



# Slot Allocation at Heathrow in the context of runway expansion

18 September 2019

Department for Transport

FINAL REPORT



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## EXECUTIVE SUMMARY

### Scope of work

CEPA was commissioned by the Department for Transport (DfT) to:

- review the current system for allocating airport slots (defined below), specifically in the context of new slots being released at an expanded Heathrow Airport;
- develop four options for reform of the slot allocation system, including at least one option involving an auction-based approach; and
- appraise these options against the Government's objectives for slot allocation, and specifically for Heathrow's expansion.

Although the primary focus of this report is the allocation of slots at an expanded Heathrow, it also considers any lessons that can be drawn for other UK airports which are both capacity constrained and facing a release of new capacity.

### Context

Within the EU, an airport slot is defined as the permission to use a bundle of airport facilities (e.g. runway, stands, terminals etc.) as necessary for an air service to take-off or land at a specific date and time. Typically, it implies a repeated right at the same time and day of the week during a season (or part of a season). The concept of an airport slot and the slot allocation system was developed in response to growing congestion at some airports, where at times of the day, more airlines wanted to use the airport's facilities than the airport was able to accommodate. The aim of the slot allocation regime is to ensure an efficient and safe use of airport infrastructure while maintaining a neutral, transparent, and non-discriminatory sharing of capacity.

Slots at Heathrow are currently allocated via an administrative system managed by an independent slot coordinator, ACL, under rules set out in UK and EU regulations. The rules broadly follow a series of procedures set out by the International Air Transport Association (IATA) in its Worldwide Slot Guidelines (WSG). The allocation system is largely, but not fully, harmonised between congested airports in the world, with many jurisdictions adopting a variation of WSG.

Slots are currently allocated without charge and are granted indefinitely provided airlines meet certain usage thresholds. They are however subsequently swapped and exchanged between airlines, as requirements change. Although no formal property rights exist to these slots, the grandfather rights associated with slots mean that they are often considered to be assets. In the UK, trading and leasing of slots in the secondary market, following allocation, is permitted in certain circumstances. Trading is largely limited to the two most congested airports in the UK, Heathrow and Gatwick, though historically trading has been limited by a preference by airlines to hold on to their slot holdings.



## The challenge at Heathrow

Heathrow has faced significant slot constraints for a long time. It has operated at over 95% of its planning cap of 480,000 ATMs for most of the past two decades and close to 99% of the cap for most of the last ten years. This implies a significant amount of pent-up demand for Heathrow that is likely to intensify over the next 5-10 years before a new runway is opened.

Once a new runway is opened, a substantial amount of new capacity will be released as capacity is phased in. The Airports NPS requires sufficient capacity to meet an additional 260,000 ATMs, an increase of over 50% from existing levels.

Despite this substantial increase, demand for slots is expected to remain oversubscribed at many times of the day, and particularly so in the peak early morning period. The DfT's most recent aviation forecasts suggest demand at Heathrow is likely to exceed the new capacity being introduced within a few years of the new runway opening.

The current administrative system for allocating slots was largely designed around the assumption that capacity would expand as airports became constrained. As a result, the process does not have a clear approach to trading off competing requests to use a slot, other than a number of high-level primary criteria and a larger number of secondary criteria that are not prioritised. Consequently, the system has relied on independent coordinators to balance multiple relevant considerations within the secondary criteria. It would be an unprecedented challenge to apply it to the scale of slot release expected following Heathrow's expansion.

## Government's objectives for capacity allocation

For the purposes of this study, we assume that the primary objective of slot allocation is to maximise economic efficiency. Government defines this as maximising the socio-economic welfare from the use of the airport. This is a broad measure of efficiency that includes all relevant impacts on society—the direct economic and social impacts of air travel, as well as wider economic, social, and environmental considerations. Economic efficiency differs from other definitions of efficiency that industry may be more familiar with, such as maximising runway utilisation, in that it recognises these wider socio-economic effects and that the impact of certain flights may be greater than others.

The Government has supporting objectives in relation to slot allocation at Heathrow, which tie-in to the overall objective of efficiency. These are to:

- Improve connectivity; and
- Facilitate effective competition between airlines to create efficiency.

In addition to maximising efficiency, Government has a further objective which is to improve domestic connectivity. Specifically, in relation to Heathrow, the Government requires Heathrow to work with airlines to strengthen existing domestic connections and work towards establishing connections to at least 14 UK airports overall.



## Current approach to slot allocation

This report starts from an analysis of the approach currently used in the UK to allocate slots, and the likelihood of it meeting the Government's objectives in the context of Heathrow's expansion. The current system is perceived to be working effectively, in the sense of achieving good usability of scarce capacity, even as airports have become more congested.

However, the release of substantial additional capacity which has significant value (given that demand will likely continue to exceed supply in the medium to long term) changes the dynamics of the process. Our review finds that:

- When a significant number of new slots are released, it is not guaranteed that the primary allocation will lead to them being given to the airlines that will use them most efficiently.
- The existence of grandfather rights creates an inertia that locks-in an inefficient initial allocation and limits the entry of new airlines that can potentially use a slot more efficiently, despite the existence of the secondary market. As the efficiency of airlines changes over time, the secondary market makes some progress at encouraging churn to improve efficiency, but does not work perfectly as airlines can be reluctant to sell their slots in some circumstances; and uncertainties between airlines mean that often trades do not occur even when they are willing to sell.
- The current rules give incumbent airlines both the incentive and an ability to manipulate them in order to obtain and retain (or hoard) slots in a manner that is unlikely to be efficient. There is evidence of airlines engaging in such behaviour in the past, and the incentive to do so at Heathrow following the release of new capacity is likely to be greater.
- Without active intervention in the slot allocation regime or in the market, it is unlikely that the Government's ambitions for domestic connectivity will be met, particularly in the longer term.
- Unless Heathrow's slots are allocated at a time when demand for them is low (such as in the middle of a recession), the scale of the slot release is going to present a very complex and unprecedented challenge for the slot coordinator.

## Alternative approaches and evaluation

Taking into account the findings of our review of the current allocation system, international experience and discussions with the DfT and industry, we developed a longlist of possible options for slot reform. We refined these into a shortlist of options which are most likely to deliver the Government's objectives, and grouped them into four policy packages which could form the basis of alternative slot allocation regimes. In our scope, at least one package needed to include an auction-based allocation, and none of the options were to negatively impact the rights of existing slot holders implied through existing legislation. A description of the four packages evaluated in the report is provided below:



## Package 1: Evolutionary administrative changes

This package includes small changes that are designed to improve the efficiency of the primary allocation. They do so primarily by reducing the incentive and ability to game the slot allocation system, and to improve ACL's ability to make trade-offs between competing slot requests. We also include measures that may at the margin improve the liquidity of the secondary market, and therefore improve longer term churn, but the changes largely codify existing practice rather than change the trading environment substantially.

restrictions to changing domestic slots once allocated

Managing complexity	Give ACL more time to produce an allocation, and publish it a year before the current timetable
Short-term efficiency	Expand the threshold for defining new entrants and prevent an airline from obtaining new entrant status if it is part of a larger airline group
	Remove the priority given to re-time requests
	Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria
Longer-term efficiency	Allow greater flexibility in buying and selling slots, but reduce the flexibility to lease slots over a longer period
Aligned incentives	Extend limitations on trading and changing the routes of slots obtained through the pool
	Remove the double allowance within the UIOLI rule for slots
Other Govt. objectives	Use ACL guidance to prioritise domestic connections and add



## Package 2: More ambitious change to the administrative regime

This package introduces more fundamental changes to the administrative allocation system to improve both the efficiency of primary allocation and the longer-term efficiency of the distribution of slots. In some instances, the options we present take a different approach to tackling inefficiencies than the options proposed in Package 1.

Managing complexity	Give ACL more time to produce an allocation, and publish it a year before the current timetable
Short-term efficiency	<p>Suspend the new entrant rule for the duration of expansion</p> <p>Give ACL the flexibility to re-time historic slots by up to 15 minutes</p> <p>Give ACL guidance on how to make trade-offs under the secondary criteria. Require airlines to provide more information in slot requests.</p>
Longer-term efficiency	<p>Allow full flexibility in buying, selling, and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades</p> <p>Restrict grandfather rights to 15 years for newly allocated slots</p>
Aligned incentives	Remove the double allowance within the UIOLI rule for all slots
Other Govt. objectives	Ringfence domestic connections to achieve minimum of 14 routes with at least three services a day

## Package 3: Combinatorial auction

This package includes an auction proposal with a design that recognises that separate runway, terminal and stand constraints exist, and that different slots act as complements and substitutes for one another. The auction is conducted in one simultaneous round with bidders permitted to make numerous alternative and contingent bids. It introduces a number of simplifications as a way of ensuring the auction remains practicable for airlines.

Managing complexity	Reduce number of auction products on offer, by auctioning 20-min daily slots rather than five-minute weekly slots
Short-term efficiency	<p>Auction indefinite slot leases using a combinatorial auction, with pre-declared capacity constraints for runway, terminal and stand infrastructure</p> <p>Cap the proportion of slots an airline group can hold to 60% of the total</p>
Longer-term efficiency	<p>Allow full flexibility in buying, selling and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades</p> <p>Remove UIOLI rules for auctioned slots</p>
Aligned incentives	Remove the double allowance within the UIOLI rule for existing (non-auctioned) slots
Other Govt. objectives	Ringfence domestic connections





## Package 4: Clock auction

This package proposes an alternative auction design that could be used to allocate slots. The auction takes place in a series of rounds, but with all slots simultaneously auctioned. Bidders are able to make package bids that they adjust with each round based on emerging price information. The proposal only auctions runway access with a separate coordination exercise used to allocate access to terminal, stand and other airport infrastructure. As with Package 3, it contains some simplifications to avoid creating undue complexity for airlines.

Managing complexity	Conduct auction through a two-stage process: an auction round with a post-auction coordination exercise
Short-term efficiency	<p>Auction 15-year runway slot leases (i.e. for a time-limited period) using an ascending clock auction format</p> <p>Create a post-auction coordination exercise, followed by an opportunity to exchange, trade or lease slots</p> <p>Cap the proportion of slots an airline group can hold to 60% of the total</p>
Longer-term efficiency	<p>Allow full flexibility in buying, selling and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades</p> <p>Restrict grandfather rights to 15 years for newly allocated slots, but without UIOLI rules</p>
Aligned incentives	Remove the double allowance within the UIOLI rule for existing (non-auctioned) slots
Other Govt. objectives	Ringfence domestic connections



## Package Evaluation

In the evaluation chapters of the report we assess in detail whether and to what extent each package of options would meet the Government's objectives for the use of slot capacity at Heathrow. High level findings are set out below:

We find that Package 1, which proposes incremental change to the current administrative system, to be imperfect in terms of achieving the Government's objectives but low risk in terms of practicality and deliverability. As it maintains an administrative approach to allocating slots, there are only limited measures that can be introduced to improve the efficiency of the initial allocation. Following this initial allocation, without reforming grandfather rights, newer airlines or those wishing to grow substantially are likely to find themselves locked out of Heathrow, at the expense of longer-term efficiency. As this package is an evolution of the current system, and as the package contains measures to mitigate the key practical challenges associated with allocating slots at an expanded Heathrow; there are fewer risks to implementing this approach.

Our other potential approaches include more substantive changes from the current system of slot allocation. As our proposed packages depart further from the present system, there is clear theoretical appeal in terms of improved efficiency but the risks in terms of practicality and deliverability also grow. Within each package, we have identified practical challenges which, if material, could significantly undermine the efficiency benefits of the approach. However, given the uncertainties around how airlines may behave under each of these circumstances, we are unable to quantify the scale of these risks.

Package 2, which also maintains an administrative system, includes several more substantive changes from the current system. A key feature of the package is the limiting of grandfather rights to newly allocated slots. There is a theoretical benefit from limiting grandfather rights, in terms of maintaining efficiency over the longer term. However, where the rights of new slot holders vary significantly from the rights of existing slot holders, as is the case with this package, the distortions introduced are highly likely to undermine efficiency.

Overall, we consider that, given the current distribution of slot holdings at Heathrow, distortions from a two-tier system would outweigh the potential efficiency benefits from greater churn through time-limited grandfather rights. This is because challenger airlines would be at a significant competitive disadvantage relative to incumbent airlines with substantial non-time-limited slot holdings, where they would have less control over their schedules and networks. It would also open up the opportunity for gaming, by encouraging airlines to ensure their most valuable slot holdings are non-time-limited, leaving the least valuable slots to be returned to the pool periodically. As it is out of scope of this study, we do not consider in detail the impact of time-limiting all slots at Heathrow, but we do believe it has greater potential for encouraging long-term efficiency.

The other elements of Package 2 are likely to be more effective at achieving the Government's objectives, such as the suspension of the new entrant rule and ring-fencing slots for 14 domestic



routes. But this is again in the context of an administrative system, where there is a limit on what can be achieved in terms of improved efficiency.

Package 3, which is the first of our auction options, builds in the sophisticated nature of airport operations into the auction design via the setting of terminal etc. capacity constraints in addition to runway constraints. The design also allows airlines to express a rich set of preferences and, as is the clear benefit of both auction options, efficiency is more objectively understood through airlines placing a value on slots. However, improved efficiency comes at the expense of additional complexity in the auction design and for airlines that may be substantial enough to make the approach impractical. To our knowledge an auction of this complexity has not been attempted in runway capacity allocation before. Airlines may find it prohibitively challenging to prepare detailed bids for slots and value them in an environment where they do not know what slots they are likely to receive at other airports.

Package 4, is a combined auction and second stage administrative process. It uses this two-stage process to manage the challenge of bidding for slots in an uncertain environment. However, it contains compromises that potentially reduce the efficiency benefits of an auction-based allocation. For example, the approach requires redundancy to be built into the capacity declaration. It also risks airlines purchasing slots through auction that they are subsequently unable to use as they intended, leaving them to use them sub-optimally or sell on the slot to another airline.

There is no option that is likely to work perfectly to allocate slots. Whilst each of the options we have presented improve aspects of the current system applied at Heathrow, they all come with risks. We have not been able to quantify the net effect of these. In reaching a preferred option, DfT would need to form a judgement based on its risk appetite and its tolerance for an outcome that is not perfectly efficient.

## Policy Conclusions

A key assumption made in this report is that demand will continue to exceed supply in the medium to long term post the release of new capacity at Heathrow. This is supported by government's forecasts of demand at Heathrow. In this circumstance the case for change is clear. We believe the current administrative system of slot allocation works relatively well in a business as usual context, but it will face unprecedented challenge as new capacity is released at Heathrow.

We have developed four practicable alternative policy packages to allocate new capacity—two that retain an administrative method for allocating slots and two auction options. In evaluating the packages, we conclude that each improves on the current process in terms of meeting Government's objectives; but none are perfect. We also find that achieving the Government's objective of improved efficiency through more radical options implies a greater risk to practicality and deliverability that would need to be weighed against the efficiency benefits.

Given the uncertainties around the balance of costs and benefits, we do not recommend a single option. The options we have presented, however, can be mixed and matched to create a hybrid package that might better fit the Government's priorities.



Regardless of the option chosen, we have identified several additional policy questions that require further thought. These include managing the challenges of earlier allocation at Heathrow when allocation elsewhere takes place closer to the start of a season, developing ACL's capabilities under an enhanced administrative option and, in some options, defining more fully the role of the UK competition authorities. Further consideration of how these issues might be resolved may aid the choice of package or suggest the development of a hybrid package.

We were also asked by DfT to consider whether some of the measures proposed in the report have broader applicability to slot allocation. Some of the measures we have proposed in Packages 1 and 2 do have this potential, as they resolve issues with the current administrative system. They include changes to new entrant status, removing the priority of retime requests and the provision of further guidance to ACL. Several other measures, such as changing the threshold for new entrants and removing the double allowance with the UIOLI rule, also have broader potential in that they are an improvement on the current system but they are likely come with other drawbacks that first need to be considered.





## 1. INTRODUCTION

CEPA was commissioned by the Department for Transport (DfT) to:

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- appraise these options against the Government's objectives for Heathrow expansion.

Although the primary focus of this report is the allocation of slots at an expanded Heathrow, it also considers any lessons that can be drawn for other UK airports which are capacity constrained.

### Slot allocation

Within the EU, an airport slot is defined as the permission to use a bundle of airport facilities (e.g. runway, stands, terminals etc.) as necessary for an air service to take-off or land at a specific date and time. Typically, it implies a repeated right at the same time and day of the week during a season (or part of a season). The concept of an airport slot and the slot allocation system was developed in response to growing congestion at some airports, where at certain times of the day, more airlines wanted to use the airport's facilities than the airport was able to accommodate. The aim of the slot allocation regime is therefore to ensure an efficient and safe use of airport infrastructure while maintaining a neutral, transparent and non-discriminatory sharing of capacity.

In the UK, airport slots are allocated under rules set out in UK and EU regulations.<sup>1, 2</sup> The rules broadly follow a series of procedures set out by the International Air Transport Association (IATA) in its Worldwide Slot Guidelines (WSG).

### Heathrow expansion

The Government designated the Airports National Policy Statement (NPS) in June 2018, providing the primary basis for decision-making on development consent applications for a new Northwest Runway at Heathrow Airport.<sup>3</sup> This is expected to increase capacity at Heathrow Airport from 480,000 air transport movements (ATMs) annually to at least 740,000 ATMs, phased in gradually following the opening of the new runway. Heathrow Airport Limited's most recent consultation suggests that the new runway will become operational around 2026 and will

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<sup>1</sup> Regulation (EC) No 793/2004 of the European Parliament and of the Council of 21 April 2004 amending Council Regulation (EEC) No 95/93 on common rules for the allocation of slots at Community airports

<sup>2</sup> Airports Slot Allocation Regulations 2006

<sup>3</sup> HM Government (2018) Airports National Policy Statement, <https://www.gov.uk/government/publications/airports-national-policy-statement>



reach a capacity of 740,000 ATMs by around 2035.<sup>4</sup> This implies that new capacity will be phased in over nine years though we understand that Heathrow Airport Limited plans to propose introducing up to 25,000 additional ATMs on its existing two runways, prior to the proposed third runway coming into operation, as part of its planning application.

Capacity enhancement on this scale is a significant change. It will be the first instance of a significant volume of new slots being released at Heathrow and will likely be the first time such a large volume of slots is allocated over a relatively short period, at an airport previously facing significant slot constraints. A review of slot allocation and alternative options is consistent with this change.

### Scope of this study

As part of its Aviation 2050 strategy, the Government is considering whether the current system for allocating slots is likely to work well when applied to the allocation of a large number of new slots at a severely constrained airport. Heathrow is currently the best example of this, and is the focus of this study, which also considers whether the current system can be adapted to achieve Government's objectives for Heathrow expansion, and whether alternative approaches exist that better meet its objectives.

In its Aviation 2050 consultation document, the Government set out objectives for slot allocation at a severely capacity constrained airport. The primary objective is ensuring efficient use of capacity through effective competition between airlines, while the secondary objectives include enhancing international long-haul connectivity and strengthening and developing existing and new domestic routes.

Following our discussions with the DfT, we understand that the description of these objectives has been under review since the Aviation 2050 consultation document was published, following early findings from stakeholder engagement. In the context of this study, the DfT has asked us to consider the primary objective for the slot allocation system to be maximising efficiency in the use of slots, with a secondary objective related to improving domestic connectivity, including ensuring that at least 14 UK airports have routes to an expanded Heathrow. The remaining two objectives (competition and international connectivity) are both considered part of the wider efficiency objective. We discuss their interpretation in Section 2.2.4.

We assess the current allocation system, how it would function in the context of the proposed expansion at Heathrow Airport and whether this is likely to achieve the Government's objectives. To inform this, we have built on the extensive stakeholder engagement undertaken by DfT, reviewing interview transcripts from discussions with airlines and airports in addition to responses to the Aviation 2050 consultation document. We also spoke to a range of interested stakeholders, including airlines and their associations, airports and competition authorities, in

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<sup>4</sup> Heathrow Airport Limited (2019) Our preferred masterplan: Phasing the expansion of Heathrow, <https://aec.heathrowconsultation.com/topics/phasing-the-expansion-of-heathrow/>



addition to attending a full day session with the UK slot coordinator. A list of stakeholder consultations can be found in Annex D.

After identifying inefficiencies with the way slots are currently allocated, we develop a range of potential reforms that could improve the process. We then evaluate these individually and group the options that effectively address problems into four policy packages. The first two of these packages are extensions of the current administrative system, while the final two packages introduce a market-based approach to allocation. All four packages are then reviewed against the Government's updated objectives.

## Regulatory context

The UK is set to leave the European Union on 31 January 2020 ("Brexit"), with an implementation period set to last until at least the end of December 2020. The precise nature of the UK's relationship with the EU post-Brexit, and the exact length of the implementation period, will have a bearing upon the scope and timescales for implementing slot reforms through primary and secondary legislation. Whilst the details of the UK's future relationship with the EU is out of scope for this report, for the purposes of analysis it is assumed throughout that it is possible for the current regulatory framework to be amended in order to implement the desired reforms.

Alongside other studies commissioned by the DfT, the analysis presented in this report is intended inform the Department and Government more broadly as they consider whether to reform the current slot allocation process in advance of the availability of new runway slots at Heathrow.

## Structure of this report

The remainder of this report is structured as follows:

- In Section 2, we describe how the slot allocation process works currently and outline some of the features of airport expansion at Heathrow that are likely to make allocating its slots a challenge;
- In Section 3, we review how the current slot allocation system might work at an expanded Heathrow and assess the key advantages and disadvantages of the current system;
- In Section 4, we present a longlist of potential policy measures that are designed to deal with the issues identified in the previous section, shortlist them to identify the most effective of these measures, and then package them up into four alternate approaches to slot allocation;
- In Section 5, we review how each of our proposed alternate approaches to slot allocation might work at an expanded Heathrow, and their merits and drawbacks relative to the current system; and finally,



- In Section 6, we present our conclusions on the efficiency of the current system and proposed approaches and discuss key issues that will impact the policy choice moving forward.





## 2. THE POLICY AND REGULATORY CONTEXT

In this section, we discuss:

- what slots are and how the current system for managing slots works;
- the wider context surrounding slot allocation at Heathrow;
- the Government's objectives for slot allocation in the context of new capacity at Heathrow; and
- the challenges of meeting those objectives in an expansion context.

### 2.1. Slot allocation

The concept of a slot and slot allocation has developed over time as a way of managing congestion at airports and distributing scarce capacity between different airlines who wish to operate services from an airport. As Heathrow is heavily congested, the rules around slot allocation have affected the current distribution of airlines operating from the airport.

Slots are currently allocated to airlines through an administrative process that aims to ensure maximum utilisation of airport infrastructure, while ensuring all airlines have equitable access to airport infrastructure. The administrative process is based on guidance agreed between airlines (but more recently with airport involvement), and has been codified in EU legislation. It aims to ensure slots are distributed fairly, neutrally and transparently.

#### 2.1.1. What are slots and why are they necessary?

Airport slots in EU countries are allocated subject to Regulation (EEC) 95/93 as amended by Regulation (EC) 793/2004.<sup>5</sup> The regulations set out common rules for the allocation of slots at European Community airports, and broadly apply the World Slot Guidelines (WSG) as defined by IATA.<sup>6</sup> The WSG provide a single source of guidance for slot allocation worldwide, reflecting the global and interconnected nature of air travel. The guidelines are given small routine updates every one to two years, with a three-year long strategic review currently in its concluding stages. The strategic review is being undertaken jointly by IATA (as the airline representative), Worldwide Airport Coordinators Group (representing slot coordinators) and Airport Council International (representing airports).

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<sup>5</sup> A consolidated version of the Regulation can be found at <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1993R0095:20090630:EN:PDF>

<sup>6</sup> IATA (2019) Worldwide Slot Guidelines, 9<sup>th</sup> Edition, <https://www.iata.org/policy/slots/Documents/wsg-edition-9-english-version.pdf>



Under the WSG, the method of allocating slots at an airport is dependent upon the extent to which it is capacity constrained (i.e. the demand for slots relative to their supply). The level of slot constraint is categorised as:

- Level 1: Where the capacity of airport infrastructure is generally sufficient to meet the demand of airport users at all times, and airlines are able to operate without reference to the slot coordinator.
- Level 2: Where there is potential for congestion at an airport during some periods of the day, week, or season which can be resolved by schedule adjustments mutually agreed between the airlines and a schedule facilitator.
- Level 3: Where airports do not have sufficient capacity to meet demand.

For Level 3 airports, where demand for slots outstrips supply, a slot coordinator is appointed to allocate slots to airlines and other aircraft operators as a means of managing demand. An independent company, Airport Coordination Limited (ACL), acts as the slot coordinator for airports in the UK.

There are eight airports in the UK, including Heathrow, that are Level 3 coordinated for at least part of the day or part of a season,<sup>7</sup> and a further ten airports that are Level 2 facilitated. Heathrow is, by some measures, considered to be the most slot constrained airport in the world with demand for slots exceeding the available supply for most of the day across the entire year.<sup>8</sup> This is expected to intensify as demand for air travel grows and until capacity constraints at Heathrow are lifted.<sup>9</sup>

### 2.1.2. How are slots currently allocated?

Slots are scheduled separately between winter and summer seasons, with the process following the timetable shown below.

Table 2.1: Timetable for slot allocation for the summer and winter seasons

Activity	Summer Season	Winter Season
Airports declare capacity and coordinator determines airlines' historic slot use for 80/20 calculation	End of September	End of April

<sup>7</sup> Level 3 UK airports: London City, Gatwick, Heathrow, Luton, Manchester, Stansted, Birmingham, Bristol. An airport can be partly Level 3 and partly Level 2, if formal slot allocation is required for certain parts of the day or certain parts of a season.

<sup>8</sup> CAA airport statistics show that Heathrow has operated at close to 99% capacity for over a decade and over 95% capacity for most of the previous two decades.

<sup>9</sup> Department for Transport (2017) UK Aviation Forecasts. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/781281/uk-aviation-forecasts-2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781281/uk-aviation-forecasts-2017.pdf)



Activity	Summer Season	Winter Season
Initial coordination/Slot Allocation Lists (SALs) issued	October	May
IATA Slot Conference	November	June
Slot return deadline	January	August
Slot monitoring	March–October	October–March

## Capacity declaration

The allocation process is initiated approximately nine months before the start of the season via the Runway Scheduling Limits meeting, in which an airport develops its capacity declaration for the upcoming winter or summer season, in consultation with the airport coordination committee. The declaration includes the number of arrivals and departures, over multiple time periods. For example, the airport declaration will include the number of arrivals and departures for a particular hour, but will also give a separate constraint for the maximum number of arrivals and departures in any 5-minute and 20-minute period.

The declaration also includes constraints related to terminal capacity, aircraft stand availability, number of check-in desks, and the capacity of the baggage systems. For terminal and baggage system capacity, Heathrow will often give an upper theoretical limit, which is the theoretical maximum capacity the terminal or baggage system can handle, and a lower coordination limit, which is used for planning and coordination purposes. Once published, the capacity declaration becomes binding and cannot be amended.

## Prioritisation of slot allocation

The allocation of available slots is then conducted by ACL in stages, based on three priorities:



### Priority 1: Grandfather rights

Airlines that have held a slot series during a season that is at least five consecutive weeks long, and have used it for at least 80% of the series length, retain the right to that slot for the following equivalent season.<sup>10</sup> This is known as the 80/20 rule or use-it-or-lose it rule (UIOLI). The 80% is calculated against the number of slots held after the slot return deadline.

Prior to the slot return deadline, airlines can hand back 20% of the slot series provided they make up fewer than five consecutive weeks, while still retaining the right to the full slot series during the following equivalent season.

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<sup>10</sup> Series length is the number of weeks that the airline intends to run services during that slot within a season.



If an airline wishes to run exactly the same operation using a slot retained under the UIOLI rule, it is commonly referred to as an unchanged historic slot. However, often an airline will wish to change the parameters associated with a slot, such as the time of operation, or the aircraft used. Those who retain slots under the UIOLI rule can request changes to their slot. Under the current system, these changes take precedence over any consideration of new slot requests, provided the capacity is available to accommodate them.

This priority currently includes requests to re-time slots, but an amendment to the WSG has recently been approved that would consider re-time requests equally alongside new slot requests. If a re-time request cannot be accommodated, the airline retains the original timing of the slot.

A slot that has been retained under the UIOLI rules but where the parameters associated with it has changed, is referred to as a changed historic slot. The rules described above governing the retention of slots and governing the priority given to historic slots, are referred to in this report as grandfather rights. The current regime allows airlines to hold indefinite grandfather rights to slots so long as the minimum usage requirement is observed.

#### Priority 2: New entrant rule.

The remaining capacity available at the airport once all requests related to historic slots are accommodated, is referred to as the slot pool. New entrants take priority for 50% of the pool each season. Airlines are considered new entrants if they hold or are allocated fewer than five slots per day at that particular airport, or, they hold or are allocated fewer than five slots per day on a specific EU route, where a maximum of three other carriers operate that service, or they are allocated fewer than five slots per day for a route to a regional airport where a non-stop service does not currently operate. Airlines will not be considered new entrants if they hold more than 5% of slots on the particular day at the particular airport.

New entrants that receive a slot are not permitted to transfer it to another airline for two equivalent seasons after the initial allocation.<sup>11</sup> In addition, new entrants are not permitted to change the use of a slot to serve a different route for two equivalent seasons after the initial allocation if, they would not have been treated with the same priority in the initial allocation under the new route.

#### Priority 3: Secondary allocation criteria.

Any remaining pool of slots is allocated to airlines by ACL through its assessment of slot requests. This assessment is based on the following guidance provided by the WSG.

Year-round operations	The WSG prioritises requests that extend a seasonal operation to a year-round operation. This is explicitly recognised as a higher priority to other secondary criteria in the WSG but not explicitly stated as such in the EU Regulation.
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<sup>11</sup> Two equivalent seasons refers to a summer season followed by the next summer season, or a winter season followed by the next winter season. In effect, the restrictions apply for two years after allocation.



Effective period of operation	Preference is given to airlines that operate a longer series length within the season.
Type of service and market	The balance of the different types of services (scheduled, charter and cargo) and markets (domestic, regional and long haul) is considered, in addition to the development of the airport route network.  For new entrants, preference is given to new routes or those with increasing consumer demand.
Competition	The WSG refers to competitive factors being considered in the allocation of slots. We understand this is often interpreted through the consideration of route-level competition, so requests that enable a second airline to enter a route currently served by only a single airline, would be considered favourably.
Curfew	Preference is given to airlines where the timing of their service is constrained by the curfew imposed at another airport.
User requirements	When allocating slots, the WSG recommends consideration of the needs of the travelling public and shippers.
Frequency of operation	Although the WSG recommends consideration of the frequency of operation, it also states higher frequency such as more flights per week should not, in itself, imply higher priority.
Local guidelines	Finally, the WSG recommends due consideration be given to local guidelines, where they exist, such as including restrictions on freighters or noise levels that can exclude certain aircraft types.

The process of applying the guidelines is not completely transparent and there is no formal prioritisation between criteria. We understand that in most cases, including at Heathrow, the first two priorities usually make it clear how to allocate a slot, leaving little need to utilise the secondary criteria.

Where recourse to the secondary criteria is required, they are applied by ACL on a case-by-case basis. We believe the primary focus is on operational feasibility before any other factors are taken into consideration. Following that, provided requests are of similar series length, it is likely that ACL looks favourably on slot requests that serve new routes where there is clear potential for demand, or requests that introduce competition on an existing route. For example, in the most recent case of a new slot being available at Heathrow, it was allocated to Vietnam Airlines, which was new to Heathrow and was proposing to introduce services to a new destination.

### Slot allocation process

Approximately seven months before the start of the season ACL will work out which slots have been used sufficiently to gain or retain grandfather rights to them. At this stage, ACL will typically



share their understanding of historic rights with airlines, to confirm that this aligns with their views.

Airlines will then submit their requests for slots, including requests to re-time historic slots. These requests will typically include preferred terminal and time of operation as well as intended aircraft and route. ACL then conducts an allocation exercise based on the prioritisation outlined above, publishing the SAL six months before the start of the season. Most of the allocation is automated using a piece of software that can automatically determine, based on the prioritisation and the declared capacity constraints, whether a request can be definitely met or definitely not met. Any requests that are at the margin or require a trade-off to be made between secondary criteria is then considered manually by ACL's slot allocators.

We understand that the majority of slot requests are approved or rejected through the automated system, though a larger proportion at Heathrow are considered manually. This is because there are frequent overages, where coordination limits are breached but upper theoretical limits are not.<sup>12</sup> This may also be because the Heathrow Slot Coordinator chooses to do more of the work manually, perhaps due to complexity or because of known issues that can only be dealt with during the initial coordination process.

Following this initial allocation, a slot conference is held, providing an important opportunity for airlines to negotiate with one another for exchanges and swaps, and for airlines and co-ordinators to discuss potential adjustments to the slot allocations. This is a critical step in making the airport slot allocation process work operationally. For example, an airline that is unable to operate at a particular terminal due to constraints may be able to agree a slightly different time slot where the capacity is less constrained, or may be able to agree to an alternate use of check-in capacity that makes the particular timeslot more workable.

Changes to slot parameters such as aircraft size can be made throughout the year, but key changes in relation to the allocation for the subsequent season are made in the three months after the slot conference. Based on their allocation, airlines try to optimise their schedules and routes, to ensure efficient use of the fleet and crew, and to match schedules as closely as possible to passenger demand. This inevitably means airlines wish to change the aircraft, route or time of a slot. As with the initial allocation, requests to change slots are submitted online, and in most circumstances, the software will be able to provide an instantaneous response. An airline allocated a slot through the new entrant rule must use the slot for the intended route for two seasons, but they can change the time (if it is an improvement for the airline concerned in terms of operations) and aircraft.<sup>13</sup>

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<sup>12</sup> Overages refer to five-minute scheduling periods where there are more scheduled movements than permitted by the coordination limits, based on runway, stands and terminal capacity etc, but within the upper theoretical (or maximum) capacity limits.

<sup>13</sup> The exception to the route change restriction is if the airline would have been allocated the slot, even if they proposed to fly a new route. For example, if the slot was allocated on the basis that the airline had fewer than seven slots per day.



Where an airline is unable to change the time of their slot, they may agree to swap it with another airline. We understand that ACL will try to facilitate such discussions. Otherwise, it must turn to the secondary slot market, which consists of:

#### Slot transfers

- An airline can trade a slot for **compensation or consideration**.
- The WSG allows trades of newly allocated after two years, while EU Regulation allows trades **after one season** (if not allocated under the new entrant rule).
- To buy a slot, an airline must obtain and trade a valueless slot (i.e. when an aircraft cannot be flown), as trades between unrelated airlines are not *explicitly* allowed under EU Regulations.

#### Slot leasing

- The historic holder of a slot can lease it to another airline to operate services for a period of time.
- Grandfather rights granted to the operating carrier after operating them for a qualifying period.
- Leases are not *explicitly* allowed under the EU Regulations but are **facilitated through contractual arrangements** to transfer (or re-exchange) slots after the end of the lease period. Conditions of return to the original holder are often contained in commercially sensitive contracts that neither the airport nor the coordinator has ready access to.

These two options together form the current secondary slot market. When making slot changes through the secondary market, the participating airlines must report the parties involved in the exchange, times and period of operation under the agreement, to ACL. All the above changes require approval from ACL to ensure they continue to be workable within airport's capacity constraints, but beyond that, ACL has no further purview.<sup>14</sup> This is necessary to ensure that the airline receiving a slot in the secondary market intends to run operations that can be accommodated.

If an airline does not intend to use a slot that has been allocated, it is required to hand it back to the coordinator no later than three months prior to the start of the season to allow for re-allocation. If these slots are returned later than the season deadline, the airline may then be given lower priority in later allocations under WSG, but we understand that this is not explicitly provided for under EU and UK Regulations.<sup>15</sup>

### 2.1.3. Bilateral air service agreements

Holding a slot does not give an airline the right to fly to any destination from Heathrow. The right to fly between different countries is determined through Air Service Agreements (ASAs). The existence of ASAs can affect how airlines compete against one another, and therefore affect which airlines compete for which slots.

ASAs provide a framework within which airlines are granted the right to fly internationally (i.e. outside their home country). ASAs between two countries dictate the rules around the right of

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<sup>14</sup> Although it will report the transfer on its website.

<sup>15</sup> This type of response – i.e. giving an airline lower priority in later allocation rounds – is usually agreed by the airport community via the Coordination Committee.



airlines with the nationality of either country, to operate flights between the two countries. For example, in a UK and Mexico ASA, there would be rules around the right of both UK and Mexican airlines to fly between the UK and Mexico.

Some of the flights to and from the UK and other countries are covered by ASAs negotiated bilaterally between the UK and the respective country. However, a large proportion of flights to and from the UK and other countries are via ASAs negotiated between the EU as a whole and other countries, and therefore cover the rights of all EU airlines. The EU itself is covered by a single ASA, which allows for the most liberal market access between EU airports.

The level of market access differs between ASAs. However, as a broad working assumption for Heathrow, it is sensible to assume that EU carriers have the right to fly to and from Heathrow to any other airport in the world, and that non-EU carriers (with a few notable exceptions) only have the right to fly between Heathrow and airports in their home country. A few countries' airlines have the right to fly between the UK and another country that is not their home, provided it is part of a wider route, e.g. Air New Zealand flies from LHR to LAX and then from LAX to New Zealand.

## 2.2. Slot allocation in the context of airport expansion at Heathrow

The design of the administrative process, alongside the gradual intensification of capacity constraints at Heathrow, have inevitably affected the distribution of slot holdings at the airport. Permitting secondary trading has changed this somewhat, but not substantially.

The level of congestion at Heathrow presents some challenges for allocating new capacity going forward and suggests that if the current administrative process was to be maintained, some changes would be required (this is discussed in further detail in Section 3 of the report). We can look to other airport expansion projects for lessons on slot allocation following large releases of new capacity but none of these fully replicate the circumstances at Heathrow. The key difference is that Heathrow's expansion will be the first time demand for slots exceeds supply even after a substantial release of new capacity.

Given the challenges for allocating new capacity at Heathrow, the Government has proposed objectives for how slots ought to be allocated following a slot release at a significantly constrained airport. These centre on the theme of maximising the efficient use of an airport following its expansion.

### 2.2.1. Evolution of slot holdings at Heathrow

As Heathrow has gradually built its capacity over several decades, the current allocation of slots at the airport partially reflects the operational patterns that existed historically. This is due to the priority given to historic slots in successive rounds of slot allocation (i.e. grandfather rights) and the lack of significant expansion of capacity in recent years. This has persisted despite the existence of a secondary market. It reflects the fact that slot constraints have existed at Heathrow for a long time and means a large proportion of slots are allocated to airlines that have

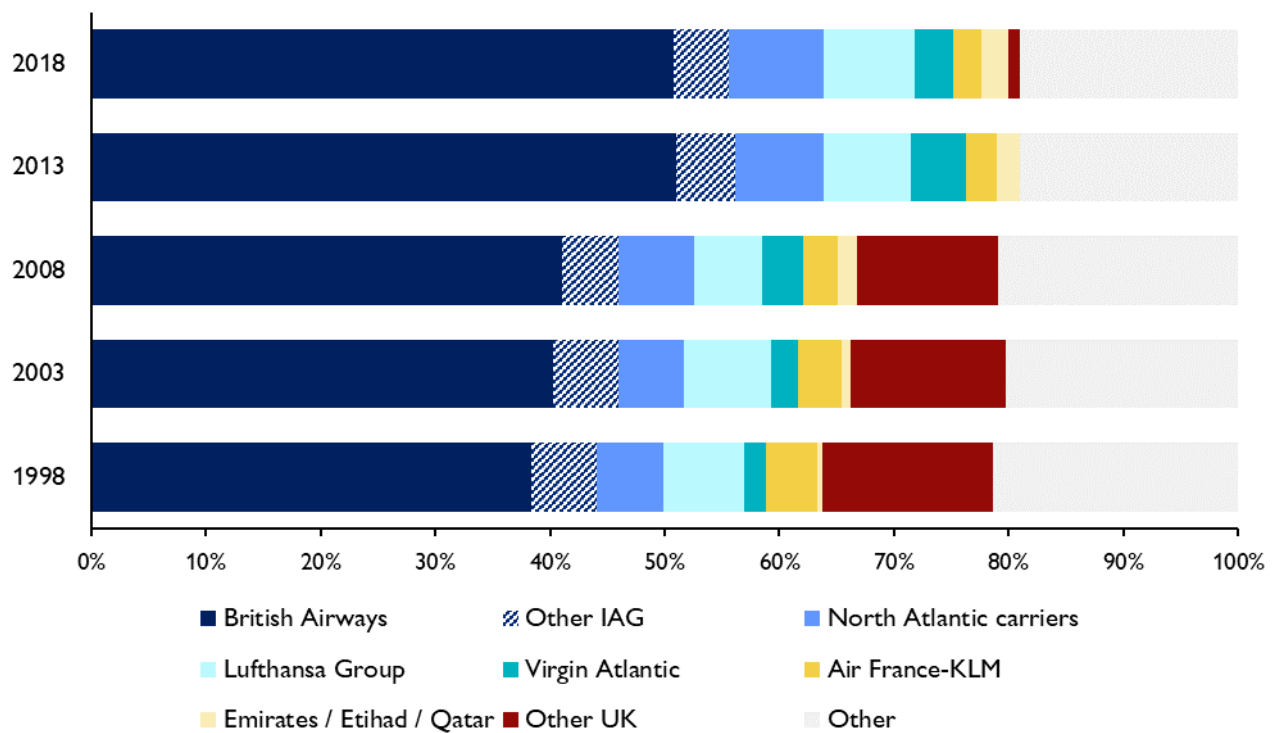




grandfather access to them. Of the current distribution of slots at Heathrow, 38% were obtained through the secondary market, with the remainder being historic allocations through the pool.<sup>16</sup>

Figure 2.1 shows how the distribution of slots at Heathrow has evolved over time. For domestic carriers, the largest proportion of slots is held by British Airways (BA) at approximately 50% in 2018. Although newer UK airlines such as Virgin Atlantic have been able to gain slots at Heathrow, their slot holdings are limited.<sup>17</sup> Other UK airlines have gradually been acquired by other airline groups, such as BMI, which was first acquired by Lufthansa and then sold onto British Airways. As the historic flag carrier for the UK and the historic hub carrier at Heathrow, BA holds the majority of slots at Heathrow through its retention of historic slot rights.<sup>18</sup>

Figure 2.1: Proportion of ATMs flown by various carriers at Heathrow, 1998–2018



Source: Civil Aviation Authority (CAA) Airport Statistics

Note: Where an airline is today a fully owned subsidiary of the airline groups listed above, they are included within the groupings above in all years.

A further proportion of slots are allocated to airlines which have purchased them through the secondary market. North Atlantic carriers began purchasing slots following the signing of the EU-

<sup>16</sup> IAG response to Aviation 2050 consultation

<sup>17</sup> The Virgin Atlantic / Delta / Air France–KLM joint venture has a 7% share of existing capacity. See WPI Economics (2019) Ticket to fly, available [online](#)

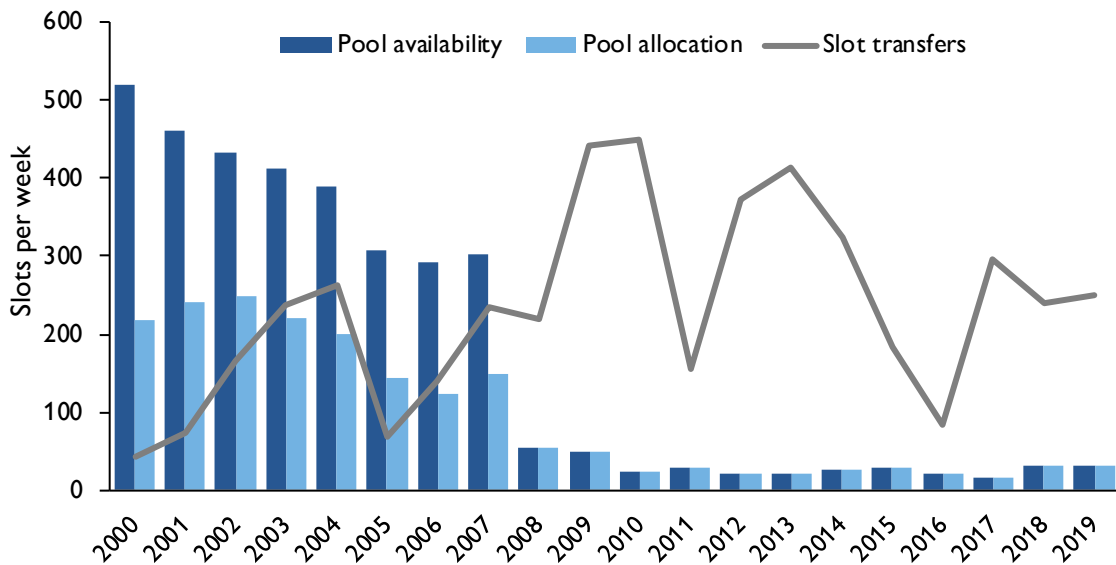
<sup>18</sup> Other European hub airlines hold a larger proportion of slots at their respective hub airports than BA does at Heathrow.



USA ASA (which liberalised access to Heathrow for US airlines), and Middle Eastern carriers followed, using the secondary market to gain a foothold into Heathrow.

As there has been no significant expansion of Heathrow for several decades, only a few slots (even fewer during peak periods) have been allocated to airlines through the slot pool in recent years. As a result, the secondary market has been the only way for many airlines to obtain slots. This can be seen in Figure 2.2 below.

Figure 2.2: Volume of slots traded at Heathrow versus allocation from the pool, summer seasons 2000–2019



Source: ACL (2019) Response to Aviation 2050 consultation

Note: 668 slots transferred from BMI to British Airways not included in S12 as this was part of the transfer of BMI as a going concern.

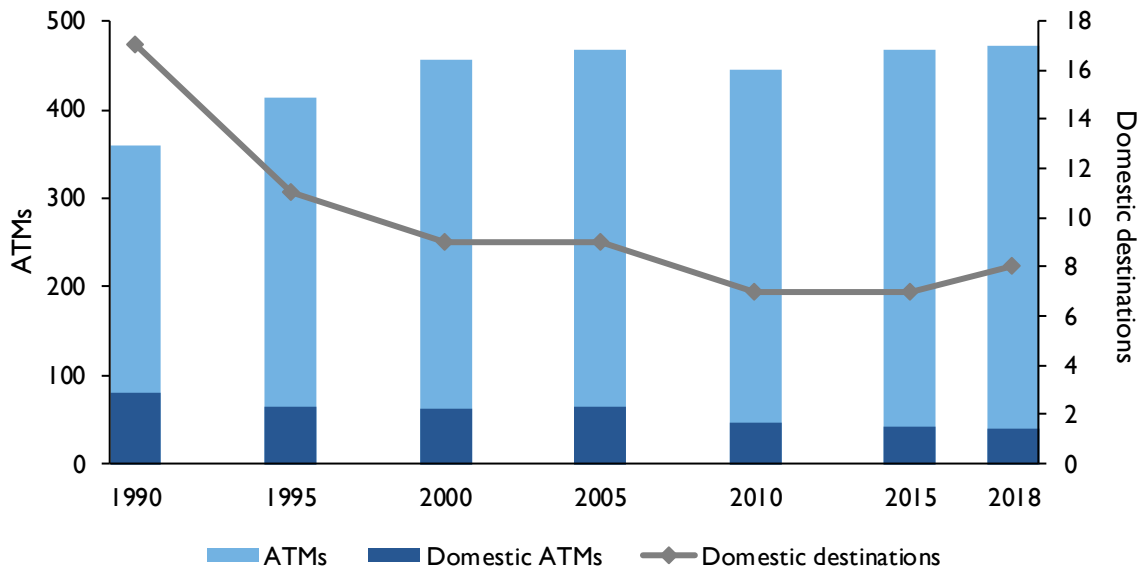
As Heathrow has become more congested, there has also been a gradual reduction in slot churn despite the existence of the secondary market. Figure 2.2 shows the proportion of slots in the summer season being allocated through the pool and through secondary trades. It excludes any slots changing hands as a result of airline mergers and acquisitions. The increase in trades seen before 2015/16 was due to the effect of the recession and increased competition from low cost carriers in the intra-Europe market, which made European leisure routes by legacy carriers from Heathrow, less profitable. As a result, some of these European legacy carriers sold slots as part of a change in strategy.

Over time, the routes served from Heathrow have also changed. Figure 2.3 below shows how the number of domestic ATMs and destinations served by Heathrow has gradually reduced, even as the overall number of ATMs flown from the airport has gradually increased. At the same time, some airlines operating less profitable flights have sold their slots, or have been acquired by other



airlines who have then switched the use of the slot to other routes.<sup>19</sup> This implies that slot constraints have, in part encouraged airlines operating domestic services to switch services to thicker, more profitable routes over more marginal, thinner routes.<sup>20</sup>

Figure 2.3: Domestic ATMs and destinations, 1990–2018



Source: CAA Airport Statistics

### 2.2.2. Challenges of airport expansion at Heathrow

The allocation of slots at an expanded Heathrow is likely to be unprecedented in terms of scale and complexity.

Heathrow has faced significant slot constraints for a long time. It has operated at over 95% of its planning cap of 480,000 ATMs for most of the past two decades and close to 99% of the cap for most of the last ten years. This implies a significant amount of pent-up demand for Heathrow that is likely to intensify over the next 5–10 years before a new runway is opened.

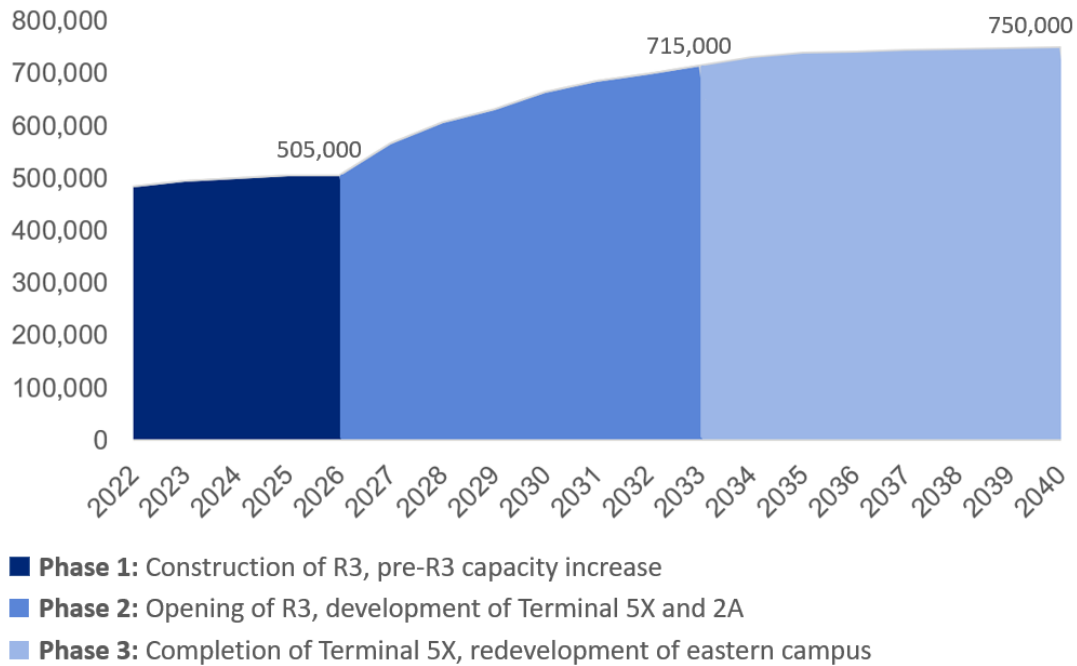
Once a new runway is opened, a substantial amount of new capacity will be released as capacity is phased in. The Airports NPS requires sufficient capacity to deliver an additional 260,000 ATMs, an increase of over 50% from existing levels.

<sup>19</sup> For example, the acquisition of BMI British Midland by Lufthansa in 2008 and subsequent sale to International Airlines Group in 2012.

<sup>20</sup> The thickness of routes is used to describe the relative demand for flights between two destinations, with regard to frequency.



Figure 2.4: Heathrow Airport: preliminary capacity expansion plan



Source: HAL (2019) *Heathrow Expansion: Preliminary Environmental Information Report Volume 1, Chapter 6*

Despite this substantial increase, we consider that demand for slots is likely to remain oversubscribed at many times of the day, and particularly so in the peak early morning period. The DfT's most recent aviation forecasts suggest demand at Heathrow is likely to exceed the new capacity being introduced within a few years of the new runway opening.<sup>21</sup>

Allocating slots in this context does not have a complete precedent. There are limited examples of new slot releases at Heathrow to draw upon. For example, although pool capacity at Heathrow has increased gradually year on year, the typical scale of slot releases at 25 slots per week (equivalent to one or two daily slot pairs) per annum<sup>22</sup> is significantly smaller than the scale of release following the opening of a new runway.<sup>23</sup> Approximately 40 slot daily pairs will be

<sup>21</sup> Department for Transport (2017) UK Aviation Forecasts.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/781281/uk-aviation-forecasts-2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/781281/uk-aviation-forecasts-2017.pdf)

<sup>22</sup> ACL's consultation response to the Aviation 2050 consultation shows that in the ten years to 2016, an average of 25 slots per week were allocated each year in the summer season, implying the equivalent of one and two daily slot pairs (the presentation clarifies that one daily arrival/departure slot pair is 14 slots per week). In reality, in most seasons, one or two weekly slot pairs have been allocated to several airlines rather than a daily slot pair being allocated to a single airline. This is because the available slots in the pool are often disparate rather than a continuous series.

<sup>23</sup> Under Heathrow's current masterplan, it is planning to phase-in most of the new capacity between 2026 and 2035. There are some planned increases in the number of ATMs both prior to and after this period, but the scale is much smaller. We therefore focus our consideration on this core period of expansion.



released each year for nine years if capacity were to be phased in evenly between 2026 and 2035.<sup>24</sup> It should also be noted that new slots released following expansion are likely to be at highly sought-after times, whereas many of the slot releases in recent years have been among the least valuable for airlines.

International examples also have limited applicability as few airports even approach the degree of slot constraint that Heathrow has faced. Additionally, few airports have been expanded alongside a general expectation of no significant further expansion; the Airports NPS rules out a fourth runway at Heathrow. Consequently, the degree of slot constraint can be expected to increase over time following the opening of the new runway, which means we can expect slots released at Heathrow to have some value based on expectations of future scarcity. The behaviour of airlines on the release of new slots may not therefore be the same at Heathrow as elsewhere, where slots have been released with little expectation of current or future scarcity value.

There are two recent examples of a slot-constrained airport expanding; both Frankfurt and Madrid Barajas were previously significantly slot constrained (i.e. they were Level 3 coordinated) and released a substantial amount of new capacity. In the context of Frankfurt capacity was set to increase by 50% from existing levels over approximately eight years, while at Madrid Barajas its expansion in 2005/6 saw a 16% rise in ATMs over two years before the effect of the recession.<sup>25,26</sup> Both provide some indication of how new slot allocation at Heathrow could work in practice.

However, in both these instances, capacity was sufficient to meet demand all day, at least for a couple of years. In the case of Madrid, this was because there had been enough capacity available to allow an approximate 4% increase in ATMs for the few years prior to the opening of the new runway, meaning there was limited pent up demand for the additional slots that became available.<sup>27</sup> Conversely in Frankfurt, the inauguration of the new runway in 2011 coincided with a dampened demand for slots due to the recession.<sup>28</sup> As such, the additional capacity was more than able to meet demand at that time, and the new capacity has yet to be fully phased in.

The potential gain for airlines from obtaining sought after slots is likely to encourage attempts at manipulating the allocation regime to obtain high value slots.

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<sup>24</sup> We take 260,000 ATMs, subtract the 25,000 Heathrow expect to be introduced before 2026 and phase it in over nine years. Assuming daily slots are used an average of 340-345 days a year (the current average), this implies 38 slot pairs.

<sup>25</sup> Steer Davies Gleave (2011) European Commission: Impact assessment of revisions to Regulation 95/93—Final report

<sup>26</sup> Aena (2019) Air transport statistics

<sup>27</sup> Ibid.

<sup>28</sup> Frankfurt Airport (2018) Air traffic statistics



The existence of slot constraints at Heathrow from the point of expansion (at least at certain times of the day), coupled with the fact that slots are currently allocated for free and indefinitely, means that the stakes for airlines in slot allocation are high. An airline that receives a slot at a premium time will be able to operate it very profitably potentially indefinitely or will be able to sell it on in the secondary market. The sums paid for slots will be lower than historic slot transactions at Heathrow, as the expansion of the airport reduces slot constraints. However, as long as some degree of slot constraint persists for as long as there is an expectation of a future slot constraint, there will continue to be a value to airlines from holding a slot.<sup>29</sup>

The future financial benefits of being allocated a slot at Heathrow are relatively high and certain so airlines have a strong incentive to apply for a slot even if they do not have a case for using it to operate a profitable service (provided the cost of holding a slot for a season or two is less than the potential gains from secondary trading). This incentive encourages airlines to manipulate the slot allocation regime. Any slot allocation system needs to be designed to mitigate the risk of game-playing, recognising that it may not be possible to do this completely in an administrative-style system.

Unless the slot allocation regime can actively encourage churn in the market, the initial allocation is likely to be preserved for a long time.

The historic experience of slot allocation at various slot-constrained airports including Heathrow, suggests that there are likely to be significant levels of inertia in the slot allocation regime, despite the availability of secondary trading. The current indefinite nature of slots and their value in the secondary market encourages airlines to treat slots as assets through which they can raise finance. For example, through leasing, which is the most common transaction on the secondary market, making up a quarter of all transactions. Although leasing can enable new airlines or services to operate, these slots are retained by the lessor over the long term.

Issues with the initial allocations are likely therefore to perpetuate. This view is reflected in many airline responses to the Government's Aviation 2050 consultation and in discussions we have had with airlines. It is reflected in the fact that, aside from the sale of British Midlands to British Airways, there have been relatively limited changes to the proportion of slots owned by the top ten airlines operating at Heathrow in the last two decades.

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<sup>29</sup> The Steer Davies Gleave report describes how some airlines value slots for secondary trades, with two airlines saying they use a net present value (NPV) of the profit obtained from operating additional services using the slot. If demand for a certain slot is higher than a slot at a different time or at a different airport, it implies that airlines expect to make a greater profit from operating that slot. As such, the NPV of obtaining that slot would be greater than zero.

If airlines expect there to be future slot constraints at Heathrow, which will improve their profitability (as increased scarcity means they can charge higher prices for tickets), then their valuation of the slot will also reflect their expectations of future profitability.



Remedies for inertia include ensuring the initial allocation meets the Government’s objectives as closely as possible, although this may not stand the test of time, or introducing mechanisms that actively encourage a degree of churn in slot holdings.

### 2.2.3. How will slots be allocated following Heathrow’s expansion, if the current approach continues to apply?

Discussions we have had with ACL, along with the experience of Frankfurt Airport provide some indication of how slots might be allocated following Heathrow’s expansion, assuming the current slot allocation regime were to continue to apply.

Figure 2.4: Current allocation approach in the context of expansion



We expect that, as currently, any airline with historic rights to a slot would again be allocated a slot for the same times from the previous equivalent scheduling period, should they choose to keep it. We also expect that any existing slot holders who currently hold slots at inconvenient times would try to use this as an opportunity to re-time their slot into the new capacity. There is uncertainty around whether they would be able to do so or whether the new capacity would be reserved for new slot requests (or some sort of hybrid). A strict reading of the EU Regulation would suggest that re-times into the new capacity would be allowed, subject to the relevant capacity being available (which in the context of expansion, is likely to be the case).

We note that the WSG has agreed to changes that would treat proposals to re-time slots equally alongside new requests for slots, which would prevent airlines from automatically re-timing their slots when new capacity comes online.<sup>30</sup> However, we also note that the EU Regulation may not necessarily be updated to replicate these changes. Although the EU Regulation is derived from WSG, and empowers coordinators to take account of the WSG, it is not automatically updated to follow changes to the guidelines.

Finally, we expect that, without any further guidance from Government, any slots lost due to the introduction of operating restrictions (such as a night flight ban) would be reallocated under the relevant secondary criterion and in line with the guidance issued for coordination at German

<sup>30</sup> IATA (2019) Worldwide Slot Guidelines, 10<sup>th</sup> Edition, available [online](#) – see para 8.3.2.1



airports.<sup>31</sup> The general consensus we have found in our discussions with industry is that this would be considered a sensible approach.

If the process were to operate as described above, it is likely that capacity at the most premium periods (such as the early morning) would be substantially reduced before new entrants/new routes and the Government's wider objectives have been taken into consideration.

Once all historic slot rights have been allocated, the remaining capacity would form the slot pool. We note that current traffic distribution rules restrict whole plane cargo services from operating at Heathrow during periods of peak congestion declared for each scheduling season, without permission from the airport operator.<sup>32</sup> If such rules continue, this would prevent slots during peak periods being allocated for freight-only services, leaving only passenger services.

For each planning hour, 50% of pool slots would then be available for new entrants, with the remaining slots (and any unclaimed new entrant slots) offered to carriers not qualifying for new entrant status. If new entrants were primarily requesting slots for non-EU routes, the maximum number of slots a new entrant could be allocated would be four slots or two slot pairs a day. With roughly 40 daily slot pairs allocated each year, approximately 10 new entrant airlines would be able to obtain slots under the rule each year. Over a nine-year phase-in of new capacity, this is potentially 94 new entrant airlines. In reality, there would be fewer new entrant airlines as some would be able to request most than two slot pairs a day (by introducing flights to destinations within the EU). Nevertheless, it is unlikely new entrants would fully utilise the slots reserved for them as we do not believe there exist sufficient airlines eligible and willing to take up the slots at Heathrow, in the longer term. Therefore, as expansion progresses, we expect to see less than 50% of slots allocated to new entrants.

Beyond these rules, it becomes less clear how competing slot requests would be decided upon. The allocation criteria described in Section 2.1.2 provide some indication, as do ACL's historic decisions, and the guidance provided in relation to the allocation of slots at coordinated German airports. This evidence taken together suggests that ACL would look favourably upon slot requests that:

- add services to new destinations (and particularly those that ACL consider would improve Heathrow's status as a hub airport—perhaps including new domestic connections);
- add services to destinations currently underserved (destinations where it is generally understood that demand is growing); or

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<sup>31</sup> Guideline for the allocation of scarce slots at coordinated German Airports, [https://fluko.org/wp-content/uploads/2018/08/Guideline\\_AOSSACGA.pdf](https://fluko.org/wp-content/uploads/2018/08/Guideline_AOSSACGA.pdf)

<sup>32</sup> These rules exist under the Traffic Distribution Rules 1991. The CAA is responsible for declaring the peak period for each scheduling season.





- improve competition on routes where the demand is sufficient to form sustainable competition with an additional carrier serving the route.

Such decisions are currently made on a case-by-case basis. It is not clear however that this would be feasible in the context of Heathrow expansion because the number of such decisions will be much greater, and the trade-offs involved potentially more complex.

## 2.2.4. Government's objectives for airport slot allocation

### Primary objective for slot allocation

We understand from discussions with DfT that for the purposes of this study, the primary objective for slot allocation generally should be to maximise efficiency. Efficiency can mean number of things and we consider each of these in turn:

- **Maximising the utilisation of the airport:** In this context, slots should be allocated to airlines that use them the most and carry most passengers with them. This maximises the number of passengers served by the airport and is therefore efficient from an operational perspective. However, the efficiency of each slot cannot be assessed in isolation, as often the number of passengers on one route will depend on the availability of effective connections with another route. So even if one route uses smaller aircraft and has a lower load factor, it may still be efficient if it leads to more passengers on other routes. The objective of the current allocation system ties in most closely with this concept of efficiency and has generally been how most of the industry stakeholders we have spoken to, perceive efficiency.
- **Maximising the socio-economic welfare from the use of the airport:** This is a broader measure that includes all of the impacts on society, both economic and social. As such, it includes the benefit (or welfare) that each traveller associates with their journey and any knock-on benefits from that journey being made, as well as the efficiency of the airline operating a particular route. In the context of freight, it refers to the value the freight owner would be willing to pay for the freight to be transported. In this case, an efficient allocation would be when airlines operate routes that passengers and freight owners are willing to pay the most to use (allocative efficiency), at the lowest cost possible (productive efficiency). Such airlines would have the most profitable routes and therefore value them the most.

An allocation that is efficient from an airport utilisation perspective may not be efficient from a welfare maximisation perspective, as different travellers may attach different levels of value to their journey and will be willing to pay different amounts for it. Therefore, an airline that uses a slot to carry passengers that place a high value on their journey, may be using the slot more efficiently than another airline that uses the slot to carry more, but lower value, passengers.



Socio-economic welfare also includes impacts on people that are not directly involved in air transport (i.e. not passengers, airlines or airports). It includes the wider economic impacts of air travel, the economic value of freight transport, and the negative environmental impacts associated with flying.

- Maximising the socio-economic welfare to the UK from the use of the airport: Efficiency from a UK perspective is likely to differ from efficiency from an overall welfare perspective. There are many travellers who use Heathrow to transfer between flights taking them from an origin country that is not the UK to a destination that is not the UK either. Such travellers do not benefit the UK directly. There are some indirect benefits to UK passengers, for example through the consequent increase in flight frequency, though the overall benefit is much less so than for passengers travelling to and from the UK. The definition of UK welfare can be unclear in certain places, such as whether it should include the benefit UK leisure travellers get from holidaying abroad (or conversely the benefit foreign leisure travellers get when holidaying in the UK). We consider the UK in the broadest sense to include all passengers and freight that travel to and from the UK.

From an airline perspective, it is much more difficult to distinguish between the impact on UK welfare versus the impact on wider welfare. Airlines may be based in the UK but employ people from outside the UK and have majority non-UK shareholdings. Conversely, non-UK airlines may employ many British people and be partially owned by British shareholders. Therefore, we do not attempt to distinguish between UK and overall impacts on efficiency in the context of impacts on airlines.

We understand that the Government's efficiency objective most closely relates to the second of these definitions – maximising the overall socio-economic welfare from the use of airport slots generally. Whilst the Government normally considers the welfare of the UK, in this case there are practical challenges in distinguishing between the impacts of aviation activities on UK and non-UK residents.<sup>33</sup>

### Efficiency sub-objectives in the context of Heathrow expansion

The Government also has supporting objectives in relation to slot allocation at Heathrow post expansion, which tie into the overall objective of efficiency. These are to:

- Improve connectivity to long-haul international destinations that currently have inefficiently low levels of service: The Government has stated that it wishes the expansion of Heathrow to “enhance Heathrow Airport as a globally strategic hub” and “to attract a growing number of transfer passengers, providing the added demand to make more routes viable. In particular, this is expected to lead to more long haul flights and

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<sup>33</sup> This means that DfT generally assesses the impact of aviation activities on all affected parties, regardless of origin. This approach is explained in DfT's published appraisal guidance (see TAG A5.2, para 3.2.10).



connections to fast-growing economies, helping to secure the UK's status as a global aviation hub, and enabling it to play a crucial role in the global economy".<sup>34</sup>

As we show later in this report, the number of international destinations served by Heathrow has failed to keep up with other hub airports, as it has become more congested. This has left many international destinations underserved as airlines focus on more profitable routes.<sup>35</sup> One of the consequences of airport constraints is that some routes will be underserved, as it is efficient for an airline to respond to such congestion by switching to routes that have the highest value.

However, under the current system, certain routes may be more underserved than others despite the value to them (i.e. there may be a higher socio-economic value on unserved routes than on others that are served). We also show that this is likely to be the case for long-haul destinations for which demand has grown only recently.

Therefore, CEPA interprets the Government's objective as to ensure that expansion delivers improved connectivity to destinations that are the most underserved in terms of passenger value and social value more generally, and that the slot allocation system continues to deliver improved long-haul connectivity as far as is practicable and efficient.

- Facilitate effective competition between airlines to create efficiency: Where there is ineffective competition between airlines, airlines are able to gain and exploit market power to the detriment of consumers. This is an inefficient outcome as passengers are paying higher prices, receiving a lower quality of service or a combination of the two, than they would if there was effective competition. Therefore, competition can be a way of achieving greater efficiency.

It is important to note here, that the Government is concerned with downstream competition, i.e. competition between airlines when operating particular services. We recognise that this does not always take place at route level and may instead take place at a city pair level, or even at a hub airport or regional level. Upstream competition, i.e. competition between airlines in the allocation of slots, is only considered in this report to the extent that it facilitates downstream competition.

## Domestic connectivity

In addition to maximising efficiency, the Government has an objective to improve domestic connectivity between UK airports. In relation to Heathrow specifically, in the Airports NPS the Government requires Heathrow to work with airlines to strengthen existing domestic connections and work towards establishing connections to at least 14 UK airports overall. DfT is

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<sup>34</sup> Department for Transport (2018) Airports National Policy Statement, available [online](#) - paragraph 3.18

<sup>35</sup> Underserved in this context is taken to mean that the level of services available to consumers is lower than it would be in the absence of capacity constraints.



currently working with Heathrow and other key stakeholders to establish how this ambition can be met, and considering the role of the slot allocation process in delivering it.

For the purposes of this study, we interpret the objective to be at least 14 routes to UK airports overall. We understand that the Government's precise objective for domestic connectivity (as opposed to the objective for Heathrow under the Airports NPS), and the role of the slot allocation regime is to play in delivering this objective, will be subject to further work following this study.

## Assessing different slot allocation regimes against the Government's objectives

In devising an approach to appraising the various options for slot allocation, we have developed the following criteria and sub-criteria, which we believe encapsulate the objectives described above.

The first criterion relates to achieving an efficient slot allocation system, both in terms of an efficient primary allocation, and an efficient allocation in the longer term; this is our primary appraisal criterion. Each of the following sub-criteria are considered with regards to the overarching efficiency criterion:

- **Efficiency of outcome:** We consider the extent to which the regime is likely to allocate slots to the airlines that are likely to use them in a way that maximises socio-economic welfare. We also consider whether the regime contains sufficient flexibility so that in the longer-term, slots transfer from airlines who value them less to airlines that can use them more efficiently, as the market evolves.
- **Competition:** We consider the extent to which the slots are allocated in a way that is likely to enhance competition in the airline market, both immediately after slots are allocated but also as Heathrow becomes more slot constrained.
- **Connectivity:** We consider the likely impact of the slot allocation regime on international connectivity, in relation to the efficient use of slots.
- **Incentives:** We consider whether the slot allocation regime encourages airline behaviours that are likely to reduce efficiency, in terms of the process for allocating slots, the airlines that ultimately obtain the slots, and how the slots are eventually used.
- **Other efficiency issues:** We consider other indicators that partially relate to efficiency, such as schedule stability and impacts on airline investment.

The second criterion we assess, relates to the Government's objective for Domestic Connectivity. This criterion considers the extent to which the slot allocation regime is able to deliver improved domestic connectivity, specifically that the new runway should facilitate at least 14 domestic routes being served from Heathrow.

Finally, we consider practical issues related to each option, from the following perspectives:



- **Functionality and operational complexity:** We consider the practicability of each slot allocation approach, both in terms of the administrative complexity of slot allocation exercises, and whether the slot allocation regime leads to a usable combination of slots for airlines.
- **Consistency with the global slot allocation system:** We consider the extent to which the proposals allow for continued consistency with the slot allocation regime used elsewhere. We consider this from a compatibility perspective (i.e. can airlines use the proposed system at Heathrow and another system elsewhere and still obtain matching slots).
- **Perception of subjectivity, unfairness or lack of independence:** We consider whether the current regime (or the proposed alternatives) are likely to lead to a perception that the slot allocation system is inappropriately subjective, unfair or insufficiently independent from Government, airlines or HAL.
- **Time to implement reform:** We consider the complexity of implementing the reform of the slot allocation regime and whether the necessary reforms are feasible in line with the current anticipated timeline of the Heathrow expansion programme. We assume the first new runway slots will be allocated for the 2027 summer season, but there may be a smaller release of slots as early as early as 2022.
- **Cost of slot allocation process:** At a high level, we consider the impact of any slot allocation regime on airlines and on the slot-coordinator, in terms of the cost of engaging with the allocation process. Specifically, we consider whether the burden imposed on the aviation sector make the implementation of a particular reform option unworkable.



### 3. REVIEW OF THE CURRENT SYSTEM IN THE CONTEXT OF HEATHROW'S EXPANSION

In the following section we discuss:

- the main features of the current system of slot allocation;
- whether they are likely to be advantageous in the context of the proposed expansion of Heathrow Airport; and
- whether the current system is likely to achieve the Government's objectives for slot allocation at Heathrow, as outlined in the previous section.

#### 3.1. Practicality

The current slot allocation system is a complex coordination exercise that has historically been perceived to be working effectively, in the sense of achieving good usability, even as airports have become more congested. There have also been few legal challenges to ACL's decision-making. There are a number of reasons for this, but some may be undermined to a degree in the context of Heathrow's expansion.

Overall, we conclude that the current system is likely to remain a practicable approach, but it will be a considerably more difficult task. This is because the number of slots being allocated will be much greater than has historically been the case at Heathrow, and a higher proportion of these will be oversubscribed compared with other airports, requiring ACL to make many more value judgements relating to the efficient allocation of slots. As a result, we expect the allocation of slots to become more administratively burdensome.

##### 3.1.1. Functionality and operational complexity

A functional slot allocation system provides airlines with slot combinations that allow them to fly viable routes. This means obtaining slots at both origin and destination airports at appropriate times. For certain airline business models, such as low-cost carriers, it may mean obtaining a combination of slots that allow enough rotations in a day, and for others, such as hub or freight carriers, it may mean obtaining slots that enable acceptable connection times for passengers or freight.

The current slot allocation system has allowed different airlines with different business models to co-exist. For example, at many European airports such as Schiphol low-cost, point-to-point carriers have been able to enter and compete effectively even though the airport has historically functioned as, and continues to function, primarily as a hub. This is arguably a key benefit of the current system, evidenced by its widespread usage at congested airports across the world and its continued usage since the 1970s.

We believe there are two main reasons for this:



- We understand from discussions with airlines that the flexibility afforded to coordinators is a key factor in ensuring a functional allocation of slots.

Specifically, coordinators can offer an airline an alternate slot that is close to its desired time, even if that comes at the expense of another airline whose first preference is that slot. Where a co-ordinator (or specifically an airport) may be able to accommodate an airline's request through small changes in airport operations (e.g. by adjusting the placement of check-in desks), the co-ordinator often actively facilitates such arrangements to ensure as many airline requests are accommodated as possible. Such discretion allows coordinators to build a workable schedule that maximises the number of slots allocated. Without this flexibility, the incentive is for airlines to overbid as a hedging strategy to mitigate the risk of not being allocated an acceptable slot.

Most of this takes place after the initial slot allocation when the slot allocation lists are published. Airlines work with coordinators to find appropriate slots, and airlines iterate their schedules and agree to exchange slots to develop workable arrangements. Previous analysis suggested that for some charter airlines, which typically have greater flexibility in the timing of their operations, up to 30% of slots were exchanged with other airlines following slot conferences.<sup>36</sup> But in the current constrained airport environment, it is likely that co-ordinators are more limited in what they can achieve by flexing the system.

- As capacity tends to grow gradually at congested airports, the existence of grandfather rights simplifies the allocation problem for coordinators.

With a strict prioritisation of rights, where historic slots have the highest priority and changed historic slots have the second highest priority, it becomes much easier to optimise the allocation of remaining slots. This is especially the case where new slots are allocated gradually and make up a small proportion of slots relative to historic slots.<sup>37</sup>

At Heathrow, for example, where the majority of slots are unchanged historic slots, a large proportion of the schedule is fixed before any new requests are accommodated. This means that in the first allocation round (allocating requests for changed historic slots), the co-ordinator needs to solely consider whether any changes in times, terminals or aircraft can be accommodated within the available capacity or through exchanges with other airlines wishing to change their historic slots. The second allocation round (considering new requests) is simplified even more as all historic slots are locked down in the schedule, so the consideration is purely about whether airline requests can be met through the limited remaining available capacity.

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<sup>36</sup> NERA (2004) Study to Assess the Effects of Different Slot Allocation Schemes

<sup>37</sup> This is confirmed numerically in a paper by Ribeiro et al (2018) An optimization approach for airport slot allocation under IATA guidelines, <https://www.sciencedirect.com/science/article/pii/S0191261517304538>



To illustrate, in the most recent allocation round at Heathrow (the Winter 2018/19 season), there were 9,224 slots that were allocated through historic rights and only 12 that were allocated from the pool. Of the historic slots, just under a third were re-timed and just under a quarter involved a move to a larger aircraft type.<sup>38</sup>

The nature of Heathrow's expansion differs from other airport expansions; Heathrow is likely to remain capacity constrained following expansion.

The scale of slot requests to be assessed by ACL at Heathrow, is likely to be much greater than at other airports such as Frankfurt and Madrid. This is because Heathrow continues to serve a larger market (in terms of overall passengers served from the airport), is a larger airport in terms of ATMs, and the extent of present constraints indicate that demand for slots is likely to be oversubscribed, at least for a significant parts of the day.

This view is supported by the majority of stakeholders we spoke to, who stated that a key challenge will be the likelihood of there being more demand for slots than there are slots available in the pool. This means there will be airlines who fail to obtain the slots they wish, and also means ACL would be required to exercise judgement on who should obtain a slot when there are competing requests and ACL has exhausted the relevant criteria.

When more capacity is released and there is strong demand for it, the role of coordinator becomes substantially more complex requiring a greater degree of judgement. This would transform the role of ACL from managing demand and capacity using clear criteria, to making value judgements about the merits of competing slot requests.

Some of the features of the current system that are advantageous in current circumstances could make it more difficult to allocate slots under expansion. Generally, when more slots are allocated, and particularly when a certain proportion of the slots are oversubscribed, there is greater scope for clashes between airlines in their slot requests. The current system relies heavily on coordinators adopting a case-by-case approach, when it is not immediately clear if an airline's request can be accommodated. Historically, this involves very few slots as the majority of them are already fixed under the grandfather rules. And even when manual adjustments are made, the majority of these can easily be determined based on an objective assessment of the feasibility of an operation within capacity limits.

When the scale of slots being allocated is much greater, it becomes more resource intensive to make manually consider numerous slot requests to form a workable outcome. And with many airlines wishing to make changes to their requests following the initial slot allocation, it becomes much more difficult to manage the multiple constraints that exist at Heathrow (e.g. terminal, parking, etc.) as different constraints will begin to apply.

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<sup>38</sup> ACL (2019) Heathrow Airport (LHR) Winter 2019/20 (W19): Initial Coordination Report, <https://www.acl-uk.org/wp-content/uploads/2019/07/LHR-W19-Initial-Coordination-Report.pdf>





Additionally, there will be many more instances where ACL is required to make a trade-off between two similar requests. In the years immediately following expansion, there will be much more flexibility around terminal operations, allowing for different types of airlines to be accommodated at different times. Also, given the nature of Heathrow's market, we expect most requests will be for year-round operations with a close to full slot series length. This means that the primary criteria will do little to discriminate between different slot requests other than at the margin.

We expect there will be many airlines wishing to fly at similar times using similarly sized aircraft. Choosing between them will require greater recourse to the secondary criteria, where there is much greater scope for subjectivity. This would change ACL's role as it has not historically had to make many value judgements about the relative merits of different slot requests, balancing different secondary criteria. In ACL's response to the Aviation 2050 consultation, it stated that the most appropriate user of a slot was usually clear based on its application of the primary and secondary criteria. Historically it has been relatively rare that ACL is faced with two similar requests for a slot. However, with many more slots available, and many more feasible configurations of airline operations, the decisions made will become less straightforward and introduce more subjectivity than has historically been the case.

### 3.1.2. Perception of subjectivity, unfairness or lack of independence

A benefit of the current allocation system is that ACL's decisions are generally accepted, though this is not necessarily guaranteed following expansion.

ACL's allocation decisions have generally been accepted by airlines. One of the main reasons for this is that the allocation hierarchy provided in the EU Regulation applies to the vast majority of decisions made by ACL. Where the EU Regulation is ambiguous or introduce an element of subjectivity (such as when pool slots are allocated using the secondary criteria), there is much greater scope for disputes to arise. However, we understand that historically, it has been relatively clear how to allocate pool slots, as either only one provider is able to use a particular slot, or their proposed service is clearly prioritised based on the new entrant rule or secondary criteria.

It is less clear that following expansion, the lack of disputes can be expected to continue. Although there is a strict hierarchy of prioritisation in relation to historic slots, there is less of a hierarchy in relation to the allocation of pool slots aside from the new entrant rule. Allocation of substantial new capacity under the current system would require ACL to more routinely make subjective value judgments about the merits of different airline's slot requests. Given the potential for windfall gains from being allocated a slot, the size of what is at stake, and the extent of subjectivity that may lie in allocation decisions, there is greater potential for ACL's decisions to be challenged by airlines than has been the case to date.

We note however, that some airlines we spoke to as part of this study, believed that the number of challenges would continue to be limited as long as any process was considered to be fair. ACL is perceived to be one of the more professional and transparent co-ordinators, features which



provide airlines with reassurance that even if they did not obtain a slot following a request, this was the result of a fair application of the rules.

## 3.2. Efficiency

We generally find that the efficiency of an initial allocation at Heathrow will depend on the extent to which slots are oversubscribed at the point of expansion. If, as the most recent evidence suggests, they will be oversubscribed, ACL's task of determining the most efficient use of a slot becomes much more challenging, inevitably leading to a less efficient allocation. It will also depend on the number of other infrastructure constraints that apply when a new runway is built (e.g. terminal capacity). One specific feature of the current system, the new entrant rule, is likely to make an initial allocation substantially less efficient because it is likely to prioritise airlines that use slot capacity less efficiently than non-new entrant airlines.

In the longer term, an initial allocation is likely to become less efficient as the general inertia in the slot allocation regime means it is less responsive to market changes, which would affect the efficient distribution of slots. Over time, airlines will adjust how they use slots in response to market changes, and the secondary market goes some way towards rectifying this and any inefficiencies in an initial allocation. But both the theory and evidence suggest that secondary trading is an imperfect solution that still retains elements of inefficiency. Not all slot holders are willing to sell their slots to airlines who value them more highly, and even when there are both willing buyers and sellers not all trades actually take place.

### 3.2.1. Context

When assessing the efficiency of the current allocation system in the context of Heathrow's future expansion, we are considering efficiency from a socio-economic welfare perspective. We primarily consider the socio-economic benefits of those using the airport (i.e., airlines, passengers, freight carriers etc.). Although air travel is associated with significant negative external effects in terms of socio-economic welfare, such as noise pollution and greenhouse gas emissions, we do not consider these explicitly unless the current allocation system is likely to have a notably different effect than alternatives.

Generally, without considering the wider externalities of air travel, airport capacity can be allocated efficiently if the cost to airlines to take off and depart from an airport is set at the cost of accommodating the extra service (the marginal social cost). This cost includes:

- Operating costs of the airport from accommodating the extra service within its present capacity;
- Any knock-on costs to airlines and passengers from increased delays as the capacity is used more intensively; and
- Any opportunity costs to other airlines that are no longer able to fly if the airport cannot physically accommodate an extra flight without removing another flight.



When an airport is unable to expand capacity, the marginal social cost of accommodating a new flight increases for each of the above reasons. For example, with the first point, accommodating an additional flight will often mean employing more staff, using more energy etc. to manage the extra flight within existing infrastructure constraints. With the second point, squeezing more flights within the existing infrastructure will lead to more congestion, resulting in more frequent and longer delays for all flights. The third point refers to the fact that at some point, no more flights can be added without removing another flight elsewhere. As demand to use a particular airport grows, there are more and more flights that cannot be accommodated including more valuable flights, so the marginal social cost of failing to accommodate flights increases.

Efficiency requires a balance between the second and third points. At some point the benefit of accommodating an extra flight is higher than the cost the extra flight imposes in terms of congestion. The key to an efficient slot allocation in the presence of capacity constraints, is to ensure that slots are given to the airlines that value them the most (i.e. those that are willing to pay the marginal social cost), provided that no airline has substantial market power.<sup>39</sup> Therefore, to the extent that price is used as a method to allocate capacity efficiently, it would be appropriate to have some level of congestion pricing.

In reality, at regulated and capacity-constrained airports such as Heathrow, the charges levied on airlines do not reflect the marginal social cost, but are materially below it, at least for extended periods of the schedule. In such circumstances, there is excess demand to fly to and from the airport, either at certain times of the day or throughout the day. Where there is excess demand, slots can still be allocated efficiently if they are given to the airlines that would value them the most in a competitive environment. Whereas a pricing system exposes whose value exceeds the price, other allocation systems must try and assess that another way.

In the context of airport expansion at Heathrow, any slot allocation is likely to achieve an efficient initial allocation if the slots are not oversubscribed (i.e. there is no excess demand). If, however, as we expect slots are oversubscribed, efficiency will depend on how slots are allocated between the different airlines who want the same slot. To the extent that some airlines instead have to use slots that would not be their first choice, there are complex trade-offs to be made.

Conventional economic wisdom suggests that any system that allocates slots using an administrative system is likely to lead to a less efficient outcome than any system where slots are allocated using a pricing mechanism. This is because it is difficult to identify which airline values a slot the most without exposing the price competing airlines are willing to pay. The experience of

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<sup>39</sup> The amount an airline would be willing to pay broadly matches how much profit they expect to make from running services using that slot. When airlines have market power, they're able to exploit that power to charge higher prices or have a poorer quality service and as a result make higher profits. Therefore, the value they attach to holding the slot is higher than it would be if they were exposed to competition. In such instances, the efficient outcome would be if slots are allocated to the airline that would value them the most in a *competitive environment*.



the aviation sector itself provides a compelling example of the efficiency of market-driven pricing and allocation over an administrative alternative. Following the deregulation of airlines in the 1970s and 1980s, airlines had fewer restrictions on the routes they were permitted to serve leading to greater competition, an optimisation of operations and lower prices for passengers.<sup>40</sup> However, different administrative systems can achieve different levels of efficiency. In this section, we consider the extent of inefficiency in the current administrative system, as a benchmark for alternative options. Here, we recognise that although administrative systems lead to inefficiency, it is not guaranteed that there exists a pricing or market-based allocation system that is practicable for slot allocation. This is something we consider in detail later on in this report.

### 3.2.2. Efficiency of a primary allocation

An administrative system of slot allocation, by design, imperfect for delivering an efficient allocation whenever there is more than one airline wanting the same slot.

In the initial allocation of slots following the release of new capacity at Heathrow, the efficiency of slot allocation will depend on ACL's ability to trade-off competing requests for slots and allocate them to the airlines that would value them the most in a competitive environment. This includes the possibility of airlines being allocated slots that they value less, but which may still be better than alternatives. The aim should be to maximise the value of the runway's utilisation, rather than simply maximising the runway's utilisation.

As an administrative task, this could be described as impossible because an airline's valuation of any particular slot is known only to them. In all likelihood, an airline's valuation of any specific slot will be highly contingent on whether they hold other compatible slots both at the same airport and at other airports. For example, a low-cost carrier will find a slot more valuable if it holds other slots at the airport to run multiple rotations a day, so that they can use their aircraft more cost effectively. Therefore, the low-cost carrier would be willing to pay more for a slot if, by obtaining it, the airline could run its target number of daily rotations.

The table below, taken from a study by Steer Davies Gleave (SDG), provides a simple illustration of the type of inefficiency that arises in any initial allocation that is done administratively. Even at airports where there is scarce demand, not all slots that were allocated to airlines were eventually operated. Such a finding, which has been replicated in other studies, shows that slots are sometimes allocated to airlines who do not even value them enough to run services on them.<sup>41</sup> While some of this may be for operational reasons, the size of the gap, particularly as all of these airports are Level 3 coordinated, suggests at least some level of inefficiency exists.

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<sup>40</sup> United States Government Accountability Office (2006) Airline Deregulation, <https://www.gao.gov/new.items/d06630.pdf>

<sup>41</sup> The reasons for not operating these slots may include a mix of commercial, operational and other reasons such as public holidays etc. In some cases, an unoperated slot may not represent an inefficient outcome if, for example, the environmental costs of operating it outweighed any user benefits.



Table 3.1: Slot requests, allocations and actual use of slots, summer season 2006 compared with year before

	Slot Requests	Slots initially allocated	Slots actually operated
London Heathrow	+14%	+1.2%	+0.9%
London Gatwick	+22%	+6%	+5%
London Stansted	+26%	+25%	+13%
Manchester	+19%	+18%	+1%

Source: Replicated from Steer Davies Gleave (2011) European Commission: Impact assessment of revisions to Regulation 95/93 - Final report

The added complexity of releasing capacity at greater scale post expansion will likely reduce the efficiency of the current system.

The scale of Heathrow's proposed expansion significantly increases the challenge faced by a coordinator in identifying the most efficient allocation of slots, both from a runway utilisation perspective and from a socio-economic welfare perspective. In the context of Heathrow's expansion:

- More slots will be allocated each season than the coordinator would be typically used to;
- More airlines will be submitting requests for the same slot, than the coordinator would be typically used to; and
- The value each airline places on obtaining a slot will depend on more variables related to which other slots they are allocated at Heathrow and elsewhere and which slots potential competitors are allocated.

Each of these adds to the challenge of efficiently allocating slots using an administrative method, with the complexity of allocating slots becoming exponentially larger.<sup>42</sup>

Even if a coordinator aims purely to meet airline requests as closely as possible, in effect maximising the utilisation of the airport, the challenge of doing this becomes more difficult with a release of slots at scale.

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<sup>42</sup> As was first demonstrated in the paper cited at the end of this footnote, even with full information on airlines' contingent valuations, which it is dubious they could ever fully describe, the problem of solving the optimal allocation of slots at an airport is of such computational complexity that any practical computer could at best make only an approximately good allocation. Moreover, there is no market clearing price. This would remain true of allocating a substantial subset of slots, rather than all of them. Computer programs for making reasonably good solutions of this generic type of problem do exist, but would not necessarily be helpful in an administrative allocation without reliable contingent valuation information. See S.J. Rassenti & V.L. Smith & R.L. Bulfin, 1982. "A Combinatorial Auction Mechanism for Airport Time Slot Allocation," Bell Journal of Economics, The RAND Corporation, vol. 13(2), pages 402–417.



The evidence suggests that even for this simpler objective of optimally meeting airlines' requests, coordinators do this less efficiently as airports become larger. A study comparing an optimised slot allocation consistent with WSG rules with the actual allocation at two Portuguese airports, found the actual allocation could be improved upon significantly at the larger airport.<sup>43</sup>

This is primarily because, following the publication of the slot allocation list for a particular season, airport coordinators respond to requests on a first-come first-served basis. This means that a request that comes in later may not be granted a slot over an earlier request, even if it scores more highly under the secondary criteria. Also, changes across several airlines that may be beneficial for all of them, will only happen if all of the requests take place simultaneously (and with manual intervention by ACL), or the airlines involved all agree to exchange the slots. While we expect some of this can and does take place through bilateral negotiations with airlines, facilitated by ACL, this only works when the nature of such exchanges is relatively straightforward (i.e. exchanging involving at most two or three airlines).

We would expect that at Heathrow, which is significantly larger than the airports in the Portuguese study, the task of optimising allocation in terms of meeting airline preferences as far as possible, is even more difficult. Following the initial allocation, there will be many more airlines wishing to change their slot, and many more potentially mutually beneficial exchanges that do not happen, as the current system of responding to requests is not designed to enable such exchanges to take place.

There are some specific features of the current allocation system, such as the new entrant rule, that make the initial allocation even less likely to be efficient.

The new entrant rule is designed to ensure airlines with no presence or a small presence at a slot constrained airport can enter it as a way of encouraging greater competition with incumbents. However, there is no evidence to suggest such airlines can use a slot more efficiently than others, and only limited evidence that airlines have been able to use the rule to effectively compete with incumbents.

The study by SDG provides evidence of one potential impact of the new entrant rule on efficiency, with new entrant airlines having lower slot utilisation rates than other airlines. <sup>44, 45</sup> This effect exists even at heavily slot constrained airports such as Heathrow, albeit at a smaller scale, where the average utilisation of slots in the 2008 summer and winter seasons was 97.9%,

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<sup>43</sup> See Ribeiro et al (2018) An optimization approach for airport slot allocation under IATA guidelines, <https://www.sciencedirect.com/science/article/pii/S0191261517304538>. The study found the initial allocation could be improved on even while maintaining the WSG's rules on historic rights and changed historic rights. If some of the WSG rules were relaxed slightly, such as by not strictly prioritising changed historic rights over new requests, the allocation would become even more efficient.

<sup>44</sup> Steer Davies Gleave (2011) European Commission: Impact assessment of revisions to Regulation 95/93—Final report

<sup>45</sup> Here we implicitly assume slot utilisation correlates with economic efficiency.



compared with 95.7% for new entrant airlines. The experience of Frankfurt provides also suggests the new entrant rule is inefficient, where more than 50% of new entrant slots were handed back before the start of the season.<sup>46</sup> While we note some of these may have been due to the recession, the large difference between the proportion of new entrant slots returned versus non-new entrant slots returned, suggests at least some of this was down to inefficiency.

Another issue with the rule is its relatively arbitrary thresholds for designating an airline as a new entrant. There is no evidence to suggest that airlines considered new entrants under the rule, would be able to compete more effectively with incumbents than other challenger airlines not qualifying for new entrant status.

We understand from previous studies and from engagement with airlines that some consider the current threshold too low to allow an airline to use the rule to effectively compete with incumbents. This is particularly the case for airlines wishing to use Heathrow as a base, where the upper limit of two slot pairs a day for new entrant status is too few to create an operation of sufficient scale (as it implies at most a daily return flight to two destinations).<sup>47</sup> Airlines are able to use the rule to gain initial slots at an airport, but quickly become incumbents and no longer have access to the new entrant pool.

The thresholds are likely to be more appropriate for non-incumbent non-EU carriers wishing to obtain slots at Heathrow, as their business models mean they only require slots for flights between Heathrow and a few destinations (usually in their home country). A Brazilian new entrant airline would therefore be able to use the rule to obtain enough slots for one return flight a day each to the two biggest airports in Brazil.

Previous applications of the new entrant rule alongside a large release of new slots, has often led to the fragmentation of the slot pool at those airports. At Paris Orly, the average number of slots allocated to each new entrant airline other than easyJet was just over one slot pair.

It is difficult to see how such airlines would be able to compete effectively with an incumbent airline holding many more slots. For example, if an airline wishes to compete with an incumbent low cost carrier, the new entrant rule does not allow an airline to obtain enough slots for the typical three to four rotations a day necessary to make a route profitable. For an airline wishing to compete with an incumbent full-service airline, it does not allow them to spread the cost of various fixed costs related to the airline's quality proposition (such as airline lounges, ground crew, check-in personnel, etc.), over many flights. This means the new airlines operate from a higher cost base.

Overall, we conclude that the initial allocation of a substantially increased number of slots at Heathrow under the current system is likely to be less efficient than at present, both from the

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<sup>46</sup> DfT notes from discussions with German Slot Coordinator

<sup>47</sup> Proposed changes to the WSG agreed as part of the strategic review include raising the threshold for defining a new entrant from less than five slots on the relevant day to less than seven slots on the relevant day, implying three rotations a day.



perspective of optimally meeting airline preferences within WSG rules, and from a socio-economic welfare perspective. The new entrant rule in particular, is likely to make the initial allocation of slots substantially less efficient. The overall extent of any inefficiency will depend on how many new slots are oversubscribed and the strength of airline demand for each slot.

The way new capacity is phased in will likely affect how slots are allocated, and will not necessarily lead to the most efficient outcome

The current allocation system relies heavily on operational feasibility checks being used to distinguish between competing slot requests. For example, if an airline operating a slot at Terminal 3 hands it back, it may be the case that there is only capacity available at Terminal 3 at that time. This means that when the slot is allocated from the pool, only airlines already operating at the terminal or a new entrant airline, might consider putting in a slot request. There are many operational reasons why it is suboptimal for an airline to be spread across two terminals (e.g. difficulties in staff rostering, impact on flight connections, access to airport lounges for business passengers, etc.).

A consequence of this, in the context of Heathrow's expansion, is that the future allocation of slots may be partially determined by where the capacity constraints lie and what infrastructure is available. When the new runway becomes operational, it is possible that other constraints will bite in the short term while Heathrow builds additional terminals and parking stands.<sup>48</sup> This means that, new capacity allocated during this period will likely favour airlines that operate at terminals where spare terminal or stand capacity exists unless there is an exercise to move airlines between terminals to accommodate new requests. There is precedence for significant airline moves between terminals, such as after the opening of Heathrow Terminals 2 and 5.

### 3.2.3. Efficiency in the longer term

Market dynamics mean that allocation of slots indefinitely is unlikely to remain efficient, even if the primary allocation was efficient.

As markets are dynamic, an airline that values a slot the most at the time of an initial allocation is less likely to be the airline that values it the most several years later. For example, a new airline business model may emerge such as the advent of low-cost carriers, or passengers may start wanting to fly to a new destination, or a new carrier may emerge that operates more efficiently than existing carriers. In each of these examples, certain airlines that are better placed to meet the demand in these market segments may wish to obtain slots, and may be able to use them more efficiently than those which hold them currently.

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<sup>48</sup> Heathrow Airport Limited (2019) Airport Expansion Consultation: Airfield, <https://aec.heathrowconsultation.com/topics/airfield/>





This could also be as simple as an airline wishing to obtain a slot for flights across an entire season, where the existing slot holder is only using the slot for part of the season, although a complication is that it would not always be the case that this represents an increase in efficiency.<sup>49</sup>

To assess whether an allocation of slots is likely to be efficient in the longer term, we need to consider how effectively slots are transferred from airlines that are using them less efficiently to those that could use them more efficiently. If slots are effectively transferred from airlines that value them less to those that value them more (in a competitive environment), an inefficient initial allocation can be readjusted to a more efficient allocation through slot transfers.

As Heathrow's new runway capacity is phased in and premium slots are allocated, the remaining slots in the pool will be the ones that are at relatively unattractive times or are disjointed (i.e. not available as a full series). A key feature of the current system is the existence of grandfather rights, which allows airlines to retain slots provided they used it for at least 80% of the time in the previous year's season. Without secondary trading, we expect some airlines would be willing to hand back a slot if they were consistently using it unprofitably, though this is less likely to be the case for airlines that were able to use the slot profitably. This is a significant source of inefficiency, as airlines that value a slot are not able to obtain it unless the existing slot holder willingly vacates it (and it therefore returns to the pool) or the airline makes do with a less attractive slot.

With secondary trading however, new airlines or growing airlines can obtain slots by purchasing them from existing slot holders. As secondary trading is allowed at Heathrow, the effectiveness of the secondary market is key to determining whether the allocation system is likely to be efficient in the longer term.

Secondary trading of slots mitigates this somewhat but trading on the current scale would not address a large-scale allocative inefficiency

The evidence on the efficiency of secondary trading is mixed. The study by SDG shows that secondary trading has contributed significantly to slot mobility at Heathrow, with the vast majority of slots in recent years being obtained through the secondary market rather than through the pool. This is likely to reflect the high values associated with slots at Heathrow which makes airlines looking to release a slot more likely to sell it on rather than holding on to it or releasing it back into the pool. The study also found that secondary trading led to an increase in average aircraft size and increased competition on key long-haul routes.

More recent analysis by ACL (see chart below) also shows the number secondary trades greatly exceeding the number of pool slots allocated. Following an uptick in secondary trades after the most recent recession, the number of trades has started reducing once again. The average

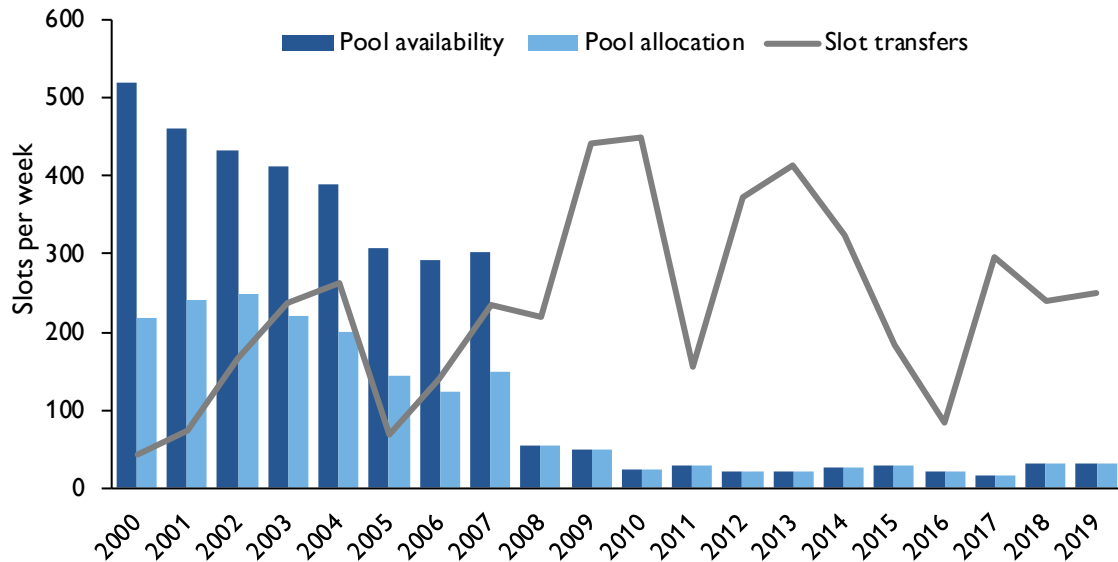
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<sup>49</sup> Maximum runway utilisation does not always equate to the maximum value of utilisation. Satisfying peak holiday demand, for example, might have higher value than a service that can be sustained across the full season.



number of daily slot pairs transferred each year has been 17 pairs in the three years to 2016, compared with 29 pairs in the three years to 2013, and 25 pairs in the three years to 2010. The ACL analysis also showed that these secondary trades improved slot utilisation, with a 90% increase in the average size of aircraft used for traded slots.

Figure 3.1: Volume of slots traded at Heathrow versus allocation from the pool, summer seasons 2000–2019



Source: ACL (2019) Response to Aviation 2050 consultation

Note: 668 slots transferred from BML to British Airways not included in S12 as this was part of the transfer of BML as a going concern.

A frequent criticism of secondary trading is that it allows incumbent carriers to cement their position, as they have easiest access to funding or financing to purchase slots. Indeed, evidence from ACL shows that larger carriers and those with clear access to finance (i.e. those with sovereign backing) have been the most active purchasers of slots at Heathrow.<sup>50</sup>

However, it is not clear that this is due to better access to financing, rather than new entrant airlines being able to obtain slots through the new entrant rule without having to consider the secondary market. As slots are non-depreciating (i.e. the value does not reduce over time) and readily transferable, there is no reason to consider that there would be more difficulty accessing finance to purchase slots than to purchase other assets such as aircraft. Also, the evidence from ACL shows that 10 airlines since 2008 have used the new entrant rule to obtain slots and then gained incumbent status through secondary trading. This suggests that new entrant airlines can and do use the secondary market where it makes commercial sense for them to do so.

Another criticism is that the secondary market has enabled airlines with a dominant position to gain more market power. Economic theory suggests that an airline with a dominant position would be willing to pay the most for slots, as by obtaining them they are able to exploit their market power to make higher profits than their competitors. There are not enough airports

<sup>50</sup> ACL response to Aviation 2050 consultation



where secondary trading takes place, to consider whether this is an accurate criticism. The two European airports where secondary trading does take place, Heathrow and Gatwick, has seen the carriers with the largest market share being the most active purchasers of slots (British Airways at Heathrow and easyJet at Gatwick). However, despite this, other airlines have been able to grow their market share at each airport, and British Airways' market share at Heathrow remains significantly lower than comparable hub airlines at their respective hubs.

A DotEcon study<sup>51</sup> counters that although secondary trading improves efficiency, there are insufficient secondary trades to rectify an inefficient initial allocation and any further inefficiency that arises due to grandfather rights. For example, taking the three years to 2016, only 2.6% of slots were traded through the secondary market. At such a rate, it would take eight years to rectify an allocation where 20% of the slots are inefficiently allocated.

There are several reasons why the secondary market may not be as effective as would be necessary to rectify an inefficient initial allocation:

- There are market imperfections that reduce the number of trades. Buying, selling or leasing slots in the secondary market, is a complex exercise that involves significant transaction costs; financial costs incurred by participants involved in the trade. As there are not many airlines willing to sell slots, or willing to publicly advertise wanting to sell slots,<sup>52</sup> it can take effort for sellers to find potential buyers and for sellers to find the buyer willing to pay the most. Also, each slot transaction is often bespoke, and may be part of a wider transaction involving slots at other airports, or involving trades between multiple airlines. This results in significant costs in negotiating an agreement between the airlines. For leases, the agreement will also need to include terms on how slots are returned and responsibility for maintaining historic rights through the use-it-or-lose-it rule. These all add to the cost of undertaking a slot trade, which means trades take place when either the gains to both the buyer and seller are high, or the seller needs to realise the financial value of the slot quickly.
- Even when there are no market imperfections, and both buyer and seller are willing to make a trade, such trades may not always take place. Theory indicates that when both buyer and seller are unsure about how much the other values a product, in this case a slot, trades will generally only occur when the buyer values the slot substantially more than the seller. <sup>53</sup> This result is found even when there are no transaction costs. This leaves a lot of instances where an efficiency improving trade does not occur.

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<sup>51</sup> DotEcon (2006) Alternative allocation mechanisms for slots created by new airport capacity: Final Report

<sup>52</sup> As selling a slot is often an indicator of financial distress, an airline may not want to advertise to its competitors or customers that it is looking to sell a slot.

<sup>53</sup> Myerson, R. and M. Satterthwaite (1983) Efficient Mechanisms for Bilateral Trading, *Journal of Economic Theory*, 29, 265-281, cited in DotEcon (2006)



- There may also be instances where airlines are unwilling to sell a slot even if it means making a large financial gain, as a way preventing a competitor from obtaining a slot. An airline may choose to keep hold of the slot and run a less efficient service (commonly referred to as slot hoarding), or may choose to temporarily lease a slot as a way of retaining ownership (commonly referred to as slot babysitting). Both DotEcon and the Competition and Markets Authority (CMA) argue that airlines have an incentive to forego a short-term gain from selling slots if it means avoiding competition in the longer term.<sup>54</sup>  
Certain airlines may have a particular incentive to hoard slots at Heathrow, although there is no publicly available data to demonstrate that this happens in practice. In theory, airlines with a small presence at Heathrow, may easily find a buyer that operates in a completely different market, leaving less of an incentive to hoard the slot. For airlines with a larger presence or airlines holding slots where potential buyers are all direct competitors, the incentive to keep hold of the slot is greater.
- Finally, for some airlines there may be some non-economic value associated with holding a slot at Heathrow, such as prestige, given Heathrow's status as a hub airport and London's importance as a destination. This leads to airlines holding onto slots at Heathrow even if they are likely to make a financial gain from selling them off. Although this is not necessarily economically inefficient, it is less clear whether such airlines would continue holding onto the slots if they faced the full opportunity cost of doing so.

The evidence for the existence of slot hoarding and slot babysitting is mixed. Although there are some historic examples of slots being hoarded, it is generally difficult to identify categorically when a slot is being hoarded. While historically, a slot may have been hoarded by running an empty plane 80% of the time to ensure grandfather rights are retained such as a British Mediterranean flight between Heathrow and Cardiff, such overt examples have become rarer due to potential political consequences of doing so.<sup>55,56</sup> Also, in the case of Heathrow, the strength of passenger demand means that an airline can run a route profitably while still maintaining grandfather rights.

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<sup>54</sup> Competition and Markets Authority (2018) Advice for the Department for Transport on competition impacts of airport slot allocation, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/767230/cma-advice-on-impacts-of-airport-slots.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/767230/cma-advice-on-impacts-of-airport-slots.pdf)

<sup>55</sup> BBC (2007) Green anger at 'ghost flights', <http://news.bbc.co.uk/1/hi/6441103.stm>

<sup>56</sup> In the US where there is no UIOLI rule, JetBlue recently gave up some slots at Long Beach Airport after coming under political pressure following repeatedly low utilisation of slots. See <https://www.presstelegram.com/2019/04/08/long-beach-says-it-may-start-cracking-down-on-jetblue-for-not-using-enough-of-its-flight-slots/>



Therefore, we can only use indicators of slot hoarding or slot babysitting. Research considering airports in the USA, has not found evidence of either slot hoarding or slot babysitting.<sup>57</sup> When considering slot utilisation as an indicator, incumbent airlines used their slots more intensively than other airlines, and the slots they leased out were used as intensively as holder-operated slots. This suggests that incumbent airlines are not holding onto slots and using them less efficiently; and are not leasing them to others who then use them less efficiently.

At Heathrow, however, there does exist some evidence of slot babysitting. The SDG study found Virgin Atlantic's slot holdings reduced temporarily in response to the downturn in aviation demand and Aer Lingus' increased, which SDG considered suggestive of Aer Lingus babysitting slots for Virgin Atlantic. More recently, a few slots at Gatwick previously held by Monarch and purchased by British Airways, have been leased to other airlines until BA can set up its operations.<sup>58</sup> There has also been a relative prevalence of slot leases over slot trades, with evidence from ACL showing that some slots are leased out repeatedly and for long periods of time. Some airlines have suggested that such behaviour is evidence of slot babysitting. The analysis from ACL also shows that slots leased out typically led to a reduction in average seats per slot (as opposed to slot sales which led to an increase). The evidence leads us to conclude that airlines prefer to lease out slots when they have no immediate use for them rather than sell them on and lose ownership (and control over who the slots go to). It also suggests that this leads to an inefficient use of slots.

As an indicator of the potential scale of slot hoarding at Heathrow, we considered how routes with low load factors have evolved over time. In 2016, there were 49 routes served by different airlines with a load factor of less than 0.65.<sup>59</sup> Of these:

- 34 were either no longer served by that airline by 2018 or the load factor had grown above 0.65;
- 6 were on routes where there were at least two carriers, potentially suggesting active competition between airlines; and
- 9 were routes where the airline continued to operate that route and the load factor continued to be below 0.65

Overall load factor does not provide a complete picture, but the continued operation of those nine routes provides possible evidence of conscious slot hoarding, where airlines are using a slot purely to retain grandfather rights as opposed to airlines running a route believing they can run it profitably. They collectively represent 5,000 ATMs or just over 1% of Heathrow's capacity. Under this metric the evidence suggests conscious slot hoarding is not currently widespread at

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<sup>57</sup> Institute of Economic Affairs (2003) A Market in Airport Slots

<sup>58</sup> Financial Times (2018) BA owner in deal to keep extra Gatwick slots, <https://www.ft.com/content/ed93c972-5a67-11e8-b8b2-d6ceb45fa9d0>

<sup>59</sup> CAA Airport Statistics



Heathrow. It also suggests that in the longer term, if Heathrow's slot constraints become as substantial as they currently are, the likelihood of widespread slot hoarding is limited. It is likely that the reality of operating at Heathrow, means that airlines will face commercial pressures to make a route profitable or to sell the slot on the secondary market.

We must caveat here that indicators relating to utilisation cannot categorically disprove the existence of slot hoarding. An airline running a route profitably and/or with high utilisation, may still be hoarding it if it is unwilling to sell it to another airline who would value a slot more highly. It is much more difficult to find evidence either way with regards to this, as there are no external indicators that can be used to suggest the existence of such behaviour.

Overall, we believe secondary trading does go some way towards both reducing any inefficiency in an initial allocation and towards maintaining churn in the market as would be expected in any dynamic market. However, both the theory and evidence suggest that secondary trading is an imperfect solution that retains elements of inefficiency. Not all slot holders would be willing to sell their slots onto airlines who value them more highly, and even when there are both willing buyers and sellers not all trades actually take place, due to market imperfections.

### 3.2.4. Competition

From a competition perspective, slot constraints at Heathrow can allow existing slot holders to obtain a degree of market power, as potential competitors are unable to obtain appropriately timed slots. The lessening of competition risks customers being charged inefficiently large fares as airlines seek to exploit their market power. We consider that any competition concerns that currently exist at Heathrow are likely to reduce immediately after capacity is expanded. However, in the longer term, competition concerns are likely to re-emerge once Heathrow becomes capacity constrained again. Some features of the current allocation system are likely to exacerbate competition issues, such as the existence of grandfather rights and the new entrant rule. Another, the competition criterion that can be used in prioritising competing slot requests, is likely to be ineffective at improving competition as currently applied but could be a more effective tool if applied differently.

When assessing the effect of the current slot allocation regime on competition between airlines, it is worth recognising that the level of competition is not static or the same for all routes to and from Heathrow. The degree of competition depends significantly on the specific route flown, the ultimate origin and destination of passengers, the degree to which effective substitutes are available, and an airline's ability to price discriminate between passenger who have access to substitutes and those that do not:

- Airlines operating short-haul services to UK and European airports from Heathrow compete directly with airlines operating from other London airports for the local



(London and the South East) origin/destination market.<sup>60</sup> A large proportion of passengers wanting to travel between London/South East and other UK/European airports have access to multiple London airports and other forms of transport such as rail.<sup>61</sup> Even if a single airline operated all the flights on a particular route, the existence of acceptable alternatives limits the potential for market power.

- For transfer passengers using short-haul services to Heathrow as part of a longer connecting flight, the degree of competition depends on whether the origin UK/European airport has access to alternate hubs or is a hub itself. If, for example, a passenger originating from a Scottish airport can only realistically travel via Heathrow<sup>62</sup> to get to their destination, then the extent of competition between airlines on that route will determine the level of efficiency.
- For long-haul local origin/destination passengers, the degree of competition depends on the route being travelled and the type of passenger.
  - Generally, routes to the east and south have substitutes in the form of European and Middle Eastern hubs. These provide an acceptable alternative for passengers that are less time sensitive in terms of availability, frequency, and total journey time. It may provide less of a substitute for time-sensitive passengers, such as those travelling for business.
  - For routes to the west, particularly across the North Atlantic, there are typically fewer acceptable substitutes as the connection times (and therefore journey times) are likely to be too long for many passengers and the frequencies are likely to be insufficient. In this context, considering effective competition at Heathrow is likely to be more important.
- Finally, for long-haul transfer passengers, there are likely to be many acceptable substitutes in the form of alternate European or Middle Eastern hubs. This means competition concerns are limited, even in the context of significant slot constraints. The only exception to this may be for niche destinations which can only be realistically accessed via Heathrow.

There has not been any study looking specifically at the extent of market power for different airlines competing on different routes at Heathrow. Whether competition between airlines at

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<sup>60</sup> Passengers travelling to and from London and the South East, rather than those transferring via Heathrow.

<sup>61</sup> Currently, airports in London have sufficient spare capacity to allow passengers to switch between them, meaning that for certain routes, competition between London airports can be very effective.

<sup>62</sup> Such situations are rare. Heathrow connects directly to eight British regional airports, whereas many more connections to continental European hub airports are available.



Heathrow is currently effective, is highly disputed. Certain competition assessments have reviewed specific markets or segments of the market, as part of merger and acquisition approvals (e.g. the creation of International Airlines Group, IAG) or for alliance approvals. These have often found some competition concerns, leading to slot divestment requirements; where airlines are required to release slots to gain competition approval.<sup>63</sup>

Following expansion, we expect concerns related to competition between airlines to be mitigated in the short term by the ability of new airlines to enter and existing airlines to expand into new markets. The WSG explicitly allows for furthering competition to be used as a criterion for allocating slots to a particular airline. We understand that ACL applies this rule where it deems it to be appropriate.

However, there is a risk that the initial allocation of slots insufficiently prioritises competition and prioritises the wrong type of competition. As discussed above, for some routes, competition at Heathrow is more important whereas for other routes, effective substitutes outside Heathrow make it less important. As we expect Heathrow to become significantly slot constrained again following expansion, and given the existence of grandfather rights, initial allocation that is ineffective at promoting competition may lead to inefficiency in the longer term. There are limited mechanisms to prevent airlines from exploiting market power once they have it, or for reducing slot concentration on particular routes once it exists.

There are three features of the current system that affect competition. We consider each in turn and assess whether the impact on competition is likely to be positive in the context of airport expansion at Heathrow:

- **New entrant rule:** Although the new entrant rule is designed to ensure new entrant airlines can gain slots at congested airports, the design of the rule applied presently is likely to introduce competitive distortions. Under the new entrant rule, 50% of slots at an expanded Heathrow would be reserved for airlines with existing holdings that do not exceed two slot pairs a day (as a minimum requirement).

Given how undersubscribed the new entrant rule is likely to be, it is likely to encourage opportunistic requests for slots by airlines who qualify for entrant status but will use any slots less efficiently than other airlines.

The experience of Frankfurt Airport's expansion is relevant here, where although in the initial allocation 50% of slots were allocated to new entrants, 68% of those slots were later handed back to the slot coordinator.

The qualification criteria for new entrants bears little reflection of the commercial reality of competition between airlines. The new entrant rule has some arbitrary aspects, which means the thresholds may be appropriate for some circumstances but are less so for

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<sup>63</sup> Slot divestments were required when IAG acquired Aer Lingus, and as part of the anti-trust immunity approval of the Oneworld Alliance formed by American Airlines, British Airways, Finnair and Iberia.





others. For example, the rule allows a foreign airline to effectively establish a small presence competing against incumbents on a particular route. But the rule is less effective at allowing a UK airline to establish a larger presence at Heathrow, either as a central base for a hub network or as another base for a point-to-point network. Both options are likely to improve competition either within Heathrow or between airlines at Heathrow and other airports, but only one is explicitly supported through the new entrant rule whereas the other may actively be held back by the rule.

We conclude that the rule only has the intended competition effect in limited circumstances.

- **Grandfather rights:** The existence of grandfather rights, create inertia in the distribution of slots over time. When faced with strengthening capacity constraints following expansion at Heathrow, grandfather rights create a barrier to entry or expansion as airlines wishing to compete with an incumbent carrier faces a choice between paying for a slot through the secondary market and obtaining an inferior slot from the pool.

In the face of capacity constraints, airlines face strong incentives to avoid selling slots to competitors even if that means losing out on a windfall gain. Depending on the extent to which an airline is faced with competitive pressures from airlines at other airports, the existence of grandfather rights is likely to strengthen market power for incumbent airlines.

Even in the instance where a competitor airline can obtain a slot either through the pool or the secondary market, this fails to create a level playing field as the airline must compete either with an inferior slot or by paying for a slot that an incumbent carrier received for free. Such airlines are less able to compete effectively as they operate from a higher cost base or are offering an inferior product to customers.

Although grandfather rights have some wider positive effects, they inhibit competition in the longer term by reducing opportunities for competitor airlines to obtain slots.

- **WSG allocation criteria:** The WSG allows slot allocation criteria to prioritise a request for a slot where it promotes the objective of strengthening competition. Whether such criteria will succeed in achieving that objective depends upon how the rule is applied in practice. If the allocation criteria prioritise strengthening competition on routes where there are limited substitutes for passengers, they are likely to be more effective on the longer term. They are also likely to be effective if they actively encourage airlines to build sufficient scale at Heathrow to obtain the flexibility to act in pro-competitive ways, for example adapt their networks to respond to routes where there is limited competition.

Our understanding of how the rules are currently applied (i.e. on a route-by-route basis) suggests the present application is too broad to be effective. In some instances, for example, the criteria would be used to prioritise new services on a route despite there being effective competition from other London airports. It does not adequately take account of the reality of competition between airlines. More importantly, ACL would



need to enhance their experience and expertise in making judgements on the nature of competition between airlines, for the purposes of a large scale capacity allocation.

As a result, we believe the application of the competition criterion risks being misapplied in the allocation of slots at an expanded Heathrow.

Overall, we conclude that slots allocated under the current regime at an expanded Heathrow should diminish many of the competition concerns that currently exist. This is because expansion provides airlines the opportunity to enter Heathrow or expand their operations at the airport. Also, the WSG explicitly includes a competition criterion that we believe is likely to be applied by ACL. However, we believe this is most likely to be applied based on route level competition analysis, which may not necessarily prioritise where the biggest competition concerns are likely to be. Additionally, the existence of the new entrant rule is likely to be ineffectual in encouraging greater competition and may have the opposite effect, by making it more difficult for other non-incumbent airlines to obtain sufficient slots. Finally, an inevitable consequence of grandfather rights to slots, is the reduced opportunity it gives other airlines from obtaining slots, therefore diminishing competition in the longer term.

### 3.2.5. International connectivity

We find that the impact of the current slot allocation regime on international connectivity is more complex than an initial review would suggest. Initial allocations are likely to favour new routes or increasing frequencies to routes considered underserved. In most instances, this is likely to be efficient but at the margin such decisions may come at the expense of high value routes that are considered already well-served.

In the longer term, as airlines change the routes served through their slot portfolio and are able to sell-on their slot holdings, we expect to see a gradual shift towards the more valuable routes regardless of the initial allocation. We also expect to see changes to the destinations served as passenger demand evolves. This is efficient from an overall welfare perspective, but not as efficient as it could be if challenger airlines had better access to slots to also serve these emerging destinations. We also conclude that the current slot allocation system does not necessarily lead to fewer international connections in the event of increased slot constraints and does not lead to fewer services to the destinations considered more beneficial in terms of UK welfare.



Figure 3.2: Number of international cities and destinations served at Heathrow, 1998–2018



Source: CAA Airport Statistics

The growth in the number of international destinations and cities served suggests that the slot allocation system has not prevented services to new routes where demand is growing. Somewhat surprisingly, increasing slot constraints has not seen a general shift from thinner routes to thicker routes. The average number flights for the thinnest 25% of routes has stayed relatively steady at 0.4 return flights a day between 1998 and 2019, while the average number of flights for the remaining 75% of routes has reduced from 5.4 return flights a day in 1998 to 4.8 return flights a day by 2018. This suggests that the thinnest routes may not be squeezed out by capacity constraints at Heathrow as is sometimes asserted.<sup>64</sup>

What the above chart does not show however, is whether these new routes are being served by incumbent carriers or whether they are being served by new entrants. We therefore consider the European market where any EU carrier has the right to fly any route within the EU (and as such there is a greater pool of new entrant airlines that could fly from Heathrow). Of the 24 European cities where new services have commenced since 2003, 21 are being served by British Airways, a further two by other IAG airlines, and one by Eurowings using slots previously held by its parent company Lufthansa. This suggests that although the current slot allocation system has not prevented new international destinations being served, it may have prevented new entrant airlines from serving these new routes. This seems logical as incumbent airlines can take a more proactive approach to developing their networks. Sometimes this happens very quickly (e.g. in response to geopolitical / security events) or it can be a gradual response to changing passenger demand.

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<sup>64</sup> See HM Government (2018) Airports National Policy Statement. Also relevant to this comment is the observation that some other European hubs offer a larger number of destinations than Heathrow. As the chart shows, the number of destinations offered from Heathrow has grown more rapidly in the last five years than the previous 15.



## Connectivity following expansion

The immediate impact of Heathrow's expansion will be an improvement in connectivity regardless of how slots are allocated. The WSG includes an explicit criterion related to the improvement of connectivity, looking favourably on slot requests that provide a balance of services to different destinations, improve the overall route network and provide services to growing destinations. We would, therefore, expect any initial slot allocation to increase the number of destinations served and re-introduce services that have previously been withdrawn (such as many African destinations), as part of the objective to achieve a balanced route network.

From an economic efficiency perspective, there may be instances where it is more efficient for a slot to be used to increase services to an existing destination, over services to a new destination. Our understanding of how ACL and other coordinators allocate slots, particularly with the new entrant rule and the criterion to form a balance in the type of routes served, suggests coordinators are more likely to prioritise a broader route network over overall efficiency.

In the longer term, as capacity constraints start to bite again and as airlines optimise their route network, we would expect airlines to switch to the most profitable (and most efficient) routes, where they are able to do so. We would therefore expect airline route networks to adjust to rectify some of the inefficiencies in the initial allocation. Again however, this will likely come from existing carriers adjusting their route networks rather than new carriers entering Heathrow. This adjustment would likely come at the expense of the least profitable routes, which in recent years have been to African and Central Asian destinations. However, it is difficult to determine exactly which types of routes are likely to be lost, as we expect demand for various routes will vary substantially by the time a new runway becomes operational.

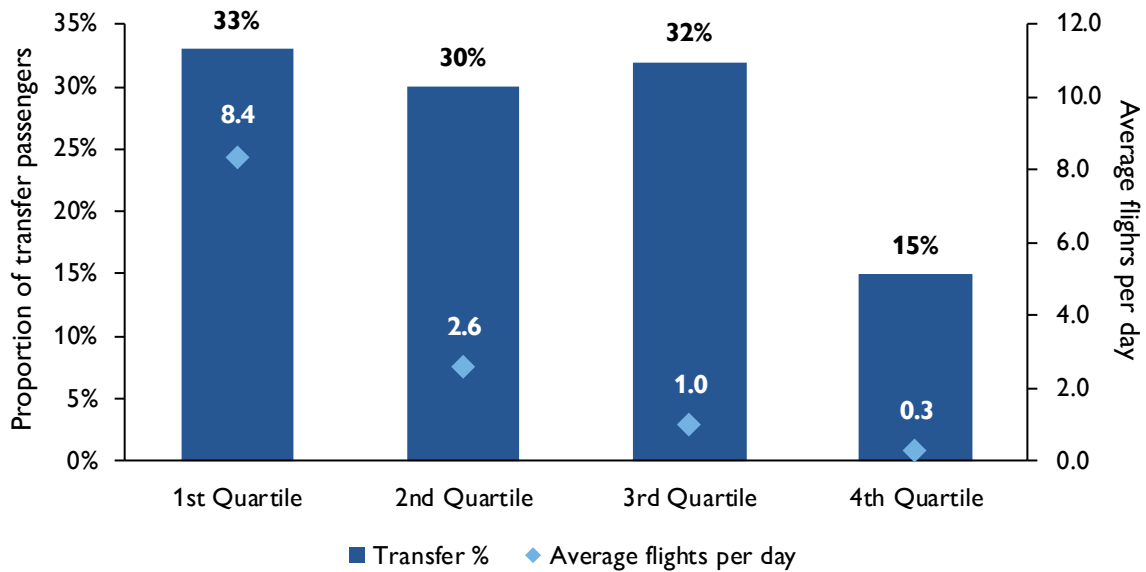
## Connectivity from a UK perspective

Although we consider connectivity from the perspective of overall efficiency, it is also worth separately considering efficiency and welfare from the perspective of the UK only. As the chart below shows, the thinnest routes (with the fewest average flights a day) are the ones that have fewest transfer passengers and the most local origin/destination passengers. This indicates that from the perspective of the UK only, a higher proportion of the benefits of thin routes accrue to the UK, compared with thicker routes where a higher proportion of the benefit accrues to transfer passengers. This finding holds even when taking into account the average loading or average number of passengers on thinner routes versus thicker routes.

The finding above that thin routes are not squeezed out by increased slot constraints is reassuring, as it implies that current slot allocation system does not lead to reduced international connectivity at the expense of UK welfare.



Figure 3.3: Average proportion of transfer passengers, by route density, Heathrow Airport, 2016



Source: Replicated from HM Government (2018) Airports National Policy Statement–Annex A, Figure 6, <https://publications.parliament.uk/pa/cm201719/cmselect/cmtrans/548/54810.htm>

### 3.2.6. Incentives

As the current slot allocation process gives airlines the opportunity to obtain a potentially valuable commodity for free, it inevitably creates an incentive to manipulate the allocation process to obtain slots and to maintain rights to them. Under the current allocation system, airlines have both the incentive and the ability to manipulate the regime to obtain slots and maintain their grandfather rights over them. Although features of the system are designed to mitigate this risk, they do not fully deal with the distorted incentives. There are areas where it would be relatively straightforward for an airline to manipulate the rules in order to obtain a slot, without significant consequence. As there have been few instances of slots being allocated in a context similar manner to Heathrow where the potential gains are very large, there are however few examples of such overt game playing that can be drawn upon.

Airlines have an incentive to manipulate the slot allocation regime, both to obtain a slot in the first place and to maintain the right to a slot holding once it has been obtained. This results from the factors we described in Section 2.2.2, where we showed how airlines will have a strong incentive to obtain a slot at an expanded Heathrow, both because of the value they can gain from using the slot and because of the potential re-sale value in the secondary market. This incentive is stronger as airlines currently obtain slots for free and the right to the slot lasts indefinitely.

There are features of the current allocation regime that affect an airline’s ability to game play:

- Slot sanctions for late hand back: Given the potential for a windfall gain from obtaining a slot, there is an incentive for airlines to make multiple speculative requests for slots and after obtaining them, handing them back if they conclude they cannot run them profitably. There is also some incentive for airlines to do this as a way of preventing competitors



from obtaining slots. This makes the task of allocating slots more complicated as far more slot requests are received than the available slots. If slots are handed back before the deadline, the impact on efficiency is mitigated as they can be reallocated. However, if slots are handed back too late for them to be reallocated, this reduces slot utilisation for that season, creating inefficiency.

By having sanctions for late hand back, the current allocation system diminishes an airline's incentive to make multiple speculative bids with the intention of handing them back after the deadline.

- Independence of slot coordinator: As the slot coordinator is independent, it is able to ensure slots are allocated in a manner that is neutral between different airlines and different types of airlines. Slots are therefore allocated in a manner that does not unduly favour certain airlines, with slots allocated on the basis of maximising utilisation and the merits of individual requests.

The general consensus from discussions with airlines is that ACL's current approach is appropriately independent. This mitigates the risk of regulatory capture, where a coordinator's decision-making process is unduly influenced by airlines.

- Experience of slot coordinator in identifying speculative slot requests: ACL is an experienced coordinator with experience of slot coordination at Heathrow over several years, and from other airports in the UK and elsewhere. This leaves it relatively well placed to identify slot requests that are likely to be an attempt to manipulate the slot regime or prevent a competitor from obtaining a slot. We understand from discussions with stakeholders that in some instances, it can be straightforward to identify a speculative slot request if an airline has provided no previous indication of its intentions to operate from a particular airport. For example, if an airline has not engaged with Heathrow Airport regarding setting up an operation before putting in a slot request, then it is possible that its slot request(s) is driven by opportunistic motives.

Despite this experience, we caution that ACL does not have experience of allocating slots at the scale that is expected at an expanded Heathrow, where particular challenges are likely to arise (as described below).

- New entrant rule: In a context where slots at Heathrow are oversubscribed, the new entrant rule provides an easier method for obtaining a slot, despite the restrictions associated with new entrant slots. This is because 50% of slots are reserved for new entrant airlines but very few airlines potentially wanting to operate more flights from Heathrow would actually qualify as new entrants. This creates an opportunity for some new entrant airlines to come in and put in speculative requests for slots even if they're not able to run them very profitably, which ACL would need to grant if the new entrant slots are not oversubscribed.

Also, neither the EU Regulation nor the WSG, prevent new entrant airlines that are partially or completely controlled by incumbent airlines, from obtaining new entrant slots.



This means there is a strong incentive for incumbent airlines to use their subsidiaries to try and obtain slots, which can then be transferred to them after two seasons.

- Secondary allocation criteria: Under the current system, airlines can make slot requests that are designed to be prioritised under the secondary criteria, and then immediately use it for a different purpose. This creates the incentive to manipulate slot requests by designing them based on what the airline thinks is likely to be prioritised by the slot coordinator. For example, an airline may request a slot with a stated purpose to establishing a route to a new destination, and then after obtaining it, use it to increase frequencies on an existing route.

There are limited opportunities for ACL to scrutinise such requests, which makes them difficult to distinguish from legitimate requests. And even if ACL believes that such requests are a manipulation of the secondary criteria, ACL is required to approve any requests to change the purpose of a slot (e.g. the time or the route) unless it is not workable from an operational perspective. The only exception to this relates to certain slots allocated under the new entrant rule, where airlines are bound to fly the route stated in their request for at least two equivalent seasons.

Even with hindsight, it is difficult to determine whether an airline switching the purpose of a slot two equivalent seasons after obtaining it, is doing so in response to changing commercial realities or because the original purpose of the slot was deliberately misstated. As the relative prioritisation of the secondary criteria is uncertain, airlines with experience of ACL's decision-making process have an advantage over other airlines. This leads to an inefficient outcome as it becomes even more difficult for ACL to ascertain which of competing slot requests is likely to be most efficient, if the details around expected slot usage are not entirely accurate.

- UIOLI rule: The use-it-or-lose-it rule, which requires airlines to use a slot for 80% of the time to retain grandfather rights creates a utilisation threshold around which incentives are distorted. It encourages airlines to use a slot at least 80% of the time regardless of whether that's the most efficient usage pattern. In some instances, this means running extra flights unnecessarily, leading to greater environmental emissions.

There have also been examples of airlines manipulating the UIOLI rule to maintain rights to a slot without having to significantly increase seat capacity.<sup>65</sup> This also prevents slots from being returned to the pool where they may be allocated to an airline that is able to use them more efficiently.

In summary, there are currently opportunities for airlines to manipulate the rules. However, at present the scale and therefore the impact of the incentive to manipulate is limited by the small

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<sup>65</sup> See Times (2015) BA cancels flights to tighten grip on privileged Heathrow position, <https://www.thetimes.co.uk/article/ba-cancels-flights-to-tighten-grip-on-privileged-heathrow-position-xd6cwt98pnt>



number of slots available for allocation. The incentive to game the system will grow when substantial new capacity is available. As a result, the rules for allocation will need to be more sophisticated than is currently the case.

### 3.2.7. Schedule stability

The current allocation system leads to stable schedules, which are often valued by passengers. It also makes it easier for congested airports to optimise their operations to accommodate additional flights, potentially leading to greater available capacity and fewer delays. However, the inertia inherent in the system also has an efficiency cost, which is likely to be greater than the benefits of stability.

One of the key benefits of the current slot allocation regime, is its ability to produce stable schedules from season to season. By prioritising historic grandfather rights, and then changes to historic grandfather rights, the system encourages optimisation of schedules rather than radical change. One often overlooked benefit of this is it makes operations at airports easier, as airports have some certainty that the schedule in the following year is going to differ only marginally from the current year, whilst also facilitating investment in new routes, new aircraft and associated airport infrastructure.

The scale of Heathrow's planned phase-in of new capacity gives a broad indication of the volume of slot changes the airport might feel comfortable accommodating in any one season, at between 5–10% of slots. In the longer term, as runway capacity becomes scarcer at Heathrow once again, it is possible that this percentage reduces with large schedule changes making it difficult for the airport to optimise the use of scarce runway capacity. Stable schedules, therefore, may have an efficiency benefit by allowing for more intensive use of scarce runway capacity.

However, the inertia that delivers stable schedules also has an efficiency cost, which is described in previous sections. Heavily constrained airports are somewhat inaccessible to new entrant airlines or growing airlines, and the airports do not readily accommodate new business models. The small degree of churn currently experienced at Heathrow, as shown in Figure 2.3 above compared with the rough indicator of how much slot churn Heathrow can handle (at 5–10% of slots being phased in each year), suggests the balance currently is tilted too far in favour of maintaining schedule stability.

### 3.2.8. Airline business planning, investment and financial stability

The existence of grandfather rights helps those airlines with long investment horizons make appropriate investments, into routes and into new aircraft. What is currently unknown is the appropriate balance between ensuring airlines have certainty over their slot holdings so they can make such investments, and encouraging churn in the market at Heathrow.

The experience of Frankfurt and Madrid Barajas suggests that allocating slots six months before the start of a season is likely to be too short in the context of Heathrow's expansion,





as it gives some airlines too little time to begin or to scale up their operations. Earlier certainty may be beneficial for certain airlines, particularly smaller ones.

## Grandfather rights

As airlines are granted slots indefinitely, provided they use it at least 80% of the time each season, they can take long planning horizons with the certainty that entails. The discussions we have had with airlines strongly suggests that this is considered a key benefit of the current allocation system and specifically, the grandfather rights to slots. We understand that for network carriers, it can take several years before a route becomes profitable, and therefore the certainty of a slot holding enables airlines to take risks on new routes. Airlines also believe the certainty of slot holdings allow them to invest in new aircraft that may have a lifespan of several decades, or invest in other aspects of the passenger service, such as airport lounges.

We agree that the current system can encourage airlines to take risks on new routes and to invest in new aircraft. However, we believe the incremental benefit of this is likely to diminish once the guaranteed length of a slot holding gets longer. This may differ by airline business model. For example, we are aware that many low-cost carriers may trial a route for a single season before determining whether it's likely to be profitable to continue. As such, the potential payback from holding a slot for low-cost carriers is likely to be much shorter than for other airlines.

Even for network carriers, it is not certain that slot holdings are required for 30 years to match the lifespan of an aircraft. There is a healthy market for second-hand aircraft and most airlines have sophisticated fleet management strategies that allow them to move aircraft between routes as commercial realities require. Airlines are also able to (and do) lease slots rather than purchasing them, giving them greater flexibility in fleet management.

## Timing of slot allocation

Currently, slots are allocated six months before the start of a scheduling season. Although the timing for this is considered a broadly appropriate balance between different airlines' differing planning horizons for new routes, many airlines have suggested this may be too short in the context of Heathrow's expansion. The scale of expansion at Heathrow might be too large to allow for airlines to effectively scale up over six months, given lead times for procuring aircraft and advertising new routes. There is a concern that an allocation that is too short before the start of a season may advantage larger airlines that are better able to scale up operations, at the expense of smaller airlines.

Evidence from expansion at Frankfurt and Madrid Barajas suggests there may be merit to this argument. It is possible that the large proportion of slots handed back by new entrant airlines (up to 68% at Frankfurt), indicates that many smaller airlines found it difficult to establish operations quickly. As most of the slots handed back were eventually given to Lufthansa, there may also be merit in the argument that the timing of slot allocation benefits larger, incumbent carriers when there is a large release of new slots. This creates an inefficiency as it means airlines may be unable



to compete effectively with the incumbent airlines under an allocation system where slots are allocated too late.

### 3.3. Domestic connectivity

The number and frequency of domestic connections are also likely to increase following the allocation of new runway slots. Without active intervention in the market however, it is unclear whether 14 domestic routes will be delivered and maintained over the longer term. Over time we expect these domestic connections to reduce as Heathrow becomes more capacity constrained and airlines switch their services to more profitable routes. From an overall efficiency perspective this is entirely appropriate but would not meet the Government's objective.

#### 3.3.1. Existing connectivity at Heathrow

As Heathrow has become more congested, the frequency of domestic flights served from the airport has gradually reduced, in favour of more services to international destinations, as shown in the chart below. This has arisen due to:

- domestic carriers switching the use of their slots away from routes with less demand and towards routes with greater demand;
- carriers wishing to serve new routes obtaining slots either through the secondary market or through acquiring airlines with existing slot holdings at Heathrow; and
- improved surface transport accessibility to London and a declining reliance on Heathrow for connections to other international destinations.

This is not necessarily an inefficient outcome. If passengers value a service to an international destination more than a service on a domestic route, we would expect the international route to be more profitable and for airlines to respond to this by switching their services. Considered from a UK only perspective, this may not be an efficient outcome. We consider this further below.

#### Connectivity following expansion

Following expansion, as slot constraints are loosened, we expect the number of domestic connections and the frequency of services to domestic destinations to increase. We understand from discussions with airlines that there is interest in increasing frequency to existing domestic connections and potentially establishing new routes to currently unserved domestic airports. This is likely to be supported by the allocation regime, given its consideration of having a balance of types of routes served.

Airlines will still experience an opportunity cost from serving certain domestic routes. Whilst some domestic routes will perform an important function for a hub network, the benefit of this



accrues mainly to hub airlines or domestic airlines with extensive code share agreements. Other domestic routes may be profitable in themselves but may be less profitable than other European or international connections. For such routes, airlines have less of an incentive to request slots for them. Alternatively, the allocation system might make it worthwhile to request a slot for such a route, and later switch it to a more profitable route, or sell on the slots once grandfather rights are established. It is not clear to us, from our discussions with airlines, that the Government's expectation of at least 14 domestic routes from Heathrow, will result in that many slots being used for domestic flights in the longer term.

As time passes and Heathrow becomes more slot constrained, we would expect the frequency of domestic connections again to reduce in favour of more valuable routes. From an overall efficiency perspective, this outcome is entirely appropriate as the routes airlines switch to are more profitable and more valuable than the domestic routes that are left unserved.

### Connectivity from a UK perspective

From the perspective of the UK welfare or in the context of the geographic distribution of benefits across the UK, the above outcome may not be optimal. Flights on domestic routes are likely to be almost entirely made up of passengers travelling to and from the UK, whereas on the thicker routes approximately 30% of passengers will be using Heathrow to connect to and from places outside the UK. Such passengers have little direct benefit to the UK, and as a result when considering a UK welfare perspective, it may be less efficient for airlines to transfer services away from domestic routes onto international routes.

## 3.4. Conclusions

At present slot allocation under current rules is considered to work reasonably well and is accepted by market participants. However, when greater pressure is placed on the system via the allocation of substantial additional capacity, it is not clear that the current system would achieve the Government's stated objectives.

Our review of the current slot allocation system in the context of Heathrow's expansion produces the following key findings:

- When new slots are released, it is not guaranteed that the primary allocation of slots will lead to them being obtained by the airlines that will use them most efficiently.
  - The current rules around how slots are allocated anticipate that ACL may need to make subjective value judgements related to efficiency, connectivity and competition. At present when only a few slots are available application of judgment is not a major concern, as the impact of ACL decisions on the efficiency of allocation is limited. However, release of capacity on a large scale and where demand is high will place greater pressure on these judgements and ACL would need to develop their expertise in judging economic efficiency in these circumstances.



- The new entrant rule is designed to encourage entry of new airlines into congested airports, either because their use of a slot will be more efficient than incumbents, or because their entry into the market will lead to more competition and as a consequence, lead to more efficient use of slots. However, it has had unintended consequences and in the event of expansion, will do little to enhance inter-airline competition.
- The existence of grandfather rights creates an inertia that locks-in an inefficient initial allocation and limits the entry of new airlines that can potentially use a slot more efficiently, despite the existence of the secondary market. As the efficiency of airlines changes over time, the secondary market makes some progress at encouraging churn over time to improve efficiency, but does not work perfectly as airlines can be reluctant to sell their slots in some circumstances; and uncertainties between airlines mean that often trades do not occur even when they are willing to sell.
- The current rules give incumbent airlines both the incentive and an ability to manipulate them in order to obtain and retain (or hoard) slots in a manner that is unlikely to be efficient. There is evidence of airlines engaging in such behaviour in the past, and the incentive to do so at Heathrow following the release of new capacity will be even greater,
- Without active intervention in the slot allocation regime or in the market, it is unlikely that the Government's ambitions for domestic connectivity will be met, particularly in the longer term.
- Unless Heathrow's slots are allocated at a time when demand for them is low (such as in the middle of the recession), the scale of the slot release is going to present a very complex and unprecedented challenge for the slot coordinator.



## 4. ALTERNATIVE WAYS TO ALLOCATE SLOTS

In this section, we:

- develop a range of possible options for reforming the system of slot allocation;
- refine these into a shortlist of options which are most likely to deliver against the Government's objectives; and
- combine the shortlisted options into four broad policy packages which could form the basis of alternative approaches to slot allocation.

### 4.1. Context

The airline community is generally supportive of the current approach to allocating slot capacity, because it supports a relatively stable and predictable outcome that is desirable from a commercial operations perspective. It is also widely applied at congested airports across the world. Airlines recognise that aspects of the current approach may need to change in response to the opening of the third runway but consider that such changes should remain consistent with the WSG and with the broader principles that underline the WSG. Generally, airlines also take the view that changes to the slot allocation regime should be agreed across the industry, rather than driven unilaterally by individual governments.

In the previous section however, we identified several concerns with the efficiency of the current approach, in the context of significant release of new capacity at an expanded Heathrow Airport. There may therefore be the case for going further than the flexibilities currently afforded within the WSG.

### 4.2. Outline of approach

Our approach to developing the policy packages follows three sequential steps:



We have designed the packages to enable a clearer understanding of the range of options available and the trade-offs involved in picking one package over the other. We are limited to four



packages, but we note that each package can be tweaked to strengthen or weaken its effects and the options we have shortlisted can be grouped differently to come up with alternate packages.

Although each package is designed to deal with the issues identified, none of them do this perfectly. Choosing one option over the other will depend on making judgements about the relative importance of different criteria. The following sections summarise our assessment of the longlist of options, describe the omitted options and set out our proposed policy package designs.

### 4.3. Identification of a longlist of options

Following a review of the public literature on the slot allocation regime and having engaged with DfT to discuss whether there are options that it has committed to exploring, we have identified a longlist of potential options for reform. These are shown in Table 4.1 below. Each option can be considered a lever that changes elements of the current slot allocation regime in order to tackle one or more of the issues we identified in Section 3.

Based on the steer we have been given by DfT, we do not include any measures that would negatively impact the rights of existing slot holders implied through existing legislation. Therefore, for any slots that are already allocated, any changes to the use-it-or-lose-it rule or grandfather rights regime, is out of scope for this study.

Table 4.1: Longlist of potential reforms to the current UK slot allocation regime

Issue	Potential reforms		
Short-term efficiency: Ensuring primary allocation is the most efficient possible	Remove or suspend priority for retiming applications	Reform or suspend the new entrant rule	Conduct slot allocation through a lottery
	Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria	Require airlines to provide more information when requesting slots	Extend the minimum series length beyond five weeks
	Give ACL flexibility to re-time historic slots	Auction new capacity	Allocate slots as bundles
	Allocate slots with posted slot prices		
Longer-term efficiency: Ensuring secondary slot mobility maintains / improves efficiency	Reform system of grandfather rights for new slots	Auction new slot capacity periodically	Restricting anti-competitive covenants
	Greater airline flexibility to sell or lease slots	Competition authority role in slot transfers	Introduce greater transparency in secondary slot trading



	Create a formal marketplace for secondary trades		
Aligned incentives: Reducing the incentive to make speculative slot requests	Reform the use-it-or-lose-it rules	Removing priority for re-routed applications	Introduce slot deposits or slot fees
	Extend limitations on trading or using slots obtained through primary allocations  Give ACL the ability to explicitly reject suspected speculative requests	Sanctions for late or repeated hand-backs	Reform the new entrant rule to remove ability to game the rule
Other Government objectives: Meeting the Government's domestic connectivity and environmental objectives	Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria	Ringfencing slots for domestic connections	Allocate slots with environmental restriction (green slots) or include environmental considerations as part of the secondary criteria
Managing complexity: Managing the increased complexity associated with allocating a large volume of slots at a congested airport	Allocate slots earlier	Conduct a two-stage allocation process	

We provide a more detailed description of each of the potential reforms identified above in Annex A, alongside an outline of the considerations relevant to how each option would be implemented.

#### 4.4. Refining the options into a shortlist

Not all of the options identified above would effectively tackle any of the concerns with the current allocation regime, and those which do not are discounted. We shortlist only those options which we are confident could have a meaningful, positive impact on the efficiency of slot allocation, on the level of domestic connectivity from Heathrow, or on the slot allocation process itself.



Following our shortlisting process, we removed the following options:

- Conducting slot allocation through a lottery
- Extending the minimum series length beyond five weeks
- Allocating slots as bundles, i.e. allocating a pre-defined group of slots together
- Allocating slots with posted slot prices, i.e. selling slots at pre-set prices
- Restricting anti-competitive covenants
- Creating a formal marketplace for secondary trades
- Introducing slot deposits or slot fees to discourage late hand backs of slots
- Giving ACL the ability to explicitly reject suspected speculative requests
- Allocating slots with environmental restriction (green slots) or include environmental considerations as part of the secondary criteria

Further detail on why these options were not shortlisted are provided in Annex A.

## 4.5. Design of potential policy packages for slot reform

Next we packaged together the options we consider worthy of further detailed consideration. The policy packages each address most (if not all) of the shortcomings in the current allocation regime, but each does so in a different way. We adopted the following methodology to design useful policy packages that achieve this, while respecting the constraints that DfT's required as described at section 4.1.

Each of our packages is:

- Internally consistent when considering the impact of the package as a whole. We consider the interactions between options within each package, to ensure that they complement one another. We also consider whether some options might introduce perverse incentives which require offsetting measures to mitigate this risk. For example, where we ringfence slots for domestic connections, we also introduce restrictions on how such slots can be changed or traded.
- Tackles each of the issues identified in Section 3. All our policy packages include levers designed to tackle the issues we have identified with the current system. Implicitly therefore, each of the policy packages are designed to ensure the Government meets its objectives as outlined in Section 2.
- Substantially different from the others. We have tried to ensure our packages are substantially different from one another to allow for a clearer understanding of the range of options available.

Our four packages are outlined below with the contents of each package are shown in Table 4.2. We then go on to describe each option in detail. The first two packages seek to make the current administrative system more efficient specifically in the context of Heathrow's expansion, while the second two packages rely on market mechanisms to allocate slots efficiently. The options also present different methods for achieving the Government's ambitions for domestic connectivity.





- Package 1: Evolutionary administrative changes. This package includes a number of relatively small changes that are primarily designed to improve the efficiency of the primary allocation. They do so primarily by reducing the incentive and ability to game the slot allocation system, and to improve ACL's ability to make trade-offs between competing slot requests. We also include measures that may at the margin improve the liquidity of the secondary market, and therefore improve longer term churn, but the changes largely codify existing practice rather than change the trading environment substantially.
- Package 2: Substantive changes to the administrative system. This package introduces more fundamental changes to the slot allocation system to improve both the efficiency of primary allocation and the longer-term efficiency of the distribution of slots. In some instances, the options we present take a different approach to tackling inefficiencies than the options proposed in Package 1.
- Package 3: Combinatorial auction. This option includes an auction proposal with a design that recognises that separate runway, terminal and stand constraints exist, and that different slots act as complements and substitutes for one another. The auction is conducted in one simultaneous round with bidders permitted to make numerous alternative and contingent bids. It introduces a number of simplifications as a way of ensuring the auction remains practicable for airlines.
- Package 4: Clock auction with post-auction coordination. This package proposes an alternative auction design that could be used to allocate slots. The auction takes place in a series of rounds, but with all slots simultaneously auctioned. Bidders able to make package bids that they adjust with each round to the emerging price indication. The proposal only auctions runway access with a separate coordination exercise used to allocate access to terminal, stand and other airport infrastructure. As with Package 3, it contains some simplifications to avoid creating undue complexity for airlines.



Table 4.2: High level design of the four potential policy packages

	Package 1: Evolutionary administrative changes	Package 2: Substantive changes to administrative system	Package 3: Combinatorial auction	Package 4: Clock auction with post-auction coordination
Managing complexity	Give ACL more time to produce an allocation, and publish it a year before the current timetable	Give ACL more time to produce an allocation, and publish it a year before the current timetable	Reduce number of distinctive slots on offer, by auctioning 20 min daily slots rather than five min weekly slots.	Conduct auction through a two-stage process: an auction phase (approx. 24 months before start of season) with a post-auction coordination exercise (approx. 18 months before start of season)
Short-term efficiency	<p>Expand the threshold for defining new entrants and prevent an airline from obtaining new entrant status if it is part of a larger airline group</p> <p>Remove the priority given to re-time requests</p> <p>Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria</p>	<p>Suspend the new entrant rule for the duration of expansion</p> <p>Give ACL the flexibility to re-time historic slots by up to 15 minutes</p> <p>Give ACL guidance on how to make trade-offs under the secondary criteria. Require airlines to provide more information in slot requests.</p>	<p>Auction indefinite slot leases using a combinatorial auction, with pre-declared capacity constraints for runway, terminal and stand infrastructure</p> <p>Cap the proportion of slots an airline group can hold to 60% of the total</p>	<p>Auction 15-year runway slot leases (i.e. for a time-limited period) using an ascending clock auction format</p> <p>Create a post-auction coordination exercise, followed by an opportunity to exchange, trade or lease slots</p> <p>Cap the proportion of slots an airline group can hold to 60% of the total</p>
Longer-term efficiency	Allow greater flexibility in buying and selling slots, but reduce the flexibility to lease slots over a longer period	<p>Allow full flexibility in buying, selling and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades</p> <p>Restrict grandfather rights to 15 years for newly allocated slots</p>	<p>Allow full flexibility in buying, selling and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades</p> <p>Remove UIOLI rules for auctioned slots</p>	Allow full flexibility in buying, selling and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades



	Package 1: Evolutionary administrative changes	Package 2: Substantive changes to administrative system	Package 3: Combinatorial auction	Package 4: Clock auction with post-auction coordination
				Restrict grandfather rights to 15 years for newly allocated slots, but without UIOLI rules
Aligned incentives	Extend limitations on trading and changing the routes of slots obtained through the pool  Remove the double allowance within the UIOLI rule for all slots	Remove the double allowance within the UIOLI rule for all slots	Remove the double allowance within the UIOLI rule for existing (non-auctioned) slots	Remove the double allowance within the UIOLI rule for existing (non-auctioned) slots
Other Government objectives	Use ACL guidance to prioritise domestic connections and add restrictions to changing domestic slots once allocated	Ringfence domestic connections to achieve minimum of 14 routes with at least three services a day	Ringfence domestic connections	Ringfence domestic connections



#### 4.5.1. Package 1: Evolutionary changes to the administrative regime

Our first package of measures proposes small changes that might be considered an evolution of the current administrative regime. It also takes as given several changes to WSG agreed as part of the recent strategic review of the guidelines, <sup>66</sup> such as the changes to the new entrant rule and the removal of priority for re-time requests.

This package includes:

Allocating slots earlier, with an initial allocation published a year earlier than is usual.

First, we include an option where ACL allocates new capacity earlier. Several airline representatives told us that they support the earlier allocation of new capacity, as this enables planning e.g. investment in new fleets and recruitment of new staff. We understand that earlier allocation has occurred in the past at Dubai Airport, which suggests that it is a workable option.<sup>67</sup> We have adapted this approach to make it more appropriate to the Heathrow expansion context.

Based on stakeholder feedback, our view is that the allocation process would need to start 30 months before the start of the season (October 2024 for the Summer 2027 season). At this point, Heathrow would be expected to provide an estimate of the available capacity. At 24 months before the start of the season (March 2025), airlines would submit their initial slot requests for the season, with ACL then having six months to put together the initial slot allocation list. This list will act as a shadow allocation 18 months before the start of operations.

Airlines would have the opportunity to engage with the coordinator during the following slot conference to discuss potential changes to their allocation. However, ACL would not consider or approve any change requests until the final allocation list was released in October 2026. Airlines unable to use the slots allocated to them in the shadow allocation would then return them to the coordinator before the start of the final allocation round.

Following the shadow allocation, there would be a final allocation round matching the existing timetable. If, there were delays in the release of new capacity, then the final allocation round would be delayed accordingly. In this round, ACL would consider both change requests and requests for any new slots that become available (because more capacity can be released than had been anticipated or some slots have returned to the pool), and publish a final slot allocation list six months before the start of the season (October 2026). The aim of the restriction on changing slots between the shadow allocation and final allocation is to ensure that ACL considers all

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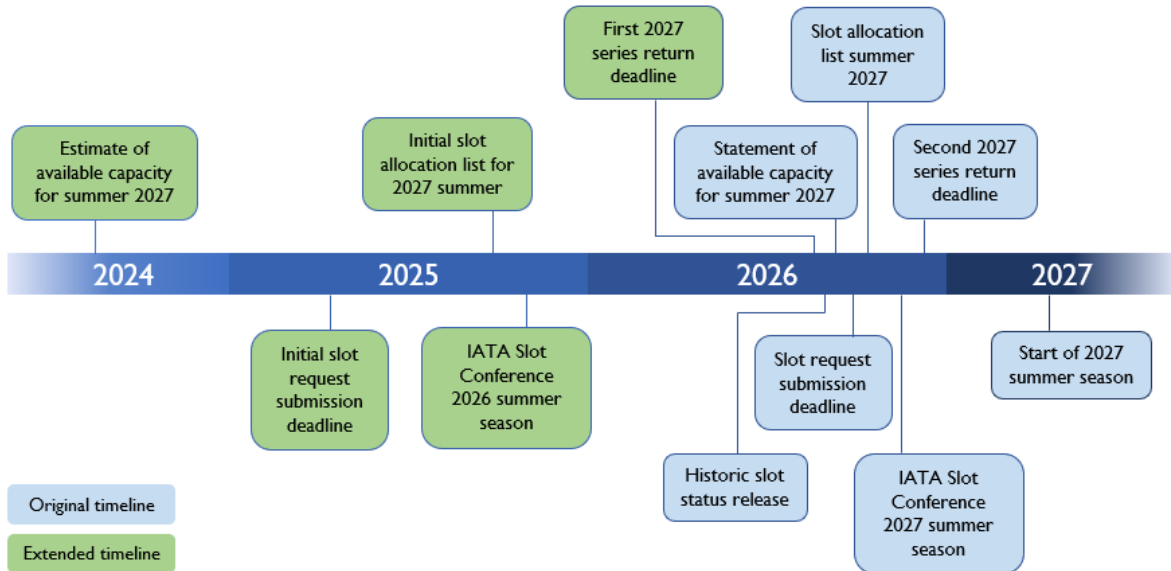
<sup>66</sup> IATA (2019) Worldwide Slot Guidelines, 10<sup>th</sup> edition, <https://www.iata.org/policy/slots/Documents/wsg-edition-10-english-version.pdf>

<sup>67</sup> IATA Response to Aviation 2050 Consultation. The earlier allocation at Dubai took place in the context of capacity being reduced rather than new capacity being introduced. As a result, the approach cannot be applied directly to the Heathrow Expansion context.



change requests holistically rather than on a first-come, first-serve basis. This should ensure that the final allocation more closely meets airline preferences.

Figure 4.1: Extended slot allocation timeline for R3 capacity



The early allocation of new capacity is an option we have included to address specific issues related to expansion. We do not believe it would be necessary to do this in a business as usual setting and would therefore propose to conduct an early allocation only when there are more than 15 daily slot pairs (or 210 weekly slots) in the pool.

We believe this would provide airlines with the right balance between certainty and the flexibility in order to adjust operations close to their start date.

Adjusting primary allocation by reforming the new entrant rule; changing the threshold for defining new entrants and preventing an airline from obtaining new entrant status if the airline group collectively would not be considered a new entrant.

Under this option, subsidiary air carriers or carriers owned by the same entity would be treated as a single airline for the purposes of establishing new entrant status. This would prevent incumbent carriers from using subsidiaries as a way of obtaining slots through the new entrant rule.

We also propose the following changes to the thresholds for defining new entrants:

- Removing the concept of an airport system, so that new entrant status is considered based on the distribution of slots at Heathrow only. We understand from ACL's consultation response that they consider the airport system rules redundant following the EU's repeal of the definition of an airport system. Therefore, we propose removing references to an airport system within legislation.
- Increasing the maximum proportion of slots an airline can hold and still be considered a new entrant to 10% of slots at Heathrow, in line with the proposed recast of the EU Slot



Regulations.<sup>68</sup> This would enable airlines that wish to operate a base at Heathrow to develop greater scale under the new entrant rule before being considered incumbents.

- Under the secondary thresholds, we propose:
  - Increasing the threshold for defining a new entrant to holding fewer than seven slots on the relevant day (as opposed to the current five slots), in line with proposed changes to the WSG. This would have a marginal but positive effect, by reducing some of the fragmentation in slot holdings that currently occurs through the application of new entrant slots.
  - Allowing airlines to obtain up to six slots (or three slot pairs) from the new entrant pool for routes that are served by two or fewer competitors (from different airline groups). With this, an airline with fewer than 10% of slots at Heathrow wishing to serve a route with fewer than two competitors could be considered a new entrant and obtain up to three slot pairs for that particular route on a given day. This would replace the current rule that relates only to intra-EU routes, which serves to prioritise competition on EU connections over non-EU routes, when there are generally fewer such concerns on these routes.

We believe these changes would provide a more effective new entrant rule. It would allow smaller airlines to scale up their operations while retaining their new entrant status for longer. A summary of changes is presented below.

Original new entrant rule	Reformed new entrant rule
<ul style="list-style-type: none"> <li>• Applies to <b>single airline</b></li> <li>• Hold <b>&lt;5%</b> of Heathrow slots on that day</li> <li>• Hold <b>&gt;2%</b> of slots in the <b>airport system</b> that day</li> <li>• Hold <b>&lt;5</b> slots at Heathrow that day</li> <li>• Hold <b>&lt;5</b> slots at Heathrow that day on a specific route</li> </ul>	<ul style="list-style-type: none"> <li>• Applies to <b>airline group</b></li> <li>• Hold <b>&lt;10%</b> of Heathrow slots on that day</li> <li>• No reference to airport system</li> <li>• Hold <b>&lt;7</b> slots at Heathrow that day</li> <li>• Hold <b>&lt;7</b> slots at Heathrow that day on a specific route</li> </ul>

Under current EU regulation, slots obtained through the new entrant rule cannot be exchanged or transferred for two equivalent seasons. We also support the provision from the 2011 recast proposal by the European Commission, that when an entrant obtains slots via its new entrant status but transfers them to another airline in order to reinvoke new entrant status it will no longer be considered a new entrant at the airport in question.

We considered whether to also change the proportion of slots reserved for new entrants from the current 50%. However, feedback from stakeholders is that the 50% is widely recognised and understood by industry. Therefore, changes to the thresholds (which are currently being changed

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<sup>68</sup> European Commission (2011) Proposal for a Regulation of the European Parliament and of the Council on common rules for the allocation of slots at European Union airports (Recast), <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011PC0827&from=EN>



within the WSG and are different within and outside of the EU) would be a more appropriate lever.

Adjusting primary allocation, by removing the priority given to retiming applications, in line with agreed changes to the WSG

We also suggest that requests by airlines to re-time their historic slots be treated equally alongside new slot requests. We expect ACL would consider each request on its own merits (using the secondary criteria), rather than attempting to meet re-time requests and new requests on a 50/50 basis.

This would mean that where multiple airlines were requesting the same time, with some airlines wishing to retime an existing slot and other airlines wishing to request a new slot, ACL would consider which of the competing requests would make the most efficient use of the slot. Under the secondary criteria this could, for example, be based curfews or geographic constraints.

Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria

We believe any system which allocates scarce capacity within a framework of potentially competing objectives requires detailed guidance on what those objectives mean in practice, how they relate to one another, and how to make trade-offs between them. This would not be a legislative change to the secondary criteria, but rather guidance on how the criteria should be considered in the context of the Government's objectives.

DfT's engagement with ACL suggests that updated guidance would be welcomed. The guidelines applied at Frankfurt Airport might provide a useful starting basis,<sup>69</sup> however, we believe more detailed guidance is necessary in the areas set out below:

- When putting together an initial slot allocation in any one season, ACL should attempt to balance the slots given to different airlines, both within that season's allocation and across seasons. This does not mean ACL should allocate slots based on the proportion of slot requests by each airline, but rather that it should ensure that the overall allocation does not inadvertently advantage one airline over a potential competitor, or inadvertently advantage passenger flights over freight-only flights. Related to this, we do not consider it necessary to maintain the restriction on all-cargo flights, as we do not consider there to be strong evidence that all-cargo flights are a less efficient use of scarce airport capacity relative to passenger flights.
- The existing distribution of slots should not create any expectation regarding the distribution of new slots. For example, British Airways holding a majority of existing slots at Heathrow should not create an expectation that it would also receive a majority of non-new entrant slots, nor should it lead to an expectation that it would necessarily receive a lower proportion of slots from the pool.

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<sup>69</sup> Guideline for the allocation of scarce slots at coordinated German Airports, [https://fluko.org/wp-content/uploads/2018/08/Guideline\\_AOSSACGA.pdf](https://fluko.org/wp-content/uploads/2018/08/Guideline_AOSSACGA.pdf)



- ACL currently assesses the credibility of an airline's plans when considering a slot request, for example by looking at aircraft orders, engagement with Heathrow, route marketing, investment in freight facilities etc. ACL should be given the authority to request additional information from airlines, and where an airline's plans are considered to be less credible, its slot request should be given lower priority.
- ACL would be permitted to consider whether a particular request will improve Heathrow's hub function, but will generally defer to the market to determine the most appropriate balance between hub and point-to-point connections unless there is strong evidence to justify its intervention.<sup>70</sup> In any case, it should maintain strict neutrality between the ability of different airlines to provide a hub function at Heathrow. Therefore, ACL should be impartial to whether Heathrow is better served by a single hub airline, by two hub airlines, or by multiple airlines all acting as an unofficial hub (e.g. through self-connection or codeshare). This serves to avoid discriminating in favour of certain airlines.
- When considering the impact of a proposed route on competition, ACL should reflect the actual nature of competition on each route being considered, and the effect on market-wide competition. In other words, ACL should consider the following questions:
  - Do the passengers on this route have access to different airlines from Heathrow, at appropriate times and frequencies? How many existing competitors are on this route, and what are their respective market shares?
  - Do the passengers on this route have access to services by different airlines from London, at appropriate times and frequencies? How many competitors are there when assessing this route on a city-pair basis (i.e. how many other London airports provide services to the same destination)?
  - How many passengers are willing to switch to other destinations served by other airlines? How many competitors are there when assessing this route from a market segment perspective (e.g. considering all routes to holiday destinations in the Mediterranean as a single market)?
  - For routes where a large proportion of existing traffic is transfer traffic, to what extent do those passengers have access to alternate hub airports, at appropriate times and frequencies?
  - For long-haul direct routes, to what extent would passengers be willing and able to switch to an indirect service via an alternate hub (e.g. flying LHR–FRA–HKG rather than LHR–HKG)? How many competitors would there be when assessing this route on such a basis?

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<sup>70</sup> A further consideration of the evidence related to the efficiency of hubs is provided in Annex B.





- To what extent would giving this slot to an airline improve its ability to provide a more competitive network of services? In other words, does it allow the airline to provide a more effective hub operation, either through a new route, additional frequencies, ability capture more transfer traffic or improved scheduling?

All of the above are relevant competition considerations. If a route proposed by an airline substantially improves a passenger's ability to choose alternative services offered by competing operators, then such requests should be prioritised.

- ACL should also be required to explicitly take into consideration the Government's ambitions for domestic connectivity, actively prioritising requests that achieve daily connectivity to 14 domestic destinations. Where two competing requests come in for domestic slots, ACL should favour new connections if the target for 14 domestic connections has not been met.
- While ACL should look favourably on new routes or new connections, greater consideration should be given to the strength of underlying demand. ACL may, where appropriate, take into consideration evidence from Heathrow, airlines or freighters in relation to this, and may collect their own evidence. The strength of underlying demand relative to actual capacity is a better indicator of overall efficiency than whether a route is currently underserved or not.

This guidance would give ACL more detail on how the various secondary criteria ought to be considered. However, we do not give detail on how these considerations ought to be included within ACL's decision making (i.e. we do not create a hierarchy within these). We believe it makes sense for ACL to continue to have flexibility around how such decisions are made, weighing up the relative merits of requests under each of the criteria. For example, in some instances, ACL may consider the competition case for an additional flight to an existing route is stronger than the case for establishing a new route, and therefore choose the former. In other instances, it may consider the case for establishing a new route is stronger.

Making an effective assessment using this guidance would require skills and capabilities from ACL that they have not previously had to use. Consequently, ACL will need to either increase its internal capabilities by hiring additional resource or seek advice from external experts (such as from the CMA in relation to the competition assessment).

Use ACL guidance to prioritise domestic connections and add restrictions to changing domestic slots once allocated

Once a slot is allocated for a domestic connection, we propose restricting its use so that it can only be used for domestic flights, essentially creating a domestic slot. Airlines would be able to change the time, the aircraft and the terminal of a domestic slot, as well as trade it in the secondary market, as is permitted for other slots. Airlines would also be able to change the route, provided that it continues to be used for a domestic connection. Such restrictions would continue to apply even if the domestic slot is transferred to another airline. This option would



not guarantee a specific number of domestic airports would be served, but would ensure that UK airports compete with one another for airline traffic.

For domestic slots that are handed back or lost under the UIOLI rule, the Government would engage with airlines to consider whether any would be willing to use the slot for a domestic service.<sup>71</sup> If no airlines are willing to run a domestic route, the slot would be returned to the pool and allocated as usual under the condition that, if another airline wishes to start a new domestic service in future seasons, it would have access to such a slot.

Changes to secondary slot mobility by allowing greater flexibility in buying and selling slots but reducing the flexibility to lease slots over a longer period and improving the transparency of secondary trades.

Applying this option would give airlines greater flexibility to sell slots. Such changes would apply to all slots, rather than just newly allocated slots. It would likely involve a few, small interventions which could, at the margins, improve the effectiveness of the secondary trading market, including:

- Removing the requirement to exchange slots as part of a slot trade, which should reduce the transaction costs associated with buying and selling slots;
- Explicitly allowing airlines to lease slots, avoiding the need for complex contracting arrangements, but restricting leases to a maximum of five years over a 15-year period; and
- Allowing airlines to trade throughout the year rather than limiting trades to the allocation period.

The change in the last bullet would require ACL to potentially approve changes to slot use mid-season or outside a season, which we believe should be allowed (provided such a change is operationally feasible). Our engagement with airlines suggests that most would welcome changes which make it easier to trade slots on the secondary market.

Restricting long-term leases would discourage airlines from holding onto slots if they have no intended use for them. In effect, this would act as a long-term UIOLI rule to encourage airlines to use slots themselves, sell them on to another airline, or hand them back.

Finally, we propose some small changes to improve the transparency of the secondary market, as a way of encouraging greater engagement from airlines:

- Requiring airlines to report on slot exchanges to ACL and for ACL to make available such data. Airlines would be required to report on each slot exchange and confirm whether they are simple exchanges without financial consideration, exchanges with financial and/or other consideration, one-way permanent trades, leases, or lease returns. Where these are leases, airlines would also be required to report on the length of the lease.

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<sup>71</sup> The Government would need to separately consider how the services would be funded, as there may be a need for the Government to subsidise the service.



- Require ACL to make airline waiting lists available to other airlines and encourage airlines to share their willingness to purchase slots on the secondary market if they become available. This would allow airlines who are looking to sell, to potentially identify airlines willing to purchase.

#### Extend limitations on trading and re-routing slots obtained through primary allocation

We suggest that the restrictions on selling, transferring and re-routing that currently apply to new entrant allocations be extended to apply to all slots obtained through primary allocation. Additionally, the restrictions should be increased from two to four equivalent seasons. Airlines would still be able to request changes to the time, aircraft or terminal, which would be treated in accordance with the existing rules.<sup>72</sup>

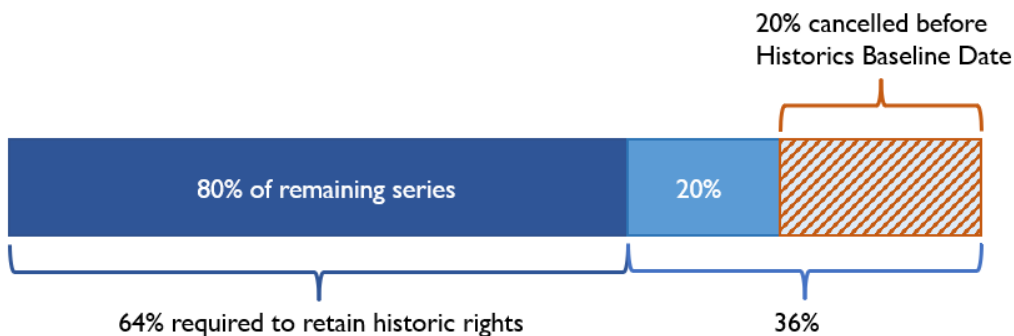
These options are designed to limit any incentive to make speculative slot requests by imposing a greater cost on airlines for doing so. Airlines would have to fly the routes more frequently and for longer, creating pressure to use them profitably or hand them back to be reallocated.

#### Removing the double allowance within the UIOLI rule

The current use-it-or-lose-it (UIOLI) rule calculates the utilisation rate of a slot from a Historic Baseline Date. Up to 20% of flights can be cancelled prior to this date without affecting the 80/20 calculation for non-utilisation. The airline can then cancel an additional 20% of flights during the season, while still retaining historic rights to the slot. This process, in effect, creates a doubled 80/20 allowance. In the Summer 2018 season, this applied to 3% of slot series at Heathrow and 5% of slot series at Gatwick.

We propose removing this double allowance as it is largely unnecessary. Utilisation would instead be calculated against the series length an airline wishes to claim as its historic series. An airline would still be able to cancel flights prior to the Historic Baseline Date, but this would count towards non-utilisation under the UIOLI rule.

Figure 4.2: UIOLI double allowance in a series



<sup>72</sup> Temporary re-routing requests may be considered in exceptional circumstances which are beyond the control of the airline community. For example, severe economic downturns, geopolitical events and security considerations.



#### 4.5.2. Package 2: More ambitious change to the administrative regime

Our second package proposes more ambitious reforms, whilst retaining the underlying administrative structures led by ACL.

In this package, we retain elements of Package 1 where we believe these are sensible changes regardless of the type of administrative system in operation. These include:

- Allocating slots earlier, in accordance with the timetable shown in Figure 4.1. The slot allocation process would begin 30 months before the start of the season (October 2024 for the Summer 2027 season) with a capacity declaration by Heathrow. Airlines would then have six months to prepare requests, with ACL given a further six months to put together the initial allocation. The initial allocation would then be announced 18 months before the start of the season (or 12 months before it is currently published).
- Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria, as described in Package 1.
- Allowing greater flexibility in buying and selling and leasing slots by explicitly allowing such a practice without requiring artificial exchanges but introducing a limitation to long-term leases.
- Removing the double allowance within the UIOLI rule, so that the utilisation rate is assessed against the slot series airlines wish to retain historic rights for, rather than against the slots held at the Historic Baseline Date.

As an alternative to solely using guidance to support domestic connections, we propose ringfencing a certain proportion of slots domestic routes.

We propose first reserving a maximum of 15% of new runway slots for domestic connections. This reservation would work in a similar manner to the current new entrant rule. Each day would be split into three periods (pre-09:00, 09:00 to 17:00 and post-17:00), with 15% of slots in each period reserved for domestic connections, so that there is adequate connectivity throughout the day. Any request by an airline to run a domestic connection would be allocated a slot within the domestic pool, provided:

- There are fewer than three rotations to that destination on that day; or
- There is only one airline serving that route.

Requests to a new destination would be given a higher priority if the number of domestic destinations served from Heathrow is less than 14. If there are not enough requests to fill the reserved slot pool, then the remaining slots would be put into the unreserved slot pool so that slot utilisation is maximised. If the domestic slot pool is not fully allocated for several years, then we expect the Government would need to consider whether further intervention is necessary to support the commercial viability of such routes or whether the target for 14 routes should be revised downwards.



Like the new entrant rule, slots allocated from the domestic pool will be subject to restrictions on how they can be used. However, a key difference will be that these restrictions will apply indefinitely, or until slots are returned to the pool. Airlines would be able to change the timings within the period in line with the allocation rules but would not be able to re-time to outside the time period (e.g. cannot re-time a pre-09:00 slot to 18:15). Another difference from Package 1 is that airlines would not be able to change the route if doing so meant that the number of destinations served within the time period would reduce to less than 14. This would ensure that the Government's target for 14 routes was maintained in the longer-term.

For domestic slots that are handed back or lost under the UIOLI rule, the Government would engage with airlines to consider whether any would be willing to use the slot for a new service to the same destination (with the Government determining whether it was willing to consider a subsidy). If no airlines were willing to run a service to that destination, the Government would then engage with airlines to consider whether they would be willing to run any domestic service using the slot. If this were also unsuccessful, the slot would be returned to the pool and allocated as usual under the condition that, if another airline wishes to start a new domestic service in future seasons, it would have access to such a slot.

In future years, as the Government gets closer to meeting its target for achieving 14 domestic connections, the reservation percentage could be reduced from the current 15% or removed entirely.

In addition to providing ACL with guidance on how to consider the trade-offs within the secondary criteria, we suggest requiring airlines to provide more information when requesting slots and formalising how such information is provided.

We propose requiring airlines to provide additional information as part of their slot requests to provide ACL with greater clarity around the intended use of the slot and the potential trade-offs to be made. Airlines would be expected to provide:

- the route the airline expects to fly;
- why the specific time is required, and whether alternatives would be acceptable;
- evidence of underlying demand on the route;
- expected growth of the route;
- how the slot request relates to other slots the airline has requested; and
- how the route fits into broader expansion plans / the airline's (or its alliance's) existing network.

We understand that some airlines already provide a commentary to accompany their slot requests that incorporates much of this information. We propose formalising this process so that all airlines would provide a commentary, and the information is used to by ACL in its allocation. Such information would be used to test the credibility of an airline's plans and in instances where the secondary slot criteria are applied (i.e. when ACL is facing competing slot requests (either re-times or new requests)). ACL would then use the additional information to assess the request in line with the secondary criteria and the guidance described above.



We propose suspending the new entrant rule completely and including new entrant status as a competition consideration within the secondary criteria.

This would mean the new entrant rule would be suspended indefinitely, and instead the guidance to ACL would be adjusted so that it considers new entrant status (on a route-level basis rather than at the airport) as part of the wider competition consideration. An alternative would be to suspend the new entrant rule for the duration of expansion (for example, up to 2035) and then reinstate. We have not proposed such an approach, as suspending the rule completely is a simpler mechanism.

Give ACL flexibility to re-time historic slots by up to 15 minutes where doing so would improve the overall allocation.

Such changes could be to align slot fragments that vary between days and across the season, or to better accommodate a new slot request. The changes would need the consent of airlines before being made, and as such, we recommend ACL engages with airlines to understand the consequences of such changes before finalising them. Alongside this, we believe it would make sense to require airlines to request time ranges for their slots rather than specific times, to make it easier for ACL to accommodate more requests.

As a way of encouraging slot mobility over the longer term, we propose time-limiting all new slots to 15 years, before they are returned to the pool to be reallocated.

In effect, grandfather rights would be limited to 15 years, with new slots functioning as a leased right rather than an indefinite right. Grandfather rights for existing slot holders would be retained under existing rules.

The length of the period is largely based on the typical time airlines hold onto aircraft before considering retiring them or trading them on the secondary market.<sup>73</sup> We see this as achieving a balance between operational certainty and slot churn. We propose limiting grandfather rights for all new R3 slots so that slots allocated through the pool are only retained for 15 years before being returned to the pool for reallocated. The UIOLI rules would continue to apply to all slots (existing and new slots), though we expect the rule will become largely redundant for new slots.

Airlines would be able to trade their slots, but the time-limit would continue to apply (e.g. an airline purchasing a slot following the second season of use would have 13 more years to use the

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<sup>73</sup> We use a variety of evidence to get to this figure. Leases for new aircraft range up to 12 years, with lease durations reducing as the aircraft gets older. Owned aircraft can be held for up to 50 years before retirement, though over 80% are held for 15 years or less before being sold on the secondary market. See:

- Aircraft Commerce (2017) Best industry practice for aircraft lease transitions, <https://www.avitas.com/wp-content/uploads/2017/04/best-industry-practice-for-aircraft-lease-transitions.pdf>
- Gavazza (2011) Leasing and Secondary Markets: Theory and Evidence from Commercial Aircraft, <https://www.jstor.org/stable/10.1086/660730>



slot). Assuming a gradual expansion of capacity, we estimate that around 5% of all Heathrow slots would be re-allocated each year going forward.

Introducing a formal role for competition authorities in reviewing slot trades, akin to the merger control regime.

Alongside the changes to secondary trading introduced in Package 1, we also propose introducing a formal role for the CMA in approving slot trades to prevent the largest, cash-rich incumbents from gradually accumulating market power unchecked through the secondary market. We believe the thresholds for this should be aligned, as far as possible, with the thresholds for merger control. The relevant threshold is:

*the [firm supplies] at least 25% of all those particular goods or services of that kind supplied in the UK or in a substantial part of it.<sup>74</sup>*

A question arises as to what the relevant market is in this context. At one end, it could mean an airport pair or a city pair (e.g. Heathrow to Newark, or London to Amsterdam), while at the other end it could mean Heathrow Airport or the London airport system. We believe it would be most appropriate to define the market as Heathrow Airport, which would mean that any slot trade that results in one airline holding 25% of slots at Heathrow or more would be reviewed by the CMA. We believe defining the market on an airport pair basis or a city pair basis would be impractical for two main reasons:

- Most long-haul city pairs (and many short-haul city pairs) have at most only two competitors, potentially bringing into scope large volumes of slot trades, and creating an impractical workload for the CMA; and
- Airlines may not know how they intend to use a slot on purchase, meaning that it may not be clear in some instances whether a slot trade would fall within the criteria for CMA review.

Another question arises as to whether the threshold should refer to airlines or airline groups. Our proposal is for it to refer to individual airlines rather than airline groups, to align it more closely with the relevant merger roles. However, we believe there are also arguments for defining the threshold at an airline group level.

#### 4.5.3. Package 3: Combinatorial auction

In this package we propose an auction format which allows airlines to express preferences (via a bid price) for combinations of packages of slots which complement and/or substitute one another. This means that airlines can obtain slot packages which together deliver an operationally

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<sup>74</sup> CMA (2014) Mergers: Guidance on the CMA's jurisdiction and procedure, [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/384055/CMA2\\_Mergers\\_Guidance.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/384055/CMA2_Mergers_Guidance.pdf)



viable flight schedule. The auction design also includes incentives for airlines to bid their true values for slots, rather than to shade their bids, as would be the case in a simple single sealed bid mechanism. Obtaining true values in the auction increases the likelihood that an efficient allocation of slots will be achieved, compared to alternative auction formats or to non-auction allocation methods.

An auction of the complexity that would be required for Heathrow is challenging and has not been undertaken previously. The design we propose draws upon advanced work undertaken to develop a practical auction for airports in New York. It has been developed further here to reflect operational constraints at Heathrow, e.g. terminal capacity, not just runway capacity.

For the auction to function effectively, it would be necessary to place constraints on the number of bids that could be made. The design would make a careful balance between enough bids—allowing airlines enough flexibility to represent their preferences by making enough alternative bids—and not too many bids—which would make the auction unmanageable. We would also need to add a further constraint to ensure that Government’s aspirations for domestic connectivity can be met.

In any auction, airlines would need to develop their current processes further. Under the current arrangements airlines routinely prepare substantial amounts of information in order to bid administratively; a key change under an auction process is that airlines must also develop a commercial valuation of each slot package that they might seek to acquire, to express their preferences bearing in the mind the possibility that they might be outbid for some of their preferred options.

### High-level description of auction

For the first auction option, we propose a single-round combinatorial format, with a second-price approach, that incorporates runway, terminal, and stand capacity limits.

Combinatorial auctions are especially useful where it is important for bidders to express both complements and substitutes.<sup>75</sup> This is the case for slot allocation because an airline’s demand for a slot typically depends on other slots. For instance, a landing slot and a take-off slot with a relatively short time interval between each other could be complements for an airline, (i.e. the airline would not want to purchase one without the other). On the other hand, a landing slot in the time interval 9:00–9:20 and a landing slot in the time interval 9:20–9:40 could be substitutes for an airline (i.e. the airline could operate either slot and would want to purchase one slot or the other, but not both).

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<sup>75</sup> Auctions with package bidding were first proposed for slot allocation by Rassenti et al. (1982). In 2008, the Federal Aviation Administration (FAA) and the US Department of Transportation (DoT) made preparations to auction take-off and landing slots at the three main airports in the New York area using combinatorial auctions (Ball et al., 2007). It was the belief of FAA, DoT, and Power Auctions that this auction format was appropriate for slot allocation. We also believe that a combinatorial auction could be an appropriate option for slot allocation at Heathrow Airport.





In the combinatorial auction, an airline would place bids on packages of slots rather than on individual slots. The airline will either win all the slots in a package or nothing. Package bidding allows bidders to express both complements and substitutes, with airlines able to design their packages as they wish. For example, an airline may have a package that bids for three slot pairs, allowing them to operate a service with three rotations a day. Packages can be additive, if airlines would prefer to win both packages they bid for, or mutually exclusive, if two different packages are substitutes for one another.

As airlines either win all the slots within a package or none, determining the combination of packages associated with the highest combined value is not a straightforward exercise. This is known as the winner determination problem.

A second-price auction for a single item is a format where the highest bidder wins the item but pays the amount bid by the second highest bidder. This approach incentivises each bidder to bid its true valuation for the item, because the payment made by the winner does not depend on its own bid amount. A second-price approach cannot be directly applied to a combinatorial auction because the auction format does not reveal the second highest bidder for a particular slot or package of slots. However, we propose a method that generalises the second-price approach to a combinatorial auction. This is described in detail in the next sub-section.

The combinatorial auction approach and second price mechanism are together intended to ensure that slots are allocated to the airlines that value them the most, yielding an efficient or approximately efficient outcome.

Once airlines have submitted their bids, a computerised auction algorithm selects the feasible allocation of slots that maximises the sum of bid values across all allocated bids. This design follows a format developed (but ultimately not used) for auctioning slots at the three main airports in the New York area.<sup>76</sup> Our proposed design has been adapted to better match the circumstances of Heathrow Airport and its expansion (e.g. to incorporate terminal and stand constraints).

Combinatorial auctions can face computational issues related to solving the winner determination problem. In settings with a very large number of items and bids, it may be impossible to solve all instances quickly with a computer algorithm. To mitigate this, we propose that limits are set within the auction design to reflect the practicalities of allocation e.g. auctioning slots at 20-minute intervals rather than 5-minute intervals and capping the number of bids per bidder. In setting these limits we are seeking to achieve an appropriate balance between allowing airlines to express their detailed preferences, while maintaining the ability to solve the winner determination problem.

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<sup>76</sup> We provide a description of the New York auction case study in Annex C, including an explanation of why authorities ultimately decided not to proceed with the auction.



## Design considerations

**Timing:** As for other options, we propose beginning the process approximately 30 months before the start of a season with a capacity declaration. Airlines would then have six months to prepare their bids, with the auction then run approximately 24 months before the start of the season. This would allow sufficient time for airlines to obtain matching slots in other airports and for any necessary secondary trading to be conducted.

**Capacity declaration:** As currently, the airport's capacity declaration will define runway scheduling limits, additional runway scheduling constraints, terminal scheduling limits, and stand limits. The auction design will incorporate these limits as constraints within the winner determination problem. As a result, the selected allocation of slots, terminals, and stands to bidders will satisfy the limits and constraints of the capacity declaration.

The one key difference between the current capacity declaration and future declarations, is that the scheduling constraints for terminal capacity would need to be a hard limit rather than follow current practise of having a lower coordination limit and an upper theoretical limit. We also expect that some of these limits would need to be simplified into having constraints at different hourly or 20-minute intervals, rather than having rolling constraints.

Other limits (such as baggage and check-in limits) are not incorporated in the winner determination problem because they appear in most instances to be secondary as compared to runway, terminal and stand limits. Although it is possible to incorporate more sophisticated capacity constraints, doing so makes solving the winner determination problem more complex. focusing attention on the most important limits will simplify the auction.

**Slot definition:** Under this proposal, the definition of a slot would be different from the current definition. A slot would be defined along the lines of an operational authority to conduct a single scheduled operation in a specific 20-minute interval, seven days a week at Heathrow, using the associated airport services (terminals, parking stands, runways, etc.). The duration of the assignment of each auctioned slot would be indefinite.<sup>77</sup>

Note that a slot is assumed to be for all seven days of the week. There is a trade-off between allowing airlines greater flexibility in their bidding, and ensuring the auction remains simple enough to allow the winner determination problem to be solved. For this auction design, we have taken the view that if most bidders are interested in having the same time slot on each day, requiring them to bid separately for each of the seven days would make the auction unnecessarily complex. Preferences for a single day can then be addressed with post-auction trading (e.g. through leasing).

**Ringfencing domestic connections:** A key objective of the auction design is to ensure the strengthening and development of existing and new domestic routes respectively. In order to

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<sup>77</sup> In this package, we propose indefinite slots to compare the outcome with Package 4 where 15-year slot leases are auctioned.



achieve this the design must reserve slots for domestic connectivity. As with Package 2, we propose ringfencing 15% of additional slots for domestic flights over three time periods (pre-09:00, 09:00–17:00 and post-17:00).

**Reserve prices:** The reserve price of an item in an auction is the minimum price at which the auctioneer will sell that item. The reserve prices for the items in a public auction are typically announced before the auction and are often proposed in a consultation document, on which interested parties may provide comments as to the appropriateness of the proposed reserve price amounts.

It is not necessary to have a reserve price, or a reserve price could be set at a very low level (e.g. the minimum required to cover the cost of running the auction). The purpose of setting a reserve price would be to reflect the auctioneer’s opportunity cost for the items being auctioned. For instance, if in one year, all bids for an item are below the reserve price, the auctioneer may prefer to offer the item in the next auction (e.g. in the following year) rather than to sell it now at a very low price. This may happen if there is a recession one year, where it may be better to reauction those slots the following year rather than giving slots to whichever airline is the highest bidder in that one season.

A reserve price can be associated with each (20-minute interval, domestic/unrestricted, aircraft size range<sup>78</sup>) combination. We propose setting significantly lower (or marginal) reserve prices for domestic slots than for the corresponding unrestricted slots in order to maximise the probability that the 15% target for domestic slots could be achieved. In a setting where terminal limits are expected to be binding, higher reserve prices may be set for larger aircraft sizes to reflect the fact that a larger aircraft requires greater terminal capacity. Reserve prices might also vary based on other characteristics, e.g., peak slots can have higher reserve prices than non-peak slots.

**Slot cap:** In order to promote competition and to avoid outcomes where an airline with a dominant position is able to foreclose other airlines, there would be a (bidder-specific) cap on the number of slots that a bidder could acquire in the auction. Specifically, an airline’s cap for a given auction could be set so that the airline’s total number of slots—existing slots plus slots newly acquired in the auction—does not exceed a certain threshold (e.g. 60% of all slots at Heathrow). Thus, an airline that already holds a very large number of slots would be limited in the number of new slots that it can acquire in the auction.

**Slot attributes:** Because, in addition to runway limits, there are terminal limits and stand limits that may also be binding, bidders would specify the following attributes for each slot that it bids on:

1. A 20-minute time interval (e.g., 7:40–8:00)
2. A terminal (optional)
3. The aircraft type

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<sup>78</sup> For the purpose of setting reserve prices, a small number of aircraft size ranges can be considered (e.g. three).



4. Whether the slot will be for an arrival or departure
5. The origin/destination of the flight

If a bidder were to require a specific terminal (e.g. because it has existing operations there), the bidder can specify that in its bid; a bidder that is indifferent does not need to specify a terminal in its bid.

Aside from the terminal, all other attributes are mandatory. They are used to formulate the terminal and stand limit constraints in the winner determination problem. Furthermore, the origin/destination attribute is used to determine if the flight is domestic and whether it will consume greater airport resources associated with long-haul flights.

Bid format: A bid would consist of a package of slots and an associated bid amount. An example is provided in the box below:

A bidder might submit a bid amount of £30,000 for a package with the following slots:

- 6:40–7:00, arrival flight from New York for a given aircraft type
- 9:20–9:40, departure flight to New York for a given aircraft type

Such a bid indicates that the bidder is willing to pay up to £30,000 for that package of slots.

The actual payment that the bidder would have to make if it won that package could be less than £30,000, because of the second-price format. However, the payment would necessarily be at least the sum of the reserve prices of the slots in the package.

Bids for a time interval would not need to be mutually exclusive; more than one of a bidder's bids could become winning bids. However, a bidder would have the option to indicate that it wants some or all of its bids to be treated as mutually exclusive in the winner determination. For example:

Suppose that a bidder submits four bids (Bid 1, Bid 2, Bid 3, and Bid 4) and the bidder considers the packages in Bids 1, 2, and 3 to be substitutes, and therefore wants to win at most one of those packages. The bidder can indicate that by labelling Bids 1, 2, and 3 as mutually exclusive. This would mean that the bidder cannot win both Bid 1 and Bid 2 but could win both Bid 1 and Bid 4.

Within this design, there would be a maximum number of bids that a bidder is permitted to submit, to ensure that the results of the auction can be computed (more bidders and more bids from each bidder increases the volume of processing power needed to compute the results of the auction). The maximum number would be set high enough to allow bidders to submit sufficient bids to express its preferences. The exact value would be determined based on the expected number of bidders and the expected number of slots in the auction.<sup>79</sup>

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<sup>79</sup> For the New York auctions, each bidder was allowed to submit up to 2,000 bids. In certain combinatorial auctions for spectrum licenses, the maximum has been set at 500 bids.



Winner determination: A reserve bid for every (20-minute interval, domestic/unrestricted, aircraft size range) slot, at the reserve price, would be included in the determination of winning bidders. In this process, it is as though the auctioneer is a bidder in the auction, placing a bid on every slot at the reserve price for that slot. This is to ensure that the incremental value that a bidder would be prepared to pay for an additional slot is at least the reserve price of that slot. The reserve bids would not be treated as a package, but rather as having been placed by different bidders so that any number of reserve bids can be selected in the winning combination.

To determine the winning bids, a computer program maximises the sum of bid amounts across all selected bids (including reserve bids) subject to the following constraints:

1. The runway scheduling limits are satisfied;
2. The additional runway scheduling constraints are satisfied for each 20-minute interval;
3. The terminal limits are satisfied for each terminal;
4. The stand limits are satisfied;
5. For every bidder, the number of slots allocated to the bidder does not exceed its cap for the auction;
6. Each bidder is allocated at most one bid for every set of bids that the bidder labelled as mutually exclusive; and
7. The total number of non-domestic slots allocated to bidders Pre-09:00 (respectively, 09:00–17:00, or Post-17:00) does not exceed 85% of the total number of Pre-09:00 (respectively, 09:00–17:00, or Post-17:00) slots in the auction.

For constraint (4), the starting assumption would be that the aircraft uses a stand for the entire period between landing and take-off. If a bidder's package bid does not include both an arrival and a departure flight for the same aircraft, the bidder would need to specify in its bid the amount of time for which it requires a stand.

For constraint (5), an airline's cap for the auction would be set based on the number of slots that the airline already holds at Heathrow.

Constraint (7) ensures that 15% of slots in the auction are reserved for domestic use in each of three periods (Pre-09:00, 09:00-17:00, and Post-17:00). Note that, with the constraints described above, it is possible for the number of domestic slots allocated to bidders to exceed 15% of the total number of slots in the auction in one or more of these time periods, it is also possible that slots reserved for domestic connectivity will not achieve the reserve price.

Price determination: The second-price rule (see box below) would be used to calculate prices such that the price for a winning airline will be at least the sum of the reserve prices, but no higher than the airline's bid amount across its winning bids. The second-price approach described here builds on what was intended for the New York slot auctions but has been extended to a situation where bids are not required to be mutually exclusive and where a slot is defined by multiple attributes (not just the time interval).

#### Box 1: Second-price auctions and the Vickrey-Clarke-Groves (VCG) mechanism

A second-price auction is a format for auctioning a single item, where the highest bidder wins the item and pays the amount bid by the second highest bidder. As such, the winner pays the



opportunity cost of obtaining the item. This mechanism provides incentives for truthful bidding and encourages an efficient allocation.

The Vickrey-Clarke-Groves (VCG) mechanism generalises this idea to a setting with multiple items. The VCG price of a given winning bidder represents the opportunity cost associated with the given bidder, and it is calculated as follows. First, calculate the maximised sum of bids when all bidders are included (value A). Second, calculate the maximised sum of bids when the bids of the given bidder are excluded from the calculation, as if this bidder had not participated in the auction (value B). The difference ( $A - B$ ) represents the incremental surplus that the given bidder brings to the auction. The VCG price for the given bidder is defined to be its opportunity cost, i.e. the payment that would award the full incremental surplus ( $A - B$ ) to the given bidder.

In some instances, if prices are set equal to VCG prices, there may exist an alternative bidder or group of bidders prepared to pay more than some winning bidder or group of winning bidders. In that case, we say that VCG prices are not in the core. An outcome that is not in the core may be considered to be unfair or uncompetitive, because one or more of the bidders could have improved their payoffs compared to the auction outcome.<sup>80</sup>

In the case that VCG prices are not in the core, prices are incremented beyond the VCG prices to the extent necessary to ensure that prices are in the core. The set of prices must satisfy the following conditions:

1. The price for a winning bidder must be greater than or equal to the reserve prices for the slots it won, but not more than the amount it has bid;
2. The prices for all winning bidders must be sufficiently high so that there is no alternative bidder, or group of bidders, prepared to pay more than any winning bidder or group of winning bidders. If there is only one set of prices that satisfy the first two conditions, this determines the prices;
3. If there are many sets of prices that satisfy the first two conditions, the set(s) of prices minimising the sum of prices across winning bidders is (are) selected. If there is only one set of prices satisfying these three conditions, this set determines the prices; and
4. If there is more than one set of prices that satisfy the first three conditions, the set of prices that minimise the weighted sum of squares of differences between the prices and the VCG prices will be selected. The weighting is relative to the sum of reserve prices across all slots won by a bidder.

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<sup>80</sup> This issue can arise whenever a bidder values two or more slots as complements. For example, suppose that there are two slots, A and B. Bidder 1 values slot A at 200 and bidder 2 values slot B at 200. However, bidder 3 values these two slots as pure complements, valuing the package {A, B} at 300. Then slot A is allocated to bidder 1 and slot B is allocated to bidder 2, but the VCG prices for each of the slots is only 100. In that event, it would be unfair or uncompetitive to allocate the two slots at a total price of 200, when bidder 3 is willing to pay 300 for them. Technically, the outcome lies outside the core, requiring an adjustment. See, e.g., Ausubel and Milgrom (2006) The Lovely but Lonely Vickrey Auction, *Combinatorial Auctions*, 17–40, <https://doi.org/10.7551/mitpress/9780262033428.003.0002>



These conditions characterise a unique set of prices such that each winning bidder pays at least its VCG price and no more than its bid amount across its winning packages. Furthermore, if VCG prices are in the core, then the prices are equal to the VCG prices.

**Bidding deposits:** For an auction to minimise gaming opportunities and to work as intended, it is essential that bids represent binding commitments. To this end, a bidder would be required to submit a cash deposit in order to participate in the auction. The amount of the deposit would depend on the set of slots that the bidder wishes to bid on in the auction. For instance, the required bidding deposit for a set of slots can be set to be a certain percentage (e.g. 25%) of the slots' combined reserve prices. The bidder's pre-auction deposit is applied toward the bidder's winning price and, if the bidder does not win any slots in the auction, the deposit is refunded to the bidder after the auction.<sup>81</sup> The deposit is subject to forfeiture in the event that the bidder defaults on its payment or fails to sign the slot lease agreement.

**Prohibited communications:** To help ensure the competitiveness of the auction process, bidders would be prohibited from communicating with each other directly or indirectly about bids or bidding strategies. Members of the same airline group or alliance would have the option of participating jointly in the auction as a single bidder, in which case they would be allowed to communicate between different members of the same bid. Such prohibited communications rules are standard in auctions, including spectrum auctions. Applicants in any auction would also be prohibited from communicating with each other directly or indirectly about defaulting on their winning bids, and from inducing or attempting to induce other applicants in any auction to default on their winning bids.

**Post-auction procedures:** Once the winnings bids and the corresponding prices have been determined, each winning bidder would have to sign its lease agreement and pay its price within a specified number of days (e.g., 30 calendar days). If a winning bidder does not sign the agreement or make the payment within the specified number of days, the bidder is considered to be in default, the slot deposit would be lost and the slot re-auctioned at a later date. This approach reveals which bidders are in default soon after the auction, not after years of delay.

## Other changes

**Secondary slot mobility:** After the auction, a winning bidder would be allowed to transfer or sublease all or part of a slot in the secondary market. This could take place any time between the auction and the start of the season.

However, the restriction that a domestic slot can only be used for a domestic flight will carry with the slot and will continue to apply even if that slot is transferred or subleased. Similarly, the transferred or subleased slot will be for the same terminal and the same (or smaller) plane originally specified.

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<sup>81</sup> In addition, the deposit should not be set so high as to discourage participation.



Competition authority review of slot trades: As with Package 2, we propose introducing a formal role for the CMA in approving slot trades than mean a single airline holds 25% or more of the total number of slots at Heathrow. This is to act as another check against the risk of an incumbent airline building a dominant position through secondary trading.

UIOLI rules: Under this option, we propose removing the use it or lose it rule as it is no longer necessary. If airlines purchase the rights to a slot at their marginal valuation, they have no incentive not to use the slot as efficiently as possible.

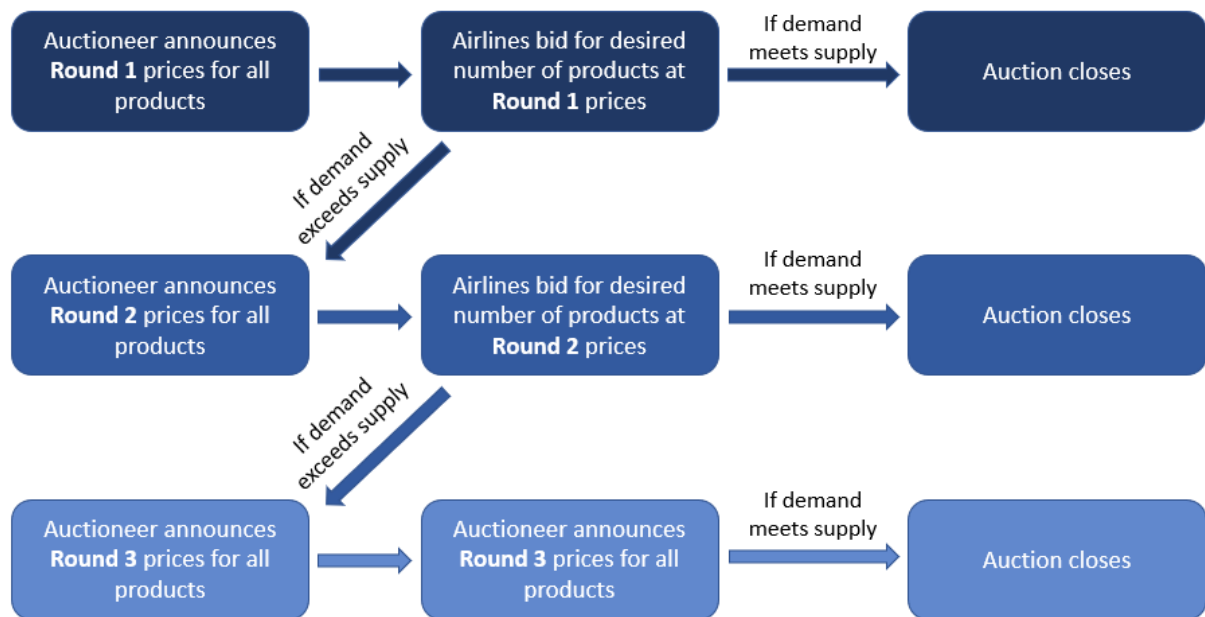
#### 4.5.4. Package 4: Clock auction

A potential shortcoming of the single-round combinatorial auction is that it consists of a single round and thus does not provide certain benefits present in multi-round auctions. Specifically, in a single-round auction, a bidder must submit its bids without obtaining any informational feedback about other bidders. We therefore propose a dynamic auction format as the second auction option.

##### High-level description of auction

For the second auction option, we propose the ascending clock auction format. This is a multiple round, or dynamic, auction with a price for each product in every round. The auctioneer announces the prices for every product, and bidders respond by indicating quantities of the products that they demand at the prices specified in that round. If there is excess demand for one or more of the products, the auctioneer conducts a new round and increases prices of the products with excess demand. Otherwise, the auction ends, and each bidder wins the quantities of products that it bid for in the final round of the auction, paying the final round's prices.

Figure 4.3: Ascending clock auction (proceeds for as many rounds as necessary)







The product is expressed as slots within a 20-minute interval (e.g. landing slots between 9:00–9:20). An important feature of the clock auction that we are proposing here is that a bidder would win exactly the set of products (slots) that it bid for in the final clock round. Thus, a bidder's bids are essentially treated as packages: a bidder will either win all of the products that it bid for in a round (if that round is the final round), otherwise the auction will proceed to a new round and all bids will be re-submitted. This feature allows a bidder to bid on its preferred package of products at the prices specified in that round without the risk of winning only a subset of the products in that package.

This is important in the context of slot allocation because an airline's demand for a slot typically depends on other slots. For instance, a landing slot and a take-off slot with a relatively short time interval between each other could be complements for an airline, that is, the airline would not want to purchase one without the other. If bidders require complementary slots, these would be jointly bid for within a round to ensure the airline does not receive a disjointed slot. On the other hand, a landing slot in the time interval 9:00–9:20 and a landing slot in the time interval 9:20–9:40 could be substitutes for an airline, that is, the airline could work with either slot and would want to purchase one slot or the other, but not both. For example, if the 9:00–9:20 product increases in price due to excess demand, the bidder may then switch its bid to the cheaper 9:20–9:40 product in the next round.

An important aspect of a dynamic auction is the information policy, i.e. what information is revealed to bidders after each round. Best practice is to provide all bidders with the aggregate demand information for all products after every round, without specifying the individual demand of any bidder. This strikes an appropriate balance between providing useful feedback to bidders without facilitating collusion.

To make the auction informative and to prevent bidders from waiting until the end of the auction to reveal their true intentions, the auction uses an activity rule. This limits bidding activity later in the auction based on the bidder's activity earlier in the auction, specifically by requiring that the number of bidding points (see below) can only decrease as prices increase. A bidder that submits a zero bid in a round (i.e. bids a quantity of 0 for all products) is not allowed to bid in future rounds.

A clock auction has several advantages as compared to a single-round auction:

- It enables price discovery, allowing bidders to incorporate information from others' bids into their own bidding strategy;
- It allows bidders keep their valuations private because they do not need to indicate their demands at prices beyond the prices of the final round;
- It is easy for bidders to switch between products if a product becomes relatively more expensive in a round; and
- All winners pay the same price per unit for each product (the final round price).



These features along with the simplicity of the auction format make bidder participation relatively straightforward.

A clock auction also has several disadvantages as compared to a single-round auction, and specifically to a single-round combinatorial auction (i.e. the first auction option).

- Because the clock auction does not include solving a winner determination problem, it cannot handle complex constraints (e.g. for terminal limits and stand limits);
- It may involve a substantial amount of gaming by bidders, who are aware that their bids relatively early in the auction are not likely to be binding and so may bid quite differently from their true demands;
- The number of bids that a bidder can submit is limited to the number of rounds, whereas in the first auction option a bidder can submit up to the maximum bid limit. This limits how well bidders can express their preferences; and
- The clock auction requires multiple rounds and therefore may take considerably longer to run than a single-round combinatorial auction, which only requires one round. However, we note that in many settings a clock auction is run in a single day or even within a few hours.

There is a trade-off between the last two of the disadvantages described above: when the number of rounds is larger, bidders can better express their preferences, but it takes longer to run the auction. The auctioneer typically specifies by what percentage to increase the clock price of a product when there is excess demand for that product. A smaller percentage results in a larger number of rounds.

## Design considerations

**Timing:** As for other options, we propose beginning the process approximately 30 months before the start of a season with a capacity declaration. Airlines would then have six months to prepare their bids, with the auction then run approximately 24 months before the start of the season. There would then be a coordination exercise 18 months before the start of the season, with a final coordination exercise run six months before the start of the season. Throughout the period from the auction being run to the start of the season, airlines would be able to exchange and trade slots (after gaining operational feasibility approval from ACL). We expect there will be a spike of trading activity at a six-month point, when SALs at other airports are published.

**Definition of slot and auction products:** Under this proposal, the definition of a slot would continue as currently defined, but these would be allocated to airlines through a two-stage process. In the first stage, rights to runway slots would be auctioned using the clock auction format, and in a second stage, access to associated airport services (terminals, parking stands, etc.) will be determined through a coordination exercise. A runway slot would, therefore, be defined along the lines of an operational authority to conduct a single scheduled operation in a specific 20-minute interval, seven days a week at Heathrow. Only following the coordination



exercise, would a runway slot be paired with a slot associated with the full range of airport services.

The winning airline will hold the auctioned runway slot for a total of 15 years before it is put back in the pool to be auctioned again.

A product in the auction will be characterised by two attributes:

1. Whether the runway slot is domestic or unrestricted; and
2. A 20-minute time interval (e.g., 7:40–8:00).

This definition strikes a balance between providing sufficient flexibility for bidders to express their preferences while keeping the number of attributes (and thus the number of products) relatively small.

It would be possible to add an attribute with the day of the week, allowing, for example, a bidder to bid for a runway slot at 7:40–8:00 on Tuesdays. However, as most bidders are interested in having the services operate at the same time each day, requiring them to bid separately for each of the seven days would make the auction unnecessarily complex. Given that daily schedules tend to be similar, we believe that the day attribute is unnecessary. Preferences for a single day slots can then be addressed with post-auction trading.

Capacity declaration and supply: This auction design requires us to determine before the start of the auction how many runway slots would be available, as its design does not consider non-runway constraints. This is a departure from the current method for allocating slots where there is a capacity declaration, but not a specific number of slots that are available. How the available capacity translates to specific slots is dependent on how the available capacity is used by airlines. This can be quite complex and often involves the interactions of several different constraints. For example, for a given amount of terminal capacity, an airport would be able to accommodate fewer larger aircraft compared with smaller aircraft. So, there would be fewer slots available if more of them were used for services with larger aircraft.

Within this auction format there would be a determination of the number of runway slots available for each 20-minute time interval. We suggest basing this on existing usage patterns in terms of different aircraft type. This means, for example, if there are typically wide-body aircraft arriving in the early morning, requiring a higher number of passengers to be processed per flight, a lower number of slots will be allocated at this time (e.g. 7:00) relative to a time interval where the aircraft are mostly narrow-body (e.g. 14:00). We also suggest conservatively estimating the number of slots available, to ensure each winner can be assigned the necessary airport services in the post-auction allocation. Any unused capacity would then be included in the auction for the following equivalent season.

Ringfencing domestic connections: In the context of slot allocation for Heathrow Airport, an objective of the auction design is to try and ensure adequate connectivity to 14 domestic airports. To achieve this objective, we propose reserving a total of 42 daily slot pairs (allowing for three daily rotations for 14 destinations), at times spread evenly throughout the day. These will be auctioned in bundles of three daily rotations, each for a different domestic connection. For the



commercially viable routes, airlines may bid a positive value but for non-commercially viable routes, airlines may bid a negative value. The domestic slots will go to the combination of airlines and routes that serve 14 commercial destinations at the highest total value of the slots.

In the clock auction format, the auctioneer needs to determine the specific slots that will be reserved for domestic flights. The supply for a given 20-minute time interval would therefore be divided into two categories: domestic and unrestricted. The auctioneer would set the available number of slots so that domestic slots make up 15% of the overall supply for each of the following periods: pre-09:00, 09:00–17:00 and post-17:00. This is a disadvantage compared to the combinatorial auction format where the auctioneer only needs to specify the overall percentage (e.g. 15%), and then the specific number of domestic slots for each time interval is determined endogenously based on the bids through a constraint in the optimisation problem.

**Slot cap:** In order to promote competition and avoid outcomes where an airline with a dominant position is able to exclude other airlines, there would be a bidder-specific cap on the number of slots that a bidder is allowed to bid for (or win) in the auction. Specifically, an airline's cap for a given auction could be set so that the airline's total number of slots – existing slots plus slots newly acquired in the auction – does not exceed a certain threshold (e.g. 60% of all slots at Heathrow). Thus, an airline that already holds a very large number of slots would be limited in the number of new slots that it can bid for in the auction.

**Reserve Prices:** The reserve price of a product in an auction is the minimum price at which the auctioneer will sell that product. Reserve prices are used to reflect the value of the auctioneer for the products being auctioned. They are typically announced before the auction, often proposed in a consultation document to which interested parties may provide comments regarding their appropriateness.

In a clock auction, the starting prices in Round 1 are set equal to reserve prices, which can vary depending upon their attributes. For example, the reserve cost of a domestic slot may be lower than a corresponding unrestricted slot, while the reserve price of a slot at peak time may be higher than non-peak times.

**Bidding Deposits:** For an auction to work as intended and minimise gaming opportunities, it is essential that bids represent binding commitments. Each bidder will be required to submit a cash deposit in order to participate in the auction. The amount of the deposit will depend on the set of slots that the bidder wishes to bid on in the auction. For instance, the deposit for a set of slots could be set to a percentage (e.g. 25%) of the slots' combined reserve prices.<sup>82</sup> The deposit is then applied toward the bidder's winning price; if the bidder does not win any slots in the auction, the deposit will be refunded. The deposit is subject to forfeiture if the bidder fails to sign the slot lease agreement (see below) or defaults on its payment.

**Activity Rule:** An activity rule is necessary to make a dynamic auction informative and prevent bidders from waiting until the end of the auction to reveal their true intentions. The rule limits

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<sup>82</sup> In addition, the deposit should not be set so high as to discourage participation.



bidding activity later in the auction based on activity earlier in the auction. This encourages bidders to submit truthful bids in each round and provides a disincentive to conceal their preferences.

Each bidder is assigned an initial number of bidding points based on its upfront deposit amount. Each slot is assigned a specified number of bidding points, related to the product's reserve price. For example, domestic slots and off-peak slots could be assigned fewer points than unrestricted peak slots.

In the first round, the total bids a bidder can place must have a sum of bidding points that is less than or equal to their initial number points. In subsequent rounds, the bidder's bidding points are limited to their number of bidding points in the previous round. That is, as prices for slots increase, the number of slots demanded by the bidder (as measured by bidding points) will only stay the same or decrease. This effectively prevents bid-sniping (i.e. waiting to place bids in the final round).

**Prohibited Communications:** To help ensure the competitiveness of the auction process, bidders will be prohibited from communicating with each other directly or indirectly about bids or bidding strategies. Members of the same airline group or alliance would have the option of participating jointly in the auction as a single bidder, in which case they would be allowed to communicate between different members of the same bid. Applicants in any auction will also be prohibited from communicating with each other directly or indirectly about defaulting on their winning bids, and from inducing or attempting to induce other applicants to default on their winning bids.

**Post-Auction Procedures:** A bidder becomes a winning bidder if it submits a non-zero bid in the final round of the auction. Each winning bidder will have to sign a lease agreement and pay the final round prices for the slots won within a specified number of days (e.g., 30 calendar days). If a winning bidder fails to do so, they are considered to be in default and the slot will be re-auctioned at a later date.

## Other changes

**Secondary slot mobility:** After the auction, a winning bidder will be allowed to transfer or sublease a slot in secondary markets. However, the restriction that domestic slots may only be operated on domestic routes will continue to apply even if that slot is transferred or subleased.

**UIOLI rules:** Under this option, we propose removing the use it or lose it rule as it is no longer necessary. If airlines purchase the rights to a slot at their marginal valuation, they have no incentive not to use the slot as efficiently as possible. This does not necessarily translate to maximum utilisation of infrastructure.

**Post-auction coordination:** As the slots that airlines win in this auction approach are constrained only by time, with no consideration of terminal capacity, a separate coordination exercise would need to be conducted to allocate winning bidders to the available terminal and stand capacity.



Such a coordination exercise would follow the slot coordination process and be timetabled as outlined in Package 1.

There would however be several key differences between slot coordination as currently practised and slot coordination under this auction option:

- Only airlines that have obtained runway slots in the auction, would be eligible to request a new slot under the coordination exercise.
- Airlines would only be able to request times within their runway slot interval, so an airline with a 9.00–9.20 slot would only be able to request a slot between these times. This would also apply to re-times in subsequent seasons, so that a re-time could only happen through exchanges or trades with other airlines. This is to prevent gaming where an airline tries to obtain a cheaper slot at an off-peak time through the auction, with the hope that they could re-time to a peak period subsequently.
- Existing slot holders would only be able to re-time within existing capacity. This is to prevent existing slot holders from using re-times to obtain the most valuable slots as a way of preventing others from gaining them, or to avoid having to pay for them in the auction.

There are two potential areas for errors to emerge from the coordination exercise. Airlines may find having obtained a runway slot, the coordination exercise fails to give them access to their preferred infrastructure. Alternatively, the coordination exercise may reveal areas of unused capacity. In our auction design, we have suggested building in redundancy to reduce the risk of the first type of error, at the expense of the second type of error.

However, it is not possible to reduce the risk of the first type of error completely without declaring inefficiently low levels of runway slot capacity. In the event an airline fails to obtain access to its preferred infrastructure, it will have the opportunity to sell those slots or sublease them to an airline until such infrastructure becomes available. We propose giving such airlines priority in the subsequent season, so that such airlines get access to the infrastructure they require before capacity is declared for the next year's auction.



## 5. ASSESSMENT OF THE PACKAGES

In this section, we assess the extent to which our alternative approaches to slot allocation meet the Government's objectives for the use of slot capacity at Heathrow. We assess the:

- practicality of each package given how airlines operate and their approach to slot allocation;
- deliverability of each package given the wider Heathrow and UK aviation policy context;
- potential efficiency costs and benefits of each package on a qualitative basis, against a baseline of the current system being used to allocate slots at an expanded Heathrow; and
- impact of each policy package in terms of meeting Government's objectives and ambitions for domestic connectivity from Heathrow.

### 5.1. Package 1: Evolutionary administrative changes

Managing complexity	Give ACL more time to produce an allocation, and publish it a year before the current timetable
Short-term efficiency	Expand the threshold for defining new entrants and prevent an airline from obtaining new entrant status if it is part of a larger airline group  Remove the priority given to re-time requests  Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria
Longer-term efficiency	Allow greater flexibility in buying and selling slots, but reduce the flexibility to lease slots over a longer period
Aligned incentives	Extend limitations on trading and changing the routes of slots obtained through the pool  Remove the double allowance within the UIOLI rule for all slots
Other Government objectives	Use ACL guidance to prioritise domestic connections and add restrictions to changing domestic slots once allocated

#### 5.1.1. Introduction

Our first package of measures contains several smaller changes that might be considered an evolution of the current administrative regime. These evolutionary changes would not be expected to dramatically change airline behaviour during the slot allocation process. Rather, they attempt to curb some of the incentives for less desirable behaviour which is occasionally



exhibited and seek to encourage greater trading activity between airlines where there are opportunities for capacity to be used more efficiently.

The evolutionary nature of the first package is deliberate, since the current slot allocation regime has historically been perceived by industry to work effectively, in the sense of achieving good usability, even as airports have become more congested. There is, therefore, a case for retaining many of the benefits of the current system, such as the relative stability of allocation from season-to-season, and the flexibility afforded to the slot coordinator to accommodate airline applications (within reason).

However, numerous stakeholders recognise that under the current system, allocation will be a considerably more difficult task in the context of Heathrow expansion, and we agree with this assessment. We have attempted to group together changes which stakeholders might generally (if not universally) support, to assess whether such changes could deliver a significant efficiency benefit.

### 5.1.2. Practicality

We expect that this package of options will increase the complexity of the slot allocation process compared with the current system used to allocate slots at Heathrow. This is because more ACL decisions will more often need to be made using subjective criteria rather than using a strictly hierarchical prioritisation process. This could also increase the perception of unfairness if ACL exercises its discretion in a way that airlines disagree with.

We have attempted to mitigate this by giving ACL more time to allocate competing slot requests and suggest providing ACL with additional guidance to aid its decision-making process. The guidance, if well designed, should reduce the likelihood of airlines perceiving the system as unfair.

We have tried to make this package as consistent with the global slot allocation process as possible. We have extended the timetable but in a way that maintains compatibility with the existing timetable for slot allocation.

We also consider that there is enough time to implement the reforms within this package in time for allocating slots as new runway capacity is released. There may also be sufficient time to implement this package of measures in time for an initial allocation of slots before new runway capacity comes online.

#### Functionality and operational complexity

An earlier allocation of slots as proposed in this package (and others), in some regards, makes obtaining a usable allocation of slots more challenging. But we have allowed for flexibility within the process to allow airlines to respond to changing circumstances.

An earlier allocation gives airlines slots without a guarantee that they will obtain a matching slot at the destination airport. For some airlines, it may also mean requesting slots without complete certainty around how the slot will be used. For example, an airline may not yet have a leasing





arrangement in place, or their fleet plan may be dependent on how many slots they ultimately obtain. We have created flexibility through a second-round allocation where airlines can request to change their slot if circumstances change.

For some airlines, obtaining a matching slot at the destination airport will be easier than for others. If an airline primarily flies to relatively unconstrained airports, then obtaining a slot at the preferred time would be easy. Similarly, if an airline proposes using a slot for a service to a constrained airport where they already hold a lot of slots, they can shuffle their slot portfolio to incorporate their new Heathrow slots. The biggest challenge will be for airlines that fly to other constrained airports where they do not already have access to other slots.

The indefinite nature of grandfather rights goes some way to help such airlines obtain the slots they ideally require. Even if an initial allocation is not optimal in terms of the schedule times or block time, they can use several years of re-time requests to optimise the service. We understand from ACL that this already takes place on routes between Heathrow and other heavily constrained airports.

This package of measures retains a priority for unchanged historic slots, which means a large proportion of the schedule will be fixed before ACL considers new requests or changes to historic slots. However, the package is, on balance, likely to lead to more instances where ACL has to trade-off competing slot requests using the secondary criteria. This will inevitably add to the complexity of the slot allocation process. But this is an inevitable consequence of our attempts to make the outcome of the slot allocation process more efficient.

Removing priority for re-timed applications may add to the complexity of the slot allocation process. This means that the optimisation problem ACL has to solve when forming its initial slot allocation is more complex. More decisions will need to be made using subjective criteria rather than using a strictly hierarchical prioritisation process. ACL would be required to consider a wider range of factors when considering re-times, rather than just whether it's feasible from an operational perspective, and so many more of these decisions will be made manually on a case-by-case basis.

For the peak week of operations at Heathrow for winter season 2019/2020, ACL received re-time requests for approximately 32% of historic slots.<sup>83</sup> We understand that the majority of these were from British Airways optimising its own slot portfolio, and therefore, these re-times rarely require ACL to make a trade-off between competing requests. However, with expansion, there will be more opportunity for existing slot holders to re-time their slots into new capacity, whereas they are currently restricted by the lack of available capacity.

We expect the volume of ACL's allocation decisions will increase significantly if re-times are given the same priority as new requests, as shown in the figure below. Although we note that where

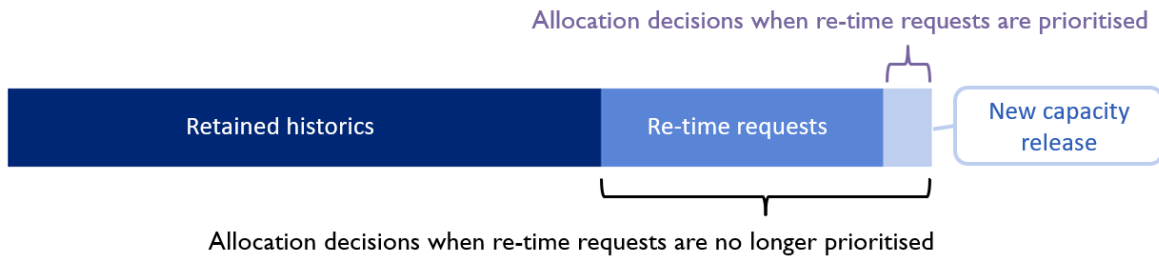
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<sup>83</sup> ACL (2019) Initial Coordination Report Winter 2019/20 LHR



re-time requests are the result of airlines shuffling slots within their existing slot holdings, there will continue to be less of a role for ACL.

Figure 5.1: Illustration of the scale of re-time requests relative to new slot requests under expansion



Source: CEPA analysis of ACL Winter 2019/20 Initial Coordination Report and Heathrow expansion plans

We are also introducing measures to reduce the incentive for airlines to put in opportunistic slot requests with no real intention of using them in the longer term. This should reduce the number of airlines overbidding for slots and therefore, reduce the number of competing slot requests ACL has to consider. As Heathrow's expansion is likely to be unprecedented in terms of slots having scarcity value at the point of allocation, we cannot estimate how much overbidding there is likely to be, nor how much this would be reduced by the measures proposed within this package.

We aim to make it easier for ACL to manage complexity, by giving it more time to allocate slots and more detailed guidance on managing trade-offs between competing slot requests.

This package also aims to manage the complexity associated with allocating a large number of slots in an environment where they are likely to be oversubscribed, by allocating them earlier than is currently the case. This would give airlines better visibility of upcoming slot availability, more time to refine their schedules, and should discourage the incentive to overbid for fear of losing out to competitors. Earlier allocation should give airlines and ACL more time to manage the added complexity of slot allocation under this package, as the initial co-ordination would take place over six months rather than the current month.

Alongside this, we propose giving ACL further guidance on how to make trade-offs between competing requests. This additional guidance does not create a hierarchy between the secondary criteria, but is designed to complement them by giving detail on what ought to be considered relevant considerations. This should improve ACL's ability to make judgements between competing slot requests, without hindering their flexibility to consider each case on its own merits.

## Consistency with the global slot allocation process

This package remains broadly consistent with the global slot allocation process. Although we extend the timetable and introduce mitigations to ensure continued compatibility with the process elsewhere.

The proposals within this package continue to be relatively similar to the slot allocation process used elsewhere. As a result, a large part of the package remains compatible with the existing regime. However, earlier allocation does reduce the compatibility of the proposals with the



broader process, as it means slots at Heathrow would be allocated before airlines are certain that they obtain matching slots at the other end of a route.

Ideally, coordinators elsewhere would also be flexible by providing earlier certainty around the availability of slots at the other end of the route, and possibly also by undertaking a shadow allocation alongside ACL. However, we note that doing this is outside the control of the UK Government.

We have attempted to mitigate this by having a second-round confirmatory allocation aligned with the existing timetable for slot allocation. This would allow airlines to change their requests if they find they are unable to obtain matching slots at the destination airport. We consider this to be the best way of maximising compatibility with the slot allocation process used elsewhere, while still providing airlines with earlier certainty around their slot holdings at Heathrow.

### Perception of subjectivity, unfairness or lack of independence

This package involves more decisions being made using subjective value judgements, though better guidance from Government should make it easier to defend against accusations of unfairness.

Under the reforms contained within this package, we anticipate that ACL will be required to make more decisions using the secondary criteria (as re-time requests are considered alongside new requests). By increasing the use of judgment based on secondary criteria, there is a greater element of subjectivity which risks creating a perception that certain airlines are being treated unfairly.

Updated and more detailed guidance should aim to address precisely this risk. Provided ACL follows the guidance provided by the Government, the overall risk of a successful challenge should be low. But for the guidance to effectively mitigate the risk of challenge, it will need to be drafted tightly enough to ensure that when ACL considers the relevant tests, each airline application is treated equally, and the guidance itself is not considered unfair.

Stakeholder views on this are mixed. Some stakeholders believe that clearer guidance will protect ACL from challenges as there is less subjectivity involved. However, others believe that requiring ACL to consider more complex factors related to competition or the strength of underlying demand may increase the number of challenges against ACL. Others consider that tightly defined criteria may undermine the independence of the process, especially if it is seen as a way of Government to influence the outcome in favour of particular carriers.

### Time to implement reforms

There is likely to be ample time to implement reforms in time for allocating slots following the opening of a new runway. It is feasible, but more challenging, to implement the reforms for an earlier release of capacity.

As with all the packaged options in this report we understand that the UK Parliament would need to implement new legislation to introduce some of the changes proposed. As many of the rules



and procedures contained within WSG are in EU legislation and are currently expected to be transferred into domestic legislation following the UK's exit from the EU, any changes from current WSG rules would require legislative change. Therefore, this option would require additional preparation by the Government relative to the current allocation regime and may take longer to implement.<sup>84</sup> We also expect the Government will need to engage further with stakeholders to finalise the exact timings for an earlier allocation and to finalise the text of the guidance to ACL.

Assuming a new runway is opened in 2026, with the first set of new slots allocated for the Summer 2027 season, our approach would require a capacity declaration to be finalised by October 2024. The slot allocation process would commence at that point. As the changes we are proposing are relatively small, we believe there is ample time to implement these changes by 2024.

We understand that Heathrow is exploring the release of some new capacity before a new runway is built. This could mean a release of new slots as early as 2022. We do not believe the volume of slots in Heathrow's plans for early release is large enough to require the early implementation of the reforms considered here, but it may still be challenging to ensure they are in place for this initial release if required.<sup>85</sup>

### Cost of slot allocation process

Relative to the current slot allocation regime, this package would make the process longer and more resource intensive for most, if not all, participants. However, the benefit of this would be a better managed slot allocation process.

Under this package, ACL would need to hold additional resource for longer (up to two years) to deal with the earlier allocation of capacity and subsequent rounds of capacity adjustments. Some of the stakeholders we consulted asserted that, in any case, ACL would require additional resources to deal with the increased volume of slot requests at Heathrow post expansion. Such stakeholders considered that although ACL's generally lean operation was preferred outside of expansion the importance of getting it right for Heathrow's expansion justifies additional resourcing.

For airlines, there may also be a similar impact in terms of resourcing. Airlines will need to begin engagement with ACL and Heathrow earlier than they may have chosen to under the current

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<sup>84</sup> The time required to pass new legislation depends on the type of instrument used, and the potential for opposition within the UK Parliament. Acts of Parliament can be passed within a year, if they are relatively uncontroversial. Statutory Instruments (sometimes referred to as secondary legislation) are subject to less parliamentary scrutiny and can generally be implemented much faster—sometimes as quickly as a few months.

<sup>85</sup> We assume that any future Government remains committed to the expansion of Heathrow Airport and that the parliamentary dynamics are favourable. But we also assume that the Government will first need to consider stakeholder responses to the Aviation 2050 consultation.



system. However, we mitigate against this by aligning the allocation, as far as possible, with the existing timetable for slot allocation. This avoids creating an entirely new process for airlines to engage in.

There may be an increase in the cost of justifying ACL decisions. This is because there would be an increase in the number of decisions ACL makes on the grounds of secondary criteria, potentially creating grounds, more routinely, for arguing that a decision has inappropriately balanced the various secondary criteria.

We believe, however, that the overall effect on cost will be small given that we are not proposing a substantial change to the current allocation system.

### 5.1.3. Efficiency

This package of measures includes some small changes that should make it somewhat easier for ACL to allocate slots to the airline that will use it most efficiently. We do this primarily by reducing the number of new requests that ACL must consider and by providing ACL with guidance on the considerations that should guide its decision making. However, these changes are only a marginal improvement on the current system, where (like most administrative systems) there are likely to be significant efficiency gains to be realised. Nevertheless, the proposed changes are small improvements that come with few unwanted effects.

The most substantial change affecting the efficiency of the primary allocation is the reform of the new entrant rule. This reduces the distortionary effects of the rule and gives non-new entrant challenger carriers more opportunities to compete effectively with incumbents. By allocating slots earlier, we also expect smaller challenger airlines to find it easier to scale up their operations in time for the start of the season. These changes should benefit the level of competition, and in turn improve the efficiency of slot usage.

We have also proposed multiple changes to reduce airlines' incentive and ability to game the slot allocation regime, which should again improve the efficiency of a primary allocation and of slot usage following the allocation.

Our proposed changes to secondary trading primarily codify existing practice. Consequently, we do not expect there to be a significant improvement to long-term efficiency relative to the slot allocation regime as it currently exists (under an expansion scenario).

In terms of connectivity, the changes we propose are likely to have a limited impact beyond allowing for more connections to destinations already served, at the expense of connections to new destinations. We believe this will most often take place when it is efficient to prioritise the destinations already served.

Overall, we consider that this package of measures would result in a marginal improvement in efficiency whilst retaining a system with which stakeholders are familiar. Therefore, we expect that it would have a limited impact on airline business planning and scheduling.



## Efficiency of primary allocation

As mentioned in Section 3, the efficiency of primary allocation of Heathrow's new capacity under an administrative system will primarily depend on the extent to which slots are oversubscribed. The more demand there is for a particular slot, the greater the likelihood of a sub-optimal allocation.

Our proposals reduce the incentive for airlines to make speculative slot requests, leading to fewer requests. This should make it somewhat easier for ACL to determine, which of competing slot requests is more efficient as there are fewer requests to consider.

Under this package, changing the UIOLI rule and extending the restrictions on newly allocated slots to non-new entrant slots, are both designed to reduce the incentive to make speculative requests. With these changes, the cost of obtaining a slot purely for the purposes of selling it on becomes much greater, as does the cost of requesting a slot with disguised intentions for what it will ultimately be used for. This does not remove the incentive entirely but is a relatively simple change that equalises the treatment of slots allocated through the new entrant rule with those that are not. It should address some of the additional demand on ACL and support better quality allocation decisions.

To illustrate the potential trade-off for airlines, we provide (in the box below) a hypothetical example of the potential gains from gaming the slot allocation regime.

We estimate the operating costs for a low-cost short-haul flight to be £5 million per annum, with new routes typically losing £1 million per annum.<sup>86</sup> For a typical long-haul flight, recognising the costs will vary significantly depending on the route, we estimate an average operating cost per flight of between £60–£90 million per annum, with bottom line figures ranging between a £6 million loss and £15 million profit.<sup>87</sup>

Under this proposal, carriers would be required to hold onto a slot for four seasons before trading it on the secondary market. As a result, losses may amount to £24 million or more for a full-service carrier operating a long-haul route, and closer to £4 million for a low-cost carrier.

Given average values for slot pairs at Heathrow have historically ranged from £15 million in the morning, £10 million at midday and £5 million in the evening,<sup>88</sup> and we expect slot prices on the secondary market will drop with the release of R3 capacity, there is considerable risk of not being able to recoup the losses. Therefore, we expect the incentive to game the system in this way would be much more limited.

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<sup>86</sup> Based on financial results of both Flybe and EasyJet. Assumed to include cost of leasing aircraft, fuel, crew, and airport charges.

<sup>87</sup> Based on financial results of Virgin Atlantic, American Airways and Air New Zealand. We assume this would not be a new route for the airline, and would therefore not require additional investment in group operations and marketing.

<sup>88</sup> Parliament. House of Commons (2017) Airport Slots, Number CBP 488



Similarly, we have attempted to mitigate the risk of airlines trying to game their requests to score more highly on the secondary criteria, by allowing for the attachment of conditions to slots. An airline wishing to use a slot for one purpose, but giving a different justification in order to obtain the slot, runs the risk of having to use the slot for the stated purpose for several years.

It is difficult to determine how much efficiency would be improved from these changes. Although airlines have historically had some ability to game the slot allocation system to obtain slots, the incentive and ability to do so at Heathrow following expansion would be much stronger. Not only would there be more slots available in the pool, including previously unavailable peak slots, such slots would be allocated with a clear expectation of future scarcity.

It is however challenging to identify concrete historic examples of where airlines have gamed the system because there are many legitimate reasons why an airline may wish to obtain a slot for one purpose and then choose to use it for another, so we cannot say with certainty that an airline has gamed the system. Also, as there have been fewer slots available in the pool, there have been fewer opportunities to game the slot allocation system.

Without knowing exactly how much inefficiency is likely to arise from gaming, we cannot know how much efficiency could be improved with the proposed changes. There is a risk that extending the limitation on trading acquired slots may lock-in some inefficiency, by preventing efficiency improving trades in the secondary market. However, we believe that risk is small given it is a relatively short time-period of the restrictions.

We also propose measures that aim to better align ACL's decision-making with efficient outcomes. This includes removing the automatic priority given to re-time requests for historic slots, changing the new entrant rule and providing ACL with more detailed guidance on how to select between competing requests.

The removal of priority for re-time requests allows ACL to consider new slot requests and re-time requests on an equal basis. We understand that airlines usually submit re-time requests to optimise their own schedules. But it is unlikely that always prioritising re-time requests over new requests results in higher aggregate efficiency. Moreover, it could limit the scope for efficiency improvements by allocating capacity based on incumbency, rather than the wider economic value of the proposed service.

We recognise that once re-time requests are considered alongside new slot requests on an equal basis, it is likely that ACL will have a larger number of allocation decisions to make on the grounds of secondary criteria. This will increase the complexity of their task, but we envisage that this can be partly offset by the guidance provided by the Government setting out where re-timing is a valid priority, and how to factor in any secondary criteria. Overall, we consider that this change should result in an efficiency improvement.

As with the secondary criteria, the guidance we propose would not contain a strict hierarchy as each case will be different. It would, however, include a series of indicators that should aid ACL's decision-making process. In producing the guidance, we have attempted to provide indicators that would suggest more or less efficient usage. However, we have generally found that it is difficult to



determine which of two competing slot requests is likely to be the most efficient, without airlines providing substantially more information about their intended usage. We therefore consider the guidance proposed in this package, will be a relatively small improvement on the existing secondary criteria in the WSG.

Finally, an important aspect of this package is reducing the portion of slots which are ring-fenced for new entrants and widening the definition of a new entrant. The proposed changes to the new entrant rule will make it more effective at Heathrow and less distortionary. Within this package, we believe this change is likely to have the biggest positive impact on the efficiency of the initial allocation. The change allows greater opportunity for airlines to grow in scale without having to use the secondary market. The nature of competition between airlines at Heathrow will be influenced more by market dynamics and less by the arbitrary thresholds within the new entrant rule. As a result, there would be more opportunity for the most efficient users of slots to enter or expand at Heathrow.

This package of measures will lead to some efficiency improvement to the primary slot allocation, though the gains will likely be relatively small.

Like any administrative allocation system, there is likely to be significant potential for efficiency gain at Heathrow. But ultimately, in the context of expansion it is uncertain whether this package is substantial enough to deliver a significant improvement in efficiency. This package of measures suggests only small changes to address the biggest challenge facing ACL - how to determine which of the many different uses of a same slot will be the most efficient.

### Efficiency in the longer term

Given the evolutionary nature of the changes to long-term slot mobility, it would be prudent to assume that the impact on airline trading activity would be limited. Therefore, although we expect some efficiency improvement from a better primary allocation, we do not expect significantly more secondary trading or the efficiency improvements this would bring.

As with other policy packages, we have sought to introduce measures which would improve the effectiveness of the secondary trading market, as we do not consider it is currently sufficiently effective to prevent inertia which it is relatively slow to resolve. It is difficult for airlines to obtain slots unless the current occupant vacates it, which it has minimal incentive to do except where the opportunity for trade is clear and strong.

By relaxing some of current rules governing slot trades, and therefore reducing some of the current transaction costs for airlines, it is hoped that airlines would engage in more frequent trading activity (at least where potentially profitable trades exist). But most of our changes relate to clarifying the legal status of trades that already take place and, therefore, the effect on trading activity will in all likelihood, be limited. Whilst some stakeholders agree that contracting slot trades, particularly shorter-term leases, is more complicated than it needs to be, the current regime does not prevent trades from taking place where there is an obvious opportunity.





Longer term, one stakeholder argued that it was concerned about the use of secondary trading (and particularly long-term leasing), as it undermines the idea of slot allocation being independent of individual airlines. With secondary trading, carriers holding slots can choose who they sell or lease slots to, giving them influence over how scarce capacity is allocated. This is a relevant factor when considering whether the proposed changes might undermine competition (see below).

Our proposal for restricting long-term slot leases is designed to improve longer term efficiency, by encouraging airlines to sell on slots they have no intention to use. This gives the purchasing airline more certainty around its operations than a lease would, potentially encouraging greater efficiency.

On the other hand, the opportunities for trading would also be limited by the requirements for airlines to operate the slot as proposed in their slot allocation for at least four equivalent seasons, although that slot could be returned to the pool and reallocated if the airline was unwilling or unable to operate it.

## Competition

Allocating slots earlier should make it easier for challenger airlines to obtain and use their slots.

We consider that allocating slots earlier would provide smaller airlines more opportunity to bid for slots, as they would have more time to plan their operations. This would in effect reduce the barriers to entry for airlines wishing to scale up operations significantly to compete with incumbents. This view was supported by the majority of airlines we spoke to, though there was disagreement on how much earlier slots ought to be allocated.

The timings we have proposed are at the cautious end of earlier allocation, at just 18 months before the start of a season. This may limit some of the benefits as it still leaves relatively little time for airlines operational planning.

The impact of an earlier allocation on competition and efficiency would be an improvement from the current system. It has the potential to have quite a large effect given the proportion of new entrant slots that were handed back at airports such as Frankfurt.

Reforming the new entrant rule should reduce some of the competitive distortions that are currently likely to arise under the rule.

Allowing a wider range of airlines to be considered new entrants should also reduce the number of slots handed back to the coordinator following an initial allocation. With a wider range of offers for the slots, and provided ACL is able to give slots to the new entrant airlines with the most credible plans for using them, more plans of low feasibility will be weeded out and there should be fewer slots allocated to airlines that are subsequently unable to use them.

The change to the new entrant rule will also reduce some of the competitive distortions that arise, allowing airlines wishing to operate at scale from Heathrow more opportunity to gain that scale. This should have a beneficial impact on competition, not necessarily because we consider fewer, larger airlines provide more effective competition than many, smaller airlines, but because our proposals level the playing field between the different types of challenger airlines.



Airlines we have spoken to have generally been hesitant to support changes to the new entrant rule. Our perception is that such hesitance stems from the fact that our proposals are a departure from the compromise position agreed in the WSG and would be an example of unilateral action by a single county. We have therefore designed our proposals to ensure some consistency with the broad approach to the new entrant rule within the WSG, while changing areas where differences already exist between different jurisdictions (for example, where the WSG differs from the EU Regulation). Some airlines were supportive of more substantial change to the new entrant rule but considered that such change should be limited to the period of expansion.

Other changes we have proposed will also have a small beneficial impact on the level of competition between airlines.

Our suggested additions to the slot coordinator guidance can also be expected to lead to positive effects on competition. By encouraging a broader assessment of competition, ACL's decisions are more likely to prioritise competition where it is necessary and likely to be most effective. ACL would be able to allocate slots in a manner that encourages more effective competition. To do so, it will need to consider how phasing of new capacity affect slot allocation, and that it will not necessarily lead to the most efficient outcome if, for example, available terminal capacity restricts the number of airlines to which new capacity is operationally viable (see Section 3.2.2 for earlier discussion of this issue).

Finally, the Government could extend the role of the competition authority by giving it powers to intervene in the secondary market. This should prevent incumbents with deep pockets from circumventing the allocation regime to build a dominant presence at the airport.<sup>89</sup>

As with the current system, the existence of continued capacity constraints will be a major limiting factor to future competition in the longer term, regardless of the design of this package.

In the longer term, the measures we proposed in this package will be of limited effectiveness if capacity expansion does not keep pace with the growth in demand. In the absence of any substantial change to the grandfather rights regime, future capacity constraints will inhibit the entry or expansion of new or challenger airlines as can be seen from the current experience at Heathrow. This will in turn limit the competitive pressures within the industry with negative consequences for efficiency. This applies to all our packages so it is worth recognising that any slot allocation regime which allocates capacity in perpetuity can only ever be partially effective at encouraging downstream competition, in the absence of new capacity.

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<sup>89</sup> We note here that this measure would only tackle incumbent airlines with deep pockets trying to build up a dominant market position. It would not tackle state-backed airlines with deep pockets using the secondary market to build a smaller position at Heathrow. We understand that both are concerns raised with regards to market-based allocation, whether primary or secondary.



## International connectivity

The guidance we propose giving to ACL would place greater emphasis on assessing the strength of underlying demand relative to existing capacity. We expect the effect of this to be more slots allocated to routes that have high frequencies but also a high volume of unserved demand, at the expense of routes that are currently unserved but where the strength of underlying demand is more limited. This would be an efficiency improvement when comparing against the current system but may lead to fewer destinations being served.

## Incentives

There are three ways airlines might try to game the slot allocation process:

- The airline community may submit many speculative bids. Because the value of a slot is large, and the relative cost of submitting an additional application is low, each airline has an incentive to attempt as many long shots as possible, even if individually it expects the success rate to be low.
- The airline community will be incentivised to develop slot requests (and the associated business case) that best satisfies the criteria set out by the Government and / or the secondary criteria used by ACL to distinguish between applications. This may be desirable initially, but the airline may later use the slot for a different purpose.
- Airlines which are part of the same parent company group, or alliance, may be incentivised to coordinate their applications, such that slots can be traded within the group to undermine competition and generate commercial value.

Although ACL is an experienced allocator and has developed its ability to identify and discourage overt instances of such behaviour, it has yet to allocate a very substantial amount of new capacity in similar circumstances. ACL recognises that it is challenging to identify more subtle attempts at gaming the slot allocation process.

We propose some measure to reduce an airline's incentive to game the slot allocation system and limit its ability to do so.

The extension of slot use restrictions for four years following a primary allocation, make it more costly for airlines to hold onto slots they have obtained opportunistically. This will actively discourage some airlines from submitting speculative slot requests, but also encourages them find a way to use them profitably or hand them back if they do obtain them.

In the package of measures, we also reduce an airline's ability to game the new entrant rule. Specifically, we suggest closing a loophole that allows incumbent airlines to obtain slots through the new entrant rule via a subsidiary or a sister airline, which is then transferred over after two seasons. A similar change was included as part of the European Commission's proposed recast of the slot allocation regulations. Although we are not aware of instances where this loophole has been used, we cannot envisage any circumstance where it would be beneficial to competition for subsidiary airlines within larger groups to benefit from new entrant status where the larger group



would be considered an incumbent. Therefore, there is value in limiting the potential for such behaviour in future.

We also propose more stringent sanctions to be used in instances when there is an identifiable gaming of the slot allocation system.

In addition to the above changes, we consider that ACL would require more powerful tools to address any blatant misuse of the slot allocation regime. ACL already has financial sanctions for identifiable misuse of slots or the slot allocation system, though the scale of the sanction is relatively small compared with the potential gains to be made from slot misuse. We consider our proposed sanction, lower priority for subsequent allocations, will be more effective at discouraging blatant attempts at gaming the system.

However, we recognise that this sanction can only realistically be applied when slot misuse is easily identifiable. We understand that it can be very difficult to identify whether an airline's action was an attempt at gaming the slot allocation system, or whether it was due to legitimate operational or commercial considerations. Therefore, we consider that limiting an airline's ability to game the system is likely to be a more effective lever than attempting to use sanctions to punish such behaviour.

### Schedule stability

One of the benefits of this package is that it does not significantly affect the stability of schedules compared with the current allocation system. All of the changes we have proposed are relatively small and do not change the fundamental approach to slot allocation. The system of grandfather rights is retained, and airlines continue to have large discretion to change how they use their historic slot holdings.

In some regards, the removal of priority for re-times to historic slots might lead to fewer changes to the timetable than the current system. We would expect that some re-time requests would be refused in favour of new slot requests. This would mean that more historic slots would be unchanged from the previous equivalent season.

The changes which may have a small beneficial effect on schedule stability are our proposed changes to the new entrant rule alongside the earlier allocation of slots. In our view, these changes would give airlines more time to prepare for their operations, leaving fewer last-minute slot hand backs and fewer airlines finding that they cannot run their preferred operation profitably (and therefore handing back the slot after one season). It should also encourage more efficient scheduling and use of capacity, by giving airlines more time to optimise their schedule and consider re-times.

### Airline business planning, investment and financial stability

Several airline stakeholders highlighted to us the investment and resourcing challenges ahead, particularly around the lead time for ordering new fleets of aircraft, which may impact the demand for new capacity at Heathrow. Therefore, we concluded that this was an issue that



needed to be addressed in the design of all packages, and that the best way to do this was to enable ACL to allocate capacity in earlier tranches.

What distinguishes this package most from the others we assess, is that the nature of the changes we propose are more evolutionary and should not require airlines to make significant changes to the way they currently plan their business or make investment decisions.

Overall, we do not consider that this package would make airlines a riskier business to invest in or add material uncertainty to their business as usual financial planning. Whilst some airlines would argue that mandating the use of slots for the specified purpose as set out in the original application would, if unprofitable, undermine their financial stability and push up prices for consumers, we think this is unlikely because the airline could simply return slots to the pool if they prove unprofitable and submit a new request to use the slot for another purpose. Moreover, by creating a broader definition of a new entrant airline, this package could encourage investment in new business models that have hitherto been locked out of Heathrow.

#### 5.1.4. Domestic connectivity

Under this package of measures, we expect there to be greater domestic connectivity than under an allocation using the slot allocation system as it currently exists. Whether the Government's ambitions for domestic connectivity can be achieved will depend on the market at the time. However, under this option, these ambitions will be actively facilitated via slot allocation.

We propose protections so that domestic connectivity is maintained when capacity becomes scarce again, to avoid the historic experience of domestic connectivity being reduced at the expense of international connectivity. However, our protections do not extend to ensuring continued connection to 14 distinct domestic destinations.

Under this option, we propose using guidance issued by Government to ACL to improve domestic connectivity from Heathrow. Such guidance could be explicit about whether the Government wishes the domestic connections to enable onward connectivity, which would favour applications from hub carriers or carriers with extensive code share agreements and shared terminal access, or whether access to and from London is more important, which may favour applications from low cost carriers that can efficiently operate intensive point-to-point routes.

Either way, guidance explicitly prioritising domestic connections should help the Government achieve its domestic connectivity ambitions over the period immediately following capacity expansion. Whether the target is fully achieved however, will depend on the level of demand for such domestic connections and whether it makes commercial sense for airlines to operate these routes. It is difficult to predict whether this will be the case by 2030 though we understand that Heathrow is confident such connections can be delivered.

The advantage of such an approach is that it can target both objectives related to domestic connectivity. In other words, if existing domestic routes already achieve good connectivity to



certain destinations, ACL can prioritise applications to run routes to new domestic destinations to ensure the ambition for 14 routes is achieved. If, in a particular year because of the available terminal or stand capacity, it makes less sense to use the available pool slots for domestic connections, ACL can respond to this in its slot allocation.<sup>90</sup> This approach, therefore, gives ACL more flexibility in responding to the market and the slot pool than some of the alternatives considered in other packages.

However, this does come at the expense of potentially creating competitive and efficiency distortions. Under this option, the guidance influences which UK airports gain additional connections to Heathrow, affecting how such airports compete with one another. For example, it may be more efficient and more commercially attractive for an airline to operate an additional flight rotation between Manchester and Heathrow airports. But if competing airports (such as Leeds Bradford or Liverpool) do not have existing connections into Heathrow, it would make more sense to apply to serve them to increase the likelihood of obtaining a slot, even if those airports are less competitive.

In the longer term, this option aims to guarantee that connectivity is retained by restricting slots for domestic use only. This would allow airlines to switch between different domestic airports which is important to ensure continued competition between them, but a consequence is that connectivity to 14 destinations may not be guaranteed in the longer term.

### 5.1.5. Conclusions

Overall, this package of measures includes a number of small changes that can be considered an evolution of the current slot allocation regime. It is designed to retain all the advantages of the current allocation system while suggesting changes that will partially tackle the main issues we have identified regarding the allocation of slots at an expanded Heathrow.

Table 5.1: Summary assessment of Package 1

Criteria	Score	Assessment
<b>Efficiency Criteria</b>		
<i>Efficiency is assessed relative to the current allocation system, scored as follows:</i>		
✓✓ <i>Significant improvement</i> ✓ <i>Improvement</i>		
~ <i>Neutral</i> X <i>Deterioration</i> ? <i>Impact unknown</i>		
Efficiency of primary allocation	?	It is uncertain whether this package of evolutionary measures would be substantial enough to result in a material improvement in efficiency. The aim is to better align ACL's decision-making with achieving efficient outcomes in a more demanding environment, but ACL's task would become more complex and it is not certain

<sup>90</sup> For example, in a particular year, the only available stand capacity may be for aircraft unsuited for domestic routes. In such instances, it is likely to be more appropriate to allocate the available capacity for routes that are more suited to the available infrastructure.



		that it is currently well equipped to consider efficiency as it decides between competing slot requests.
Efficiency in the longer term	~	The proposed changes to the secondary trading rules in this package seek to reduce barriers to slot trading, but it would be prudent to assume that the impact on trading activity would be limited. The impact on the long-term efficiency of the slot allocation regime would likely be marginal.
Competition	✓	This package aims to level the playing field for airlines wishing to operate at Heathrow airport by removing the distortions which arise from the new entrant rule. This should create more opportunities for non-new entrant airlines to gain scale and could result in more intense competition. This would be further bolstered by updated guidance provided to ACL.
International connectivity	✓	The net impact of the guidance we propose would be a greater focus on routes where the strength of underlying demand is high. This would be an efficiency improvement compared to the current system, but as capacity constraints return it may lead to fewer destinations served in the longer term.
Incentives	✓	Proposes measures aimed at reducing the incentive on airlines to submit speculative slot requests, e.g. by making it more costly for airlines to hold onto slots obtained opportunistically by reforming the UIOLI rule and extending slot use restrictions. But these measures would not mitigate the incentive entirely.
Schedule stability	~	The benefits of this package are that it would not significantly affect the stability of schedules. The fundamental approach to slot allocation is unchanged—i.e. the system of grandfather rights is retained, and airlines continue to have large discretion to change how they use their historic slot holdings.
Airline planning, investment & financial stability	~	None of the measures proposed in this package would materially increase the level of risk of investing in an airline business, or add material uncertainty to business as usual financial planning.
<b>Feasibility and safeguards for domestic connectivity</b>		
Feasibility of the proposed reforms		In terms of the feasibility of the proposed reforms, this package of measures is likely to function as well as the current allocation system in the context of expansion, and should be capable of implementation in time for allocation of new runway slots at Heathrow (based on current timescales), and possibly even for any slot released preceding a new runway. There are measures within this package that would make ACL's decision making more complex than under the current allocation system, but other measures aim to reduce



	<p>this complexity and equip ACL with tools to manage it better. There would also be a cost implication, but this would be limited.</p> <p>The main features of the current system, including most of the primary allocation criteria and the system of grandfather rights would be retained. We expect the outcome of this package of reforms to lead to a usable allocation of slots.</p>
Domestic connectivity	<p>Whether the Government's ambitions for domestic connectivity can be achieved will depend on the market. However, under this option, these ambitions would be facilitated using guidance issued to ACL.</p>







## 5.2. Package 2: More ambitious change to the administrative regime

Managing complexity	Give ACL more time to produce an allocation, and publish it a year before the current timetable
Short-term efficiency	Suspend the new entrant rule for the duration of expansion Give ACL the flexibility to re-time historic slots by up to 15 minutes Give ACL guidance on how to make trade-offs under the secondary criteria. Require airlines to provide more information in slot requests.
Longer-term efficiency	Allow full flexibility in buying, selling, and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades Restrict grandfather rights to 15 years for newly allocated slots
Aligned incentives	Remove the double allowance within the UIOLI rule for all slots
Other Government objectives	Ring-fence domestic connections to achieve minimum of 14 routes with at least three services a day

### 5.2.1. Introduction

Our second package of options can be considered a more substantial departure from the current approach to allocating slots. It contains several different measures designed to tackle the issues we have identified with the current system and can be regarded as being close to the limit of what can be achieved within an administrative system of allocating slots.

As we show below, introducing measures that deal with some of the issues we have identified, creates weaknesses elsewhere in the slot allocation system. In designing this second package, we have included a combination of, measures that we believe on balance will lead to a more efficient allocation of slots and measures we believe are sufficiently different from proposals in other packages to warrant investigation.

From our engagement with stakeholders, we acknowledge that many aspects of this package of options will prove controversial with airlines. In the evaluation below, we explain our justification for including the measures even though this is the case.

### 5.2.2. Practicality

Some of the measures we propose give ACL more opportunity to exercise its discretion under the secondary criteria, making the role more challenging. This could increase the number of decisions where ACL may be perceived as having exercised its discretion in a way



that particular airlines disagree with. But this is an inevitable consequence of our attempts at reducing some of the distortions that exist under the current system and achieve a more efficient outcome within an administrative system.

Our proposals will create a much greater challenge for airlines in terms of developing and maintaining optimised schedules, resulting from being allocated time-limited rather than indefinite slots. The proposal for time-limited slots, among other changes, also creates a major inconsistency with the global slot allocation process, though we expect the two processes to be compatible with each other.

Where we deviate substantially from the WSG, there may be a risk of the changes being perceived as discriminatory against foreign carriers, potentially risking retaliatory action.

In terms of timings, this package would require legislative change, but we believe this package could be implemented before the third runway opens (but possibly not for any earlier release of slot capacity). As with Package 1, this package would make the process longer and more resource intensive for most participants relative to the current slot allocation regime. However, the benefit of this would be a more efficient slot allocation process.

## Functionality and operational complexity

An earlier allocation makes obtaining usable slots more challenging, but our two-round allocation process mitigates this issue. A bigger challenge arises from our proposal to time-limit the grandfather rights of new slots.

Similar to Package 1, earlier allocation risks giving airlines slots before they have all the details around their planned operations. This will inevitably vary by the type of airline, and the timings we have proposed are an attempt to find a compromise position. Having a second-round allocation gives airlines an opportunity to change the slots they have previously obtained, once they have more certainty regarding slots at other airports.

Our proposal to time-limit the allocation of slots, however, creates new challenges for airlines:

- Airlines have less time to optimise their schedules and run a profitable route before the slots are returned to the pool. In some instances, it may take several years or even a decade for an airline to use a slot exactly how they wish, if for example, the airport at the other end of the route is heavily slot constrained.
- With time-limited slots, airlines will have to optimise their network and schedules more regularly and more intensively than they currently do. For example, if an airline loses a time-limited slot, it would need to decide whether to use another slot to operate that service or to drop that service altogether. This may result in knock-on consequences for the airline's whole schedule, especially if that service relies heavily on transfer traffic, or is part of a rotation pattern. Also, the airline would then have a spare slot at the destination airport that it would need to find a use for.

These issues make it significantly more challenging, although probably not impossible, for airlines to use the slots they obtain to run schedules as optimally as they can.



ACL's role would be marginally more complex than under the evolutionary package and increasingly dependent on balancing different criteria. But additional complexity is an inevitable trade-off to achieve a more efficient outcome, and we propose other changes that will give ACL the ability to manage the additional complexity.

As with Package 1, there are features of this package which would make the allocation of slot capacity somewhat more complex than the current system (when applied to Heathrow's expansion). In particular, the removal of priority for re-timed applications will result in an increase in the number of allocation decisions which are made on the grounds of secondary criteria (see Figure 5.1), where there is no hierarchical prioritisation process for ACL to follow and it must balance the various factors which are raised by the competing applications.

This complexity is an inevitable consequence of attempting to make the outcome of the slot allocation process more efficient than the current regime within an administrative system. But this package should make it easier for ACL to manage the additional complexity by giving it more time to allocate slots, and through the provision of more detailed guidance on managing trade-offs between competing slot requests.

This package goes further than Package 1 in that it also requires airlines to submit more information to support the intended use of the slot being requested. This would take the form of a standardised slot request template, to be populated with information that would allow ACL to better understand the trade-offs being made in each slot decision. We also propose to give ACL flexibility to re-time historic slots. This should help to maintain some ability for airlines to optimise their slot holdings.

ACL will need to track time-limited slots against permanent slots, but we do not think this is a significant issue.

Time-limiting grandfather rights creates a practical challenge that adds to the complexity of slot allocation. ACL, as the coordinator, would need to develop a system to track which slots are indefinite and which slots are time limited. The system would also need to track how many years each time-limited slot has remaining. We do not believe such challenges are insurmountable; ACL already tracks which slots have been allocated under the new entrant rule and which of these are still associated with restrictions on how they can be used.

Despite an overall increase in the level of complexity, we consider that the reforms are feasible and that the slot allocation regime would remain functional.

### Consistency with the global slot allocation process

This package creates three key areas of inconsistency with the global slot allocation process. The first is the changed timetable, which we believe can be managed to maintain compatibility with the process elsewhere. The second two relate to the removal of the new entrant rule and the time-limiting of grandfather rights. These two measures would make the Heathrow process more definitively inconsistent with the process elsewhere, although it should remain compatible.



As discussed in Section 5.1, having earlier allocation means slots at Heathrow would be allocated before airlines can be sure they can receive matching slots at the other end of a route. However, we propose mitigating this via a second-round confirmatory allocation aligned with the existing timetable for slot allocation, enabling airlines to change their requests based on the slots they receive at other airports.

Our proposals to suspend the new entrant rule and limit grandfather rights are both more fundamental changes that would be inconsistent with both the WSG and the EU Regulation. Although Package 1 also contained changes to the new entrant rule, it retained the broad principle of having slots reserved for new entrants. Package 2 removes the new entrant rule entirely. This should not affect the compatibility of the two processes however, as it is already possible for an airline to qualify for new entrant status at one end of a route not at the other.

We believe that time-limiting grandfather rights is unprecedented globally. This raises some compatibility issues as airlines would potentially lose a time-limited slot at Heathrow while still retaining a permanent slot at the destination airport. However, this is not a fundamental change as airlines already consider the slots at either end of a route to be separate rights, often selling on or leasing slots at only one airport while retaining the rights at the other airport. The possibility of losing one slot but retaining the other would not be significantly different.

### Perception of subjectivity, unfairness or lack of independence

The number of decisions made using secondary criteria is likely to increase compared with the current system, and where ACL exercises greater discretion there is a greater risk of decisions being perceived as being unfair. If the Government provides clear guidance, it should reduce this risk.

These reforms are likely to result in a situation where ACL must make more decisions using the secondary criteria and therefore subjective, as re-timed requests are considered alongside new requests and there is not separate pool for new entrant requests. By increasing the number of decisions where allocation is based on secondary criteria, there is a greater risk that airlines are unhappy with the decisions made.

In addition, we envisage that under this scenario ACL will have greater autonomy and flexibility to re-time historic slots and reach its own interpretation of the information provided by airlines about the intended use of slot requests. This imports greater risk, should airlines consider that ACL has overreached its discretion, or has made a mistake in its assessment of the merits of its slot application.

We consider that updated and more detailed guidance would help to mitigate the risk of the process being considered unduly subjective. But the guidance will need to be drafted tightly enough to ensure that when ACL considers the relevant tests, each airline application is treated equally, and that ACL's assessment of the merits of competing slot requests is evidenced and transparent.



Some stakeholders are concerned that removing the new entrant rule could be perceived as being discriminatory against foreign carriers, and have suggested there is a risk of retaliatory action. The time-limiting of grandfather rights for new slots may also risk retaliatory action, but we believe the risk here is lower.

As the biggest beneficiaries of the new entrant rule, foreign carriers may perceive a suspension of the new entrant rule as a deliberate attempt at discriminating in favour of home-based carriers. Several stakeholders we spoke to, raised this as a possibility and suggested that this created a risk of retaliatory action by the states who consider their airlines to be most affected by the change.

Time-limiting grandfather rights for new slots may also create a perception of unfairness, especially as new slots granted at other airports would likely continue to in perpetuity. This is partially mitigated by the fact that our proposals only affect newly allocated slots and do not undermine the rights of existing slot holders.

### Time to implement reforms

Any changes from current WSG rules would require legislative change, but we believe this package could be implemented before the third runway opens

As with all the packages discussed in this report, the UK Parliament would need to enact new legislation to introduce some of the changes proposed. As many of the rules and procedures contained within WSG are in EU legislation and are currently expected to be transferred into domestic legislation following the UK's exit from the EU, any changes from current WSG rules would require legislative change. Therefore, this option would require additional preparation by the Government relative to the current allocation regime and may take longer to implement.

Assuming a new runway is opened in 2026, with the first set of new slots allocated for the Summer 2027 season, our approach would require the capacity declaration to be finalised by October 2024 at the latest. The slot allocation process would commence at that point. The changes proposed in this package are more radical than Package 1, but there should still be sufficient time to implement the necessary legislative changes by 2024.

However, if new slots created by the expansion programme are not granted in perpetuity and are instead limited to 15 years, demand for slots released prior to the limiting of grandfather rights will be much greater as they will be the last slots allocated at Heathrow with indefinite rights.

We think it would be more challenging to implement this package of reforms in time for any early release of new slots compared to Package 1.

### Cost of slot allocation process

As with Package 1, this package would make the process longer and more resource intensive for most, participants relative to the current slot allocation regime. However, the benefit of this would be a better managed slot allocation process.

This package would undoubtedly increase the cost for ACL to carry out the allocation process relative to the current slot allocation regime. ACL would need to hold additional resource for



longer (up to two years) to deal with the earlier allocation of capacity and subsequent rounds of capacity adjustments.

We also think that the potential for ACL to be making a larger number of allocation decisions on secondary criteria, over and above the expected impact of Package 1, would require it to hire additional resources with a different skillset to deal with the increased volume and more complex nature of slot requests at Heathrow post expansion.

For airlines, there may also be a similar impact in terms of resourcing. They will need to begin engagement with ACL and Heathrow earlier than they may have chosen to under the current system. We mitigate some of this impact by aligning the allocation, as far as possible, with the existing timetable for slot allocation.

Finally, we note that limiting the grandfather rights of newly created slots will create regular slot tranches being returned to the pool from 2042. This means that this more intensive process for allocating new runway slots, would operate almost indefinitely rather than wind down once most of the new capacity is allocated.

There is also the possibility of costs relating to explaining decisions and defending against challenges

There may be an increase in the cost in explaining and defending slot allocation decisions compared with the current allocation system. This is because there will be more opportunity for ACL to exercise its discretion when allocating slots and choosing to move historic slots. ACL's decisions would also be potentially more controversial when reallocating time-limited slots that have returned to the pool, where the financial stakes may be higher for airlines that have lost a slot.

### 5.2.3. Efficiency

We consider the proposals within this package an incremental improvement from Package 1 in terms of improved efficiency in the primary allocation. More detail from airlines should allow ACL to test the credibility of their plans, while ACL proposing adjustments to historic slots could enable a more optimised slot allocation. Suspending the new entrant rule would likely have the clearest positive impact on competition and therefore, efficiency, by removing an arbitrary prioritisation of a specific type of airline.

In the longer term, limiting grandfather rights would have uncertain consequences for longer-term efficiency. Although it would encourage churn in the distribution of slot at Heathrow, it might also discourage some airlines from developing a secondary hub from Heathrow, impacting on connectivity. Removing grandfather rights only for new slots, could also have some serious unintended consequences for competition between airlines.

An indirect effect of time-limiting newly allocated slots is that it limits the gains to be made from gaming the slot allocation system. However, it also creates an incentive to game the system in new ways through airlines seeking to protect against losing their most valuable slots at the end of the lease period.



Also, we would expect schedules to be less stable than they currently are, as airlines would have to re-optimize their networks in response to changes in their slot holdings. This will apply more to non-incumbent airlines that have a larger proportion of their slots as time-limited ones.

## Efficiency of primary allocation

This package of measures goes a step further in attempting to achieve a more efficient primary allocation of slots. Overall, we can conclude that the package is an improvement on the current slot allocation system, in terms of ensuring the efficiency of primary allocation. However, it is debatable how effective some of these measures will ultimately be, and it is unlikely to lead to an allocation that maximises efficiency. As we have discussed in previous sections, maximising efficiency is challenging in an administrative system.

There are three measures we include in this package to improve the efficiency of primary allocation:

- Introducing a requirement for airlines to provide further information on their intentions for a particular slot and for their operations at Heathrow more broadly
- Giving ACL more flexibility to re-time historic slots where they allow for a more optimised distribution of slots
- Suspending the new entrant rule for the duration of capacity expansion

Requiring airlines to provide more detail around their plans should better enable ACL to assess the credibility of their plans, and fully understand the trade-offs required. Also, allowing ACL to propose adjustments to historic slots, could allow for some optimisation of the allocation.

Suspending the new entrant rule, would likely have the clearest positive impact on efficiency, by removing an arbitrary prioritisation of certain types of carriers.

The requirement to provide more detail on an airline's intentions for a particular slot and their operations at Heathrow more broadly, would allow ACL to better understand the trade-offs between particular slots. It would also allow ACL to more easily identify instances where airlines may have gamed the allocation system if, for example, their actual plans bear little resemblance to their stated aspirations. Alongside more detailed guidance for how to decide between competing slot requests, we expect this would make ACL's decision-making slightly easier by allowing them to identify requests that are less serious.

The second measure will allow ACL to optimise overall allocation where small adjustments to historic slots give the opportunity to more optimally meet new slot requests or re-time requests. Currently, each airline attempts to optimise its own portfolio of slots separately. Airlines with large existing slot holdings are at an advantage as they have more flexibility to shuffle their slots around to reach an optimal schedule. Airlines with smaller slot holdings are reliant on other airline's actions in order to obtain mutually beneficial re-times. ACL, in its position as



coordinator, can identify instances where certain re-times would benefit more airlines than it disadvantages.

An airline we spoke to suggested that ACL does on occasion, do this already, and in most instances, airlines are willing to be flexible recognising that in future such changes may be beneficial to them. However, ACL did caveat this, noting that historically there have not been many opportunities for it to propose such changes.

We believe both changes would likely help ACL improve the efficiency of primary allocation of slots. However, the impact would depend on how ACL used the additional information provided and the additional flexibility. If, as we expect, there are opportunities to use these tools following expansion, then there should be a noticeable improvement in efficiency.

Finally, the suspension of new entrant rule avoids the distortive effects of prioritising certain air carriers over others. This would not prevent new entrants from obtaining slots, as there would be many more available and their requests would have some priority under the secondary criteria. The key to this option is that it would avoid arbitrarily determining the right number of slots for new entrants, allowing ACL to exercise greater discretion on when the prioritisation of new entrants is appropriate and when it is less so.

Limiting grandfather rights for newly allocated slots may negatively affect the efficiency of a primary allocation, by particularly discouraging certain non-European airlines. However, we believe the effect of this on efficiency will be limited.

One of the measures in the package could have a negative impact on efficiency. Our proposal to limit slot rights to 15 years may discourage certain airlines from applying for slots at Heathrow. This is more likely to apply to non-European airlines that regard different European hubs as substitutable bases. In such cases, Heathrow would become less attractive as other European hubs would still be granting slots in perpetuity.

However, this issue should be considered in the context of why such measures are likely to be needed in the first place. Heathrow's popularity as a destination and as a connecting airport has persisted despite the presence of less congested (and often cheaper) alternatives. DfT's projections show this popularity is likely to persist; airlines' demand for slots will exceed the available supply even after new capacity is available, through most of the day if not throughout. This means that although demand for slots at Heathrow might reduce if airlines are only able to obtain them for 15 years, demand is likely to remain from airlines that can extract significant value from running a Heathrow service, even over a 15-year period.

### Efficiency in the longer term

As with Package 1, we include a number of proposals to reduce the transaction costs associated with secondary trading and as a result, improve the liquidity of the market. This should ensure some movement of slots from airlines that are able to use them less efficiently, to those that are able to use them more efficiently. However, for all the reasons outlined previously, the





effectiveness of the secondary market at improving efficiency or ensuring continued efficiency, will remain limited.

Limiting grandfather rights is likely to have a substantial effect on long-term churn at Heathrow, with potential positive consequences for longer-term efficiency.

The most substantial change within this package is the removal of grandfather rights for newly allocated slots. This would reduce the incentive for holders of such time-limited slots, to hoard them or babysit them as a way of preventing them being obtained by competitors. This is because, under this option, there will always be a certain number of slots available in the pool each season. As such, any attempt at preventing a competitor from obtaining a slot through the secondary market could easily be circumvented by requesting a slot from the pool. The effect of this should be a more active secondary market.

The incentive for holders of existing slots to hoard them would also be diminished slightly, but less so than for holders of time-limited slots. We believe time-limiting all slots i.e. including those with existing grandfather rights, would make this measure significantly more effective as existing slot holders would have much less ability to control access to slots in the absence of further expansion. However, as noted previously, this it is out of the scope of this study.

Another effect of this measure is that it would introduce artificial churn to the market at Heathrow. There are lots of unknowns about how effective this option might be in terms of ensuring longer term efficiency. If demand continues to outstrip the growth in capacity and no further expansion at Heathrow can be expected, we have shown in Section 3 that the secondary market is unlikely to be effective at enabling entry or expansion of many airlines. Replenishing the slot pool by time-limiting slots may be the only way of allowing new airlines to enter and grow at Heathrow.

- The effectiveness of this lever will however depend on the extent to which demand continues to outstrip available capacity. The longer Heathrow is capacity constrained and the greater the degree of constraint, the more likely it is that the inertia created in the distribution of slots is further from an efficient outcome. It also creates a higher likelihood that more efficient or more innovative airlines have been prevented from growing at Heathrow due to capacity constraints and limited churn in the secondary market.

In such instances, artificially introducing churn is likely to create a greater opportunity for such airlines to expand their offerings from Heathrow.

- Also, the effectiveness of this lever will depend on the efficiency of ACL's primary allocations. If ACL's allocations correlate closely with an efficient allocation, then re-allocating slots periodically would ensure efficiency over the longer term. However, if ACL's allocations are not very close to an efficient outcome, this lever would have the perverse effect of making the allocation less efficient over the longer term, especially if gradual optimisations and secondary trades make the allocation more efficient over time.



Given we have previously described the difficulty in coming up with an efficient allocation through an administrative method, we believe this is a real risk.

- A further uncertainty is the availability of alternatives at other London airports. If airlines that are unable to enter Heathrow, can create similarly efficient operations at other London airports, then the long-term cost to efficiency from slot constraints and limited churn, is mitigated. For example, many low-cost carriers have chosen other London airports as their base. As these airports had spare capacity, the existence of slot constraints at Heathrow has not hindered the development of the low-cost business model.

Therefore, whether artificially introducing churn is likely to be effective will also depend on whether the airlines that benefit from it, have access to alternative airports where they can base their operations. In reality, as airports throughout the south-east are beginning to face capacity constraints, this seems increasingly unlikely.

- Finally, there is uncertainty around how slots at the end of the 15-year lease period would be reallocated. ACL could face pressure from the existing user of the slot to re-grant them access to it, regardless of whether alternate slot requests score more highly under the secondary criteria. Alternatively, the terminal and parking capacity constraints that exist may mean that the existing user is the only airline that is willing and able to use the slot.

## Competition

Removing the new entrant rule could negatively affect competition, but we think this is unlikely.

There is a risk that the suspension of the new entrant rule would create an insurmountable barrier to entry for airlines with limited existing presence at Heathrow. However, we don't see that being the case if new entrant status is considered one of the secondary criteria. We believe there would be a greater benefit from the suspension of the rule, by creating a level playing field between different types of challenger airlines. ACL would still be able to prioritise requests that improve competition but would be able to tailor this to the actual nature of competition. In some instances, this may be about supporting a new entrant's request for a slot and in other instances it may be about supporting an incumbent airline's request to enter a new market.

Removing grandfather rights for just new slots could have some serious unintended consequences for competition between airlines.

The proposed change to the grandfather rights regime has a significant effect on competition between airlines. As we are only proposing to time-limit newly allocated slots, this creates a two-tier slot regime where certain airlines have access to slots indefinitely and others only have access to them for a limited period. The competition effect of this would be limited if the distribution of indefinite slots was widely dispersed, as access to the indefinite slots would not grant a single airline (or airline alliance) substantial market power.



However, as IAG has access to over half of the indefinite slots, time-limiting new slots may cement IAG's position as an incumbent. Airlines with time-limited slots wishing to compete with IAG, either directly at Heathrow or indirectly by enticing Heathrow passengers to travel via their hub, would face a risk of losing their slot and associated air services after 15 years. This could discourage certain customers who value an extended route-network and long-term certainty around services, from using the services of such airlines, especially if certain services are using slots close to the end of the lease. This would create a situation that favours IAG and other incumbent carriers.

### International connectivity

As with Package 1, the guidance we propose giving to ACL suggests a greater focus on assessing the strength of underlying demand relative to existing capacity. We expect the effect of this to be more slots allocated for routes that have high frequencies but also a high volume of unserved demand, at the expense of routes that are currently unserved but where the strength of underlying demand is more limited. This would be an efficiency improvement when comparing against the current system but may also potentially lead to fewer destinations being served.

Some of the airlines we spoke to, suggested that limiting grandfather rights might discourage certain airlines from operating at Heathrow, choosing to operate routes to airports where there is longer term certainty around airport access. Airlines suggested this was likely to be the case for non-European airlines where the largest European hubs are considered substitutes. Time-limiting slots at Heathrow, therefore, could make it less attractive than other European hubs, diminishing its value as a secondary hub for foreign carriers.<sup>91</sup> This could reduce the number of destinations served and have an efficiency cost.

It could also be argued that it could be much more difficult, though not impossible, for an airline to form a sustainable second hub operation at Heathrow. This option creates two types of slots, the historic indefinite slots and new time-limited ones. British Airways, as the largest single holder of indefinite slots, would be able to maintain a hub operation even if it faced the prospect of losing a proportion of time-limited slots. Any new carrier wishing to establish a hub operation at Heathrow, would be much more reliant on the time-limited slots to obtain the requisite scale. Consequently, their hub operation would periodically be at risk as time-limited slots reach the end of the 15-year period. This could have negative consequences for connectivity (and efficiency), if competition from a second hub operation creates connections to destinations that would not otherwise be served from Heathrow.

Alternatively, it could be argued that the recycling of slots creates opportunities rather than threats for effectively run airlines, in comparison to the present situation. The recycling of slots would give the ambitious airline an opportunity to build up more a substantial slot holding than is

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<sup>91</sup> Some non-European airlines choose a European airport to act as a secondary hub for their operations. Passengers generally fly to these European hubs and then connect onto alliance partner flights to reach their final destination,



currently the case, although it would also need to continuously maintain it. A more flexible situation presents more opportunity at the same time as reducing long run stability.

## Incentives

Package 1 includes several measures designed to limit an airline's incentive and ability to game the slot allocation system. It also includes more stringent sanctions to be used in instances when there is an identifiable gaming of the slot allocation system. In this package, we propose some alternate measures to reduce the incentive and ability to game the slot allocation system.

An indirect effect of time-limiting newly allocated slots is that it limits the gains to be made from gaming the slot allocation system. However, it also creates an incentive to game the system in new ways.

Time-limited slots will be less valuable than indefinite slots, as the value of a slot is derived from the ability to make a profit from running routes on the slot. In effect, the value of the slot would be the present value of the profit from running a route over 15 years. An indirect consequence of this is that it reduces the incentive to game the system, as the gains to be made either from using the slot or from selling it on are smaller.

However, the creation of a two-tier slot system creates new incentives to game the system. An airline that holds both indefinite slots and new time-limited slots would have the incentive to shuffle their slots so that the indefinite ones are held at the most valuable times and the time-limited ones are held at the off-peak times. This would mean that over time, the slots returning to the pool would be the least valuable ones, significantly defeating the purpose of time-limiting them. This could be mitigated by preventing airlines from re-timing slots in this way, so that indefinite slots could only be swapped with other indefinite slots and new slots could only be swapped with other new slots. However, we consider that this could be challenging for ACL to police.

## Schedule stability

We expect that this package of measures will lead to more frequent changes in the schedule from season to season, compared with an expanded Heathrow where new slots are allocated under the existing rules. The main reason for this is the creation of time-limited slots, which means there will always be a certain proportion of slots returned to the pool to be re-allocated. The direct effect of this will be limited as it would mean around 1/10th of new capacity would be re-allocated every 15 years.

The bigger effect would come from airlines that lose slots, who are likely to respond by adjusting their schedules and route networks to be optimal. For example, an airline that uses a slot that was previously used to run a route to a commercially lucrative destination, may change an existing slot holding to ensure the route is retained. Although airlines do currently optimise their schedules from season to season, we expect the number of changes to be greater than would typically be the case at present, as their slot portfolio would change more substantially from season to season.



This would also substantially benefit airlines with greater access to existing slots as they would be working with fewer constraints in designing their network and schedules, whereas airlines with a greater proportion of time-limited slot holdings may have to make do with a sub-optimal network.

## Airline business planning, investment and financial stability

As with our assessment of Package 1, we conclude that the challenges associated with planning for the release of new capacity at Heathrow can best be addressed through an earlier allocation of slots. The approach we have proposed is designed to give airlines earlier certainty around how many (and which) slots they can expect to obtain each season, while giving them the flexibility to adjust their portfolio closer to the start of operations. This should make it easier for an airline to plan their operations, invest in the required aircraft and train ground staff, in time for the start of operations. It should also make it easier for smaller airlines to expand their Heathrow operations at scale, should they wish to do so, and should they obtain the requisite number of slots.

What distinguishes this package from Package 1, is the time-limited nature of newly allocated slot. This is likely to have some negative side-effects from an efficiency perspective:

- Although the immediate effect of time-limiting slot on an airline's business planning would be minimal, this would change as airlines get closer to the point where their slots are to be returned to the pool. Faced with uncertainty around the size of their future slot holdings, airlines may adopt a risk averse approach, reducing investment in new routes. Alternatively, they may bid for more slots than they strictly require as a way of mitigating the risk of losing some of them in future seasons.
- When airlines get closer to the end of their slot lease, there may be a reduced incentive to invest in certain airport facilities, such as airport lounges. This will ultimately depend on the extent to which airlines have continued access to other slots, e.g. an airline may lose one daily slot pair but still have access to a further five daily slot pairs, in which case investment in airport facilities would still be worthwhile. But given that airlines typically invest in airport facilities when they have substantial slot holdings, the risk of losing a proportion of them is unlikely to significantly impact the return from making such investments.
- For airlines with limited slot holdings at Heathrow, there is a greater risk of creating stranded assets. An airline losing a slot may mean it no longer has all the slots available to conduct a daily rotation (if, for example, they lost a Tuesday slot). This would have a knock-on effect on aircraft placement and crew rostering, potentially creating instances where aircraft are sat idle or crew are being paid but without a service being run.

Airlines have asserted that with time-limited slots, there would be significantly reduced incentives to invest in new aircraft or new routes. Although we believe this may be the case as an airline reaches the end of their slot holding, this is unlikely to be the case at the start. Data provided to us by IATA shows that airlines begin retiring their aircraft after approximately 15 years, though



some may be used for longer. This suggests that airlines can earn a return on an investment in aircraft within the 15-year period. Similarly, as legacy airlines typically take three to four years to make a profit on routes, we expect 15 years should be more than sufficient to ensure they make a return on new routes.

The uncertainty created by time-limiting slots will inevitably increase the riskiness of operating at Heathrow, potentially increasing the cost of capital. Whether this rises to inefficient levels, however, would depend on the extent to which airlines are exposed to higher levels of risk than they would be at other less congested airports. As we showed in Section 3, there is little churn of airlines at Heathrow due to the level of scarcity. We would expect there to be more churn at less congested hub airports, where spare capacity enables the entry and exit of more airlines and services. This creates more dynamic competition at these airports than at Heathrow, exposing the airlines operating at that airport to more competitive pressure. If the churn created by time-limiting slots mimics the competitive pressures faced by airlines at other less congested airports, then we do not consider the impact on riskiness an inefficient outcome. However, if time-limiting slots created more churn than might be experienced elsewhere, then this is likely to be an inefficient outcome.

#### 5.2.4. Domestic connectivity

As we use a stronger lever to protect domestic routes, we expect there to be greater domestic connectivity than under an allocation using the slot allocation system as it currently exists. However, as with Package 1, the likelihood of achieving the Government's ambitions for domestic connectivity will depend on the market at the time. Under this option, these ambitions will be actively facilitated using the slot allocation regime, with protections to maintain a variety of domestic connections over the longer term.

Under this option, we propose reserving 15% of new slot capacity for domestic connections. This creates a much stronger and transparent signal about the Government's ambitions for domestic connectivity, and consequently, may encourage more airlines to request slots for domestic connections. The disadvantage of the approach is that it gives ACL less flexibility to adjust the target upwards or downwards depending on the circumstances of the particular season's allocation.

There is a risk that reserving 15% of new slot capacity could lead to an overprovision of domestic connections, as the Government's target can be met without reserving as much capacity. This would come at the expense of potentially more valuable international services, creating an efficiency loss. We have therefore proposed that the 15% be revised over time to reflect the actual provision for domestic services. We have not undertaken analysis to determine whether 15% would be appropriate and recommend the Government undertakes further work to assess what the proportion ought to be.

Also, the restrictions we have proposed in terms of how slots can be used are greater than in Package 1, as airlines can only change the route of a domestic slot if it would not risk the



Government's target for 14 domestic connections. This might make some airlines hesitant to bid for such slots, similar to the hesitance of some airlines to request new entrant status even if they are eligible for it.

The guidance issued to ACL, will be used to promote the Government's target for 14 routes to domestic connections. As with Package 1, such guidance could be explicit about whether the Government wishes the domestic connections to enable onward connectivity or improved direct connectivity to London.

It is worth recognising however, that even with a ringfenced allocation of slots, the allocation system does not guarantee domestic connectivity. Whether the Government's ambitions can be met will depend on whether it makes commercial sense for airlines to run such routes. We have proposed a mechanism that allows for the proportion of slots reserved for domestic slots to be adjusted depending on how close the actual allocation is to the 15% target. We have also proposed a flexible system that ensures slots do not remain unallocated inefficiently, if there is insufficient demand to run domestic routes.

In the longer term, this option aims to guarantee that such connectivity is retained by restricting use for domestic services only. The restrictions also aim to maintain at least 14 connections, with three rotations a day. This does not guarantee it however, as an airline may choose to hand back a slot rather than run an unprofitable domestic service.



## 5.2.5. Conclusions

Table 5.2: Summary assessment of Package 2

Criteria	Score	Assessment
Efficiency Criteria		
Efficiency is assessed relative to the current allocation system, scored as follows: ✓✓ Significant improvement    ✓ Improvement ~ Neutral    X Deterioration    ? Impact unknown		
Efficiency of primary allocation	?	The allocation task is highly complex, despite the additional guidance, airline information and ACL's ability to adjust scheduling for a more optimised distribution of slots. The suspension of the new entrant rule will reduce distortions but may also make the process more challenging. A more efficient primary allocation should result if ACL is able to effectively manage additional complexity.
Efficiency in the longer term	?	Limiting grandfather rights is likely to result in increased churn over the long term as slots are returned to the pool. If Heathrow remains highly congested over the long term, and ACL's allocation is a good approximation of efficiency, churn would increase efficiency by moving away from a state of inertia, and enable new carriers to enter the market.
Competition	✓	The suspension of the new entrant rule will create a larger slot pool for smaller, growing airlines. However, the two-tier system could be distortionary; only incumbents would hold slots in perpetuity, allowing them to cement their position at Heathrow.
International connectivity	✓	Slots would be allocated based on underlying demand and therefore on high value routes. This could lead to fewer destinations served. Time-limiting slots may diminish Heathrow's attractiveness as secondary-hub, reducing destinations served. The establishment of a second hub carrier would be more challenging under a two-tier system.
Incentives	?	Time-limiting would incentivise airlines to use these slots efficiently, but also to hoard and shuffle existing slots so that those returned to the pool are least valuable.
Schedule stability	X	The increase in churn from time-limited slots would result in less schedule stability.
Airline planning, investment &	X	The risk of operating at Heathrow would increase as the end of a slot lease approaches due to stranded assets and operational





financial stability		costs and may impact the cost of capital. It may also reduce incentives to invest in new routes, airport facilities, etc.
Feasibility and safeguards for domestic connectivity		
Feasibility of the proposed reforms	<p>This package would function similarly to the current system, in that the allocation is conducted administratively. ACL would have increased discretion to make the outcome more efficient, assuming it can manage the associated complexity. The deviation from WSG could leave allocation decisions more open to challenge.</p> <p>Developing and maintaining optimised schedules would be more challenging for airlines relative to the current situation in which slots are indefinite. The allocation process would also take longer.</p> <p>This option should be capable of implementation before the opening of the third runway, despite the requirement for legislative change. We expect the outcome of this package of reforms would lead to a usable allocation of slots.</p>	
Domestic connectivity	15% of slots would be ringfenced for domestic connections, while guidance would support a route network to 14 domestic destinations. However, as with Package 1, achieving the Government’s ambitions for domestic connectivity will depend on the market.	



### 5.3. Package 3: Combinatorial auction

Managing complexity	Reduce number of auction products on offer, by auctioning 20-min daily slots rather than five-minute weekly slots
Short-term efficiency	Auction indefinite slot leases using a combinatorial auction (with accompanying property rights), with pre-declared capacity constraints for runway, terminal and stand infrastructure  Cap the proportion of slots an airline group can hold to 60% of the total
Longer-term efficiency	Allow full flexibility in buying, selling and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades  Remove UIOLI rules for auctioned slots
Aligned incentives	Remove the double allowance within the UIOLI rule for existing (non-auctioned) slots
Other Government objectives	Ringfence domestic connections

#### 5.3.1. Introduction

Core to this package of measures is the auctioning of indefinite slots using a combinatorial auction mechanism. We recognise in earlier sections the complexity of slot allocation due to different combinations of slots being complements and substitutes of one another, and the multiple infrastructure constraints that apply at Heathrow.

The auction design in this package attempts to deal with some of this complexity. Specifically, it allows bidders to provide different valuations for different combinations of slots. It also builds infrastructure constraints (beyond runway capacity) into the auction design, so that there is consideration of these constraints when determining who wins the slots.

#### 5.3.2. Practicality

Although an auction represents the most objective way of allocating slots (all the relevant considerations are simplified into a single metric, price) some of the design parameters are partly subjective and potentially open to challenge.

This auction option is likely to be complex for airlines, as they must prepare bids for potentially thousands of different slot combinations. Airlines already make similar considerations in the administrative system, but it will be a more challenging task under an auction as they are required to be more explicit. In this specific design, we have attempted to



simplify the work for airlines but doing so comes at the cost of reduced flexibility (and potentially efficiency).

Complexity poses a challenge for determining the winner of the auction, as there exists a trade-off between reflecting the reality of airport constraints and making the auction design unfeasibly complex. This auction package also creates some potentially major incompatibilities with the current system for slot allocation, which we envisage would be resolved by allowing post-auction exchanges or trades.

Notwithstanding these issues we consider that an auction of this design is practicable, and it would be possible to implement it in time to auction new runway slots, but the timeline may need to include an allowance for challenges to the auction design.

### Functionality and operational complexity

Putting together bids for an auction will be a challenging task for airlines, particularly those with strong ambitions for using new capacity at Heathrow. Many of these challenges would also exist under an administrative system, but they are likely to be greater in an auction context.

Many airlines participating in the auction may have a large number of slot combinations for which they are willing to bid. An airline would need to consider all the potential combinations of slots they may be willing to accept, including any variants considering different aircraft types and different terminal placements. Although we expect airlines will have to have some consideration of this regardless of whether there is an auction or not, there are several key differences that make the task of bidding more challenging in this package:

- Under the current administrative regime, the task is made simpler by the ability for airlines to optimise the schedules as the slot allocation process progresses. So, if an airline obtains a slot that it then cannot make it work, it can consider the alternatives and make a change request. Airlines are therefore able to rapidly iterate their requests and schedule designs in a way that is not possible within an auction. Under this auction package, airlines would need to have a very good understanding of what they are seeking to obtain right at the start of the process.
- In addition to planning the slot combinations, airlines would also need to place a monetary value on them. This would be a new step that airlines do not currently have to consider. Again, although we expect some consideration of this would have taken place even under an administrative regime (as airlines would need to assess whether to invest in a new route), we expect far more work would be required under the auction proposal.
- Airlines would also have to attach values to slots under uncertain conditions. As an auction would take place prior to the slot allocation process elsewhere, airlines would be putting in requests without knowing whether they would obtain a slot at the destination airport. This may have knock-on consequences for the valuation of several slots if, for example, the expectation was that the route would drive a lot of transfer traffic.



The challenge would be greatest for airlines with significant existing operations at Heathrow or with large ambitions for their future operations at Heathrow. This is because the number of potential variants of the distribution of slots grows exponentially with the number of slots an airline is looking to bid for.

With a combinatorial auction, there are potentially hundreds or thousands of slot combinations that an airline may be willing to bid for. We have attempted to simplify this, but it comes at the cost of reduced flexibility.

If bidders were unconstrained in determining the combinations on offer, the potential set of combinations would be so large that the auction would become unworkable in practice both for the airline and the auction coordinator. Therefore, to reduce the burden on airlines in terms of valuing potential slot combinations, and on the auction coordinator in terms of determining the outcome, we propose to simplify the auction by limiting what airlines can bid for.

Specifically, the number of packages which are theoretically available can be reduced by auctioning off slots within 20-minute windows at the same time each day. This makes the auction less resource intensive and more manageable for airlines, but also less computationally intensive for the coordinator.

We note that this package would significantly increase the degree of operational complexity for airlines relative to the current administrative approach. We also consider that it would be more operationally complex than either Package 1 or Package 2. But as we have concluded elsewhere, additional complexity is the cost of a regime which allocates slot capacity more efficiently.

Slots allocated under this package would require more complex day-to-day management to ensure usability as airlines would be free to schedule their services as they wish within the 20-minute period of their slot.

As airlines, under this package, obtain a slot with a 20-minute interval rather than a 5-minute interval, they have some flexibility in their scheduling. This makes it more challenging for airports to ensure that they have sufficient infrastructure to manage demand within that 20-minute period. However, we recognise that this is not significantly different to the present system, as although a coordination exercise currently delivers a schedule at 5-minute increments, there are inevitably day-to-day variants that have to be managed by Heathrow.

For example, Heathrow currently retains a number of stands for contingency purposes, if delays or cancellations mean that an airline is unable to depart when originally intended. Similarly, if many airlines choose to arrive at the start of their 20-minute window, the contingency stands could be used to ensure that there is enough stand capacity available. Similarly, within a 20-minute window departures or arrivals could be managed on a first-come, first-served basis.

Finally, an airline wishing to operate less than a daily service may not be able to obtain a slot from an initial auction and would be required to obtain a slot through the secondary market.

The current process auctions of each day of the week together as a single bundle of slots. Any airline wishing to only operate part of the week would need to either bid for the full week, potentially with the expectation of selling on unwanted days, or attempt to obtain slots through



the secondary market. Neither option is straightforward. The first option, in particular, would involve attempting to estimate the resale value for the days of the week that are not needed.

### Consistency with the global slot allocation process

This package of measures would create a slot allocation process that is inconsistent with slot allocation elsewhere.

This package of measures would be a fundamental break from the current slot allocation system. The way slots are defined would vary between Heathrow slots and those elsewhere (including at other UK airports). The timetable would differ, and the rights associated with slot holdings would also be different; auctioned slot leases would give airline property rights whereas existing slots would have indefinite usage rights with unclear property rights. In Package 4, we consider an approach that allows for slightly more consistency between the two systems, whereas in this package the two systems are almost completely separate from one another.

In terms of the effect of this inconsistency on the compatibility of the two processes, this package leads to some potentially major incompatibilities. It may also change how auctioned Heathrow slots are seen, with them being the foundation of an airline's slot holdings with slots elsewhere being used to work around an airline's Heathrow slots.

This package of measures requires airlines to consider the type of slot they want, the time they require, and the terminal and size of aircraft they intend to use, all before knowing what slots they have access to elsewhere. We allow for a round of secondary trading including exchanges and slot swaps, but there remains a risk of airlines winning and paying for a slot that they cannot use due to constraints at other airports.

We could mitigate this by running an auction soon after the initial slot allocation elsewhere, so that airlines have an opportunity to take that into consideration prior to putting in their bids. However, this would remove the opportunity for airlines to trade their slots before the start of the season. It would also give airlines a very short window to plan their operations before the start of the season.

### Perception of subjectivity, unfairness or lack of independence

An auction is the most objective way of allocating slots as it is all determined by different airline's valuations for slots relative to one another; value is reduced to the metric of price.

Once implemented, one of the key benefits of the auction option is that slot requests (bids) are resolved based on objective criteria (i.e. slot is allocated to the highest bidder). In theory, therefore, the outcome is easier to understand and defend. By contrast, an administrative system will necessarily involve subjective judgements. Where the facts or assumptions underlying ACL's



decision are weak or disputed, there is greater potential in an administrative system for the outcome to be challenged by the airlines with unsuccessful applications.<sup>92</sup>

However, elements of the auction design could be perceived to be subjective or unfair.

For example, the cap proposed to prevent an incumbent airline from buying up all the slots in an auction may be seen as too generous by some airlines or too restrictive by others. Although we propose consulting on the most appropriate threshold for the cap, the ultimate decision will be highly subjective. At the same time, it should be recognised that a similar judgment about capping (or not capping) incumbent airlines would need to be made by ACL under an administrative system, so this aspect of subjectivity is not necessarily unique to an auction.

Similarly, any attempt at preventing states from financially aiding their respective airlines in the acquisition of slots at Heathrow, would be perceived to be unfair or discriminatory. Existing debates around the existence (or not) of state aid between certain airlines and their governments have continued for decades with little resolution. Any action either way, in the auctioning of slots, would be considered highly controversial.

### Time to implement reforms

Implementing the reforms would require both legislative change and further work to refine and finalise the design of the auction.

This package of measures is somewhat more complex than Packages 1 and 2 and would therefore require more work to adequately design and implement the legislation. For example, the legal rights to a slot would need to be clarified before the auction. Alongside this, the detailed design of the auction would need to be refined, finalised and ideally tested before the first auction round. Both of these would need to take place in parallel to ensure that any design issues are properly reflected in the legislation.

This package is likely unachievable for any early release of new capacity given the time it takes to implement legislation, but may be more feasible for allocating new runway slots.

### Cost of slot allocation process

This process proposed within this package of measures would be significantly more costly than administrative alternatives, primarily for airlines and to a lesser extent the auction operator.

Airlines wishing to engage with an auction would need to spend some time familiarising themselves with the proposed auction format and to develop a bidding strategy. As we note previously in this section, as an airline's ambitions for their operations at an expanded Heathrow become more ambitious, the complexity of their bids increases substantially. This in turn makes it significantly more costly for them to develop a bidding strategy.

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<sup>92</sup> We consider some of the mitigating measures which could address this risk in our assessment of Package 1 and Package 2.



Smaller airlines or airlines who only require a few slots, would have simpler preferences, and should not find it as costly to engage with the auction process. For example, a small foreign carrier wishing to obtain a slot for a point-to-point service to their home country, would just need to bid to express their preferences for different time slots, without needing to have substantial regard to the impact of transfer traffic or different rotation patterns.

For the auction operator, there is a complex task of managing the auction. We expect there will be a cost associated with engaging with airlines and making sure they have sufficient familiarity with the process and the design. The running of the auction itself, while complex, should not be particularly costly as it is mostly automated through auction software.

### 5.3.3. Efficiency

This auction option should, in theory, lead to an efficient outcome, producing greater efficiency than the non-auction packages or the status quo. However, potential inefficiencies arise in several areas. Some of this is due to the inherent uncertainty that comes from running an auction before the slot allocation process for other airports is conducted. Another area of inefficiency comes from airlines having to bid for a full week of slots rather than each day of the week separately. These issues will also affect airline planning, as airlines will be bidding for slots without knowing exactly how they can use them.

Over the longer term, this auction option should be an efficiency improvement compared with the current system under an expansion scenario, as airlines face the opportunity cost of holding onto a slot. This means there is a stronger incentive to sell on the slot rather than holding on to it, if it is profitable to do so. Auctioning slots also fundamentally transforms the secondary market by formally recognising the idea of a slot as a commodity.

Regarding competition, the design of the auction partially addresses concerns related to airlines with deep pockets using an auction to purchase most of the slots. However, less can be done in response to airlines in receipt of state aid. In terms of connectivity, there are some reasons why this auction option may lead to inefficiently low levels of connectivity, by discouraging non-European airlines that have access to substitutes.

Finally, we expect the impact of this package on investment and financial stability to be relatively limited. However, we may see less of a willingness on the part of airlines to take risks on new routes where the payoffs are uncertain.

#### Efficiency of primary allocation

In theory an auction option should lead to an efficient primary allocation. However, there are areas where inefficiency is introduced into the design. We have attempted to mitigate this as far as possible, but we cannot do this fully without making the auction impractically complex.



Under this option, we expect the primary allocation to be close to the constrained social optimal (or efficient) outcome.<sup>93</sup> This is because slots would be allocated to the airline that values them the most in a competitive environment. This is a distinct advantage of the auction options; allocation options that do not utilise market-based pricing are unlikely to maximise social welfare.

However, some aspects of the auction design introduce elements of inefficiency:

- As this auction option bundles together daily slots, rather than allocating each day of the week separately, the auction outcome would not be efficient if airlines only wish to obtain slots for certain days of the week. From discussions with airlines, we understand that sometimes they may wish to run a route for only three or four days a week, as it allows them to optimise the placement of aircraft and cabin crew.

We have allowed for a round of secondary trading to allow airlines to sell-on aspects of the weekly series they do not wish to operate. This mitigates some of the effect, but there are transaction costs associated with introducing a round of secondary trading.

A similar issue arises with the length of the series. In this option, airlines can only bid for the full season, and cannot bid for a partial series (e.g. only five weeks in the summer). This could lead to an improvement in efficiency if, in the secondary trading round, airlines are able to obtain partial slot series that they value particularly highly. For example, an airline may find it's more valuable to trade on the peak summer slots to a charter holiday operation, rather than using the slots themselves.

An alternative auction design choice would be for each day of the week to be auctioned separately. However, this would substantially increase the number of products within the auction, making bidding far more complex for airlines and making solving the auction more computationally challenging. For example, assuming a 17-hour operation, moving from auctioning daily slots, to separately auction each day of the week, would mean the number of products on offer would rise from 51 to 357. The number of potential combinations to form a slot pair would rise ten-fold, likely making the auction impractical due to the complexity for both bidders and the auction operator.

- Additionally, there is a risk for airlines that they obtain a slot at Heathrow under the auction but are unable to obtain the requisite slot at the destination airport. In many of the responses to the Aviation 2050 consultation, airlines made the point that often the airports they fly to are also Level 3 co-ordinated, meaning that obtaining slots can be challenging.

To some extent this risk already exists within the administrative packages we have proposed and is something airlines must manage. However, the administrative system

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<sup>93</sup> The outcome will not necessarily be the most optimal outcome due to the proportion of slots reserved for domestic connectivity (which may not necessarily be the most efficient use of the slot but is a tool to ensure continued domestic connections).





creates a second allocation round allowing airlines the flexibility to change their slots once they have greater certainty. In an auction, this needs to be managed through a round of post auction exchanges and secondary trades. This is much more administratively burdensome than a round of allocation where the process is managed by a central coordinator. While a central exchange could be set up to facilitate these trades and exchanges, it is unlikely to match the existing process in terms of efficiency.

An auction approach would increase transparency of how slots are allocated compared with the current system, as it is based on airlines' valuations for different combinations of slots. In an auction, there are explicit rules that specify exactly how slots are allocated to airlines based on the bids, whereas in the current system, there is no formal prioritisation among the criteria used to allocate new slots. However, the combinatorial auction is more complex than the clock auction we present in Package 4, which can make the results of the auction less straightforward to understand. In particular, individual slots do not have a value, only combinations of slots have a value attached to them.

We investigate some of the potential issues with auctioning slots, commonly raised by airlines. We find it difficult to conclude that slots would go to the airlines with the deepest pockets, but we do expect some instances of the winner's curse (where airlines find they have overpaid for slots). This has some efficiency implications.

In responses to the Aviation 2050 consultation, there are several arguments made by airlines for why an auction may not necessarily lead to an efficient outcome. We consider each of these in turn:

- One issue raised is the idea that airlines are unlikely to behave rationally or may not have access to full information, leading them to overbid for access to slots. To the extent that some bidders may randomly over-value an item, such over-valuing bidders are more likely to win the auction and pay more than they later discover to be an accurate value. This is commonly referred to the winner's curse. The rational response to understanding the risk of winner's curse is to shade your bid. This means that (well-informed) bidders are encouraged not to bid the full amount they calculated as their value, but a reduced amount accounting for the unknown risk they may have over-valued. This results in some modest loss of efficiency in the auction.

The risk of winner's curse is lower in multi-round auctions where there is price discovery through observing the course of the auction. A combinatorial auction is more susceptible to the winner's curse than other auction formats as it is a single-round auction and as such, there are few price signals prior to the auction being run. Specifically, in a single-round auction, a bidder must submit its bids without obtaining any feedback about other bidders. On the other hand, in a multi-round, or dynamic auction, bidders express their demand in each round at that round's prices and then obtain aggregate demand information before bidding in the next round. Thus, a dynamic auction enables price discovery because bidders can incorporate information from others' bids into their own



bidding strategy and the final price reflects this information. This price discovery process, therefore, helps bidders avoid the winner's curse.

We can observe that airlines will have some material uncertainty over the value of slots, because they will not be completely sure of the usage of the slots at time of bidding. There are other factors in slot allocation beyond the runway, not just at Heathrow itself, but also in obtaining matching slots at the intended destination airport. This will affect an airline's assessment of their willingness to pay. In some cases, airlines will not be able to do exactly what they want and may find that they have paid more for the slot than they intended. Rationally, they should shade their bidding amount to adjust for this risk, as we already noted.

One mitigation is the quasi-second price nature of the combinatorial auction. This limits the loss of efficiency, compared with a first-price single-round auction, because a bid only affects its likelihood of winning, not the price paid. The price paid is determined by other bidders' bids.

Another mitigation is that auctions will be run repeatedly as new capacity comes online. Airlines would be able to use the results of previous auctions as a price signal to inform their bidding strategy for future auctions. This effect has been observed in other markets where auctions are run on a repeated basis, e.g. in the allocation of mobile telephone spectrum and in markets for rough diamonds. The fact that similar auctions run at different times and in different venues—and that participants can draw experience about the true value of the items being auctioned from past auctions—tends to mitigate concerns about the winner's curse. Again, this means the likelihood of the winner's curse becomes lower as the auctions become more routine. The mitigation effect would be stronger if auctioned slots were time-limited and older slots re-auctioned, thus increasing auction activity.

A further mitigation is the possibility of secondary trading. This provides airlines the opportunity to recoup some of the costs of the slot if they find themselves having overpaid for it. But this mitigation does not resolve the issue entirely. In principle the evidence of the auction is that other airlines were willing to pay what that airline paid. But when the winner finds he would now rather sell, that may depress the resale value of the slot if other airlines would have similar issues.

- A different factor that can also sometimes create a risk of overbids, but should not be confused with winner's curse, is where competitors in a market consider the auction outcome existential to their competitive position. The 3G spectrum auctions in the UK are widely considered to have suffered this issue, mainly because only a small number of large spectrum packages were made available. A bidder was at a high risk of obtaining no package and their competitive position seriously prejudiced. One result was the slower roll-out of 3G in the UK, as the large payments reduced winning bidders' financial capacity to make rapid investments to exploit the spectrum acquired. Subsequent auctions were



redesigned to reduce the issue. The issue is mitigated here, as lots are auctioned in small packages and also available through a secondary market. A stronger mitigation would be time-limited rights that are re-auctioned from time to time. But on this point the issue is no different from the present administrative system.

- Another issue raised is the idea that auctions would allow airlines with the deepest pockets, primarily those with state backing and those that are large incumbents, to obtain slots at the expense of other airlines. As data from ACL has shown, incumbent airlines and those with state backing, have been the most active purchasers of slots in Heathrow's secondary market. This suggests there is some merit to these arguments, which could be the result of two linked factors:

- The first is that such airlines value slots more than other airlines and therefore outbid them. This could be because they are incumbent carriers with a dominant market position and can therefore make monopoly profits. In response to this, we propose a cap preventing airlines from owning more than 60% of slots at Heathrow. This should prevent any single airline using the slot allocation process to try and foreclose their competitors.

Similarly, if airlines are subsidised by their state, it would allow them to bid higher valuations for slots than would be possible if they were operating on a level playing field. Within the EU, there exists regulations preventing EU governments from subsidising their airlines, making this less of a concern. Outside the EU, the existence of airline subsidies is highly disputed, with accusations frequently levelled against middle eastern carriers.

There is little that can be done to deal with airlines suspected of being in receipt of state subsidies, other than preventing such airlines from taking part in the auction. However, we must note that the distortionary effect of such subsidies goes far beyond slot auctions and would be an issue even in a slot allocation regime where airlines did not pay for slots.

- The second argument is that the airlines face fewer financing constraints and therefore can raise the cash to pay for the slot. There is significant scepticism that newer airlines would be able to raise the financing to purchase slots at Heathrow.

However, there are reasons not to expect financing constraints to disbenefit airlines without deep pockets. Firstly, the values in relation to auctioned slots are likely to be substantially lower than historic slot sales, as there will be less scarcity following expansion. This means that the cost to airlines of obtaining a slot are likely to be lower, reducing the financing constraints.

Also, as the auctioned slots will take place alongside much clearer ownership rights with no use-it-or-lose-it rule, we expect it will be much easier to use the



value of the slot to raise financing against it. This is common in the United States, where airlines frequently raise finance against their slot portfolio.<sup>94</sup>

To illustrate, the average cost of a slot pair at Heathrow currently ranges from £5 million to £15 million, depending on the time of day. This compares favourably with the cost of a new narrow-body aircraft, which ranges from \$70–120 million, particularly when considering we expect the value of slot pairs to be lower following expansion. If airlines can obtain financing for aircraft, it is difficult to see why they would not obtain financing for slots.

- Finally, airlines frequently argue that auction costs would have to be passed on to consumers in terms of higher prices. They argue that their margins are too thin to be able to absorb the costs of auctions.

We generally consider this argument to have limited merit. Air ticket prices are a function of the degree of competition airlines operating at Heathrow are exposed to. Later on in this section, we conclude that there will not be a negative effect on competition from this auction option and may well positively affect competition. As such, we consider that airlines will be constrained in their ability to raise ticket prices. This explains why airlines that have purchased slots in the secondary market, do not have systematically higher ticket prices than those that have obtained them from the pool.

Given we expect airlines to be constrained in their ability to raise ticket prices, we expect their bids would also be constrained to a level that would allow them to maintain the margin that their shareholders would expect.

### Efficiency in the longer term

This package is designed to ensure efficiency over the longer term, firstly by having an efficient primary allocation and secondly by encouraging a more liquid secondary market

In this package, auctioning slots compels airlines to recognise the opportunity cost of holding a slot. As airlines have paid for a slot, if they're no longer able to use it as profitably as they had originally anticipated, then it would be commercially optimal to trade it on the secondary market.

The results of the auction also create a price signal that facilitates trading within the secondary market. For example, some airlines are currently hesitant to engage in the secondary market as the limited liquidity makes it difficult to estimate the value of a potential slot. By having more detail on how the market values certain slots (from the results of the auction), more airlines would have confidence engaging in the secondary market and greater clarity on whether their

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<sup>94</sup> For example, when IAG acquired BMI from Lufthansa, the 42 daily landing slots it obtained at Heathrow in the process were used as security for the acquisition debt. Virgin Atlantic subsequently raised £220m through a private placement of 10 to 15-year bonds secured on portfolio of its slots at Heathrow in 2015.



valuation of a slot is greater than market rates. Similarly, auctioning slots regularises the concept of slots as a commodity with clear ownership rights, that can be traded in the secondary market.

## Competition

There are at least two key facets to any slot allocation mechanism's impact on downstream competition. First, there is the issue of whether it allows any airline or airline group the ability to build or maintain a dominant position at the airport. Second, there is the issue of the extent to which an allocation mechanism enables new entrants to add operations at the airport.

The first issue can be handled effectively within each auction option via a quantity limit. Quantity limits are limits on what bidders can obtain from the auction in isolation, or limits on the number of total slots that can be held by a single airline or airline group. With this package of measures, we propose the latter and suggest a metric, though we recommend that if this option were to proceed, it be set in consultation with airlines and competition authorities.

The second issue can also be handled effectively within the auction design. This package has sealed bid auction and is based on a solution to a winner determination problem over all submitted bids, so there is no way that incumbent airlines can specifically target entrants or try to deny them slots. It is also important that bidders are not permitted to communicate with each other about their bids or bidding strategies, and that anti-collusion provisions of competition law are enforced.

In this package, we describe the auctioning of slots with indefinite durations. The rationale for indefinite durations is to place the auctioned slots on equal footing with grandfathered slots. However, giving slots indefinite durations may exacerbate barriers to entry. An alternative approach is to give (both auctioned and grandfathered) slots a finite duration and to auction slots upon their expiry. This would make it easier for new entrants to enter Heathrow and for incumbents to offer new routes. In this package, a winning bidder would be allowed to transfer or sublease its won slots in secondary markets after the auction. A competition concern is that an incumbent airline might be more willing to transfer or sublease its leases to other incumbents than to new entrants. This could be addressed by requiring airlines to resell slot leases through a blind mechanism that does not allow them to favour particular buyers. We would recommend exploring the implementation of such a restriction, in a way that causes minimal reduction to, or enhances, secondary market liquidity.

## International connectivity

In theory, this auction would lead to as much connectivity as would be efficient. However, there are some reasons why this may not necessarily be the case

Airlines suggested that the cost of obtaining a slot through auction at Heathrow, would significantly reduce its competitiveness relative to other European hub airports. As with Package 2, the perception was that this was likely to be the case for non-European airlines where the largest European hubs are considered substitutes. Auctioning slots would, therefore, make



Heathrow less attractive than other European hubs, reducing the number of destinations served and have an efficiency cost.

However, given this is an auction, if other European hubs were perfect substitutes for Heathrow, we would expect the auction valuation of slots to be marginal or negligible. We do not expect this to be the case. Those airlines that opt not to take part in the auction are the ones that value obtaining at Heathrow slot the least.

Another issue is that airlines unused to the idea of slots as an asset, may struggle to engage with slot auctions.<sup>95</sup> Again, this is likely to be the case with airlines with less experience of the secondary market. This may create a barrier to entry into Heathrow for certain airlines with less capacity to participate, either due to limited experience or limited expertise.

To illustrate this, we note the example of different (predominantly Asian) airlines that lose their slots under the UIOLI rule at Heathrow, despite the core principle of the rule being included in the WSG for several decades. Such behaviour could be considered irrational given the high resale values for such slots; it makes little commercial sense for airlines to lose the slot under the UIOLI rule rather than sell it on. That such events happen repeatedly suggests that there are certain airlines that have limited capacity to engage with the current rules of slot allocation, which would become even more challenging under an auction option.

This will inevitably have an impact on connectivity, as it is typically certain types of carriers that are likely to be least capable of engaging with the secondary market.

## Incentives

The auction format used in this package has been designed to make it difficult for airlines to game the system.

The format of the auction is very close in its incentive properties to the Vickrey-Clarke-Groves (VCG) mechanism, where the incentive is for bidders to be truthful about how much they value a slot.<sup>96</sup> In other words, bidding according to one's true valuations for slots leads to better outcomes than alternative strategies. As such, bidders are unlikely to be able to game the system.

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<sup>95</sup> In its review of the lessons learned from the 4G radio spectrum auction, the NAO reported that some bidders considered the auction design to be so complex that it meant they did not obtain the spectrum that they desired. See National Audit Office (2014) 4G radio spectrum auction: lessons learned, <https://www.nao.org.uk/wp-content/uploads/2015/03/4G-radio-spectrum-auction-lessons-learned.pdf>

<sup>96</sup> The VCG mechanism is a generalisation of the results of a Vickrey auction (sometimes referred to as a second price sealed-bid auction). In such an auction, bidders simultaneously submit sealed bids for a single item. The person who bids the highest wins the item, but only pays the amount of the second-highest bid. So, if the winning bidder bids £100 for an item and the second highest bidder bids £95, the winner pays £95. With these rules, a winning bidder can never influence how much they pay, so there is no incentive for them to misrepresent their valuation. From a generic bidder's perspective, the amount they bid only determines whether they win, not what they pay: and only by bidding their true valuation can they succeed



## Schedule stability

We expect that this package of measures to lead to more frequent changes in the schedule from season to season, compared with an expanded Heathrow where new slots are allocated under the existing rules.

We expect there to be more changes to the schedule, compared with the current system under expansion. This is because we expect more slots would be traded between airlines through the secondary market. Generally, however, provided the release of new capacity is phased-in rather than being auctioned in totality, we expect schedule changes to be manageable.

## Airline business planning, investment and financial stability

Airlines should have enough time to plan some of their operations, but there is inherent uncertainty that comes from running an auction before the slot allocation process for other airports is conducted.

As we are proposing to run the auction roughly two and a half years prior to the start of operations, we believe airlines will have enough time to plan their operations based on the combination of slots that it obtained in the auction. Airlines will have time to lease aircraft or redeploy their existing fleet and plan their schedules accordingly. However, with uncertainty around whether an airline would receive slots at the destination airport, some of the detailed planning may not be possible until the publication of SALs at other airports (so six months before the start of the season). This may mean that airlines have to rapidly re-plan their operations once they have more certainty.

We expect the impact on investment and financial stability to be relatively limited. However, we may see less willingness to take risks on new routes where the payoffs are uncertain.

As we are proposing that slot allocations are given formal property status, against which secured loans may be obtained, we believe airlines should have minimal difficulties in financing its slot auction acquisitions. This suggests the impact on an airline's ability to raise financing for other investments, should be limited. However, this will be dependent on whether airlines have significantly overpaid for slots. In theory, airlines should only be bidding their maximum willingness to pay, and as such the effect on investment and airlines' financial stability should be minimal. In practice though, airlines will be bidding in an uncertain context (as discussed previously), which may lead to instances where airlines have overpaid for slots. Where slots are granted indefinitely, the overpayment 'premium' is likely to be higher than in a scenario where slots are granted for a limited period. This could affect an airline's ability and willingness to invest in other aspects of their service, such as new routes, aircraft or airport facilities.

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in winning when they have the highest valuation, and avoid paying more than their valuation. *Winner's curse*, i.e. risk of over-valuing and hence over-bidding, remains a rational reason to shade your bid.



### 5.3.4. Domestic connectivity

Under this option, we protect certain slots for domestic connections, which should indirectly help meet the target for 14 domestic routes. However, achieving this objective would depend on whether airlines are willing to run routes to 14 domestic airports, which is uncertain. As a result, achieving the objective cannot be guaranteed within this package.

In this auction option, we have proposed reserving 15% of auctioned slots for domestic connections as a mechanism for achieving the Government’s ambitions for domestic connectivity. Doing this will create a two-tier pricing structure, one price for unrestricted slots and another price for domestic slots. We expect the prices for domestic slots would be lower and may even be zero, as demand to run domestic services is lower than the demand to run other services.

The auction could be designed to allow airlines to express negative bids, if the Government wished. This would give airlines the opportunity to express the subsidy required to use 15% of new capacity for domestic services, if a subsidy were required. Importantly, although reserving slots ensures some domestic connectivity is maintained over the longer term, it does not guarantee that 14 domestic routes will be served. For example, an airline may find it preferable to use the slots to run to a small number of domestic airports at higher frequency, than to run fewer services to a larger number of airports. Within an auction format, ensuring connections to 14 domestic routes would involve identifying the routes to be served separately reserving slots for each of them. We do not propose this.

We expect that some airlines with existing flights to domestic destinations may bid for some reserved slots for domestic connections, while repurposing their existing slots for other destinations. This means that although overall, domestic connections will have some protection through slot reservations, it is unlikely that the 15% reserved for domestic connectivity will be completely additional to existing levels. For example, approximately 8% of Heathrow’s current slots are used for domestic connections. If the airlines serving these routes all bid for new domestic slots, purely for the purposes of transferring their domestic routes into the new auctioned slots, then the 15% reservation quota would easily be met.

### 5.3.5. Conclusions

Table 5.3: Summary assessment of Package 3

Criteria	Score	Assessment
Efficiency Criteria		
Efficiency is assessed relative to the current allocation system, scored as follows:		
✓✓ Significant improvement	✓ Improvement	
~ Neutral	X Deterioration	? Impact unknown





Efficiency of primary allocation	?	While in theory an auction should be efficient, inefficiency may result from airlines having to bid for a full daily series, as well as the uncertainty around access at the destination airport. The single-round format also increases the risk of the winner's curse, where airlines may overbid for slots due to limited information and/or irrational behaviour.
Efficiency in the longer term	✓	Auctioning creates a price signal in the secondary market and makes the opportunity cost of holding onto a slot more explicit to airlines. This is likely to increase churn in the secondary market, enabling slots to move to airlines that value them more highly.
Competition	✓	Quantity limits can prevent an airline (group) from building or maintaining a dominant position, which should enable smaller airlines to grow their operations.
International connectivity	?	Certain airlines may struggle to participate due to their limited experience or expertise, which could negatively impact connectivity. As with previous packages, auctioning would result in a concentration of high-value routes, which might result in fewer destinations being served. Requiring airlines to pay for slots may somewhat diminish Heathrow's attractiveness relative to other European airports.
Incentives	✓	The format of the auction is designed to limit the ability of airlines to game the system.
Schedule stability	X	We expect there would be an increased level of churn in the secondary market from price signals and opportunity costs, thereby leading to reduced schedule stability.
Airline planning, investment & financial stability	X	Airlines should have enough time to plan operations, but uncertainty of access at destination airports risks a requirement for rapid re-organisation. The potential for overbidding, especially in early years, could reduce an airline's willingness to experiment with new routes.
<b>Feasibility and safeguards for domestic connectivity</b>		
Feasibility of the proposed reforms		<p>The process is objective as all relevant considerations are simplified into a single metric, but the resulting operations may be somewhat complex due to the 20-minute slot window.</p> <p>The process of developing bids would be challenging and costly for airlines as they would need to identify and value a large range of slot combination scenarios, without certainty of obtaining slots at the other end of the route. It would also represent a fundamental break from the current slot allocation system.</p>



	It is feasible that this auction package could be introduced for allocating new runway slots.
Domestic connectivity	15% of auctioned slots would be reserved for domestic connections, but 14 destinations would not be specified. Achieving the Government's objectives would then be dependent upon the willingness of the market to provide those routes.



## 5.4. Package 4: Clock auction

Managing complexity	Conduct auction through a two-stage process: an auction round with a post-auction coordination exercise
Short-term efficiency	Auction 15-year runway slot leases (i.e. for a time-limited period) using an ascending clock auction format (new slots only)  Post-auction coordination exercise to be followed by an opportunity to exchange, trade or lease slots  Cap the proportion of slots an airline group can hold to 60% of the total
Longer-term efficiency	Allow full flexibility in buying, selling and leasing slots, but introduce a formal role for competition authorities in reviewing slot trades  Restrict grandfather rights to 15 years for newly allocated slots, but without UIOLI rules
Aligned incentives	Remove the double allowance within the UIOLI rule for existing (non-auctioned) slots
Other Government objectives	Ringfence domestic connections

### 5.4.1. Introduction

This package of measures involves auctioning 15-year leases to the rights to use a runway, runway slots, using a simultaneous ascending clock auction mechanism. The clock auction variant of Package 4 essentially allows for package bidding because it treats a bidder's bid within a round as a package. Thus, airlines can express a set of slots that act as complements for one another.

A key difference with Package 3 is the existence of a two-stage process to allocating slots. First, there is the auction stage when runway slots are auctioned off in a multi-round auction, and then there is a coordination stage where the runway slots are matched with associated non-runway airport infrastructure.

### 5.4.2. Practicality

This auction option is potentially simpler for airlines to engage with as airlines only need to know their preferences for slots at different times, and airlines would be allowed to iterate their preferences as the auction progresses. They would also learn about likely relative values of slots as the multi-round auction progresses.

However, the downside is that airlines are unable to express their preferences in as complex a manner as the auction in Package 3. There is also a similar trade-off between auctioning



granular amounts of capacity (such as each day of the week separately), and making the auction simple enough to participate in.

Finally, within this package, a second-round coordination exercise may identify areas where an airline wins a runway slot in an auction but cannot operate a service as they had intended, due to non-runway capacity constraints.

In terms of compatibility with the existing system of slot allocation (which will be retained at other airports in the UK and worldwide), this auction option maintains some consistency, but some incompatibilities are unavoidable.

As with Package 3, an auction is, in theory, the most objective way of making a primary allocation of slots, although some of the design parameters are partly subjective. Despite the challenging of designing and implementing an auction, we believe it would be possible to implement this package in time for auctioning new runway slots.

### Functionality and operational complexity

This auction package would also significantly increase the degree of operational complexity for airlines relative to the current administrative approach, though probably less so than package 3.

Some of the key issues we identified in Package 3, the combinatorial auction, continue to apply to this package:

- Airlines would need to place a monetary value on different combinations of slot holdings, which would be a new step for airlines to consider. This would be simpler under a clock auction because a bidder would only need to report its preferred package at the round's prices. Furthermore, bidders would be able to adapt their valuation following each round of the clock auction. So, if they find that demand for one time period is particularly strong even at a high price, they may decide to update their valuation based on the additional information.
- More importantly, airlines would have to attach values to slots under uncertain conditions. As an auction would take place prior to the slot allocation process elsewhere, airlines would be putting in requests without knowing whether they would obtain a slot at the destination airport. This may have knock-on consequences for the valuation of several slots if, for example, the expectation was that the route would drive a lot of transfer traffic.

As with the other auction option, the challenge would be greatest for airlines with significant existing operations at Heathrow or with large ambitions for their future operations at Heathrow. This is because the number of potential variants of the distribution of slots grows exponentially with the number of slots an airline is looking to bid for.

However, the simpler design of this auction makes it easier to navigate than the combinatorial auction:



- In each auction round, airlines only need to consider the complements rather than both the complements and the substitutes. They can adapt their view of what would be an acceptable substitute as the auction progresses and they have more of an understanding of demand at different time periods.
- Airlines do not, at this stage, need to express their preferences for particular terminals or aircraft sizes. This would all be done at a later stage through the coordination exercise. This means airlines can undertake their network planning after they have a better idea of how many slots they have obtained, rather than having to plan for everything in a single-round.
- Each time-period would be associated with a single price per product, making it easier for airlines to plan bidding strategies for future auction rounds.

This clock auction still requires airlines to express preferences for potentially hundreds of different slot combinations. We have attempted to simplify this, but it comes at the cost of reduced flexibility.

The number of bids an airline can bid for under a clock auction is limited by the number of auction rounds. However, given how rich airline preferences can be, there may be several dozen auction rounds before the market is cleared. At its most extreme, the auction could take place over several weeks or months before finding a winner. However, clock auctions for rough diamonds are conducted regularly and take only a few hours, and clock auctions are conducted regularly in electricity markets and take only a couple of days.

As with Package 3, we have attempted to simplify the auction design to make it easier to run. We have proposed auctioning runway slots at 20-minute intervals rather than at 5-minute intervals, and each day of the week together. This does mean however, that airlines wanting to run less than a daily operation, would either need to bid a full week and sell on the unwanted parts, or obtain the required slots through the secondary market.

This package requires a second-round coordination exercise to match the auctioned runway slots to specific bits of non-runway infrastructure. The role of ACL is a lot simpler as its job is purely to coordinate the demand for slots rather than attempting to make trade-offs between competing slot requests.

There is a risk within this package, that in the coordination exercise, airlines find that they cannot use the slot as they had originally intended as the non-runway infrastructure is unavailable. For example, it could be that the aircraft size they were planning to use is too large and, therefore, there is insufficient terminal capacity. We have attempted to mitigate this by suggesting building some redundancy into the capacity declaration. However, we do not attempt to plan for every eventuality as building in too much redundancy would be inefficient. As a result, there will continue to be a small risk of airlines not being able to use a slot as they had intended.

If this occurs, airlines have three options. They can sell a slot in the secondary market, run it sub-optimally, or wait a year until more capacity becomes available. We consider that, if an airline



elects to proceed with one of the latter two options, it would be appropriate to allocate the airline the required capacity prior to the running of the next auction round, so at most an airline loses one year of operation.

On the other hand, a key benefit is that under an auction, the role for ACL would be simpler when compared with the current system under an expansion scenario. The auction would reduce demand within each 20-minute interval to a level that is consistent with the capacity of the various bits of infrastructure. ACL would then not have to make significant trade-offs to determine which airline gets access to a slot and which airlines do not.

ACL would still need to coordinate within the 20-minute period, which means that some airlines may not get the exact schedule time they were looking for. They may also face some infrastructure constraints, as discussed previously, but these would be much more typical of the kinds of decisions ACL has to make currently.

### Consistency with the global slot allocation process

This package of measures would create a slot allocation process that is inconsistent with slot allocation elsewhere but is slightly more consistent than the combinatorial auction.

This package of measures would be a major break from the current slot allocation system used in most places. We would be introducing a new concept of runway rights, which would essentially be a way of airlines qualifying for access to slots (as currently understood). As with Package 3, the timetable would also differ, and the rights associated with slot holdings would also be different (with legally derived slot leases at Heathrow compared with indefinite usage rights elsewhere).

However, this auction package maintains the concept of an airport slot and maintains a role for ACL as the coordinator. This means that although slots would be allocated differently, the concept of a slot would remain consistent with slot allocation elsewhere.

In terms of the effect of this inconsistency on the compatibility of the two processes, this package leads to some potentially major incompatibilities.

This package is subtly different from Package 3. It remains the case that airlines would be bidding for slots without necessarily knowing exactly how they were going to use the slot but this would be determined at a later stage once airlines have a better idea of whether there were likely to receive slots at the destination airport. This package splits the process into two stages. All the airlines we spoke to place slot requests with a detailed understanding of how they are going to use them and expect to do so even under expansion.

However, this approach would not necessarily be very different from how the secondary market works currently in certain instances. For example, some of the airlines we spoke to stated that they sometimes purchased slots with a high-level view of how they were going to use them, but not necessarily with an exact plan in place. Similarly, many airline acquisitions in recent years have been as a way of accessing the airline's slot portfolio, but most of these will have taken place without detailed plans for how the acquired slots were going to be used.



## Perception of subjectivity, unfairness or lack of independence

An auction, in theory, is the most objective way of allocating slots as it is all determined by different airline's valuations for slots relative to one another. All the relevant considerations are simplified into a single metric; price. However, elements of the auction design could be perceived to be subjective or unfair.

Once implemented, one of the key benefits of the auction option is that slot requests (bids) are resolved based on objective criteria (i.e. slot is allocated to the highest bidder). In theory, therefore, the outcome is easier to understand and defend. By contrast, an administrative system will necessarily involve subjective judgements.

However, specific design considerations could be open to challenge, such as the cap on how many slots a single airline can hold, or any attempt at disqualifying airlines suspected to be in receipt of state aid.

Specifically, with this auction option, there is a separate risk relating to the post-auction coordination exercise. If an airline won a slot in an auction but then found that they were unable to use it due to other infrastructure constraints, and were also unable to find an acceptable trade in the secondary market, there may be an increased risk of challenge.

## Time to implement reforms

As with Package 3, implementing the reforms would require both legislative change and further work to refine and finalise the design of the auction, making the timetable challenging but possible. However, there is a risk of delays from challenges to the right of the Government to hold an auction in the first place, and challenges to the specific design of any particular auction round.

This package of measures is somewhat more complex than Packages 1 and 2 and would therefore require further work to adequately design and implement the legislation. For example, the definition of a runway slot would need to be introduced in legislation, with associated legal rights. Alongside this, the detailed design of the auction would need to be refined, finalised, and ideally tested before the first auction round. Both of these would need to take place in parallel to ensure that any design issues are properly reflected in legislation.

This timing is likely to be unachievable for any early release of new capacity given the time it takes to implement legislation but may be more feasible for allocating new runway slots. However, there is a risk that the implementation of the auction could be delayed by legal proceedings, should an airline challenge the Government's decision to auction new capacity, or the design of the auction process. Whilst this would be an undesirable outcome, we believe it is a likely risk and consider it prudent to incorporate the impact on the timetable within the programme for slot reform.



## Cost of slot allocation process

This process proposed within this package of measures would be significantly more costly than administrative alternatives, primarily for airlines and to a lesser extent the auction operator.

Airlines wishing to engage with an auction would need to spend some time familiarising themselves with the proposed auction format and to develop a bidding strategy. As we note previously in this section, as an airline's ambitions for their operations at an expanded Heathrow become more ambitious, the complexity of their bids increases substantially. This in turn makes it significantly more costly for them to develop a bidding strategy.

Smaller airlines or airlines who only require a few slots, would have simpler preferences, and would therefore not find it as costly to engage with the auction process. For example, for a small foreign carrier wishing to obtain a slot for a point-to-point service to their home country would just need to bid to express their preferences for different time slots, without needing to have a lot of regard of the impact of transfer traffic or different rotation patterns.

For the auction operator, there is a complex task of managing the auction. We expect there will be a cost associated with engaging with airlines and making sure they have sufficient familiarity with the process and the design. We also expect the cost will be slightly greater than a combinatorial auction as there will be multiple auction rounds rather than a single round.

Finally, there will also be a cost arising from the coordination exercise. This will be more straightforward than under the current system and therefore less costly, but would be an additional cost relative to Package 3, which does not have a coordination round.

### 5.4.3. Efficiency

This auction option should in theory lead to an efficient outcome, but potential inefficiencies arise in several areas. The most significant of these comes from airlines having to bid for a full week of slots rather than each day of the week separately, and from uncertainty around whether an airline would be able to obtain a matching slot at the destination airport. These issues would also affect airline planning, though to a lesser extent than Package 3.

Over the longer term, this auction option should be an efficiency improvement compared with the current system under an expansion scenario, as airlines would face an opportunity cost of holding onto a slot. This means there is a stronger incentive to sell on the slot rather than holding on to it, if it is efficient to do so. Time-limiting slots also creates more opportunities for future airlines to grow their operations.

Regarding competition, the design of the auction partially addresses concerns related to airlines with deep pockets using an auction to purchase most of the slots. But removing grandfather rights for new slots only could have some serious unintended consequences for competition between airlines, especially given the current distribution of slots at Heathrow. In terms of connectivity, there are some reasons why this auction option may lead to inefficiently low levels of connectivity, by discouraging non-European airlines that have access to more substitutes.





An auction of this type will inevitably increase the riskiness of operating at Heathrow, potentially increasing an airline's cost of capital, but we do not expect this to introduce financing difficulties for airlines. It could, however, affect investment in other ways, especially as these slots will be time limited.

### Efficiency of primary allocation

Again, this auction option should in theory lead to the most efficient outcome possible, but in practice, there are some areas where inefficiency is introduced. These exist as we have had to simplify the design of the auction to make it practicable and compatible with the way slots are auctioned elsewhere.

Under this option, we expect the primary allocation to be close to attaining an efficient outcome. This is because slots would be allocated to the airline that values them the most in a competitive environment. This is a distinct advantage of the auction options; allocation options that do not utilise market-based pricing are unlikely to maximise social welfare (within the constraints that exist).

However, there are aspects of the auction design that introduce elements of inefficiency:

- As with Package 3, this auction option bundles together daily slots, rather than allocating each day of the week separately, the auction outcome would not be efficient if airlines only wish to obtain slots for certain days of the week. From discussions with airlines, we understand that sometimes they may wish to run a route for only three or four days a week, as it allows them to optimise the placement of aircraft and cabin crew.

We have allowed for a round of secondary trading to allow airlines to sell-on aspects of the weekly series they do not wish to operate. This mitigates some of the effect, but there are transaction costs associated with doing so.

A similar issue arises with the length of the series. In this option, airlines can only bid for the full season, and cannot bid for a partial series (e.g. only five weeks in the summer). This is likely to lead to inefficiency unless, in the secondary trading round, airlines are able to obtain partial slot series where they value a slot particularly highly. For example, an airline may find it more valuable to trade the peak summer slots to a charter holiday operation, rather than using the slots themselves.

- Additionally, there is a risk for airlines that they obtain a slot at Heathrow under the auction but are unable to obtain the requisite slot at the destination airport. In many of the responses to the Aviation 2050 consultation, airlines made the point that often the airports they fly to are also Level 3 co-ordinated, meaning that obtaining slots can be challenging.

To some extent this risk already exists within the administrative packages we have proposed and is something airlines must manage. However, the administrative system creates a second allocation round allowing airlines the flexibility to change their slots



once they have greater certainty. In an auction, this needs to be managed through a round of exchanges and secondary trades. This is more administratively burdensome than a round of allocation where the process is managed by a central coordinator. While a central exchange could be set up to facilitate these trades and exchanges, it is unlikely to match the existing process in terms of efficiency.

- Finally, there is a risk for airlines that after purchasing a runway slot, there is insufficient terminal, stand or baggage system capacity to accommodate planned operations. The proposed coordination exercise would attempt to meet as many airline preferences as possible, but it is possible that not all airline preferences could be accommodated. This would mean airlines either run sub-optimal operations, because they are required to use a different aircraft to that originally intended; run a route at a different time etc.; or be left holding slots they are unable to use.

Building in redundancy should reduce this risk but not remove it completely. However, building in redundancy introduces a new element of inefficiency, as it means the available capacity is not fully utilised (at least until the next season when it can be re-auctioned). We have suggested building in some redundancy, as we consider the efficiency cost of airlines purchasing runway slots that they are then not use as intended, to be greater than the efficiency loss from limited redundancy.

An auction approach would increase transparency of how slots are allocated compared with the current system, as it is based on airlines' valuations for different combinations of slots. In an auction, there are explicit rules that specify exactly how slots are allocated to airlines based on the bids, whereas in the current system, there is no formal prioritisation among the criteria used to allocate new slots. Compared with the combinatorial auction, the clock auction is easier to understand and bid in and is more transparent as each time period is associated with a single price per product.

This auction takes the same approach as Package 3 in terms of dealing with the risk of airlines with deeper pockets purchasing all the slots and has similar impacts. However, this approach has a lower risk of the winner's curse.

There is a concern that incumbent carriers with a dominant market position can make monopoly profits. In response to this, we have proposed a cap preventing airlines from owning more than 60% of slots at Heathrow. This should reduce the risk of a single airline using the slot allocation process to try and foreclose their competitors.

Similarly, if airlines are subsidised by their state, it would allow them to bid higher valuations for slots than would be possible if they were operating on a level playing field. There is little that can be done to deal with airlines suspected of being in receipt of state subsidies, other than



preventing such airlines from taking part in the auction. However, this would be highly controversial and would likely require a level of proof that has not yet been met in other fora.<sup>97</sup>

Another concern related to the idea of the winner's curse, the idea that airlines are unlikely to behave rationally or may not have access to full information, leading them to overbid for access to slots. This may result in an airline reducing investment in other areas as a way of compensating for overpaying for the slot.

As with Package 3, there are some key areas of uncertainty that would affect an airline's assessment of their willingness to pay and is likely to lead to some instances of overpayment for slots. These include whether airlines are able to obtain slots at the destination airport, and whether the coordination exercise would allow them to use the airport infrastructure they wish to use. We have attempted to mitigate this by allow time for slots to be sold on in the secondary market. This provides airlines the opportunity to recoup some of the costs of the slot if they were to find themselves having overpaid. But this mitigation does not resolve the issue entirely.

Overall however, we consider there is less risk of the winner's curse under this auction option, as airlines can glean useful information from each bidding round which provides an idea of the potential market price for different slots.

### Efficiency in the longer term

As with Package 3, this auction option is designed to ensure efficiency over the longer term. However, the auction does depend upon a degree of secondary trading and other allocations to make the primary allocation more efficient, given the degree of coarseness in it. The benefits from those arrangements are lost when the package is re-auctioned and will have to be regained through secondary arrangements.

In this package, there are two measures that are designed to ensure the long-term efficiency of slot allocation:

- Auctioning slots compels airlines to recognise the opportunity cost of holding a slot. As airlines have paid for a slot, if they're no longer able to use it as profitably as they had originally anticipated, then it would be commercially optimal to trade it on the secondary market.

The results of the auction also create a price signal that facilitates trading within the secondary market. For example, some airlines are currently hesitant to engage in the secondary market as the limited liquidity makes it difficult to estimate the value of a potential slot. By having more detail on how the market values certain slots (from the results of the auction), more airlines will have confidence engaging in the secondary market and will have greater clarity on whether their valuation of a slot is greater than

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<sup>97</sup> Although there have been accusations of unfair state aid, there have not been any trade remedies instituted in response to this, either by the European Commission or the US Government.



market rates. Similarly, auctioning slots regularises the concept of slots as a commodity with clear ownership rights, that can be traded in the secondary market.

- Time-limiting rights to a slot ensures that newer airlines with the potential to use a slot more efficiently, have the ability to gain entry, or expand into Heathrow. As an airline's access to slots is no longer guaranteed indefinitely, the incentive to hold onto slots is more limited if they can sell them onto an airline that values them more.

## Competition

This package adopts a similar approach to avoiding competition issues as Package 3, with similar results. But removing grandfather rights for new slots only could have some serious unintended consequences for competition between airlines.

As with Package 3, we propose capping the number of slots that can be held by a single airline and raise the possibility of secondary trades taking place through a blind mechanism. While we consider a cap would be necessary to avoid incumbents from exploiting any market power to purchase slots, we believe a blind mechanism is unlikely to be necessary as the ability to use secondary trading to foreclose competitors is weaker.

The proposed change to the grandfather rights regime has a significant effect on competition between airlines. As we are proposing to only time-limit new slots, a two-tier slot regime is created where certain airlines have access to slots indefinitely and others only have access to them for a limited period. The competition effect of this would be limited if the distribution of indefinite slots was widely dispersed, as access to the indefinite slots would not grant a single airline (or airline alliance) substantial market power.

However, given the distribution of slots at Heathrow, time-limiting new slots may cement IAG's position as an incumbent. Airlines with time-limited slots wishing to compete with IAG, either directly at Heathrow or indirectly by enticing Heathrow passengers to travel via their hub, would face a risk of losing their slot and associated air services after 15 years. This would make it more difficult for such airlines to develop and sustain a network that effectively competes with incumbents.

## International connectivity

In theory, this auction would lead to as much connectivity as would be efficient. However, as with Packages 2 and 3, there are some reasons why this may not necessarily be the case.

Airlines suggested that the cost of obtaining a slot through auction at Heathrow, would significantly reduce its competitiveness relative to other European hub airports. We believe this is more likely to be the case for non-European airlines where the largest European hubs are considered substitutes. Auctioning slots would, therefore, make Heathrow less attractive than other European hubs, reducing the number of destinations served and have an efficiency cost.

However, given this is an auction, if other European hubs were perfect substitutes for Heathrow, we would expect the auction valuation of slots to be marginal or negligible. As we are expecting



the value of a slot at an expanded Heathrow not to be negligible airports are not perfect substitutes for one another and those that opt not to take part in the auction are the ones that value obtaining Heathrow slots the least.

Another issue is that airlines unused to the idea of slots as an asset, may struggle to engage with slot auctions. Again, this is likely to be the case with airlines with less experience of the secondary market. This may create a barrier to entry into Heathrow for certain airlines with less of a capacity to participate in auctions, either due to limited experience or limited expertise. We have proposed remedying this through extensive airline engagement prior to running the first auction.

## Incentives

Under this auction format, it is theoretically possible to game the system, but it would be relatively difficult to game it successfully.

As airlines are aware that their bids relatively early in the auction are not likely to be binding, there is an incentive to bid differently from the true intention as a way of influencing the final outcome. For example, bidding particularly strongly for a specific timeslot in earlier rounds, might be used to encourage a bidding war or to discourage other airlines from bidding for that timeslot. Alternatively, an airline might bid differently from their true demands as a way of avoiding revealing information to airlines until the last few rounds.

Successfully exploiting the behaviour of other bidders like this would be challenging however, as the airline cannot be certain of how other bidders might behave under different circumstances.

## Schedule stability

We expect that this package of measures will lead to more frequent changes in the schedule from season to season, compared with an expanded Heathrow where new slots are allocated under the existing rules, and compared with other packages.

The periodic re-auctioning of slots means there will always be a certain proportion of slots returned to the pool to be re-allocated. But we expect that there would be even more frequent changes to the schedule than under other packages, including Package 2. This is because we expect more slots being traded between airlines through the secondary market. If, following the coordination exercise, airlines find they are unable to use a slot they were allocated in the manner they wished (for example, because there was insufficient stand capacity), then their options would be limited to selling it or leasing it to another airline or using it for another purpose until infrastructure constraints were lifted.

Generally, provided the release of new capacity is phased-in rather than being auctioned off in a single go, we expect schedule changes to be manageable. However, we note that the task for airlines in maintaining a workable schedule may become significantly more challenging, particularly for airlines with large numbers of time-limited auctioned slots at Heathrow.



## Airline business planning, investment and financial stability

A two-stage process should make planning operations easier than a process where the auction is conducted through a single round, but as with other packages, there is inherent uncertainty from having an auction before an airline knows what other slots they have access to.

As we are proposing to run the auction roughly two and a half years prior to the start of operations, we believe airlines would have enough time to begin planning their operations based on the combination of slots that they obtain in the auction. Airlines would have time to lease aircraft or redeploy their existing fleet and start planning their schedules accordingly. However, detailed planning can only complete once the coordination round is also complete and when airlines know what slots they are likely to obtain at destination airports, which will happen approximately six months before the start of the season. This may mean that airlines have to rapidly re-plan operations once they have more certainty.

Having a two-stage process should make planning somewhat more straightforward as airlines have an idea of the volume of slots they have obtained and the times at which they have them, allowing them to build a provisional schedule against which they can make decisions. They can then move on to the second stage where they have to determine the type of aircraft they wish to use for the various slots and the specific schedule times they require.

An auction should not introduce financing difficulties for airlines but could affect investment in other ways.

As we are proposing that slot allocations are given formal property status, against which secured loans may be obtained, we believe airlines should have minimal difficulties in financing its slot auction acquisitions. This suggests the impact on an airline's ability to raise financing for other investments, should be limited.

In terms of investment, we would expect a negative effect if airlines significantly overpay for slots. In theory, airlines should only be bidding their maximum willingness to pay, and as such the effect on investment and airlines' financial stability should be minimal. However, in practice, airlines would be bidding in an uncertain context (as discussed previously), which may lead to instances where airlines have overpaid for slots. This could affect an airline's ability and willingness to invest in other aspects of their service, such as new routes, aircraft or airport facilities.

What distinguishes this package from Package 3, is the time-limited nature of newly allocated slots. As described in Package 2, this is likely to have some negative side-effects on airline investment:

- As airlines get closer to the point where their slots are to be returned to the pool and are faced with uncertainty around the size of their future slot holdings, they may adopt a risk averse approach, reducing investment in new routes. Alternatively, they may bid for more slots than they strictly require as a way of mitigating the risk of losing some of them in future seasons.



- As airlines get closer to the end of their slot lease, they may also invest less in certain airport facilities such as airport lounges. As discussed previously in Section 5.2.3, we believe this effect would be relatively small.
- For airlines with limited slot holdings at Heathrow, there is a greater risk of creating stranded assets. An airline losing a slot may mean they no longer have all the slots available to conduct a daily rotation (if, for example, they lose a Tuesday slot). This would have a knock-on effect on aircraft placement and crew rostering, potentially creating instances where aircraft are sat idle or crew are being paid but without a service being run.

We do expect that the cumulative effect of paying for slots and having them on a time-limited basis, may discourage airlines from taking risks on new routes where the payoffs are uncertain. However, we expect the effect to be relatively small given airlines would still have up to 15 years to obtain a payoff from a new route investment.

The uncertainty created by time-limiting slots will inevitably increase the riskiness of operating at Heathrow, potentially increasing their cost of capital.

Whether the cost of capital rises to inefficient levels, however, would depend on the extent to which airlines are exposed to higher levels of risk than they would at other less congested airports. If the churn created by time-limiting slots mimics the competitive pressures faced by airlines at less congested airports, then we do not consider the impact on riskiness an inefficient outcome. However, if time-limiting slots creates more churn than might be experienced elsewhere, it is likely to be an inefficient outcome.

#### 5.4.4. Domestic connectivity

Under this option, we protect certain slots for domestic connections, which should indirectly help meet the target for 14 domestic routes. However, this would depend on whether airlines were willing to run routes to 14 domestic airports, which is uncertain. As a result, achieving this objective cannot be guaranteed within this package.

As with Package 3, we propose reserving 15% of auctioned slots for domestic connections as a mechanism for achieving the Government's ambitions for domestic connectivity. Doing this would create a two-tier pricing structure, one price for unrestricted slots and another price for domestic slots. We expect the prices for domestic slots would be lower and may even be zero, as demand to run domestic services is lower than the demand to run other services.

The auction could be designed to allow airlines to express negative bids, if the Government wished. This would give airlines the opportunity to express any subsidy required to use 15% of new capacity for domestic services. Importantly, although reserving slots ensures some domestic connectivity is maintained over the longer term, it does not guarantee that 14 domestic routes will be served. For example, an airline may find it preferable to use the slots to serve a small number of domestic airports at higher frequency, than to run fewer services to a larger number



of airports. Within an auction format, ensuring connections to 14 domestic routes would involve identifying the routes to be served separately reserving slots for each of them. We do not propose this.

We expect that some airlines with existing flights to domestic destinations may bid for some of the reserved slots for domestic connections, while repurposing existing slots for another destination. This means that although overall, domestic connections will have some protection through slot reservations, it is unlikely that the 15% reserved for domestic connectivity will all be additional to existing levels. For example, approximately 8% of Heathrow’s current slots are used for domestic connections. If the airlines serving these routes all bid for new domestic slots, purely for the purposes of transferring their domestic routes into the new auctioned slots, then the 15% reservation quota would easily be met.

### 5.4.5. Conclusions

Table 5.4: Summary assessment of Package 4

Criteria	Score	Assessment
Efficiency Criteria		
Efficiency is assessed relative to the current allocation system, scored as follows: ✓✓ Significant improvement    ✓ Improvement ~ Neutral                                    X Deterioration                                    ? Impact unknown		
Efficiency of primary allocation	✓	While in theory an auction should be efficient, inefficiency may result from having to bid for a full daily series, as well as uncertainty around access at the destination airport. A dynamic auction enables improved participation relative to Package 3 but introduces risk of insufficient capacity once slots have been allocation through the auction.
Efficiency in the longer term	✓✓	Time-limiting the slots would result in greater churn, but long-term efficiency relies on an efficient primary allocation process. The secondary market will contribute to long term efficiency with additional churn. This is through the more explicit commodification of slots and associated opportunity cost of holding a slot.
Competition	?	Quantity limits can prevent an airline (group) from building or maintaining a dominant position, which should enable smaller airlines to grow their operations. The establishment of a second hub carrier would be more challenging under a two-tier system.
International connectivity	?	Certain airlines may struggle to participate due to their limited experience or expertise, which could negatively impact connectivity. As with Package 2, auctioning would result in a concentration of high-value routes, which may result in fewer destinations being served. Requiring airlines to pay for slots may





Criteria	Score	Assessment
		somewhat diminish Heathrow's attractiveness relative to other European airports.
Incentives	✓	It would be challenging to game the system successfully under as airlines would struggle to predict the behaviour of others.
Schedule stability	X	This package is likely to reduce schedule stability the most relative to other packages and the current allocation system due to both increased secondary market activity and time-limiting slots.
Airline planning, investment & financial stability	X	Planning should be easier relative to Package 3 as a result of the two-stage process, but uncertainty of access at destination airports risks rapid re-organisation. Time-limitations on slots would reduce the likelihood of overbidding but may increase risk and thus the cost of capital. Airlines would find this system more challenging relative to the current system.
<b>Feasibility and safeguards for domestic connectivity</b>		
Feasibility of the proposed reforms		<p>The need to value slots under uncertain conditions would result in high complexity and costs for airlines relative to administrative allocation, but less so than Package 3. The information obtained through the dynamic structure enables adaptability and reduces the initial burden.</p> <p>This package requires a second-round coordination exercise to function, which presents a risk that airlines that have won a slot may not be able to use it.</p> <p>The auction is inconsistent with global processes, but relatively objective as all relevant considerations are simplified into a single metric.</p> <p>The implementation timetable is challenging but possible.</p>
Domestic connectivity		15% of auctioned slots would be reserved for domestic connections, but 14 destinations would not be specified. Achieving the Government's objectives would be dependent upon the willingness of the market to provide those routes.



## 6. POLICY CONCLUSIONS

In this section, we:

- summarise our findings on the case for reforming the system for allocating new slot capacity at Heathrow;
- present our views on whether we consider any of the alternate approaches presented in this report are likely to improve the current system in a Heathrow expansion context;
- describe the key policy considerations for slot reform; and
- provide a view on how our findings might be applied to other congested airports facing a substantial release of new capacity, and to slot allocation more broadly.

### 6.1. Summary

We believe the current administrative system of slot allocation works relatively well in a business as usual context, but will face an unprecedented challenge by the release of new capacity at Heathrow. We have developed four options in response to this—two options that retain an administrative method for allocating slots and two auction options.

In reviewing the options, we generally find that achieving the Government’s objective of improved efficiency also implies a greater risk to practicality and deliverability. We do not have an evidence base to quantify the costs and benefits of each option, so our analysis is qualitative primarily drawn from economic theory and working through the practicality of each option. Given the uncertainties around the balance of costs and benefits, we do not recommend one particular package. The packages we have presented, however, can be mixed and matched to create a hybrid package that better fits the Government’s priorities.

Regardless of the option chosen, we have identified several policy questions that require further thought. Resolution of which may help the choice of option or development of a hybrid

Some of the measures we have proposed under the administrative system have broader applicability to slot allocation at other coordinated airports. Generally, we recommend adopting more broadly, measures that improve on the current system of slot allocation and remain consistent with WSG and / or EU Slot Regulations.

### 6.2. Case for change and alternative options for slot allocation

#### 6.2.1. Case for change

The case for using a different slot allocation system at an expanded Heathrow, depends substantially on the assumption made around whether new capacity will be over-subscribed. A key assumption we have made is that at Heathrow, the combination of many slots being allocated over a short period of time, limited scope for future releases of new capacity once these slots are



allocated, and a likelihood of there being more demand for slots than there is available capacity, will challenge the current allocation system in a way that it has not been challenged before.

This challenge exists both in terms of practically; devising an allocation that works, and in terms of meeting the Government's core objective; efficiency.

Taking the first of these, applying current processes would be challenging for all the stakeholders involved.

- Airlines that wish to obtain a large proportion of the new capacity in any one season, would need to prepare relatively detailed plans for how they wish to use the new capacity (including destinations, frequencies, schedules, and aircraft types); consider alternatives if they only receive some of the slot capacity they request, or receive it at different times than was requested; and will need to scale up their operations at only six months' notice of how much capacity they have received. Although they currently do this on a small scale, the challenge will be greater as the number of slots available is larger.
- Heathrow Airport would need to design infrastructure without necessarily knowing how much capacity each airline will ultimately receive; and would then need to coordinate terminal moves between airlines to ensure terminal constraints do not inadvertently discriminate against certain carriers.
- ACL as the coordinator, would be expected to engage with airlines and Heathrow on potentially hundreds of slot requests each season, to assess what flexibilities exist within an airline's plans and within the airport's declared capacity. Alongside this, ACL would also need to trade-off multiple competing requests, all of which might be workable from a capacity perspective and therefore be considered of similar priority under the WSG's primary and secondary criteria.

To meet the Government's objectives, ACL would need to identify the most efficient use of a slot between multiple practicable competing slot requests. We find that the primary allocation criteria are generally poor indicators of this, particularly the new entrant rule. Where ACL has the discretion to make decisions using the secondary criteria, it would be difficult to identify the most efficient use of a slot. The more over-subscribed slots are, the more challenging it is to identify the most efficient use of them.

Finally, given the existence of grandfather rights and limited liquidity in the secondary market, an initial allocation is likely to exist for a long time. Changes to the distribution of slots from secondary trading or other forms of slot mobility, will be slow to resolve inefficiencies in an initial allocation or to keep pace with changing market conditions.

For these reasons, we consider that changes are required to the current processes for allocating the large-scale release of new capacity at Heathrow. We consider that the scale of the issues we have identified is currently unique to Heathrow's expansion and consequently, the case for change is weaker for other airports facing large-scale capacity expansions. The key test for applicability elsewhere is the scale of excess demand for slots that exists following expansion. As



most airports have gradually expanded as capacity constraints have started to hit, very few have faced instances where new capacity has been insufficient to meet demand.

### 6.2.2. Alternative approaches to slot allocation

In this report, we have presented four alternative approaches to slot allocation which address the issues that we discuss above. We cannot quantify the efficiency benefits either or assess the scale of the risks we have identified. At this stage, therefore, the analysis we have presented is qualitative, drawing on economic theory, stakeholder engagement and the experience of other airports.

However, alongside this study, DfT has commissioned Oxera to conduct a behavioural experiment exploring alternative mechanisms for slot allocation. The experiments in the Oxera study test the impact of some of the changes we have proposed within this study, and as such provide some experimental evidence on the potential impacts of the various approaches.

Generally, we consider our first alternative approach—Package 1—(Incremental change to the current administrative system) to be imperfect in terms of achieving the Government’s objectives but low risk in terms of practicality and deliverability. As it maintains an administrative approach to allocating slots, there are only limited measures that can be introduced to improve the efficiency of the initial allocation. Following this initial allocation, without reforming grandfather rights, newer airlines or those wishing to grow substantially are likely to find themselves locked out of Heathrow, at the expense of longer-term efficiency. As this is an evolution of the current system however, and as the package contains measures to mitigate the key practical challenges associated with allocating slots at an expanded Heathrow; there are fewer risks to implementing it.

Our other potential packages include more substantive changes from the current system of slot allocation. As our proposed approaches depart further from the present system, there is clearer theoretical appeal in terms of improved efficiency but the risks in terms of practicality and deliverability also become greater. Within each package, we have identified practical challenges which, if material, could significantly undermine the efficiency benefits of the approach. However, given the uncertainties around how airlines may behave under each of these circumstances, we are unable to quantify the scale of these risks.

Package 2, which also maintains an administrative system, includes several more substantive changes from the current system. A key feature of the package is the limiting of grandfather rights to newly allocated slots. There is a theoretical benefit from limiting grandfather rights, in terms of maintaining efficiency over the longer term. However, where the rights of new slot holders vary significantly from the rights of existing slot holders, as is the case with this package, the distortions introduced are highly likely to undermine efficiency.

Overall, we consider that, given the current distribution of slot holdings at Heathrow, distortions from a two-tier system may well outweigh the potential efficiency benefits of greater churn through time-limited rights. This is because challenger airlines would be at a significant



competitive disadvantage relative to incumbent airlines with substantial non-time-limited slot holdings, where they would have a diminished ability to form stable schedules and networks. It would also open up the opportunity for gaming, by encouraging airlines to ensure all of their most valuable slot holdings are non-time-limited, leaving the least valuable slots to be returned to the pool periodically. As it is out of scope of this study, we do not consider in detail the impact of time-limiting all slots at Heathrow, but we do believe it has greater potential for encouraging long-term efficiency.

The other elements of Package 2 are likely to be more effective at achieving the Government's objectives than package 1. These include the suspension of the new entrant rule and ring-fencing slots for 14 domestic routes. But this is again in the context of an administrative system, where there is an upper limit on what can be achieved in terms of improved efficiency.

Package 3, which is the first of our auction options, builds the sophisticated nature of airport operations into the auction design via the setting of terminal etc. capacity constraints in addition to runway constraints. The design also allows airlines to express a rich set of preferences and, as is the clear benefit of both auction options, efficiency is more objectively understood through airlines placing a value on slots. However, improved efficiency comes at the expense of additional complexity in the auction design and for airlines and this may be substantial enough to make the approach impractical. To our knowledge an auction of this complexity has not been attempted in runway capacity allocation before. Airlines may find it prohibitively challenging to prepare detailed bids for slots and value them in an environment where they do not know what slots they are likely to receive at other airports.

Package 4, is a combined auction and second stage administrative process. It uses this two-stage process to manage the challenge of bidding for slots in an uncertain environment. However, it contains compromises that potentially reduce the efficiency benefits of an auction-based allocation. For example, the approach requires redundancy to be built into the capacity declaration. It also risks airlines purchasing slots through auction that they are subsequently unable to use as they intended, leaving them to use them sub-optimally or sell on the slot to another airline.

As we show, there is no option that is likely to work perfectly to allocate slots. Each of the options we have presented provides some clear areas of improvement over the current system when applied at Heathrow, though they all come with risks. We have not been able to quantify the net effect of these advantages and risks. DfT, in reaching a preferred option, would need to form a judgement based on its risk appetite and its tolerance for an outcome that is not perfectly efficient.

It is worth noting here that although the approaches have been presented as discrete options, the measures included within them can be mixed and matched. Elements of Packages 1 and 2 can be combined to produce a hybrid administrative option. This is important given the distortionary effects of time-limiting grandfather rights for new slots in Package 2. An alternate auction option could combine elements of Packages 3 and 4, so that there is a two-stage allocation using a combinatorial auction mechanism. The key benefit of the auction options is to maintain an



objective valuation of slots via airlines pricing them since this is the efficiency benefit that these approaches have over administrative options.

## 6.3. Key policy considerations

At a high level, our assessment has identified four potentially workable policy packages which would be more efficient, to varying degrees, than the current slot allocation regime, if implemented in the context of the expansion of Heathrow airport.

Nonetheless, our assessment highlights several important considerations which policymakers must reflect on before making a final decision on the future of the slot allocation regime in the UK.

### 6.3.1. The challenges of earlier slot allocation

We have proposed that, irrespective of whether policymakers pursue an administrative reform package or an auction-based package, the release of new capacity at an expanded Heathrow airport will be larger than anything ACL has hitherto allocated. From a coordination perspective, it is likely to be an unprecedented challenge in terms of the volume of competing slot requests in an environment where multiple parties attach significant commercial value to the outcome.

For reasons including the need to mitigate this challenge, we have recommended that policymakers legislate to allow ACL to allocate new capacity at least 30 months in advance of its availability. However, this will create its own challenges for airlines, which having obtained slots at Heathrow, face the risk that they are unable to obtain a slot at the corresponding airport for their intended route(s).

We consider that, airlines would be capable of managing this challenge through the slot conferencing process and through careful management of their existing slot holdings, with minimal impacts on the efficiency of airport operations, and ultimately end consumers. However, we would recommend that DfT, with support from ACL, engage with IATA and other national coordinators to see whether there are options to reduce this risk by providing some earlier certainty on the allocation of capacity at other capacity-constrained airports.

### 6.3.2. Role of ACL

In Section 3, we concluded that the current slot allocation regime is not well designed for making decisions about how competing slot requests should be traded-off against one another. The unprecedented release of new capacity at Heathrow leads us to conclude that the primary and secondary criteria which are suitable for the current regime are too simplistic to result in an outcome that meets the government's objectives for the efficient use of significant extra capacity. This is because several the rules implied by those criteria could have distortive effects, e.g. advantaging new entrants by virtue of their (limited or lack of) existing slot holdings over incumbents who might otherwise operate a more efficient service.



Based on our assessment, either of the administrative packages would require ACL to develop new capabilities and recruit the necessary expertise to make decisions between competing slot requests (i.e. the skills to undertake consumer welfare analysis). We consider this to be important because, irrespective of the reforms considered in this report, the potential for conflicting slot requests for new capacity is much larger than anything ACL has dealt with before.

However, in a scenario where the current primary and secondary criteria are significantly reformed or deprioritised, policymakers will need to provide new guidance to ACL on how to decide between competing slot requests. In Section 4, we presented a broad outline of new guidance to ACL that we believe would more closely align its decision-making to encouraging an efficient outcome.

The guidance we have proposed can be considered soft guidance—higher level guidelines instructing ACL on how to make trade-offs under the pre-existing criteria—rather than hard guidance—with a strict hierarchy between criteria. We have chosen soft guidance as we believe ACL's decisions will need to react to the actual requests that airlines make, and because there is less risk of airlines attempting to game their requests to meet the criteria.

We have had limited opportunity to engage in detail with stakeholders on the content of the guidance. Consequently, we recommend DfT continues to engage with industry, the CMA and ACL to develop a complete draft.

### 6.3.3. Consulting airlines on retiming historic slots

ACL may need a process for consulting airlines before it re-times historic slot allocations to accommodate new requests. Whilst some airlines told us that they would be willing, on occasion to accommodate small re-times to their slots, there were others who assert that they work to a tighter schedule. Given there are potential practical, commercial and safety consequences on their operations, airlines may sometimes object to an ACL decision to re-time their historic slot and may wish to appeal.

In our current approach, we have not proposed exactly when ACL should engage with airlines to understand the impact of potential re-times. However, as we are proposing a longer period for ACL to conduct its initial slot allocation, there should be time for ACL to engage with airlines before proposing a re-time.

To ensure our recommendation remains consistent with the scope of this study, we do not suggest giving ACL powers to re-time historic slots without an airline's consent. We recommend that DfT consults further with ACL and industry on whether such an approach would be welcome.

### 6.3.4. Designing the competition authority's role in slot transfers

We have set out in general terms a potential role for the CMA in approving slot trades via the secondary market. However, further work is required to work out the details of this reform.



We have suggested a threshold for determining the slot trades that would be within scope of competition review, which we believe is a sensible basis for further discussions with airlines. The threshold needs to be low enough to ensure trades that lead to competition concerns are referred to the CMA, but high enough to avoid overwhelming it with casework and to avoid the risk of it acting disproportionately on small trades. Similarly, there may be a case for adopting a de-minimis threshold under which trades involving a small number of slots would not be referred to the CMA.

There also needs to be consideration of trades or transfers involving related airlines, such as those within the same airline group or within an airline alliance, are treated. Although we have suggested that each airline be treated as a separate entity for the purposes of determining which trades fall into scope, alternate arrangements might be more appropriate.

Finally, we recommend consideration of whether a bespoke assessment process is needed. This work could be led by the CMA or the CAA with airlines consulted on the process. Our discussions with airlines have revealed that not all are satisfied with the appropriateness of traditional airline merger and acquisition assessments.

### 6.3.5. Making an auction compatible with the slot allocation system used elsewhere

In Sections 5.3 and 5.4, we highlight that one of the significant issues with auctioning slot capacity would be the compatibility with systems used to allocate capacity at other airports around the world. We note that an auction taking place prior to the slot allocation processes employed elsewhere would require airlines to put in slot requests for an expanded Heathrow without knowing whether they would obtain a slot at the origin / destination airport.

This is likely to be a particular issue for airlines which operate a large number of flights to other congested airports where there may be less flexibility to rearrange existing slot holdings. There may be instances where this compatibility uncertainty would dampen airline interest in bidding for slots, and therefore the valuation placed on those slots, particularly where the commercial case was heavily dependent on transfer traffic.

Ultimately, there are three ways of mitigating this issue:

- Using a round of secondary trading (including slot exchanges and swaps) after the auction to enable airlines the opportunity to optimise their slot holdings. If, for example, an airline obtains a slot at a different time at the destination airport, they can use exchanges to ensure block times remain appropriate. This is the option we have suggested within Package 3.
- Conduct an auction through a two-stage process, where airlines primarily bid for specific time slots at an auction without necessarily having a detailed view of how they are going to use them. And then airlines put together more detailed plans once they know how many Heathrow slots they have obtained and put in slot requests at other airports accordingly. We suggest this option in Package 4.





- Holding an auction after the publication of SALs for other airports, and therefore closer to the start of the season. This would provide airlines with greater certainty of available capacity at other international airports but would be difficult to manage given the short window to hold an auction. There would also be a reduced opportunity to rearrange, trade and exchange slots before the start of the season.

Therefore, if the Government wishes to develop the auction-based options further, it will need to consider how to make the two approaches as compatible as possible. Based on our assessment of the packages, we believe a two-stage approach has the most promise, but with an opportunity to exchange slots at the end of the process. We recommend that government engages further with airlines to determine, which of these methods would be most appropriate to manage the risks around compatibility.

### 6.3.6. Other recommendations

Below we make further recommendations that we believe are relevant to the Government's objectives for slot allocation at Heathrow, but not directly within the scope of our study.

#### Testing different allocation systems

One of the things we have been unable to do in this study is quantify the efficiency benefits of different policy options or assess the scale of the risks of we have identified. We generally consider that it would be difficult to do a monetised or quantitative analysis of the relative merits of different approaches, given the difficulties in anticipating:

- how airlines would bid for slots under the different options;
- how ACL would allocate slots under different administrative methods;
- how the requests would interact with Heathrow's capacity constraints; and,
- how efficient different slot allocations are.

Nevertheless, we believe it may be worthwhile to test these options under different scenarios. For example, for Package 4, it may be worth testing how different levels of redundancy would affect the likelihood of an airline obtaining a slot that they could not then use, based on historic variations in slot requests. Additionally, we understand that DfT has commissioned other consultants to undertake behavioural experiments of different allocation approaches, which may provide insight into some of the issues we have identified.

#### Ex-post reviews

If the Government chooses to retain an administrative system of slot allocation, we believe it would be sensible for there to be an ex-post evaluation of the decisions made by ACL, following the allocation of any early capacity release. This would allow the Government to test the efficiency of the existing allocation system in an expansion context, and also provide an opportunity to refine the guidance to ACL based on real data.



We also consider it sensible to begin continuous monitoring of the airline submissions and subsequent ACL decisions related to the allocation of new capacity. This would both provide further transparency for airlines and would provide the opportunity for external scrutiny of ACL's decision making.

### Role of secondary market

We consider that allocating slots indefinitely is preferable to creating a two-tier system where some slots are allocated with limited grandfather rights, but there is a long-term consequence of this in terms of limited slot mobility. We have considered some approaches to improving the liquidity of the secondary market in Section 4 and in Annex A. But we have generally erred on the side of caution to avoid recommending measures that may inadvertently reduce the number of secondary trades.

However, if the secondary market continues to function imperfectly, there may be a case for more seriously considering the reforms not proposed in this study. These include the creation of a formal marketplace for slot trades as a way of commoditising slots (and thus making price discovery easier).

## 6.4. Lessons for slot allocation elsewhere

As stated above in Section 6.2.1, there is not a strong case for substantial reform of the slot allocation at all congested airports where substantial new capacity will be released. The key test of whether the approaches we have proposed would be applicable elsewhere, is whether slots are likely to still be over-subscribed at that airport despite a substantial release of new capacity. As far as we are aware, this has not applied at any other airport prior to Heathrow but may potentially apply at other airports in future.

However, there are some measures we have proposed that have broader applicability to slot allocation. These are primarily the measures within Packages 1 and 2, which are changes to the current administrative system. Many of these measures are designed to tackle issues that exist at all slot coordinated airports but are exacerbated in a Heathrow expansion context. As such, the measures should lead to improvements to slot allocation at all congested airports.

The measures we propose be applied elsewhere, are:

- Preventing an airline from obtaining new entrant status if it is part of a larger airline group: The possibility of gaming the new entrant rule like this extends to all airports, and as such, there is little justification for not applying this provision universally to all Level 3 coordinated airports.
- Removing the priority given to re-time requests: Similarly, although we believe this measure will be applied with greater regularity at Heathrow, there may be instances where it may be appropriate to do this at other Level 3 airports.



- Providing ACL with detailed guidance on how to make trade-offs under the secondary criteria: We believe most of the detailed guidance proposed in Section 4 would be not directly relevant in the context of other airports, such as the promotion of domestic connectivity, or an airport's status as a hub. However, we believe some of the other considerations would help ACL make trade-offs at other congested airports where they may be small releases of new capacity.
- Allowing greater flexibility in buying and selling slots, but reduce the flexibility to lease slots over a longer period: This would only affect airports where trades take place (primarily Heathrow and Gatwick), but there is little justification for limiting the changes to just these airports.
- Give ACL the flexibility to re-time historic slots by up to 15 minutes without an airline's consent

Other measures we have proposed may have a case for being extended to all slot coordinated airports. Here, the measures are an improvement on the current system but do also come with downsides, or may be resisted by airlines. These are:

- Expanding the threshold for defining new entrants (beyond the changes proposed by the WSG strategic review) or removing the new entrant rule: We do consider there is inefficiency arising from the current definition of the new entrant rule, making the changes more easily justified in a context where there is a large release of new capacity and many competing demands for the slots that are released. However, justifying a divergence from WSG or EU Regulation at other airports is more difficult, as the distortionary effects of the rule are more limited.
- Extending limitations on trading and changing the routes of slots obtained through the pool: Creating restrictions on changing the routes of slots obtained through the pool is likely to limit airline flexibility unnecessarily with limited gain, if applied to other coordinated airports. Although airlines would be able to hand back a slot and request it again for a different route, in most circumstances this would be an unnecessary extra step that adds little value. However, there may be value to applying this at other congested airports if Government considers that the risk of manipulating the slot allocation system is high, i.e. at airports where there is significant excess demand at certain periods.
- Removing the double allowance within the UIOLI rule for all slots: As above, where there is more general availability of slots, there is less of a case for strengthening to UIOLI rule if it creates a divergence from WSG or EU Regulation.



## GLOSSARY AND ABBREVIATIONS

ACL	Airport Coordination Limited
Airport slot	The permission to use a bundle of airport facilities (e.g. runway, stands, terminals etc.) as necessary for an air service to take-off or land at a specific date and time
ASA	Air Service Agreement
ATM	Air Transport Movement
BA	British Airways
CAA	Civil Aviation Authority
Coordination limit	The practical capacity limit for a terminal or baggage system, used when determining whether a new slot request can be accommodated
CMA	Competition and Markets Authority
DfT	Department for Transport (UK)
DoT	Department of Transport (USA)
EC	European Community
EEC	European Economic Community
Equivalent season	Consecutive summer seasons (two summers) or consecutive winter seasons (two winters) as opposed to two consecutive seasons (a summer and a winter season)
EU	European Union
FAA	Federal Aviation Authority
FRA	Frankfurt Airport
Grandfather rights	The right to a slot based on historic usage of the same slot in the previous equivalent season, subject to use-it-or-lose it rules
HAL	Heathrow Airport Limited
Historic slots	Slots allocated based on historic precedence (i.e. grandfather rights)
HKG	Hong Kong International Airport
IAG	International Airlines Group



IATA	International Air Transport Association
Incumbent	An airline not defined as a new entrant
LAX	Los Angeles International Airport
LHR	Heathrow Airport
New entrant	An airline without an existing presence at the airport, or with a small enough presence such that they would be eligible for preference under the new entrant rule
NPS	National Policy Statement
NPV	Net Present Value
Overage	Overages refer to five-minute scheduling periods where there are more scheduled movements than permitted by the coordination limits, based on runway, stands and terminal capacity etc, but within the upper theoretical (or maximum) capacity limits
Runway slot	The permission to use a runway for an air service to take-off or land at a specific date and time
SAL	Slot Allocation List. The initial allocation of slots as published by the slot coordinator prior to the slot conference
SDG	Steer Davies Gleave
Season	Summer or winter, with the summer season commencing on the last Sunday in March, and the winter season commencing on the last Sunday in October
Slot	See airport slot
UIOLI	Use-it-or-lose-it. This refers to the principle whereby historic precedence is only granted for a series of slots if an airline uses the slot at least 80% of the time during the previous equivalent season
Upper theoretical limit	The maximum theoretical capacity for a terminal or baggage system
VCG	Vickery-Clarkes-Grove
WSG	Worldwide Slot Guidelines



## ANNEX A DESCRIPTION OF LONGLISTED POLICY OPTIONS

In this annex, in Table- A.1, we describe the longlist of policy levers identified in Section 4 and identify the key consideration necessary in determining how to apply such a lever. We also include a short justification for why certain options were not shortlisted.

Table- A.1: Assessment of the longlist options

Lever	Shortlist?	Justification
Managing the increased complexity associated with allocating a large volume of slots at a congested airport		
Allocate slots earlier	Yes	<p>Allowing ACL to allocate new capacity created by the third runway one, two or three years ahead of opening would give airlines more time to develop business cases, and more certainty as they plan their staff and fleet resources. This should result in higher quality slot requests and give ACL more time to assess competing applications. It should also give smaller airlines a better opportunity to develop their operations before the start of the season.</p> <p>Issues for consideration are:</p> <ul style="list-style-type: none"> <li>• How far in advance slots should be allocated</li> <li>• How ACL should deal with airlines wishing to change their slots once obtained</li> <li>• How an earlier allocation should link in with the existing timetable for slot allocation</li> <li>• Whether changes to the slot allocation process can be implemented in time for an earlier allocation of slots</li> </ul>
Conduct a two-stage allocation process	Yes	<p>Another option would be for slot allocation in the event of expansion to be conducted in two stages. The first stage would be to allocate slots based on overall available capacity, while the second stage would be a coordination exercise to determine how the airlines that have obtained slots use the available capacity. The aim would be to dampen demand such that the second round becomes purely a coordination exercise with less determination around whether one airline should obtain a slot at another's expense.</p> <p>Issues that would need consideration include:</p> <ul style="list-style-type: none"> <li>• How to determine the capacity that's available for the first round</li> <li>• Whether ACL should conduct each stage of the process or another party</li> </ul>



		<ul style="list-style-type: none"> <li>• How slots should be allocated in the first stage;</li> </ul>
Ensuring primary allocation is the most efficient possible		
Remove or suspend priority for retiming applications	Yes	<p>Under this option, the automatic priority given to requests to re-time historic slots over new slot requests would be suspended. If feasible, this would address the concern that under the current regime, the incumbents would be handed favourable access to the highest value, peak slots after expansion. We understand that this option has been agreed as a revision to the WSG, so that re-timed slots are given equal priority to new slot requests.</p> <p>Issues that would need consideration include:</p> <ul style="list-style-type: none"> <li>• Whether ACL would accommodate re-time requests and new slot requests on a 50:50 basis, or assess each request on its own merits</li> </ul>
Reform or suspend the new entrant rule	Yes	<p>Under this option, the new entrant rule would be redefined or suspended during the allocation of new capacity. We consider that this option could improve downstream competition between airlines, or at the very least reduce the distortions and mitigate the unintended effects of the rule. We understand that there has been an agreed revision to the WSG that increases the threshold from fewer than five slots on the relevant day to fewer than seven slots on the relevant day. This compares with a European Commission proposal to increase the threshold to fewer than nine slots on the relevant day.</p> <p>Issues that would need consideration include:</p> <ul style="list-style-type: none"> <li>• Whether the threshold for defining a new entrant should be raised from the current five slots per day</li> <li>• Whether the proportion of slots reserved for new entrants is changed from the current 50%</li> <li>• Whether there should be a separate new entrant rule at the route-level (i.e. to encourage entry on particular routes)</li> <li>• Whether the rule should be suspended entirely</li> <li>• Whether the rule should be adapted to consider route-level competition</li> </ul>
Conduct slot allocation through a lottery	No	<p>There are several designs for a lottery-based approach to slot allocation. We consider three alternate options below:</p> <ul style="list-style-type: none"> <li>• The first would involve an ex-ante determination of the number of airport usage rights to be allocated each season. These would be allocated randomly to any interested airline, with a cap to ensure that no single</li> </ul>



		<p>airline wins more than a certain proportion of the new capacity, and a second cap to ensure airlines do not get more slots than they require. There would then be a round of coordination by ACL to turn these airport usage rights into slots associated with a specific bit of infrastructure at a particular time.</p> <ul style="list-style-type: none"> <li>• A second approach would be for airlines to request slots as they currently do, but rather than relying on the secondary criteria, ACL would allocate the slots randomly between the various airlines wanting the same slot.</li> <li>• A third approach would be to determine ex-ante the type of services the Government wishes to run from Heathrow (e.g. X number of domestic services, Y services to Europe, etc.). Airlines would then bid to run such services, which would be allocated through a lottery.</li> </ul> <p>We consider that a lottery-based approach would not address the primary concern with the current allocation regime, which is that it doesn't lead to an efficient outcome. A lottery, by definition, would lead to a random allocation. It is highly unlikely that this would be more efficient than ACL attempting to determine which of competing uses is more likely to be efficient.</p>
<p>Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria</p>	<p>Yes</p>	<p>Updated guidance to ACL on the Government's objectives for slot allocation in the context of Heathrow expansion, and how those objectives relate to one another, may help to improve the transparency of the current regime. It may also help ACL to make trade-offs between competing applications in a more consistent and effective manner to achieve an outcome that meets the Government's objectives for slot reform.</p> <p>Issues for consideration include:</p> <ul style="list-style-type: none"> <li>• What should be included in the guidance</li> <li>• The extent to which the guidance should be prescriptive</li> <li>• Whether the guidance should be in addition to, or a replacement for, the existing primary and secondary criteria</li> </ul>
<p>Require airlines to provide more information when requesting slots</p>	<p>Yes</p>	<p>We consider that if airlines were required to submit more detailed information to support their slot requests, this may assess competing applications and make trade-offs between the Government's overarching objectives for slot allocation more effectively. This could support an overall more efficient allocation of scarce capacity, as well</p>





		<p>as addressing the Government’s other social and environmental objectives.</p> <p>Issues for consideration include:</p> <ul style="list-style-type: none"> <li>• What detail airlines would need to include to support an assessment</li> <li>• How the additional information would be used and in what circumstances they would be required</li> <li>• Who the additional information would be assessed by</li> </ul>
Extend the minimum series length beyond five weeks	No	<p>We consider that extending the minimum series length might avoid the issue of schedule fragmentation where peak season slots are allocated but slots outside the peak remain unallocated.</p> <p>However, we have not shortlisted this option as there is little evidence to suggest that the current minimum series length is a serious issue at Heathrow, where demand is high year-round.</p>
Give ACL flexibility to re-time historic slots	Yes	<p>This option would give ACL the flexibility to re-time historic slots, potentially allowing them to approve more airline requests and improve the overall allocation of slot capacity. This could address some of the inefficiency which is gradually locked in by the grandfather rights attached to historic slots. Such flexibility would be particularly helpful dealing with instances where certain airlines have mismatched slot series that could be aligned to create a consistent year-round operation, by changing the times of other slots. To a certain extent, we understand this occurs already through negotiations between airlines, though giving ACL the power to do this explicitly will allow them to make many more of these small optimisations to the schedule.</p> <p>Issues that would need consideration include:</p> <ul style="list-style-type: none"> <li>• Whether such changes would need the consent of airlines before being made;</li> <li>• Whether there should be an upper limit to how much ACL should be able to adjust the times of slots;</li> <li>• Whether ACL’s flexibility should be limited for short-haul flights where the potential effect for airline operations would be greater;</li> <li>• Whether this lever should be combined with slot requests including a time range rather than a specific time</li> </ul>
Auction new capacity	Yes	<p>In theory, an auction, or similar price-based allocation mechanism, would be more effective at revealing the</p>



		<p>commercial value of each slot. This would enable ACL to allocate scarce capacity to the user with the highest valuation.</p> <p>Issues for consideration include:</p> <ul style="list-style-type: none"> <li>• Whether slots should be allocated in perpetuity or for a time-limited period;</li> <li>• Whether all new slots should be auctioned, or whether only a sub-set should be auctioned;</li> <li>• What auction design should be used;</li> <li>• Whether other rules such as the UIOLI rules should be retained following slot auctions;</li> </ul>
Allocate slots as bundles	No	<p>Slots would be bundled into packages of slots and allocated as a single bundle. Such a bundle may be a daily series (so an airline can operate a route at the same time each day) or may be multiple slots each day (so as to allow sufficient rotations). The purpose of such bundling could be to ensure airlines with a smaller presence at Heathrow can obtain sufficient scale to compete effectively with incumbent airlines. If the incumbent airlines are not currently exposed to sufficient competition, bundling slots could in theory lead to greater efficiency, if it allows airlines to enter at scale. An alternative would be to bundle up domestic slots alongside unrestricted slots, so that an airline that obtains the full bundle has to operate all the services (i.e. also run domestic services).</p> <p>However, we do not proceed with this option. We do not believe this is an effective method for encouraging airlines to scale up their operations, as it is not possible for any party to pre-determine the bundle of slots that would allow an airline with a small presence at Heathrow to compete more effectively with incumbent airlines. Different airlines have different business models, and fly to different destinations, which means that each has different turnaround times and different daily frequencies. Therefore, each has a different preference for an appropriate bundle of slots. Any attempt at combining slots into bundles is likely to introduce more distortions than currently exist, resulting in greater inefficiency rather than less.</p>
Allocate slots with posted slot prices	No	<p>In this option, slots are sold for certain pre-set prices, with further rounds of slot allocation adapting the price to take it closer to the market clearing price. A major difficulty with using posted slot prices is that there does not exist a single market clearing price for a particular slot. The market clearing price of one slot will depend on how other slots are allocated as an airline's valuation of one slot will depend on the</p>



		<p>combination of slots it holds and the combination of slots its competitors hold. This makes it close to impossible to determine what the pre-set price ought to be - setting it too high would potentially create excess supply at certain times, whereas setting it too low would still leave slots oversubscribed.</p> <p>We do not consider this option further, as it does not improve efficiency in any meaningful way. If slots remain oversubscribed, the ACL would still need to determine how to distinguish between competing requests for slots. It could be argued that using posted slot prices removes airlines with low valuations, though we believe it would be difficult to set the price to a level that would do this without risking setting it too high.</p>
<b>Ensuring secondary slot mobility maintains / improves efficiency</b>		
Reform system of grandfather rights for new slots	Yes	<p>We consider that grandfather rights are the major barrier to slot churn and that, if removed, slot mobility would be significantly improved. This would allow airlines to enter and expand their operations at Heathrow after Heathrow becomes significantly slot constrained once again. However, we note that the implications of such a radical change on airline operations and incentives to invest should be explored further. We will need to consider the appropriate balance between the potential for increased competition for slots (churn) with the reduced incentives that airlines might have to invest in their services as their slots expire.</p> <p>Issues for consideration include:</p> <ul style="list-style-type: none"> <li>• Whether grandfather rights should be removed for all new slots or just a subset of new slots;</li> <li>• How long airlines should retain slots for before they re-enter the pool;</li> <li>• Whether UIOLI rules would be retained for slots that are time limited.</li> </ul>
Restrict anti-competitive covenants	No	<p>Anti-competitive covenants relate to conditions attached to secondary trades (purchases and leases) that restrict an airline's ability to use the slot as they wish (e.g. by preventing them from competing on certain routes). We do not consider this option further as there is little evidence that this is a common practice in the UK, and it is unclear that competition law would not be sufficient to deal with such practices.</p>
Give airlines greater airline flexibility to sell or lease slots	Yes	<p>There are a range of smaller interventions which could encourage a more liquid secondary market. These include removing the requirement to exchange slots; explicitly allowing slot leases; and allowing sales and leases across the year rather than during slot allocation seasons. Cumulatively, these could</p>



		<p>ensure that the secondary market is more effective at addressing some of the inefficiency which develops over time, by reducing the barriers for challenger airlines to purchase and lease new slots.</p> <p>Issues for consideration include:</p> <ul style="list-style-type: none"> <li>• Should there be flexibility for both selling/buying slots and leasing slots, or should it just be for one form of secondary trading?</li> </ul>
<p>Competition authority role in slot transfers</p>	<p>Yes</p>	<p>This option would help to prevent the accumulation of market power by incumbent airlines through the secondary market. This would address one of the main concerns with the secondary market—that the incumbent airlines would be able to use their financial muscle to outbid challengers and new entrants to gain a more dominant market position. It also creates consistent treatment between slot purchases and airline purchases that involve the acquisition of the airline’s slot portfolio. It may also reduce the incentive on incumbents to purchase slots as a way of preventing competitors from obtaining them.</p> <p>Issues for consideration include:</p> <ul style="list-style-type: none"> <li>• The threshold to determine which secondary trades would be referred to the competition authority;</li> <li>• Whether there should be a bespoke assessment process, or whether it should follow typical merger and acquisition processes;</li> <li>• Whether the CMA has the capacity to handle the number of assessments required.</li> </ul>
<p>Introduce greater transparency in secondary slot trading</p>	<p>Yes</p>	<p>Greater pre-trade transparency may involve requiring airlines to advertise slots they wish to sell or lease. Post-trade transparency may involve requiring airlines to report when trades have taken place, potentially with details of the trade (e.g. is it a lease or a permanent sale, did it involve compensation, etc.). Alternatively, ACL (or another body) may wish to publish average price information based on trades that have taken place. Each of these levers would be designed to provide more information to other potential buyers or sellers, encouraging those who would otherwise be hesitant, to participate in the secondary market.</p> <p>Considerations include:</p> <ul style="list-style-type: none"> <li>• Should there be pre-trade transparency or post-trade transparency, or both?</li> </ul>



		<ul style="list-style-type: none"> <li>• What information should be shared? Just the existence of a trade or the particulars of the trade?</li> <li>• Should the rules cover sales, leases, non-compensation exchanges, or a combination of all of them?</li> </ul> <p>The UK slot market does have some transparency regarding trades. All slot exchanges are reported on the ACL website. While we consider some small interventions to improve transparency further, we consider that some of the more major interventions would likely reduce the liquidity in the secondary market.</p> <p>Airlines may be reluctant to advertise their willingness to sell a slot if doing so risked discouraging investors.</p> <p>Similarly, sharing price information may provide regulatory authorities and competitors more information than an airline would be comfortable providing. And given the limited liquidity of the secondary market and the bespoke nature of secondary trades, it is difficult to see how post-trade price data could be aggregated in any meaningful way.</p>
Create a formal marketplace for secondary trades	No	<p>A formal marketplace could take different forms. At the far end of the spectrum, airlines could be required to trade through an official marketplace and to trade anonymously (so that the seller has to sell blindly to the highest bidder).</p> <p>We do not shortlist this option under an administrative system as we consider the impact on liquidity is likely to be neutral or negative. Most historic secondary trades have been highly bespoke, usually being part of a wider agreement that may involve leasing arrangements, aircraft sharing etc. Creating a formal marketplace may undermine future trades by limiting the scope of the agreement.</p>
Reducing the incentive and ability to make speculative slot requests, or manipulate the slot regime		
Reform the use-it-or-lose-it rules	Yes	<p>This option would increase the cost to the airline of making a speculative slot request, as it could afford fewer cancellations. But we note that utilisation at Heathrow is regularly above 90% at present and that this change may only have a marginal impact on incentives unless the required utilisation rate is raised significantly.</p> <p>Issues for consideration include:</p> <ul style="list-style-type: none"> <li>• What the threshold for the UIOLI rules should be;</li> <li>• Whether any events outside an airline's control should be included within the utilisation calculation.</li> </ul>



<p>Removing priority for re-routed applications</p>	<p>Yes</p>	<p>Under this option, the automatic priority given to requests to change the route of historic slots over new slot requests would be suspended. We consider that this option would address some of the perverse incentives on airlines to make speculative slot requests, or to try to game a reformed slot allocation regime.</p> <p>However, we note that many re-routing applications could be supported by a legitimate justification (e.g. security or political factors beyond the airline’s control) or would result in a more efficient use of capacity.</p> <p>We will need therefore need to consider the role of ACL in determining when airlines use these applications to manipulate the allocation regime for commercial gain.</p>
<p>Introduce slot deposits or slot fees</p>	<p>No</p>	<p>Under this option, airlines would pay a deposit on obtaining a slot, which would be refunded if airlines use the slot or hand the slot back within the deadline. However, if the slot is handed back after the deadline, the deposit is forfeited. This would encourage airlines to return slots before the slot hand back deadline.</p> <p>An alternative would be for deposits to be forfeited if airlines return slots after obtaining them (i.e. even if they return the slot before the hand back deadline). This would reduce the incentive for airlines to overbid for slots that they have little intention of using.</p> <p>We do not shortlist either variant as there is little evidence to suggest that slot hand backs are likely to be a significant issue at Heathrow. It would also be difficult to determine the appropriate size of the deposit; too low and it would fail to discourage such behaviour, whereas if it is too high, it could have the unintended effect of encouraging airlines to use the slot to avoid the sanction, even if it was more efficient to return the slot to the pool. We suggest non-financial sanctions (described below) would be a more effective deterrent against such behaviour.</p>
<p>Extend limitations on trading or using slots obtained through primary allocations</p>	<p>Yes</p>	<p>Extending the limitations on trading slots acquired via the slot pool to all airlines would reduce the incentive on airlines to make speculative slot requests by compelling them to operate the proposed service for a specified period of time before being able to sell or lease them on.</p> <p>Similarly, extending limitations of how slots can be used, so that they can only be used for the originally stated purpose, might reduce the incentive for airlines to try and game ACL’s decision-making process. It might also address some of the Government’s objectives around international connectivity and</p>



		<p>competition between airlines. However, we will also need to consider the potential impact on the rate of slot churn, and whether it is likely to result in an overall more efficient allocation of capacity.</p> <p>Considerations include:</p> <ul style="list-style-type: none"> <li>• Whether new entrant slots should be treated differently to slots not allocated through the new entrant rule;</li> <li>• Whether the limitation should be on trading slots, using slots, or both;</li> <li>• How long such limitations should exist.</li> </ul>
Sanctions for late or repeated hand-backs	Yes	<p>An alternative to financial sanctions for late hand-backs or repeated hand backs, the threat of lower priority in future allocation rounds could have more of an effect in reducing the incentive for airlines to abuse the slot allocation system in a deliberate attempt to prevent competitors accessing valuable capacity. We shortlist this option as we understand that it is suggested as an approach within the WSG.</p> <p>We will need to consider:</p> <ul style="list-style-type: none"> <li>• Whether ACL could police such behaviour effectively;</li> <li>• Whether such sanctions would be automatic or whether they would apply at ACL's discretion.</li> </ul>
Reform the new entrant rule to remove ability to game the rule	Yes	<p>This option relates to two specific loopholes to the new entrant rule.</p> <p>The first is the ability of airlines to set up a subsidiary as a way of obtaining slots under the new entrant rule, simply to transfer the slot to the parent company. The second is the ability of airlines to transfer or sell slots in order to become eligible for slots under the new entrant rule.</p> <p>Under this option, both of these loopholes would be closed.</p>
Give ACL the ability to explicitly reject suspected speculative requests	No	<p>Under this option, ACL would be given the ability to explicitly reject airline requests it considers speculative.</p> <p>We will need to consider:</p> <ul style="list-style-type: none"> <li>• How ACL would identify whether a slot request was speculative, and the bar for judging a speculative request</li> <li>• Whether airlines would have an appeal route if they thought the request was speculative</li> </ul>



		We do not shortlist this option as we consider it would be immensely challenging for ACL to identify a speculative request with enough certainty to reject it. Instead, we consider that being able to attach conditions to requests would be a more proportionate and effective tool.
<b>Meeting the Government’s ambition for domestic connectivity and environmental objectives</b>		
Provide ACL with detailed guidance on how to make trade-offs under the secondary criteria	Yes	<p>More detailed guidance may help ACL to protect and develop a minimum number of domestic routes and/or the Government’s other objectives for the use of capacity at Heathrow, especially where assessing competing bids may involve trading-off between these objectives.</p> <p>But ultimately, this option would not guarantee a minimum number of domestic services, as it would depend on voluntary decisions by airlines to request slots for domestic services (which they may then use for other services).</p>
Ringfencing slots for domestic connections	Yes	<p>Therefore, we will also consider mandatory ringfencing of slot capacity for specific uses. This would give ACL greater ability to steer the market towards bidding to deliver outcomes that it would not otherwise provide.</p>
Allocate slots with environmental restriction (green slots) or include environmental considerations as part of the secondary criteria	No	<p>Under this option, certain slots would be reserved for airlines using aircraft that meet environmental criteria, or given priority of they choose to use aircraft that meet environmental criteria, such as noise or greenhouse gas emissions.</p> <p>We do not shortlist this option as it does not specifically deal with the issues we have identified. Although it does aim to support the Government’s objectives in relation to the environment, the measures create further distortions in the allocation of slots. These are likely to make the measures either ineffective or come at a large cost to efficiency. For example, with the exception of noise restrictions for slots allocated in the night period, it is not clear what the value would be to only have some slots with environmental restrictions. This would create an incentive to move environmentally friendly aircraft onto the green slots, without leading to an overall benefit.</p> <p>There are some instances where it makes policy sense for specific slots to be associated with environmental restrictions. This should be applied, as currently, through local rules. For example, local rules could be used to have a maximum limit on the noise emissions from aircraft flying during the night period.</p>



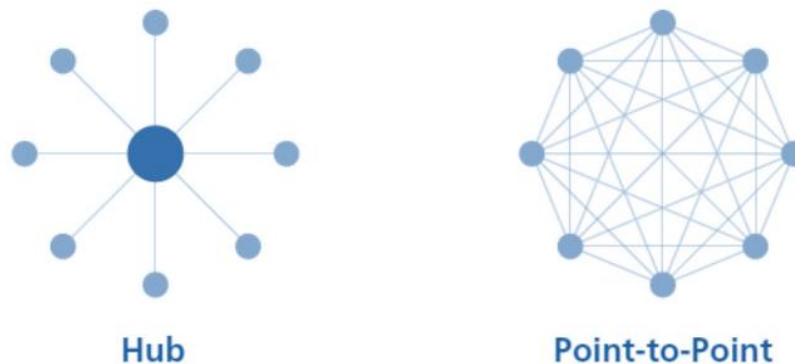


## ANNEX B EFFICIENCY AND HUB NETWORKS

### The efficiency benefits of hub operations

Hub and spoke networks began forming following the deregulation in the US domestic market in the late 1970s, and have since expanded across the globe. Hub airports are used by one or more airlines to pool both passenger traffic and operations. They act as a central point, allowing passengers to transfer to a wider range of final destinations. The design of a hub and spoke network compared with a point-to-point network is shown in the figure below.

Figure- B.1: Hub vs point-to-point connectivity



A hub acts as a consolidation point by pooling demand. By feeding traffic through a single hub airport, a hub airline can increase both connectivity and frequency. Where there may not be enough demand from an airport's catchment area to serve a destination, feeding additional traffic through the hub can make routes to those destinations commercially viable. Similarly, feeding traffic through a hub allows for greater frequencies than would otherwise be possible, giving passengers more choice over flight times.

The key efficiency benefit of a hub and spoke network is that it allows an airline to serve the greatest number of destinations with the fewest routes of any alternative design, with the fewest number of aircraft.<sup>98</sup>

By centralising operations, the hub carrier can benefit from increased passenger density and therefore economies of scale. The large-scale economies from hubbing suggest that a concentrated industry focusing on a relatively small number of hubs should emerge over time.<sup>99</sup> Consumers then benefit through lower fares, assuming there is enough competition to prevent the airline from abusing market power and overcharging passengers.

H&S networks allow for a seamless passenger experience when an indirect flight is the only option for a particular route. They benefit from a multitude of factors such as single check-in,

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<sup>98</sup> Cook & Goodwin (2008) *Airline Networks: A Comparison of Hub-and-Spoke and Point-to-Point Systems*.

<sup>99</sup> Starr & Stinchcombe (1992) *Efficient Transportation Routing and Natural Monopoly in the Airline Industry: An Economic Analysis of Hub-Spoke and Related Systems*



reduced transfer time, better infrastructure and more efficient ground operations (e.g. baggage handling). A hub carrier is also incentivised to invest in airport facilities at its hub airport, such as lounges, to encourage a positive passenger experience and repeat business.

It has been suggested that hub operations lead to certain economic benefits that don't exist with point-to-point networks. This includes, supporting freight operations as there are more larger aircraft with longer turnaround times,<sup>100</sup> generating more employment than non-hub carriers,<sup>101</sup> and increasing economic activity through better connectivity.<sup>102</sup> <sup>103</sup>

However, it is important not to overplay the efficiency benefits of hub operations. Hub operations typically require passengers to transfer at a hub airport, imposing a time and inconvenience penalty. Point-to-point networks, on the other hand, allow passengers to fly directly to their destination, which is often preferred by time-sensitive passengers. As a result, there is increasing demand for passengers for direct services between different long-haul destinations, bypassing hubs.

Additionally, as hub operations are typically associated with legacy, full-service carriers, they typically have a large cost base that make certain routes unviable even with the benefits from hubbing. Low cost carriers have been able to exploit this to create large point-to-point networks, serving routes that were previously thought to be not commercially viable. Within Europe, such networks have often outcompeted legacy hub carriers.

## Hub airports and models of competition

The standard model of a hub operation is for an airline to operate their hub network from a single airport. Examples of this include KLM at Amsterdam Schiphol and Emirates at Dubai Airport. Under this model, the network externalities from hubbing are maximised as all traffic is fed through a single airport.

A hub airline may choose to enhance their hub operation by participating in cooperative arrangements with other airlines such as an alliance or joint venture. The other airlines within the cooperative agreement may also operate hubs, easing transfers through their collective network. For example, the partnership between British Airways and American Airlines allows passengers to transfer seamlessly between London, Fort Worth and Laredo.

One airline may choose to operate out of multiple hubs. This may be the case if, for example, there is limited capacity at a carrier's primary hub causing it to use a secondary or reliever hub. Typically, one airline using two hubs is not considered an optimal solution as each additional hub in the network reduces the density economies and introduces additional complexity. However, if

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<sup>100</sup> Compass Lexecon (2019) State of airline and airport competition in the United Kingdom

<sup>101</sup> ITF (2013) Airport Capacity Expansion Strategies in the era of Airline Multi-hub Networks

<sup>102</sup> Bel & Fageda (2009) Privatisation, regulation and airport pricing: an empirical analysis for Europe.

<sup>103</sup> ACI Europe (2015) The impact of an airport



each hub is surrounded by a large enough market, this strategy may make sense. For example, many US airlines operate secondary hubs out of Los Angeles, New York and Chicago.

In some instances, two or more hub airlines may share a single hub airport, particularly where the catchment area of the airport is particularly large. In such instances, there may be enough demand from the area surrounding the airport to sustain multiple competing hub operations. Whether such shared hubs are sustainable and efficient is relevant in the context of Heathrow's expansion, as we know Virgin Atlantic intends to use expansion at Heathrow to build a hub operation to compete with British Airways' existing operation.

Finally, multiple hub airlines may form a virtual hub operation from a single airport. Such a model may be explicitly enabled, through code sharing agreements or joint ventures between airlines, or through airport attempts at easing transfers between multiple airlines. Alternatively, it may be an unofficial operation where passengers choose to self-transfer between different flights, each served by a different airline. Such a model does not currently exist but is being attempted at airports such as London Gatwick.

### Efficiency of shared hubs

Overall there is very little literature regarding two hub competing hub carriers sharing the same airport as a hub, suggesting this has not been a subject of considerable debate. We find there are two opposing effects of this arrangement: scale economies and competition. The former effect implies that it is more efficient for a single carrier to use a single hub. As the airline grows, it will experience economies of scale and network externalities, leading to reduced costs for passengers, and density economies, thereby increasing connectivity. This also allows the hub airport to more effectively compete with other airports which may provide an alternative route for transfer passengers. However, we expect that such scale economies are not indefinite and diminish beyond a certain scale.

Assume there is sufficient demand to introduce a new or additional route. Theory suggests that passengers should receive a lower price if the largest carrier operates the route, given its relative density economies. If the carrier operates the route as a monopoly however, the cost savings may not translate, (this argument applies to any monopoly carrier, whether or not it is the sole hub carrier). A single hub airline operating in a market is likely to hold a monopoly position on certain routes. The market power of the hub carrier enables it to overcharge consumers for the service provided.

Conversely, if a second hub carrier was to enter the market, the resultant competition could lead to improved operating efficiency for both airlines, driving down prices. This may induce enough demand to allow two competing operations to be sustained and outweigh the density economies from having a single hub operation.

However, a shared hub may introduce an overlap issue when it comes to feeder traffic. The second hub airline requires feeder traffic to make its longer distance routes commercially viable. This may result in some passengers shifting away from the feeder traffic of the original hub carrier, and potentially impact the viability of its long-haul routes, thus reducing the connectivity



from the original hub carrier. What is important here is the net connectivity effect, which ultimately depends on the extent to which competition induces demand that would not otherwise exist. Although not directly applicable, the experience of airlines such as Ryanair is relevant in this context., which have used efficient operations to induce demand for air services between destinations, where services did not previously exist.

The arguments regarding shared hubs are mainly theoretical, with limited empirical evidence. There have been several attempts to establish shared hubs, some of which have been successful whereas others have not. Examples of both successful and failed attempts are outlined in Table-B.1 below.

Table- B.1: Examples of shared hubs

Airport	Airlines	Comment
Failed		
London Heathrow International Airport	British Airways and British Midland	British Midland failed, purchased by BA
Hong Kong International Airport	Cathay Pacific, Oasis and Hong Kong Airlines	Oasis ceased operations; Hong Kong Airlines is in financial stress
Dallas Fort Worth International Airport	American Airlines and Delta	Delta closed hub in a restructuring to avoid bankruptcy
Successful		
Chicago O'Hare International Airport	United Airlines and American Airlines	United operates out of eight hubs and American out of ten.
Tokyo Narita, Tokyo Haneda and Osaka Kansai International Airports	Japan Airlines and All Nippon Airways	ANA operates out of three hubs, and Japan out of four.
Seoul Incheon Airport	Korean Air and Asiana Airlines	Asiana operates a secondary hub at Seoul Gimpo International Airport

Source: CAPA; American Airlines and Virgin Airways responses to Aviation 2050

## Heathrow as a shared hub

IAG has held the majority of ATMs at Heathrow since 2013. In its response to Aviation 2050, Virgin Atlantic suggests that, due to the scarcity of slot at Heathrow, insufficient transfer traffic and IAG's proportional holding, no other airline is able to effectively compete at scale. This enables IAG to operate a number of monopoly routes, leading to "higher fares, limited choice and



less innovation for passengers".<sup>104</sup> Conversely, IAG takes the view that one strong hub carrier operating from Heathrow is able to maximise connectivity and offer lower prices for passengers, and is therefore vital in achieving the increases consumer welfare and economic benefit outlined in the Government's Aviation Strategy.<sup>105</sup>

Supporting the notion that British Airways should remain the dominant hub carrier, the ITF has found that connectivity increases in a non-linear way; the connectivity of one large hub is larger than the sum of two hubs that are half the size.<sup>106</sup> This suggests that the introduction of a second hub carrier at Heathrow may reduce rather than increase connectivity, and is important when considering Heathrow's ability to compete with other European hubs.

Given that Heathrow has suffered from capacity constraints for a number of years, there is likely to be pent-up demand for service. As London has a large catchment area with strong demand for air travel, previous studies have suggested it is one of the only places in Europe that has the potential to support two competing hub carriers.<sup>107</sup> The scale of additional capacity provided by R3 may theoretically provide space for an additional hub carrier, particularly if that carrier already has a significant slot holding at Heathrow. However, if the new hub carrier is to effectively compete with British Airways, it would require a large proportion of the R3 slots to reach the required density economies (depending on its current slot holding).

There is a risk that the introduction of a second hub carrier may negatively impact British Airways' willingness to continue investing at Heathrow. For example, British Airways has committed to introduce automated boarding gates and self-service bag drops in T5. Depending on the level of investment from the other hub airline, this may not be a desirable outcome for Heathrow or passengers.

The opposing impacts and lack of empirical evidence make it difficult to draw any conclusions as to whether or not a shared hub in this context should be actively supported by the Government. Rather, it brings to light the issues with pursuing a singular solution, such as specifying a type of competition. It would be preferable to allow the market to determine whether a shared hub at Heathrow leads to greater efficiency than a single hub operation. Also, in relation to whether the Government should support one model over the other is likely to conflict with the principles of neutrality and non-discrimination.

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<sup>104</sup> Virgin Atlantic response to Aviation 2050: The Future of UK Aviation

<sup>105</sup> Compass Lexecon (2019) State of airline and airport competition in the United Kingdom

<sup>106</sup> ITF (2013) Airport Capacity Expansion Strategies in the era of Airline Multi-hub Networks

<sup>107</sup> ITF (2013) Airport Capacity Expansion Strategies in the era of Airline Multi-hub Networks



## ANNEX C CASE STUDY OF PLANNED NEW YORK AUCTION

In 2008, the Federal Aviation Administration (FAA) and the US Department of Transportation (DoT) made advanced preparations to auction take-off and landing slots at the three main airports in the New York area: LaGuardia Airport (LGA), John F. Kennedy International Airport (JFK), and Newark-Liberty International Airport (EWR). These preparations extended to carrying out a demonstration event to allow airlines to participate under the detailed auction rules which had been designed and see the results of those mock auctions.

The origin of the requirement for the auction was that the FAA and DoT proposed reducing the number of available slots slightly from existing levels, as a way of reducing delays. The New York airports were highly congested, and cascading delays emanating from New York were believed to cause more than half of all air traffic delays east of the Mississippi River. At LGA in particular, it was estimated that during every hour of the day from 6 am to 10 pm, there were more flights scheduled than the runways could physically accommodate.

In addition to capping the number of slots, 10-year leases for 90% of the available slots would be grandfathered to the airlines that were currently operating at these airports at the time, and 10-year leases for 10% of the available slots would be auctioned gradually over the following five years.

The aim of the auction proposal was to create a more efficient allocation of slots, provide opportunities for new entry, and to reduce congestion. The existing slot allocation system at LGA, JFK, and EWR was considered highly inefficient, with new entry at LGA nearly impossible. The auction would encourage a portion of the slots at these capacity constrained airports to be allocated to the users that valued them the most. The gradual auctioning over five years was designed to facilitate entry.

The auction proceeds would be retained by the FAA. After recouping its costs, the FAA intended to spend the remainder of the proceeds on aviation capacity enhancement and delay management initiatives in the New York City area.

The first auction event was planned for 12 January 2009. Slots at each airport would be assigned in a separate auction, but the three auctions would be conducted simultaneously. A slot was defined as the operational authority to conduct a single scheduled operation (landing or take-off), seven days a week, during a specific 30-minute period at a specific airport. The duration of the assignment of each auctioned slot was planned to be about 10 years (from 8 March 2009 to 9 March 2019 for slots associated with LGA, and from 25 October 2009 to 30 March 2019 for slots associated with JFK and EWR).



Each auction would use a single round combinatorial auction format.<sup>108</sup> Prices would be determined with a second-price approach.<sup>109</sup> In each auction, each bidder would have the opportunity to bid for packages of slots at the particular airport. There would be no quotas for certain types of flights, routes, or airlines.

A bid would consist of a package of quantities for requested slots and an associated price for the package. For instance, a bidder could submit a bid for a package with two units for the 6:30–7:00 slot, one unit for the 7:00–7:30 slot, two units for the 8:30–9:00 slot, and three units for the 9:00–9:30 slot (all at LGA) with a bid amount of \$30,000. Such a bid would indicate that the bidder was willing to pay up to \$30,000 for that package. The actual payment that the bidder would have to make if it won that package could be less than \$30,000, because of the second-price aspect of the pricing rule. However, the payment would necessarily be at least the sum of the reserve prices of the slots in the package, which was \$10,000 for a peak slot and \$100 for an off-peak slot.

Each bidder could submit up to 2,000 mutually exclusive bids for each of the three airports. This means that, for each airport, at most one of the bids of a given bidder could become a winning bid. Submitting mutually exclusive bids is a fully expressive bidding language that allows bidders to express both complements (e.g., between a pair of slots for take-off and landing) and substitutes (e.g., a slot at 9:00–9:30 and a slot at 9:30–10:00). This was the chosen method for ensuring that airlines were able to express how much they were willing to pay extra for a particular combination of slots, relative to if they only obtained some of them.

To determine winning bids, a computer programme would find the combination of bids that maximised the sum of bid amounts across all selected bids, subject to the constraints that:

- (1) each bidder has at most one of its bids selected; and

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<sup>108</sup> A combinatorial auction is where bidders bid for indivisible packages of lots, which they have selected from the available lots. Such package bids are either fulfilled in full, or not at all. For such auctions to be meaningful, bidders are permitted to make numerous alternative package bids, only one of which will be accepted. The alternative bids thus represent their willingness to accept alternatives if their ideal bid is not accepted. The bids are packaged to allow bidders to reflect that certain lots together are worth more to them. The solution of the auction requires the auctioneer to assess which set of non-overlapping packages (a *feasible allocation*), at most one each from each bidder, has the largest bid value. The set of winning bids therefore maximises the value raised from the set of allocations which are feasible. The exact solution of large combinatorial auctions involves more computations than any conceivable computer can make. But modern algorithms can achieve approximate solutions that are extremely close to exact solutions. This is good enough to allow combinatorial auctions to be performed for rights such as radio spectrum.

<sup>109</sup> A second price auction, at least in a standard one lot auction, is where a bidder pays the price bid by the second highest bidder. The advantage is less risk to bidders and a more efficient allocation. In first price auctions, bidders have an incentive to shade their bids below their valuation, second-guessing the valuations and behaviour of other bidders. Since they may guess wrongly, this produces risk in the outcome. But the incentive for this is reduced in a second price auction. In a combinatorial auction, explicit first and second prices are not explicitly exhibited, since winning bids are for package lots, not individual items. But the mathematics of solving combinatorial auctions allows the computation of prices which have similar properties to second prices.



(2) the quantity allocated of each slot is no greater than the available supply.

A separate optimisation exercise would be solved to determine the winning bids for each airport.

The pricing rule determines the amount that each winning bidder pays. The New York auctions would use a second-price approach, based on a pricing rule which generalises the second-price rule for a combinatorial auction. In particular, payments are determined so that there is no alternative bidder or group of bidders prepared to pay more than any winning bidder or group of winning bidders. If there are many sets of payments that fulfil the previous condition, a set of payments that minimises the sum of payments across winning bidders is selected, a key property it shares with standard second-price rules. This second-price rule simplifies bidding in that it maximises the incentives to bid truthfully while ensuring a competitive outcome.

Once the winnings bids and the corresponding prices were determined, the FAA would insert the winning package and the payment into the slot lease for each winning bidder and transmit the slot lease to the winning bidder by email. A wire transfer from the winning lessee valued at 100% of the lease amount would then have to be received by the FAA no later than 30 calendar days after the date/time of the FAA email notifying the winning bidders. If the above steps were completed, the FAA would then countersign the slot lease.

Competition-related issues were designed to be addressed, both through the rules of the auction itself (such as the prohibition on airline communications) and through additional rules to apply once slots had been allocated. To help ensure the competitiveness of the auction process, applicants in the same auction would be prohibited from communicating with each other directly or indirectly about bids, bidding strategies, or settlements. Such prohibited communications rules are standard in auctions, including spectrum auctions. Applicants in any auction would also be prohibited from communicating with each other directly or indirectly about defaulting on their winning bids, and they would be prohibited from inducing or attempting to induce other applicants in any auction to default on their winning bids.

After the auction, a winning bidder would be allowed to transfer or sublease its slot lease in secondary markets. A competition concern for the secondary markets was that each of the legacy US airlines (now American, United and Delta) appeared to be more willing to transfer or sublease its lease to another legacy airline than to a smaller airline or a new entrant such as Southwest or Jet Blue. To address this competition issue, there were tentative plans for requiring airlines to resell slot leases through a blind mechanism in the secondary market.

There would be no minimum usage requirements for slots awarded in the auction: unrestricted slots would not be subject to use-or-lose requirements. However, the Office of Aviation Enforcement, within the Office of the Secretary of Transportation, would monitor any anti-competitive activity with respect to the acquisition and use of slots.

Most of the major stakeholders were opposed to the introduction of auctions. Not unexpectedly, all of the airlines were against auctions, as they did not want to pay for what they previously received for free. However, entrants such as Southwest and Jet Blue expressed a lower degree of antipathy than legacy airlines such as American, United and Delta, as they recognised that





auctions would reduce the entry barriers especially at close-in airports. The airport operator, the Port Authority of New York and New Jersey, was also opposed to auctions, which would diminish the considerable discretion that the Port Authority had in the operation of the airports—and dilute the Port Authority’s ability to extract favours from the airlines in return for exercises of its discretion.<sup>110</sup> In the end, the only stakeholders that favoured slot auctions were: the US DoT and FAA; the US Department of Justice (which, as the competition authority, believed that auctions would promote entry and enhance competition in the airline sector); and the academic community.

The main legal and political vulnerabilities of the New York slot auction initiative were:

- it was legally uncertain whether the FAA possessed the statutory authority to conduct auctions of slots; and
- while the Executive branch favoured slot auctions, the Legislative branch was reasonably responsive to lobbying against auctions by stakeholders.

Three months before the scheduled auction, the General Accountability Office (GAO) released an opinion letter in response to a Congressional request concluding that the FAA lacked the authority to auction slots. Three days after the bidder seminar, a lawsuit that had been filed by the Port Authority and the Air Transport Association resulted in a stay of the slot auctions by the US Court of Appeals for the District of Columbia Circuit. Three months later, lobbying by the airlines resulted in a provision of the Omnibus Appropriations Bill, 2009, which prohibited the DoT and FAA from using any appropriated funds toward the introduction of slot auctions or congestion pricing at airports.

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Federal Aviation Administration (2008) Congestion Management Rule for John F. Kennedy International Airport and Newark Liberty International Airport; Final Rule, 73 Federal Register 60544

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<sup>110</sup> Several years later, a corruption investigation led to the conviction of the Chairman of the Port Authority for extorting from United Airlines a weekly non-stop scheduled flight between Newark Airport and the South Carolina airport near the Chairman’s vacation home in exchange for considerations. See New York Times (2015) United C.E.O. Is Out Amid Inquiry at Port Authority, <https://www.nytimes.com/2015/09/09/business/united-ceo-port-authority-investigation.html> and CNN (2017) Port Authority chief gets house arrest in airline bribery case, <https://www.cnn.com/2017/03/06/us/david-samson-port-authority-chairmans-flight-bribery/index.html>



## ANNEX D DETAILS OF STAKEHOLDER ENGAGEMENT

Building on the information provided by DfT, we have engaged with a range of stakeholders throughout the course of this work, as listed below:

- British Airways
- American Airlines
- DHL
- Virgin Atlantic
- Norwegian Air
- Heathrow Airport Limited
- Airport Coordination Limited
- Competition Markets Authority
- International Air Transport Association
- Independent aviation consultants



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