the period between the first and last date of the slot series. Hence, this provides airlines an opportunity to manipulate the system by spreading out their flight cancellations.

Table 5 illustrates how a series of slots can be inefficiently utilized by an airline.

**Table 5: Examples of Slot Series Utilization**

| **Scenario 1** | | | | | |
|---|---|---|---|---|---|
| **Period in an operating season:** An airline obtains a historic right to operate a route for 30 weeks in a season. It operates one flight per day at an airport, and therefore, has a slot for each day of the week for the 30 weeks | | | | | |
| Duration | 30 weeks | | | | |
| **Actual operation:** However, the airline only operates the route for 25 (5+20) weeks, with a consecutive gap of five weeks (i.e. a series of slots) without operations | | | | | |
| Duration | 5 | 5 | 20 | | |
| **Period eligible for slots as historic rights:** The cancellation of five or more consecutive weeks will reduce the period eligible for historic precedence – in this case, 25 weeks, split over two separate periods. The slot series for the remaining five weeks are returned to the slot pool for other competing airlines and new entrants to utilize | | | | | |
| Duration | 5 | | 20 | | |
| **Scenario 2** | | | | | |
| **Period in an operating season:** An airline obtains a historic right to operate a route for 30 weeks in a season. It operates one flight per day at an airport, and therefore, has a slot for each day of the week for the 30 weeks | | | | | |
| Duration | 30 weeks | | | | |
| **Actual operation:** However, the airline only operates the route for 24 (4+4+16) weeks, with two non-consecutive gaps of three weeks each of non-operation | | | | | |
| Duration | 4 | 3 | 4 | 3 | 16 |
| **Period eligible for slots as historic rights:** Because the airline has operated for at least 80% of the time in the 30 weeks (24 weeks), it is eligible for the historic rights over all the 30 weeks, even though it had not operated for six weeks | | | | | |
| Duration | 30 weeks | | | | |

Legend

| | |
|---|---|
| | Period of utilization of slot |
| | Period of non-utilization of slot |

*Source: IATA (n.d.)*

### Insufficient Competition Through the New Entrant Rule

The new entrant rule states that 50% of newly created or available slots in the slot pool should be reserved for new entrants. Given that IATA defines new entrants as airlines that are operating seven or fewer slots a day at an airport, such new entrants essentially operate low-frequency services and may not be able to provide effective competition to incumbent airlines. Although more new entrants are eligible now (as the threshold was increased to seven slots a day at an airport from five slots), there may still be existing carriers left out who could offer more frequent operations and, hence, competition to incumbent carriers.

### Concerns Over the Independence of Slot Coordinators

The WSG states that slot coordinators are required to act in a neutral, transparent, and non-discriminatory way. However, concerns over the independence of slot coordinators may arise in terms of their legal status, ownership, and funding structures.

In the past, concerns were raised regarding the independence of slot coordinator—for example, slot coordination in Spain was previously undertaken by a department in Aena SME, S.A. (Aena), which is the national airport operator in Spain.[56] Although the slot coordination entity was maintained as a separate department and was therefore functionally independent as per EU requirements, its extent of independence was unclear. In terms of funding structures, for example, the German slot coordinator—the Airport Coordination Germany (FHKD)—is partially funded by airlines through the cost unit rate per slot.[57] This implicit relationship between the funding of the coordinator and the commercial performance German airlines may raise concerns over the independence of the slot coordinator.

Although slot coordinators in EU Member States have taken steps to comply with the requirements set in Regulation No. 95/93 that slot coordinators are independent (for example, Spain had since established a separate body to coordinate airport slots), concerns remain regarding the model employed by other slot coordinators around the world.

In Australia, the ACA is funded by airlines—raising the same concerns as the FHKD's funding structure. Although arguments have been made that the board of slot coordinators is made up of airline representatives and therefore would be able to ensure that slot coordinators act independently, membership of the board may not be diverse—the ACA's Board's airline members are only made up of representatives from Qantas and Virgin Australia Airlines.[58]

[56] Steer Davis Gleave (2011).
[57] FHKD (n.d.).
[58] ACA (2019).

In Malaysia, the NSCM is a unit under the largest airport operator in the country (MAHB). The NSCM undertakes slot allocation for all Malaysian airports including those run by other airport operators. This may raise concerns over the transparency of the slot allocation process where NSCM may prioritize MAHB's airports over others run by different operators.

## Solutions to Overcome Challenges in Slot Allocation

Regulators worldwide have studied potential reforms to the current slot allocation system to increase competition and efficiency. These studies primarily propose the creation of a primary or secondary market that allows for the auctioning and trading of slots to overcome the deficiencies associated with current slot allocation rules.

### Primary Trading

Primary trading involves negotiations for the trading of slots in return for monetary compensation between airports and airlines such as auctions. The mechanism touted under the primary trading option would involve the total suspension of grandfather rights, resulting in the return of all slots into the slot pool, and re-allocation using auctioning to the highest bidders.[59]

#### *Advantages of Slot Auctions*

Auctioning has been proposed as a more efficient alternative to the current slot allocation mechanism as it promotes efficient utilization of slots, given that airlines would want to maximize the value of the slot higher than the value of which they paid for it. Additionally, it also differentiates slots in terms of pricing, as slots in peak hours are valued higher than those in off-peak hours, which would improve the allocative efficiency of the slots.[60] This would mean that airlines would be incentivized to use bigger aircraft or operate high-demand routes during peak hours, which would boost airport capacity utilization and yields. The airlines would also consider the dynamic nature of the aviation industry over time, as slots would be priced differently over IATA seasons, throughout the years, and between airports.

Moreover, auctions are a transparent way to allocate slots and would result in other benefits. For example, scarce slots would be priced at the point in which demand matches the supply available, which allows airports to value their capacity more efficiently, facilitating better infrastructure planning in the future. It also reveals information on the airlines' willingness to pay for slots. This may be particularly advantageous at congested airports as airport operators can use this information to price their slots appropriately.

[59] House of Commons (2017).
[60] European Parliament Directorate-General for Internal Policies (2016). Allocative efficiency means that the slots should be used in ways that provide the highest possible social value.

Auctions are also a more transparent mechanism in slot allocation. All winning bids and prices for slots are transparent and stated from the onset. This reduces the risk of disputes as well as the scope for lobbying activities by airlines as all slot transactions take place publicly via the auctions.

### *Disadvantages of Slot Auctions*

However, slot auctions would likely face resistance from airlines themselves, owing to several reasons. Firstly, airlines, especially legacy carriers, would be reluctant to switch from the present grandfather rights to slot auctions regime, mainly because this would subject them to the threat of new entrants or other competitors that have a better financial position to bid for slots. In 2000, the European Commission (EC) had attempted to introduce reforms to the then slot allocation directive in the EU, which included allowing the partial auctioning of slots.[61] However, this proposal was opposed by the European flag carriers that benefitted from the longstanding grandfathering rights mechanism of allocating slots, particularly at congested European airports. The proposal was eventually vetoed by the EU Member States.

Secondly, airlines have also raised concerns that the costs associated with auctioning may lead to higher airline costs which ultimately translate into higher airfares.[62] In 2008, the FAA proposed an auction process for slots at airports located in New York and New Jersey (i.e. EWR, LGA, JFK).[63] Airlines opposed the proposed auction on the grounds that since the auctions would raise the value of the slots relative to their cost, the surplus would represent a tax, and under US law, it would be illegal for the FAA to impose the tax on airlines. The auction was also argued to violate the Chicago Convention and that it would raise fares and reduce the airline's ability to invest. The FAA's auction proposal was stayed at the US Court of Appeal and was never implemented.

Thirdly, implementing an auction mechanism to allocate slots may overlook the complementarities involved in the aviation industry. An airline would have to obtain a slot at the two airports in which it seeks to establish a direct service to; if it bids for a slot at one airport but does not obtain a matching slot at the other, the value of the obtained slot to the airline decreases. This may be exacerbated when bidding for slots at congested airports, as the risk of being out-bid—especially for peak time slots—may be high. Potential solutions to this problem, such as a coordinated global slot auction, are difficult to implement, in addition to being even more costly for airlines.

[61] Boyfield et. al. (2003).
[62] Ibid.
[63] Berardino (2009).

Lastly, an accurate valuation of slots may be difficult to arrive at, given the various components involved in a slot. As a slot is defined in some jurisdictions as the full range of airport infrastructure available, airport authorities would need to attempt to define the value of all interdependent components. Access to check-in counters, baggage chutes, and runways would have to be valued and priced independently of each other to arrive at an overall value of a slot before the start of an auction. In addition, the airport operator may also value each component differently depending on the type of aircraft deployed by an airline, which is not known prior to the auction. This adds to the complexity of auctions and risks slots not being valued appropriately.

### *Recent Developments in Slot Auction*

Notwithstanding the challenges concerned, China has experimented with slot auctions as recently as 2015. The Civil Aviation Administration of China mentioned that the auction was an experiment to reform the current slot allocation mechanism in the country (based on the WSG), as the current regime was found to be subject to abuse and corruption. Slot auctions have been undertaken at CAN and PVG. In both cases, the effects of the auction on the industry are unclear at present, but it is noted that no auctions have been attempted since.[64,65]

In developing proposals for slot auctions, useful lessons may be learned from the example of telecommunication spectrum auctions (discussed in Box 4). However, it should be noted that spectrum auctions have been criticized as an easy way for governments to raise revenue, and that such objections can also be raised by opponents of slot auctions.

### *Box 4: Telecommunication Spectrum Auctions and Potential Slot Auction Design*

In the US, telecommunication spectrum auctions are undertaken by the US Federal Communications Commission (FCC). The FCC was authorized to use a competitive bidding process in 1993 to choose from qualified bidders for a licence. Prior to this, the FCC used hearings and lotteries to determine the pool of mutually exclusive applications and to then select the licensee.[66] At present, the FCC uses a Simultaneous Multiple-Round Auction mechanism, a method where all applicants bid throughout the entire auction over multiple rounds. This allows each bidder to know the value of other bids, as the results of all bids in each round are made transparent. Bidding continues until there is only one bidder left, who wins the auction. This allows the FCC to extract the highest possible value from the spectrums being auctioned.

[64] Reuters (2015).
[65] IATA (2017).
[66] FCC (2006).

*Auction Design for Slots*

The Simultaneous Multiple-Round Auction mechanism has been touted as a potential option for slot auctions.[67] Airlines can bid for a series of slots and observe the bids made by their rivals and adjust their bidding strategies accordingly after each round. This can address the risk that airlines may only be able to obtain a slot at an airport but not the other. If an airline is unable to obtain the set of slots it was looking for, it can continue bidding in other sets of slots that can act as a substitute for the primary slot set.[68]

Hub and spoke carriers offer services with sufficient frequency and destinations that appeal to a wide range of travelers. Failure to obtain slots at a desired airport or time may affect an airline's offerings, which would necessitate the airline to pursue other slots at different airports and/or times instead. The Simultaneous Multiple-Round Auction mechanism may also be able to facilitate bids on a bundle of slots, but this would represent a high risk to airlines—failure to win the auction would eliminate several of the airline's backup strategies in addition to losing their desired set of slots.

The UK Competition and Markets Authority (CMA) has advocated that a market-based slot allocation mechanism such as slot auctions can aid airports in plugging in the gap of infrastructure financing.[69] The auctioning of slots to airlines can provide airports with the certainty of airline future business plans and address challenges associated with pre-funding for new airports or expansions to current airports. Furthermore, this can also provide an opportunity for airlines to secure future capacity at an airport, making an advance contribution through slot auctions.

### Secondary Trading

Another option to improve the efficiency of current slot allocation rules is secondary trading. Secondary trading involves bilateral negotiations for the trading of slots in return for monetary compensation between airlines (or other non-airport players such as financial institutions).

[67] DotEcon Limited (2001).
[68] Gruyer and Lenoir (2003).
[69] CMA (2018).

However, it is important to first discuss the issues regarding the ownership of slots (discussed in Box 5) to establish the rights associated with slot trading.

*Box 5: Issues Regarding Ownership of Slots*

*Introduction*

Even though the question over slot ownership remains unanswered, slots can be traded. A 1999 UK High Court decision in a case between British Airways and KLM established that a secondary market for airport slots exists. The High Court found that the term 'freely exchanged' in the EU Slot Allocation Directive (95/93) meant that slots could be freely exchanged for money.[70] In this regard, the rights of slots can be further categorized as property rights and trading rights.

At the EU level, the EC decided that airlines have indefinite property rights over slots, which allow them to undertake secondary trading at coordinated airports in the EU.[71] This is despite the EC's definition of a slot pointing to it not being a property right, but a permission to utilize airport infrastructure. This decision supported the airlines' claim to slot ownership as they had the right to swap slots.

*Property Rights and Trading Rights*

The UK Civil Aviation Authority (CAA) argued that the property rights to slots are not as important as the trading rights of slots and that airlines need not have property rights over slots to trade them.[72] A study by Steer Davies Gleave (2011) on the impact of Regulation No. 95/93 highlighted the airlines' view that the lack of clarity over slot ownership has not stopped the development of a secondary market for slots.

This view was also echoed by slot coordinators and EU Member States who argued that more work should be undertaken to make slot allocation procedures more transparent instead. However, the aforementioned study quoted that airports in Europe preferred that slot ownership should be assigned to them instead, given the investments that airport operators make in expanding capacity that can lead to the creation of more slots.

Clarifying the property rights of slots may also lead to perverse incentives. For example, if property rights were assigned to airports, they may be incentivized to restrict the number of slots so as to raise the value of individual slots. If assigned to either airports or airlines, there could be culpability on either party to compensate passengers if, due to any constraints, the number of slots was restricted, leading to congestion.

[70] Boyfield (2003).
[71] de Wit and Burghouwt (2008).
[72] UK CAA (2001).

Despite a lack of clarity over the ownership of slots, airlines list the value of the slots they currently hold as part of their financial statements, typically under intangible assets. Table 6 lists the value of slots for selected airlines.

**Table 6: Value of Slots as part of Airline Financial Statements**

| Airline | Value of Slots (in mn, local currency) | Description |
|---|---|---|
| Air Canada | CAD97 | • Recorded as part of intangible assets |
| Lufthansa | EUR112 | • Recorded the value of the slots purchased that are tradeable |
| Qantas | AUD35 | • Recorded as part of intangible assets |
| United Airlines | USD97 | • Recorded as part of intangible assets<br>• Pledged as collateral for credit agreements |

*Source: Respective Airlines' 2018 Annual Report*

Third parties have also accepted the airline holding of slots as collateral – a known example of this was the slot trust agreement between Trans World Airlines and Shawmut Bank in 1989. Trans World Airlines slots at JFK (154 slots), LGA (42 slots), and DCA (32 slots) were used as collateral in the payment of their Five-Year Notes.[73] The title of the slots was held in trust and licensed back to Trans World Airlines for their utilization. This arrangement may lend credence to airlines' claims over slot ownership.

### *Slot Ownership in the US*

In the US, the Air Commerce Act of 1926 provided the Federal Government with a claim over US airspace.[74] In 1938, the FAA was assigned control of the airspace until 1969, including the duty of allocating slots. However, due to growing air traffic demand, congestion at US airports occurred, and airlines established scheduling committees to allocate the slots from 1969 onwards, which was enabled by the granting of immunity to airlines from antitrust laws. Following the Airline Deregulation Act of 1978, increased competition amongst airlines ultimately led to the breakdown of the scheduling committees.

In 1986, laws were amended again to allow airlines to buy, sell, or lease slots due to continued congestion at high-density airports. The rules also provided that:

*"Slots do not represent a property right but represent an operational privilege subject to absolute FAA control. Slots may be withdrawn at any time to fulfil the Department's operational needs."*[75]

[73] Fukui (2010).
[74] Riker and Sened (1991).
[75] Ibid.

This rule specifies the circumstances in which the FAA can determine a different method of slot allocation by airports – for example, the FAA can withdraw a slot from a domestic carrier and assign it to an international carrier at ORD. At LGA, the FAA can allocate slots to carriers that operate international flights, but only if required by a bilateral agreement. However, as mentioned in the previous sub-section, airlines have challenged the right of the FAA to auction slots when the latter attempted to do so in 2008. It was argued that:

*"The FAA cannot create property by exercising its regulatory power to regulate the use of navigable airspace; slots are not property when created and held by government but only become property when transferred to an air carrier…the return of slots to the government at the end of the term of their leases would constitute an unconstitutional taking of property."*[76]

Given that the FAA's auction proposal was stayed at the US Court of Appeal and was never implemented, slot ownership may still be unclear in the US. From the airlines' perspective they insist that they should be allowed to continue with the practice of buying, selling, or leasing their slots. On the other hand, the FAA had hoped to leverage on its supposed ownership of slots and raise capital to fund expansion infrastructure at congested airports.

### *Advantages of Secondary Trading*

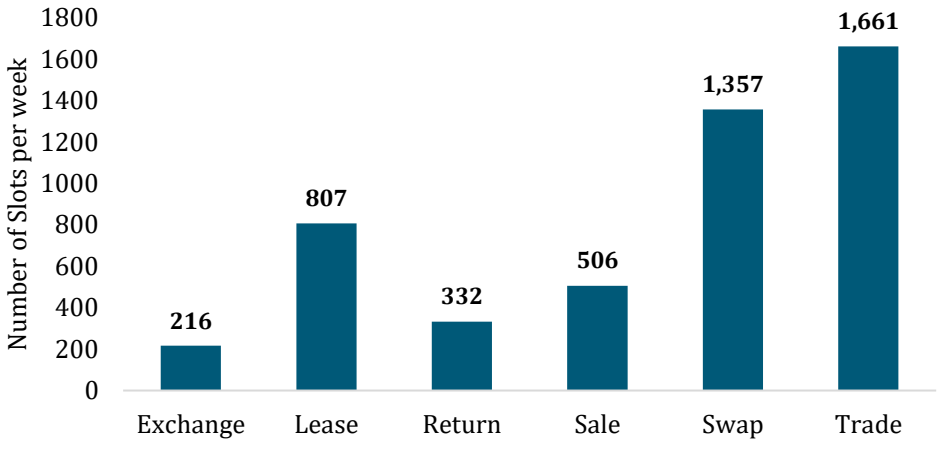
Unlike primary trading, secondary trading does not do away with grandfather rights, but seeks to accompany the present rules by allowing a viable secondary market to exist through the buying and selling of slots between airlines. In this sense, it does not seek to significantly alter slot allocation practices globally and is more widely accepted by airlines.

Secondly, slot trading also enhances the number of slots available at congested airports such as LHR, given that very few slots are returned to the slot pool annually as LHR slots are much sought after. For example, Scandinavian Airlines had sold two of its slots at LHR to an undisclosed airline for USD75mn in 2017.[77] Slot trading in the UK is overseen by ACL to ensure adherence to slot rules.

[76] Berardino (2009).
[77] Business Traveller (2017).

Figure 10 depicts a number of weekly slots traded at airports in London (LCY, LGW, LHR, LTN, STN) between 2014 and 2018. It shows that slot trades were the most common form of slot transaction, showing that slot mobility can increase with secondary trading.

**Figure 10: Number of Slots by Transactions at Airports in London, 2014 – 2018**




*Source: ACL*
*Note: There is no official definition for each type of transaction above.*

It was found that slot trading at LHR resulted in a higher average number of seats per aircraft deployed, indicating that the purchasing airline tends to operate a larger aircraft to better utilize their slots.[78] Slot trading also allowed the emergence of other carriers such as Virgin Atlantic at LHR, even though dominant airlines such as British Airways increased their share of slots. [79]

### *Disadvantages of Secondary Trading*

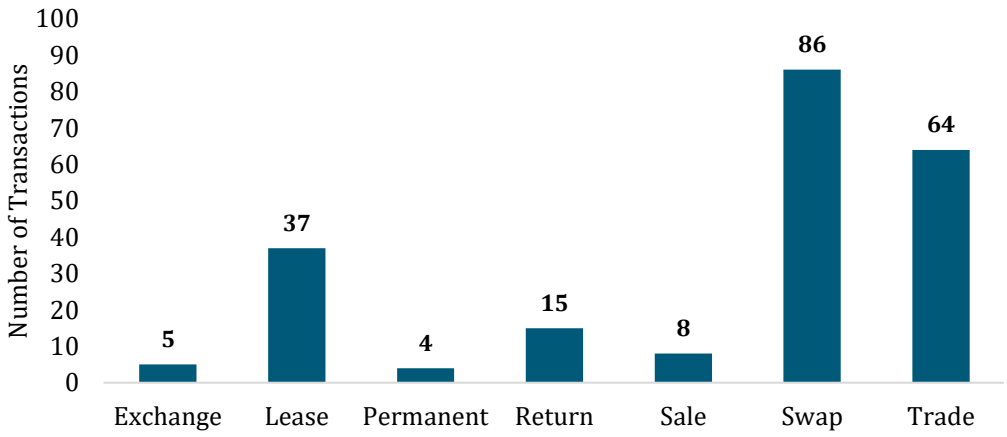
In some cases, slot trading would not improve the efficiency of slot allocation if the airlines that hold prominent slots refuse to trade or sell them. In this event, competition is dampened as airlines would not want to cede valuable slots to their competitors.

Slot trading also encourages the 'babysitting' of slots. In babysitting slots, a partner airline rents the slot from their parent or alliance member for a fee. This is a relatively new trend where airlines transfer the slots that they do not utilize to airlines not deemed as competitors, such as partner airlines (i.e. airlines within alliances) or subsidiary airlines.[80]

[78] CAPA (2016).
[79] Steer Davies Gleave (2011).
[80] European Parliament Directorate-General for Internal Policies (2016).

Figure 11 illustrates a number of weekly slots transactions at airports in London (LCY, LGW, LHR, LTN, STN) between 2014 and 2018. The count of slot swap transactions was the highest relative to other transaction categories. Additionally, 46.5% of all slot swaps and 37.8% of slot leases at airports in London between 2014 and 2018 were found to have taken place between airlines of the same alliance. This may indicate the existence of slot 'babysitting'.

**Figure 11: Count of Slot Transactions by Categories at Airports in London, 2014 – 2018**



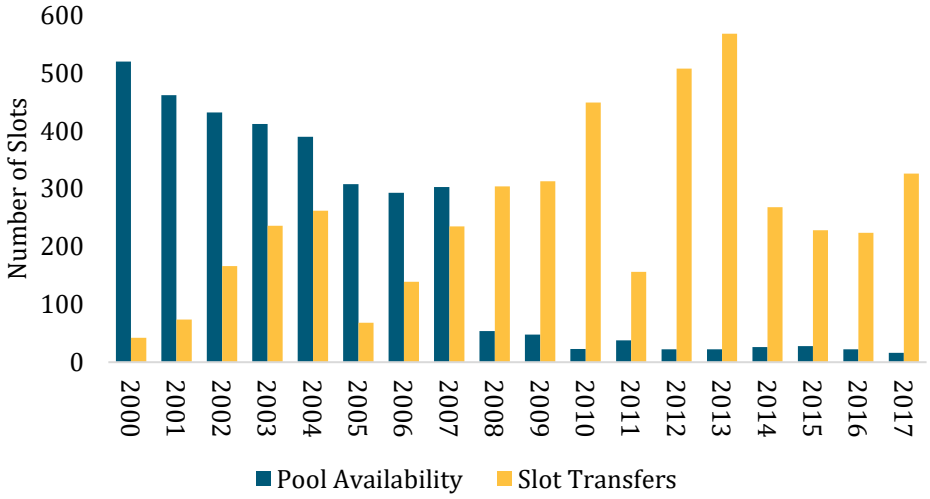

*Source: ACL*

The babysitting of slots was practiced by Delta Airlines for several years when it leased six slot pairs at LHR from joint-venture partner Air France-KLM.[81] Delta Airlines eventually purchased the slots as it sought to build up its own slot portfolio at LHR for transatlantic flights with its other joint-venture partner, Virgin Atlantic Airways. Such practices are also common in Europe, where airport congestion often results in airlines finding creative methods to maintain their historic slots. 'Babysitting' also occurs due to operational reasons such as the waiting of the delivery of aircraft from manufacturers.

[81] Air Transport World (2015).

Furthermore, secondary trading may also decrease the number of slots returned to the slot pool as airlines would trade the slots either for monetary compensation or other slots, rather than returning the slots to the pool. This can be seen in the case of LHR, where the number of new slots available decreased over time as the number of slot transfers increased (see Figure 12).

**Figure 12: Slot Availability at LHR Against Slot Transfers, 2000 – 2017**

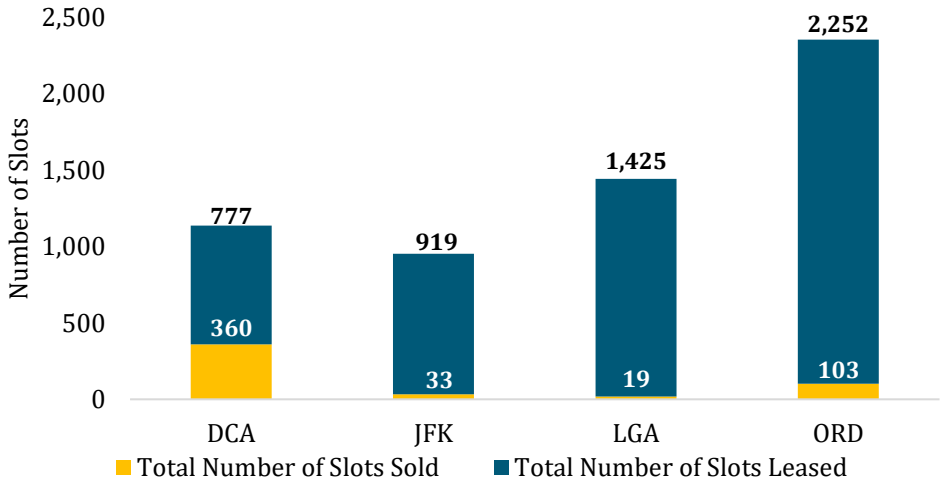



*Source: Frontier Economics (2019)*

The US Government Accountability Office (1990) found that allowing the buying and selling of slots had not resulted in a dynamic secondary market. It noted that since the buy-or-sell rule was introduced in 1986, slot leases have increased, reducing the ability of new entrants to secure slots via the slot pool. This may indicate that incumbent airlines are leasing out their excess slots and holding their prime slots. The leasing of slots to other airlines allows the lessor to maintain its hold over the slots as under existing rules, the slot would be deemed as utilized by the lessor and not by the lessee.

Fukui (2010) further analyzed slot data at the slot-controlled airports in the US in the 1990s and confirmed that the number of slots sold to other incumbent carriers and new entrants was limited relative to the number of slots leased (see Figure 13).

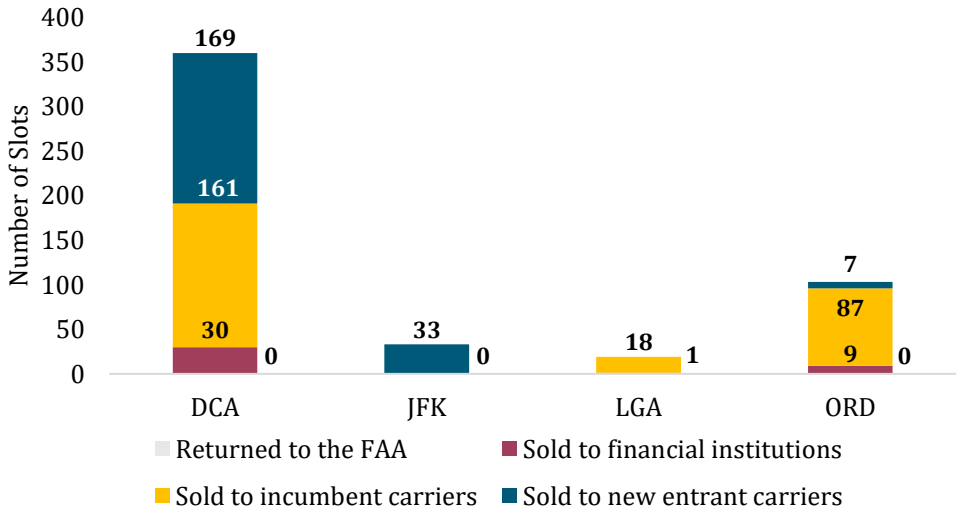
**Figure 13: Slot Sales Against Leases at US High-Density Airports, 1995 – 1999**




*Source: Fukui (2010)*

The high number of slots sold also indicates that other incumbent carriers or new entrants are more likely to obtain slots at high-density airports by purchasing them from incumbent airlines than receiving them through the slot pool under existing slot rules (see Figure 14). As shown below, the number of slots returned to the slot pool ('Returned to the FAA': none for DCA, JFK, ORD, and one for LGA between 1995 and 1999) is negligible.

**Figure 14: Slot Sales by Purchaser at US High-Density Airports, 1995 – 1999**




*Source: Fukui (2010)*

# SECTION 4: SLOT ALLOCATION AND COMPETITION

The relationship between slot allocation and competition may be seen through two aspects.

Firstly, slot allocation practices have been viewed as a cause for anti-competition concerns. Although key slot allocation principles such as grandfather rights can be viewed as raising barriers to entry, these practices have also been shown to promote efficiency as part of an airlines' business strategy. Hence, the net effect of slot allocation on competition is ambiguous.

Secondly, slot-related measures have also been used in assessments on airline mergers, acquisitions, joint ventures or alliances. Competition authorities and transacting parties have proposed slot divestments at certain airports as remedies to overcome concerns on lessened competition arising from proposed transactions.

This Section discusses the relationship between slot allocation and competition law, as well as, highlights the extent to which competition law can address competition concerns in slot allocation reforms.

## Competition Concerns of Current Slot Allocation System

Certain WSG principles, such as grandfather rights and the use-it-or-lose-it rule, may mean that slots are not allocated to their most efficient use. Grandfather rights may uphold the advantage held by incumbent airlines over new entrants, despite the existence of a slot pool for new entrants. The use-it-or-lose-it rule may also be subject to manipulation, resulting in incumbent airlines retaining unutilized slots as part of their historic rights.

A secondary market that allows slot trading can improve slot mobility, therefore improving the efficiency of slot allocation alongside the WSG principles. This occurs in certain jurisdictions such as the EU and UK, which have a relatively high number of congested airports. However, as discussed in the previous section, secondary market solutions may inadvertently incentivize anti-competitive practices such as slot hoarding.

### Anti-competitive Effects of Slot Rules

Slots can be viewed as barriers to entry as without a slot, an airline cannot operate at an airport. Given that airport capacity expansion has generally not kept up with the demand for air travel, the hoarding of slots translates into an ability to erect barriers to entry and monopolize air transport markets.

#### *Grandfather Rights*

As previously discussed, grandfather rights can lead to fewer slots being returned to the slot pool at congested airports. Incumbent airlines may hoard slots by operating them inefficiently to prevent the slot from being returned to the slot pool and potentially being used by a competitor.

A study found that at congested airports in the EU such as LHR and FRA, 93% of allocated slots are allocated to incumbent airlines that hold historic rights.[82] The study also found that the proportion of slots that were unutilized without being returned to the slot pool at AMS, CDG, LGW, and STN were between 8% and 13% of the total slots at those airports for the Summer 2002 season. As a result, new entrants or other competing airlines may find it challenging to launch a sustainable service from congested airports.

The lack of slots act as a barrier to entry for airlines seeking to establish new services or for other competing airlines to expand their existing services. A consequence of this is that the growth of low-cost carriers (LCCs) took place at secondary airports, as slots were not easily available at primary airports. This may have disadvantaged the LCCs as secondary airports may not have been as well connected to other modes of transport relative to primary airports.

The incentive to erect barriers to entry is also greater for incumbent airlines due to their business models. Incumbent airlines tend to be legacy carriers, that operate a hub-and-spoke system, where destinations (spokes) are connected to a central hub. The network effects inherent in this system increases the marginal benefit of a slot at an airport as it allows network carriers to increase their reach, incentivizing incumbent carriers to hoard slots.

### *Slot Trading*

In the secondary market, the trading of slots between airlines may result in increased slot holdings. Slots that are valued highly may be hoarded by incumbent airlines, especially network carriers, through strategic purchases. In addition, the trading of slots may also be undertaken between airlines within the same alliance, restricting competition from airlines in different alliances.

Secondary trading may also exacerbate competition concerns in the passenger market. Incumbent carriers may reluctantly sell slots to competitors or even sell slots at excessive prices and to selected airlines only. Airlines may also deliberately avoid the sale of slots to their competitors. These practices may, in part at least, restrict the extent of services that other airlines can offer at the same airport.[83]

### Efficiency Benefits of Slot Rules

However, the evidence that slot rules reduce consumer welfare by lessening competition is mixed. Several studies have pointed to increased slot concentration being a result of the network effects of hub carriers, which results in improved efficiency. This weakens the argument of the applicability of competition law on the secondary market trading of slots.

[82] NERA Economic Consulting (2004).
[83] Polemis and Oikonomou (2017).

#### *Increased Efficiency Through Slot Allocation*

Large holdings of slots may instead point to airlines—especially network carriers—attempting to increase their economies of scale. Similarly, the Office of Fair Trading (OFT) (2005)[84] argued that the concentration of slots by a network carrier at a hub airport may not be indicative of high market power but may instead show that the carrier values the slots available at such hub airports. This is because the hub airport can provide the carrier with options to expand its network through flight connections, which may not necessarily result in a lower consumer welfare for passengers.

In addition, higher airfares in routes from or to congested airports may instead be a result of 'scarcity rents', which reflect the higher demand that these airports have relative to supply. The value of the rent may affect the price of the slots sold in the secondary market, and not necessarily point to the occurrence of any anti-competitive behavior.

### Applicability of Competition Law in Slot Allocation

Competition law can potentially play a role in reducing the anti-competitive effects of slot allocation or slot trading, as well as, utilize slots as an instrument for potential remedy in airliner mergers or joint ventures assessments. Active competition assessments in the airline business take place in mature jurisdictions such as Australia, the EU, and the US. However, competition assessments involving airlines and slots are also growing in emerging economies.

#### European Union

#### *Background*

EU competition law is addressed in Articles 101 to 109, Chapter 1 of Title VII of Part Three of the Treaty on the Functioning of the European Union (TFEU). Additionally, another instrument of EU competition law is the EU Merger Regulation (EUMR). The EUMR provides the framework for mergers, acquisitions, and joint venture assessments. The EUMR is supplemented by additional guidelines that provide further detail on the procedural and substantive aspects of the merger control regime in the EU. The EUMR applies only to transactions that meet the EU's pre-defined financial threshold at the global or EU-level. The Directorate-General for Competition is the competent authority of the EC that is responsible for competition policy.

[84] European Competition Authorities (2005).

### *EU Competition Law and Slot Allocation*

Article 101 prohibits any agreements that may distort competition within the EU internal market. Specifically, Article 101(2) states that such agreements are automatically declared null and void. Such agreements may include, among others, price-fixing arrangements and market sharing. However, Article 101 does provide exemptions if the parties to the transaction can demonstrate that the arrangement improves the workings of the internal market and does not distort competition.

Article 102 prohibits the abuse of a dominant position within the EU internal market. Such abuses may include price discrimination among different types of consumers and the exclusion of competitors from a market. Unlike Article 101(2), Article 102 does not contain any exception for a firm's conduct to be declared legal in special circumstances. Article 106 stipulates that EU competition rules also apply to companies owned by Member States.

Articles 101 and 102 may have limited applicability to slot transactions as individual transactions may not be viewed as material and would fall outside the scope of the Articles. In other words, because of the negligible effect of individual slot transactions on the downstream (passenger market) in the aviation industry, it is unlikely that slot transactions can have a significant impact on competition.

### *Past Case*

In some cases, large slot exchanges in transactions may warrant the return of slots as a remedy for the approval of mergers, acquisitions, or joint ventures. For example, in the oneworld alliance case involving American Airlines, British Airways, and Iberia in 2010, the EC found that the joint venture may result in anti-competitive effects on the trans-Atlantic market. The EC further found that the parties would act as a single entity on certain trans-Atlantic routes, which would deprive the market of competitive pressures that were previously present. The remaining competitors would be unable to replicate the competitive pressures due to a lack of slots at key airports such as LHR and JFK. Under the commitments later made by the participants, slots were returned at LHR to facilitate the entry of new competitors in routes between London and New York, Boston, Dallas, and Miami. The EC accepted the commitment as a suitable and sufficient remedy and approved the joint venture.[85]

[85] EC (2010).

### *Challenges on the Applicability of Articles 101 and 102*

However, this case appears to be the exception rather than the norm. The applicability of Articles 101 and 102 on slot transactions appear to be limited due to numerous reasons. Firstly, market definition may be challenging to be carried out. Competition authorities may find it challenging to prove that an airline's hoarding of slots at an airport is anti-competitive because it may be difficult to establish its effects on the passenger market, as a slot can be used for numerous routes. For example, a hub airline may have a strong basis to justify the hoarding of slots as part of its business strategy at a particular airport. The airline may argue that it can provide more efficient services to consumers by establishing itself at an airport relative to its network.

In addition, it may also be challenging to establish that rival airlines have been denied entry at an airport since airlines operate on different business models and that the market may be defined as a group of airports in a geographical region. In this case, rival airlines may still be able to operate at an airport as it can purchase slots from other airlines. An airline's holding of a significant number of slots at an airport may not be an anti-competitive practice as it can be argued that competing services could also be provided at neighboring airports, particularly if the competing airlines utilize a different business model. As mentioned earlier, airlines operate on different business models, with FSCs adopting a network carrier approach that benefits users going through an airport hub that provides connections to other destinations. These FSCs could argue that additional slot holdings at hub airports aid the development of their network as per their business model.

Thirdly, given that Article 102 addresses abuse of dominant position, it may also be challenging to establish that individual slot transactions can significantly contribute to an airline's market power at an airport. If an airline purchases additional slots, it could instead argue that it would be able to provide more efficient services through the acquisition of these slots, especially if it has established hub services at an airport. The distinction between allowable business behaviour and abusive practices may not be clearly distinguishable in this case.

In summary, the burden of proof required under Article 101 and 102 on refusal to supply cases (as in the case of slot hoarding) or abuse of dominant position may be challenging to establish owing to the potential issues that can be raised by the participants to competition authorities.

### *EU Merger Regulation and Slots*

The EUMR has been used to address concerns on concentrations in airline mergers, acquisitions, and joint ventures. In assessing these cases, the EC considers the slot holdings of participants in evaluating the competitive effects of the proposed transactions.

For example, in assessing the acquisition of Virgin Atlantic by Air France-KLM, Delta, and Virgin Group,[86] the EC investigated whether the airlines' combined slot holdings at airports where their services overlap would act as a barrier to entry by hindering competitors from entering those airports. The EC's investigation found that the combined slots portfolio is not likely to have a substantial negative effect on passengers at these airports and approved the acquisition in February 2019.

In another case, the EC investigated Lufthansa's claim of acquiring a majority stake in Swiss Air Lines and found that the proposed acquisition would significantly reduce competition in several intra-European routes. Both airlines agreed to return numerous slots at airports in Zurich, Frankfurt, and other European cities in which their combined services were found to significantly reduce competition. The surrendered slots were returned to the slot pool as per IATA guidelines, which allowed new entrants to provide services to or from these airports. Lufthansa also agreed to refrain from adding new services on these routes or purchase additional slots on the secondary market to provide more time for the new entrants to establish their services. Additionally, both the Swiss and German civil aviation authorities made separate undertakings to provide opportunities for new entrants and existing competitors to compete with the combined Lufthansa-Swiss Air Lines services by granting additional ATRs.

[86] EC (2019).

Airline mergers approvals undertaken by the EC between 1995 and 2009 show that slot divestments formed a majority of remedies, as highlighted in Table 7. In the EU, the EC had even proposed to the interested parties to reduce frequencies or prices on certain routes to reduce the anti-competitive effects of alliance or mergers, and cooperation with railways on short-haul routes.

**Table 7: Airline Merger Remedies in the EU, 1995 – 2009**

| Airlines Cases | Blocked Space Agreement | Freeze/Reduce Frequencies | Freeze/ Reduce Price | Interlining, Code-Sharing | Intermodal Agreements | Open Up Frequent Flyer Program | Surrender of Slots |
|---|---|---|---|---|---|---|---|
| Air France/KLM | X | X | X | X | X | X | X |
| British Airways/Air Liberté | | | | | | | |
| British Airways/TAT European Airlines | | | | | | | X |
| Iberia/Vueling/Clickair | | | | X | | X | X |
| KLM/Air UK | | | | | | | |
| KLM/Marinair | | | | | | | |
| Lufthansa/Austrian | | | | X | X | X | X |
| Lufthansa/BMI | | | | | | | |
| Lufthansa/Eurowings | X | X | | X | X | X | X |
| Lufthansa/SN Brussels | | | X | X | X | X | X |
| Lufthansa/Swiss | X | X | | X | X | X | X |
| Scandinavian Airlines/Spainair | | | | X | | | |
| Swissair/Sabena | | X | | X | X | X | X |
| **TOTAL** | **3** | **4** | **2** | **8** | **6** | **7** | **8** |

*Source: Nemeth (2016)*

The Ryanair-Aer Lingus case was a notable example of a proposed airline merger that was not approved by the EC. Despite the interested parties offering to divest slots at London airports and additionally on London-Ireland routes, the Commission found that the slot remedies offered were insufficient and that there would still be a substantial lessening of competition in 46 routes as some of the competing airlines that would take up the divested slots were not deemed to be able to effectively compete with Ryanair-Aer Lingus.[87] However, the effectiveness of the EUMR to address competition issues using slot allocation appears to be limited. The EUMR is intended to assess the sale/purchase of businesses, which slot transactions, individual or otherwise, are not. The EC may consider slot arrangements as part of a wider assessment into joint ventures, mergers, acquisitions, or alliance arrangements between airlines.

[87] EC (2013).

### United Kingdom

#### *Background*

Members of the EU and European Economic Area have competition laws that are modeled after EU legislation, namely Article 101 and 102. In the UK, the Competition Act 1998 and the Enterprise Act 2002 are the relevant competition laws domestically.[88] The Competition Act 1998 is modeled on Article 101(1) of the TFEU – it forbids agreements, decisions by associations of undertakings and concerted practices that have as their object or effect the restriction of competition. It is also modeled on Article 101(2) of the TFEU in that it forbids the abuse of a dominant position. Later, the Enterprise and Regulatory Reform Act 2013 abolished the OFT and established in its place the CMA, an organization that oversees the administration of competition law in the country.

Domestic law is interpreted consistently with EU rules, thereby assuring the alignment of EU and UK competition laws. Sectors such as aviation are also subject to specific regulatory control, where the UK CAA has powers to undertake competition enforcement over airport operation and air traffic services.[89] The UK CAA, however, does not have the power to enforce competition law in relation to airlines. As regards competition aspects of slots, it is enforced at the EU level as part of broader competition concerns among airlines.

#### *Future Developments*

However, this arrangement may change given the UK's impending exit from the EU, as the UK will no longer be subjected to the EU legal system and the EC's authority over airport slot allocation in the EU will no longer apply in relation to UK airports and airlines. The CMA will then be responsible for assessing mergers and investigating anti-competitive conduct among organizations in the country.

The experience of the UK CAA in undertaking competition enforcement over airport operation and air traffic services is currently shared with the CMA and other competition regulators through the UK Competition Network.[90] After the UK's exit from EU membership, the CMA may develop its own antitrust and merger regulations. However, the UK Government had also proposed that the CAA takes on additional authority to monitor competition in airline services either through greater cooperation with the CMA or with the full competition authority that currently resides with CMA.[91]

[88] Whish and Bailey (2018).
[89] UK CAA (2015).
[90] Ibid.
[91] UK DOT (2018).

## United States

### *Background*

The main regulation used to oversee competition in the US aviation industry is the federal antitrust laws as administered by the US Department of Justice (DOJ). The DOJ possesses the authority to investigate mergers between airlines if the effect of it is found to be anti-competitive and detrimental to consumers. Supervision over airline mergers was initially undertaken by the CAB until 1985 when it was passed to the US Department of Transportation (DOT) and then the DOJ in 1988.[92] However, the DOT retains limited power to cease *"unfair or deceptive practice(s) or unfair method(s) of competition…"*[93] This authority, contained in the Federal Aviation Act, is used by the DOT to prohibit any such behavior that is beyond the reach of the DOJ.

The specific statute that applies to mergers is the Clayton Act, which prohibits any mergers or acquisitions that may reduce competition substantially in a market.[94] As in the case of the EU, the assessment undertaken by the DOJ in antitrust investigations in the US seeks to determine if the combined entity will have their market power enhanced to the extent that the market becomes uncompetitive, to the detriment of the consumer. In the aviation industry, these markets are usually defined in terms of city-pairs, or a narrower definition. Narrower definitions take into consideration whether passengers fly directly to their destination or purchase a ticket in different fare classes.

The DOJ may prohibit a merger or an acquisition of airlines if the combined entity has significantly higher market power, resulting in market concentration. Barriers to entry for other airlines into a market are also taken into account – which would include the availability of slots at an airport or the presence of alternative airports nearby.

### *Past Cases*

The DOJ had assessed numerous airline mergers or acquisitions over the years. In 2013, American Airlines and US Air had announced their intention to merge, but this was initially blocked by the DOJ. A settlement was later reached to allow the merger as the airlines agreed to divest some slots of the combined entity at several airports in the US such as DCA and LGA.[95] With this slot remedy, the DOJ found that the combined entity would not raise market concentration. In another case, the merger of United and Continental Airlines in 2010 involved the combined entity returning 36 slots at EWR to Southwest Airlines, an LCC. Southwest Airlines used those slots to establish services at EWR which lowered fares for consumers by between 15 to 27%.[96]

[92] Gifford and Kudrle (2017).
[93] Ibid.
[94] Federal Trade Commission (2005).
[95] Gifford and Kudrle (2017).
[96] Ibid.

In this case, the return of slots is used as a remedy to strengthen competition at airports. The DOJ presumably views price competition as an unlikely occurrence among legacy carriers and therefore, LCCs that have access to congested airports via slots would be able to lower airfares for consumers and provide competition to legacy carriers and the merged entities.[97]

However, as in the case of the EU, airline mergers may also be approved without the need for divestment of slots as it can, in some cases, be proven that the combined entity would result in greater efficiencies for consumers through the network effect. For example, in the case of the merger between Delta and Northwest Airlines in 2008, the DOJ approved the merger without requesting for slot divestiture at major airports, as the parties to the transaction argued that the combined entity would result in cost savings to passengers through better network offerings and the airlines' existing routes had minimal overlaps.

### *Assessment on Slot Transactions*

Unlike in the EU, the DOJ also assesses slot transactions as part of its enforcement in antitrust law. Particularly, the Sherman Act, an antitrust law that regulates competition among business enterprises, is relied upon. In 2015, the DOJ filed a lawsuit to stop the transaction of 24 slots at EWR by United Airlines from Delta Air Lines as it would substantially strengthen the former's dominant position at the airport.[98] It was found that airfares at EWR were among the highest in the US, whilst the quality of service provided by United Airlines was among the worst. Allowing United Airlines to strengthen its position at EWR (it was already holding 73% of the slots) would provide consumers with poorer options and higher prices. Subsequently, United Airlines abandoned its plans to purchase the slots from Delta Air Lines.

However, it is arguable if the anti-competitive concerns raised by the DOJ was the main reason that the airlines abandoned their transaction, as the FAA had also announced the lifting of aircraft movement limits at EWR, resulting in more slots for competitors under the new entrant rule. This shows that legal avenues through competition regulation may work in tandem with operational aspects of airport management (such as slot allocation) to deal with competition concerns. In addition, US laws may also be seen as more effective in addressing competitive concerns over slot transactions relative to EU laws as investigations into slot transactions are undertaken alongside merger, acquisition, and joint ventures assessments.

[97] Ibid.
[98] DOJ (2015).

## Australia

### *Background*

In Australia, the Australian Competition and Consumer Commission (ACCC) enforces competition law in the country through the Competition and Consumer Act 2010 (previously known as the Trade Practices Act 1974).[99] The Act empowers the ACCC to act and accept court-enforceable undertakings to remedy breaches of various trade practices provisions such as anti-competitive practices, abuse of market power, and any mergers or acquisitions that lessen competition. The ACCC also enforces the various consumer protection provisions in the Act.

As regards the aviation industry, the ACCC utilizes the Competition and Consumer Act 2010 to assess airline mergers cases. The ACCC uses the Act to assess the merits of allowing the development of larger, stronger airlines against the possibility that the new entity will result in an abuse of market power. It also has proposed the divestment of slots as remedies to airlines that intend to merge or acquire one another.

### *Past Cases*

A most notable case was the takeover of Impulse Airlines by Qantas in 2001. After years of rapid growth, Impulse Airlines began to face financial difficulties considering the increasing competition in the aviation market in Australia. In May 2001, Qantas offered to pay Impulse Airlines AUD50mn in exchange for Impulse Airlines' aircraft, which effectively enables effective control over the airline by Qantas. Qantas sought the ACCC's advice if the merger could be opposed. After investigations, the ACCC opined that it would not oppose the merger as it would not result in a substantial lessening of competition in the market. The factors considered by the ACCC include that Impulse Airlines was a failing firm and on the verge of insolvency. The bankruptcy of the airlines would lessen competition in the domestic aviation market, and the ACCC allowed the acquisition of the airline by Qantas. Secondly, Qantas had also offered to undertake divestment of important slots at SYD during peak periods to other competitor airlines such as Virgin Blue, as well as, facilitating access to the domestic terminal at SYD to a new entrant.[100]

In another case involving Qantas, in 2000, the ACCC oppose the bid for Hazelton Airlines by Qantas and Ansett Australia. The Commission found that Hazelton Airlines accounted for a third of all regional passengers in the New South Wales area; a successful bid of the airline by either Qantas or Ansett would result in the combined entity having a market share exceeding 60%[101] of regional air services in New South Wales.

[99] ACCC (n.d.).
[100] ACCC (2001).
[101] ACCC (2000).

As regards slots, the ACCC found that either of the combined entity would result in at least 50% of the slots at SYD being controlled by the merged entity. Given that SYD is a slot-controlled airport, this would represent a significant barrier to entry for new entrants to provide effective competition to the merged entity. Eventually, Qantas ceased its bid for Hazelton Airlines, paving the way for Ansett's takeover of Hazelton Airlines in 2001.

The concessions made by Ansett included:

- 80 slot divestments to new entrants, especially for regional airlines
    - 30% of Hazelton's peak period slots (0700 to 0900) at SYD are to be included in the slot divestment for regional routes in New South Wales
- Limitation of slot swapping within the Ansett group
- Return of slots to slot pool if all 80 slot divestments cannot occur

*Exemptions*

The ACCC also possesses the authority for airlines to engage in certain agreements that may first be deemed as anti-competitive, if the interested parties can demonstrate any public benefits successfully. The ACCC takes a wide definition of the term public benefits – in the Australian Competition Tribunal's assessment of the ACCC's refusal to approve cooperative agreements between Qantas and Air New Zealand in the trans-Tasman market, the Tribunal mentioned that a 'modified total welfare standard'[102] should be used to assess public benefit.

Using this, the ACCC approved the alliance between British Airways and Qantas on the so-called 'Kangaroo Route' between the UK and Australia in 2005. The ACCC approved the alliance on grounds that benefits from cost savings, presence of discount seats, and schedule connections would outweigh any detriment in the market for business passengers.[103] This alliance was approved despite the ACCC finding that there would be a lessening of competition in the market for business passengers—as 60% of the market share would be held by both airlines—and that existing slot constraints at LHR would act as a barrier to entry to new carriers or other competitors.

[102] The total welfare standard assesses the amount of welfare of all participants (including consumers and producers) in a market and looks at the aggregate welfare created, disregarding the distribution of gains or losses.
[103] ACCC (2005).

### Singapore

#### *Background*

In Singapore, airline mergers, acquisitions, joint ventures, or alliances are subject to the Competition Act 2004.[104] The Act addresses prohibitions to:

- agreements which prevent, restrict or distort competition (Section 34)
- conduct which amounts to an abuse of a dominant position in any markets (Section 47)
- mergers that would result or would expect to result in a substantial lessening of competition within any market for goods and services (Section 54)

The Competition and Consumer Commission of Singapore (CCCS) is responsible for the administration of the Competition Act. The Singapore competition regulatory regime allows voluntary notifications of anticipated mergers to seek the CCCS's decision on whether the proposed transaction would infringe Section 54 of the Act. It also allows, with certain conditions met upfront, transacting parties to obtain confidential advice on whether their proposed merger would raise any competition concerns. Similarly, in the case of alliance assessments, airlines that are interested in such agreements are required to notify the CCCS if their proposed alliance would infringe the Competition Act.

In view of this, the CCCS has published a guidance note for all airline alliance agreements facilitating their notification process to the Commission. Considering the rapid development of the aviation industry, this guidance note intends to facilitate easier self-assessment by airlines for alliance agreements. The Commission notes that airline alliances can enhance the efficiency of the industry, which would lead to public benefits. The self-assessment guide would allow airlines to determine if their proposed alliance agreement would breach Section 34 of the Competition Act and if the agreement would generate outcomes where the benefits outweigh any competition concerns.[105]

Section 35 of the Competition Act provides that alliance agreements can be approved so long as it meets efficiency claims under a Net Economic Benefit exclusion.[106] As regards extensive assessments of merger applications, the CCCS also allows airlines to propose remedies, such as slot divestment, to address any potential competition concerns.

[104] CCCS (2019).
[105] CCCS (2018).
[106] This is similar to Australia's 'modified total welfare standard'.

### *Past Cases*

In 2014, the CCCS cleared the acquisition of Tiger Airways by Singapore Airlines as the proposed transaction found that it would not infringe Section 54 of the Competition Act. In its assessment, the CCCS found that Tiger Airways would most likely cease its operations considering its financial position if the transaction by Singapore Airlines was not approved, which would result in greater competition concerns. Furthermore, the CCCS also found that although the proposed transaction would result in a lessening competition in two (SIN-PEN v.v. and SIN-DAC v.v.) of the 41 routes affected by the acquisition, there is no barrier to entry in terms of airport slots availability at the affected airports for other competitors or new entrants to increase existing flight frequency or establish new services.[107]

## Malaysia

### *Background*

Between 2010 and 2015, competition affairs in the airline industry were subject to the Competition Act 2010 [Act 712], enforced by the Malaysia Competition Commission (MyCC). Notably, the Competition Act 2010 only contained prohibitions against anti-competitive agreements and abuse of dominant position; there are no provisions for merger control. The only case relating to airlines decided by the MyCC was a finding of infringement against Malaysia Airlines, AirAsia, and AirAsia X for a share-swap agreement that was deemed to have an object of sharing markets within the air transport services sector in Malaysia.[108] No decisions on aviation-related individual exemptions have been issued by the MyCC.

Following the enactment of Act 771, competition matters in the aviation services market are now regulated by MAVCOM. Unlike the Competition Act 2010, Act 771 has provisions governing merger control, in addition to prohibitions against anti-competitive agreements and abuse of dominance.

[107] CCCS (2014).
[108] The case has been heard by the Competition Appeal Tribunal (2016) and the Kuala Lumpur High Court (2018), and an appeal at the Court of Appeal is scheduled for 13 December 2019.

### *Past Cases*

To date, MAVCOM has granted three individual exemptions for joint ventures between airlines. In all three cases, MAVCOM found that the joint ventures fulfilled the conditions to be eligible for an individual exemption under section 50 of Act 771. No substantial measures relating to slots was imposed (see Table 8).

**Table 8: Slot-Related Considerations in MAVCOM's Decisions on Individual Exemption Applications**

| Case | Slot-Related Considerations |
|---|---|
| All Nippon Airways Co. Ltd. And United Airlines, Ltd. | No discussion on slot-related issues |
| Singapore Airlines Limited and Deutsche Lufthansa AG | MAVCOM noted that slot availability did not act as a barrier to entry or expansion to the relevant markets |
| Malaysia Airlines Berhad and Japan Airlines Co. Ltd. | MAVCOM noted that there is slot congestion at HND, NRT, and FUK airports in Japan, which are Level 3 airports. However, MAVCOM further noted the relevant Malaysia-Japan markets to be competitive with evidence of recent entries into the markets by competing airlines |

*Source: MAVCOM*
*Note: Proposed decision on the case of Malaysia Airlines Berhad and Japan Airlines Co. Ltd.*

While MAVCOM has not required substantive remedial measures (whether structural or behavioural), measures such as slots divestment may be a condition or remedy that the Commission imposes on future individual exemptions and merger approvals.

MAVCOM also considers ATRs in its competition-related work insofar as they may act as a barrier to entry or expansion in the market for certain routes. For example, in its Proposed Decision for an Individual Exemption for a proposed joint business between Malaysia Airlines Berhad and Japan Airlines Co. Ltd., MAVCOM noted that the restriction of ATRs and slot congestion at HND may act as barriers to entry for routes involving the airport. However, MAVCOM concluded that the barriers are not material to its finding given that the limited ATRs at HND are exercised by an airline competing with the parties of the proposed joint business.

### *Authority Over Slot Allocations*

In addition to the clauses relating to competition, Act 771 also contains provisions that grant MAVCOM powers to supervise and regulate the slot allocation process. The provisions specify that airlines shall not intentionally:

- Operate air services at times significantly different from the allocated slots; or
- Use slots in a significantly different way from that indicated at the time of allocation, where such use causes prejudice to aerodrome or air traffic operations.

# SECTION 5: KEY DEVELOPMENTS AND FUTURE TRENDS

Several key developments have been observed in the area of slot allocation, primary and secondary trading, as well as, the use of slots as remedies in airline mergers, acquisitions, and joint ventures. These developments may influence the future trends of slot allocation practices globally.

## Key Developments

Given the liberalization of air services, the long lead time involved in new infrastructure (expansion or construction), and the continued growth in passenger traffic owing to demographic and economic factors, slot allocation rules are expected to continue to play a crucial role in the demand management at airports.

### Continued Liberalization of Air Services

In general, nations worldwide continue to seek more liberalization of their skies by negotiating more ATRs at the bilateral and regional levels. This aids the development of various sectors in their respective economies, notably trade and tourism. In turn, the number of slots at airports—particularly at peak hours—would also need to keep up given the continued liberalization of ATRs. Several countries have identified the liberalization of ATRs as part of their aviation policies and strategies.[109]

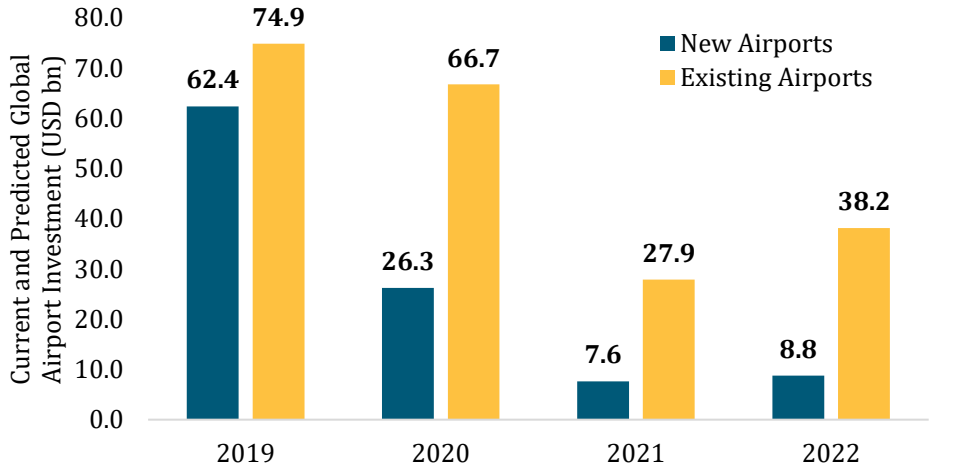
As mentioned earlier, given that slots are viewed as a temporary measure in light of infrastructure constraints, slots may only be able to satisfy extra demand up to a certain point; after which, infrastructure expansion, either via building new airports or expanding existing ones, becomes critical.

[109] MAVCOM (2018).

## Investments in Airport Infrastructure to Increase Capacity

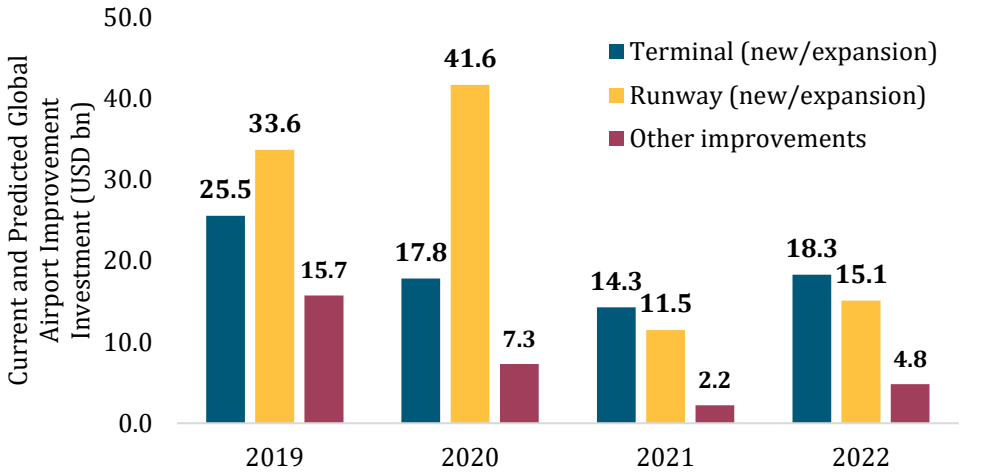
A total of USD265.8bn is projected to be spent on new and existing airports between 2019 and 2022 to meet future demand and resolve the existing capacity crunch.[110] Consistent with trends in passenger growth, a majority of spending is expected to occur in the Asia Pacific region. Figures 15 and 16 illustrate the breakdown of current and projected infrastructure spending between 2019 and 2022.

**Figure 15: Predicted Global Airport Investments, 2019 – 2022**




*Source: CAPA (2019)*

**Figure 16: Predicted Global Airport Improvement Investments, 2019 – 2022**




*Source: CAPA (2019)*

[110] CAPA (2019).

### Strong Passenger Traffic Growth Will Exert Pressure on Airport Infrastructure

IATA (2018) forecasted that global demand for air travel will increase to 8.2bn passengers by 2037 with a compound annual growth rate of 3.5% from 2017.[111] The increase in passengers is mainly driven by the growth in demand in the Asia Pacific, Africa, and the Middle East. In the Asia Pacific, IATA forecasted that countries such as China, India, Indonesia, and Thailand will become some of the largest passenger markets worldwide.

Given the rapidly growing markets in Asia, the development of transport infrastructure—including airports—has generally lagged travel growth. Furthermore, passenger traffic at major Asian airports such as BKK, CGK, and HKG are exceeding their respective terminal design capacities[112], a trend that is also being observed at secondary airports in the region.

## Future Trends

### Changes in Future Slot Allocation Practices

National authorities worldwide have called for current slot allocation practices—which are largely based on the WSG—to be revised in order to promote greater efficiency and competition. The WSG may, in the future, find itself under more scrutiny from national authorities demanding for more market-friendly principles to be incorporated into slot allocation practices. However, introducing market principles into slot allocation practices may be difficult due to the challenges discussed previously. This Section discusses options that are being considered by the UK and Australian governments in reforming their slot allocation practices and potential lessons for Malaysia.

[111] IATA (2018).
[112] PricewaterhouseCoopers (2015).

*United Kingdom*

The UK Department for Transport (DOT) consultation paper outlines the UK government's aviation strategy to meet current and future challenges. In the paper, the DOT recognized that the current slot allocation process can create issues at congested airports and limit competition (see Table 9), resulting in poorer choices and higher fares for consumers.

**Table 9: Issues Associated with Current Slot Allocation Practices**

| Challenges | Issues |
|---|---|
| Historic grandfather rights | • Slots can be retained by airlines even when the 80% rule has not been met<br>• This is because airlines are permitted to return up to 20% of their existing slots without losing the historic rights to that 20% |
| New entrant rule | • The new entrant rule has the unintended consequence of acting as a barrier to entry to the expansion of smaller incumbent airlines as 50% of the new slots in the slot pool is reserved for new entrants |
| Re-timing of existing slot | • Incumbent airlines are prioritized in retiming their slot holdings before the remaining slots in the slot pool are allocated to new entrants and other airlines<br>• This provides incumbent airlines with the first right to re-time their slots to more attractive times |
| Secondary trading market | • Secondary slot trades favour airlines with relatively large financial holdings as they may be able to out-bid other, smaller airlines |
| Slot hoarding and gaming | • Incumbent airlines may bid and hold slots at congested airports to block the entry of other airlines, even if they have no intention to utilize these slots<br>• Incumbent airlines may also hoard slots and trade them in the secondary market, where they may be able to sell it to their affiliate airlines |
| Transparency of the allocation system | • The transparency over how slot coordinators worldwide address competing bids for slots is unclear<br>• The management of any potential conflicts of interest arising from slot coordinators that have representatives from airlines as directors |

*Source: UK DOT*

The paper also noted that while the addition of capacity may alleviate airport congestion to some degree, it may also exacerbate some of the issues listed above and prevent the efficient allocation of scarce capacity. Although the IATA's Strategic Review had proposed several recommendations for the revised WSG, these recommendations still lack a basis on market principles and may still fall short of allocating slot efficiently.

In response to the DOT's consultation paper, the CMA stated that the current slot allocation process is flawed and is unable to promote meaningful competition at congested airports in the UK. Among others, the CMA considers that:

- an in-depth review of the current slot allocation system is not productive as it would still not allocate slots to their most efficient use;
- a market-based solution, such as an auction system, to allocate slots would be the best approach to improve allocative efficiency, resulting in greater competition; and
- increasing the transparency of slot trades by publishing the transactions and differentiating between peak and non-peak hour slots would be desirable.[113]

The CMA acknowledged the risks involved in auctioning slots such as large auction fees that would otherwise be used for airlines business expansion. Furthermore, airlines may be able to coordinate their auction efforts to dominate certain markets. The UK CAA also cautioned that any slot auctions would have to be carefully designed and tested to avoid implementation difficulties, especially the removal of grandfather rights.[114] Notwithstanding these risks, the CMA believes that the benefits of slot auction would still outweigh the costs. However, any changes to the present slot allocation system would require extensive engagement with industry players.

Given the UK's impending withdrawal as a member of the EU, slot allocation rules in the country could change, depending on the extent to which the UK Government would want to deviate from EU standards. The UK may decide to discontinue its membership in the European Common Aviation Area and develop its own slot allocation rules with deviations from the EU and/or WSG standards.

However, it is important to balance between suggestions for the introduction of market principles into slot allocation and the need for practicality in the aviation industry. For example, airlines may decide to change the size of aircraft used on certain routes in-season as a response against competition. Auctions, although may result in more efficient slot allocation, can also increase the cost of doing business for airlines, resulting in higher fares for passengers.

[113] CMA (2018).
[114] UK CAA (2019).

### *Australia*

The APC (2019) undertook a review of the existing economic regulatory regime of Australian airports. Prior to 1997, major airports in Australia were operated by the FAC. A privatization initiative commenced in 1997 where these major airports would be leased to business entities for a specified period and would be subject to a price capping regime. Several studies by the APC were undertaken after the completion of the privatization initiative in 2002, with the latest review on BNE, MEL, PER, and SYD being conducted in 2018.

The APCs' draft findings found that the current slot allocation mechanism at SYD, limit efficiency, as well as, competition through the grandfather rights mechanism. Accordingly, the APC recommended the Australian Government to revise the current slot allocation mechanism at SYD—which is currently based on the WSG—to improve competition. One proposed revision is to allow slots that are not part of the Permanent Regional Service Series to be utilized for either regional or non-regional flights. At present, these slots are ring-fenced for regional services, which limit slot mobility and competition at SYD as new entrants may find it challenging to obtain slots.

The APC also proposed that the Government should consider deviating from the continued use of grandfather rights to allocate slots as it does not promote competition. More broadly, the APC recommended the slot allocation mechanism at SYD should deviate from the WSG towards more market-friendly principles. These proposals were welcomed by airlines and airline associations.[115]

IATA considered that the APC's draft findings were misplaced as it claimed that there is no evidence that the current slot allocation mechanism based on the WSG limits competition.[116] Furthermore, IATA highlighted that the consistent utilization of WSG principles across all airports globally facilitates the development of the aviation industry. Therefore, deviations from the WSG would be ill-advised. IATA further submitted that the lack of airport infrastructure is the key challenge in Australia, not the lack of slots. Hence, the upcoming Western Sydney Airport is likely to alleviate congestion at SYD, resulting in more slots being available for incumbent airlines and new entrants.

### Prospects for Malaysia

Slot coordination in Malaysia is expected to play a crucial role in allocating scarce airport capacity in airports as demand is already exceeding capacity at certain airports. This is due to maintenance works or a lack of timely infrastructure expansion.

[115] Australian Aviation (2019).
[116] IATA (2019d).

### *Reduced Airport Capacity Despite Growing Demand*

Given the growing demand for KUL in recent years, the airport would need to be more efficient in terms of operations to cater to increased aircraft movements in the future. Given the ongoing and future maintenance works on the runways at KUL, current airport capacity is expected to be reduced further, leading to fewer available slots for airlines.

### *Capacity Relief is Required at Some Airports*

Table 10 shows the terminal design capacity and utilization rates for airports in Malaysia. As of 2018, there are 10 airports that are handling a greater number of passengers annually than their respective terminal design capacity.

**Table 10: Terminal Design Capacity and Terminal Capacity Utilization Rate of Airports in Malaysia, 2017 – 2018**

| Airports | Terminal Design Capacity (mppa) | 2017 Passengers Handled (mppa) | 2017 Terminal Utilization Rate (%) | 2018 Passengers Handled (mppa) | 2018 Terminal Utilization Rate (%) |
|---|---|---|---|---|---|
| SZB | 1.50 | 2.88 | 192.0 | 1.96 | 130.9 |
| LDU | 0.10 | 0.13 | 127.7 | 0.12 | 124.8 |
| PEN | 6.50 | 7.23 | 111.3 | 7.79 | 119.8 |
| MYY | 2.00 | 2.19 | 109.4 | 2.35 | 117.5 |
| MZV | 0.05 | 0.06 | 125.3 | 0.06 | 115.1 |
| KUL-T1 | 25.00 | 28.29 | 113.2 | 28.29 | 113.2 |
| KBR | 1.50 | 1.99 | 132.6 | 1.69 | 112.5 |
| KCH | 5.00 | 5.10 | 101.9 | 5.56 | 111.3 |
| TWU | 1.50 | 1.37 | 91.7 | 1.64 | 109.4 |
| JHB | 3.50 | 3.07 | 87.7 | 3.52 | 100.7 |
| BKI | 9.00 | 8.01 | 89.0 | 8.62 | 95.8 |
| BTU | 1.00 | 0.85 | 85.0 | 0.92 | 92.3 |
| SBW | 1.80 | 1.50 | 83.2 | 1.58 | 87.7 |
| KUL | 70.00 | 58.55 | 83.7 | 59.99 | 85.7 |
| KTE | 0.10 | 0.09 | 90.0 | 0.08 | 83.9 |
| KUL-T2 | 45.00 | 30.27 | 67.3 | 31.92 | 70.9 |
| LGK | 4.00 | 2.77 | 184.5 | 2.74 | 68.4 |
| SDK | 1.40 | 0.90 | 64.0 | 0.95 | 67.9 |
| TGG | 1.50 | 0.94 | 62.9 | 0.89 | 59.6 |
| LMN | 0.08 | 0.05 | 66.0 | 0.05 | 56.8 |
| AOR | 1.50 | 0.80 | 53.5 | 0.82 | 54.5 |
| IPH | 0.60 | 0.27 | 45.7 | 0.32 | 52.6 |
| KUA | 0.50 | 0.24 | 48.3 | 0.26 | 51.8 |
| LBU | 2.20 | 0.58 | 26.3 | 0.57 | 26.1 |
| MKZ | 0.50 | 0.06 | 12.4 | 0.05 | 10.5 |

*Source: MAVCOM*

Terminal capacity is dynamic and is a function of demand characteristics, processing times, layout configuration, and the level of service to passengers. These factors influence the operational performance of an airport and as such, any over-capacity may lead to reduced service levels. To improve the operational performance, the 10 airports listed above may require capacity relief in the future either via operational optimization, terminal enlargement, or new terminal construction.

Operational optimization involves the de-peaking of aircraft arrivals and departures to reduce congestion during peak periods, freeing up slots during those periods. For example, although KUL-T1 passenger traffic had exceeded its design capacity, KUL-T2 has not; capacity optimization can take place by offering airlines an incentive to establish their operations at KUL-T2 instead. Additionally, discussions on terminal enlargement and new terminal construction at other congested airports such as SZB[117] and PEN[118] are also taking place, following an expansion of LGK's terminal in 2018. These are expected to result in the availability of more slots.

### *Improvements in Air Traffic Management*

Efforts to de-congest airports in Malaysia and to make more slots available are also expected to take place via upgrades to the existing air traffic management system. As outlined in the 11th Malaysia Plan (2016-2020), upgrades to the air traffic management system will consist of improvements to the communication, navigation, and surveillance systems. In this regard, the construction of the new Kuala Lumpur Air Traffic Control Centre is expected to increase the number of aircraft movements at KUL to 108 movements per hour.

### *Secondary Trading May Not be Required*

Secondary trading may still be a premature move in Malaysia due to the presence of many airports that have not yet reached their terminal design capacity which offers airlines an opportunity to establish new routes or airport hubs. Additionally, improvements in air traffic management and expansion of existing airports, as well as, prospects for improved operations may all result in more slots being created.

Any introduction of secondary trading in Malaysia would also require clear rules on the mechanism (i.e. what type of transactions can be undertaken between airlines and how the transactions are to be undertaken), which is not available at present. It is important that slot allocation rules are made transparent for the benefit of all stakeholders, including rules that govern the secondary trading of slots. In coming up with effective slot allocation rules, considerations pertaining to a State's international obligations (i.e. ASAs), existing legal framework, as well as, existing and future airport capacity should be considered. This can ensure that slot rules commensurate with the local aviation environment and are compatible with worldwide slot allocation practices.

[117] MAHB (2019a).
[118] MAHB (2019b).

## SECTION 6: CONCLUSION

Airport congestion can negatively affect passengers, airlines, air traffic controllers, and airports. In Malaysia, 10 airports face capacity constraints as they handle more passengers than their respective terminal capacity designs, with KUL being classified by IATA as a Level 3 airport.

Improvements in an airport's operational efficiency and upgrading of air traffic management system can be undertaken to address airport congestion before committing to invest in airport infrastructure upgrades. However, given that the infrastructure upgrading has a long lead time and may be subject to various financial and environmental constraints, slot allocation is used as an interim demand management mechanism to address congestion.

Slot allocation in Malaysia is undertaken by the NSCM in accordance with the WSG. The WSG, which prescribes the key principles of slot allocation, is also used by other slot coordinators worldwide. However, the current slot allocation rules may entrench incumbency, promote slot hoarding, and incentivize inefficient slot utilization. The introduction of secondary slot trading in other countries to improve slot mobility among airlines also resulted in fewer slots being returned to the slot pool.

In overcoming the aforementioned challenges, slot coordinators should develop accompanying guidelines to the WSG, such as slot performance monitoring measures. Additionally, competition regulators should also ensure that the current slot allocation practices do not lead to anti-competitive effects.

Given the future growth of the industry and the increasing demand on airport infrastructure, improvements to slot allocation practices should be explored. As infrastructure enhancements are costly and involve long lead times, slot allocation practices—as a temporary measure to address airport congestion—will continue to play an important role.

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If you have any queries or comments, please contact:

MAVCOM

Level 19, Menara 1 Sentrum
201, Jalan Tun Sambanthan
50470 Kuala Lumpur
Malaysia

Tel: +603 2772 0600
Fax: +603 2772 0601
Email: enquiries@mavcom.my