

READY FOR TAKEOFF

Building competition in the aviation industry

By Matthew Lesh

BRIEFING PAPER

EXECUTIVE SUMMARY

- Airline deregulation and airport privatisation has substantially increased aviation industry competition, improving passenger choice, encouraging innovation, and reducing flying costs. It has opened the opportunity of regular travel to millions, boosting economic growth.
- Competition forces firms to innovate, reduce costs, and provide greater consumer benefits. It ensures resources are put to best use. Monopolies lead to stagnation, laziness, overcharging, and market manipulation.
- There are a number of policies that could promote further aviation sector competition:
 1. Initiate an independent process to assess the potential benefits of the competing Development Consent Order (DCO) applications for the Heathrow Airport expansion, with a view to the potential benefits provided by terminal competition at the design, construction, and operational stages.
 - Despite separate ownership, following the Competition Commission (CC)'s forced BAA plc breakup in 2009, individual airports maintain substantial market power. Heathrow Airport has been accused of 'gold plating' infrastructure, contributing to the highest per passenger costs in the world.
 - There are now competing applications for Heathrow Airport's expansion, for the first time since the introduction of the DCOs in 2008. There is no tender-like process to analyse DCO applications
 - International evidence, as well as pronouncements from the CC, favour terminal competition. JFK International Airport in New York City currently has five competing terminals, each owned by separate entities, providing lower costs without coordination difficulties.
 2. Introduce slot auctions for the allocation of additional landing and take-off capacity at Heathrow and Gatwick airports, and consider auctioning some, if not all, grandfathered slots, following Britain's exit from the EU.
 - The existing system of landing and takeoff slot allocation allows existing airlines to hoard rights, resulting in inefficiency and creating a barrier to new entrants and smaller airline expansion. Over half of the slots at Heathrow Airport are currently allocated to IAG, the owner of British Airways, limiting competition.
 - Slot auctions would ensure that slots go to airlines willing to pay the most, leading to each slot being used most efficiently. This would provide

opportunities for new and mid-sized carriers to expand, increasing market competition, encouraging innovation, and avoiding arbitrary decision-making and political interference.

- If slot auctions are used to allocate expanded capacity at Heathrow Airport, there could be 16 million more passengers per year than under the existing allocation rules. This change could raise over £7.5 billion for the Heathrow expansion.

3. Auction low-altitude airspace for new forms of transport such as air taxis and autonomous freight drones.

- Air taxis will soon be able to transport passengers from Heathrow Airport to the City of London in 8 minutes and from London to Brighton or Oxford in 23 minutes. Hundreds of hourly take-offs and landings could congest the skies, requiring allocation of scarce air corridors.
- Bureaucratic allocation of access to congested airspace would be unresponsive to changing technology, entrench early movers, and lead to inefficient allocation.
- The auctioning of rights to operate an aerial travel corridor, at a specific altitude over for a period of time, would deliver efficient use of the space, and raise substantial revenue.

ABOUT THE AUTHOR

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The UK aviation industry is one of, if not the most competitive in the world. Airports compete for business and airlines, both UK and foreign registered, compete to serve them. The Adam Smith Institute played a role in this accomplishment. In 1984 it published Sean Barrett's seminal essay on a competitive, privately-owned airport industry, precursor to the outstanding Airports Act of 1986. This Act privatised the then British Airports Authority, one of the largest privatisations of its day, and encouraged the same for other publicly-owned airport assets, laying the foundations for today's enterprising industry.

The UK is fortunate to have pro-competitive regulators. The CAA has sought to minimise its regulatory reach and the Competition Commission (now the Competition and Markets Authority) played a vital role in restructuring BAA Plc, establishing the potential for Stansted, Gatwick and Heathrow to compete. Heathrow, however, dominates and through networking externalities associated with its hub status, it is a powerful force.

In this most stimulating report Matthew Lesh advances invigorating ideas for increasing the competitive framework within which to develop Heathrow. He suggests introducing more competition into the provision of terminal services at Heathrow by inviting third-parties to bid for contracts to build and operate new terminal capacity. To provide more efficient access to runways, he suggests auctioning the new slots (the rights to take-off and land at a particular time) that will result from the extra capacity associated with Runway Three.

Governments too often are caught-out by issues arising from technical progress with the result that subsequent administrative interventions are inadequate or make matters worse. Matthew's original contribution on drones and air taxis anticipates a forthcoming airspace log-jam and highlights how market-led solutions can anticipate and solve the drone airspace conundrum in a manner that will promote economic growth.

The modern UK aviation industry has achieved a great deal but, as Matthew's paper suggests, we should not rest on our laurels. The ASI and Matthew are to be congratulated therefore for revisiting the industry and bringing forward fresh, innovative thinking that goes with the grain of economic advancement. For, to adapt a line from another great economic thinker, the test will be less the effectiveness of our material investments than the effectiveness of our investment in ideas.

David Starkie

Former Adviser, Airports Commission

In 1984, the Adam Smith Institute released the seminal report *Airports for Sale: The Case for Competition*, which called for the privatisation of airports to maximise competition and improve passenger options.¹ The report opened a quote from Adam Smith's *The Wealth of Nations*:

A monopoly granted either to an individual or to a trading company has the same effect as a secret in trade or manufactures. The monopolists, by keeping the market constantly under-stocked, by never fully supplying the effectual demand, sell their commodities much above the natural price, and raise their emoluments, whether they consist in wages or profit, greatly above their natural rate.²

The ASI has always believed that the benefits of competition are substantial and the effects of monopoly are dire. Competition encourages businesses to use limited resources in the most efficient manner possible, leading to innovation. Monopolies stagnate businesses and lead to higher prices and rents, disadvantaging consumers.

Aviation is key to Britain's success and cultivating the global personal and business connections. The Department for Transport estimates aviation directly contributes £22 billion to the economy and is responsible for over 230,000 jobs.³ UK passenger numbers are expected to grow from 284 million in 2017 to over 435 million by 2050. Meanwhile, as the global economy grows, and more people enter the middle class, the scale of the global aviation industry will substantially grow. More people than ever before are boarding aeroplanes and travelling for work and pleasure across the globe. Annual global passenger traffic is expected to grow from 8.7 billion in 2018 to over 22 billion by 2040.

This raises a range of questions about how to expand airport capacity and allocate scarce resources like landing slots. The Airports National Policy Statement (ANPS), released in 2018, committed the Government to supporting the building of a third runway at Heathrow Airport and an associated new terminal for additional passenger capacity. This is a much-needed piece of infrastructure to alleviate bottlenecks in airport traffic. The Government's *Aviation 2050: The future of UK aviation* consultation released in December 2018 noted that "A thriving aviation sector is tangible evidence of economic confidence, growing tourism, increased trade, and business investment."⁴ The consultation is currently seeking feedback on how to build the aviation industry, support connectivity, and improve passenger experience.

¹ Sean D. Barrett, *Airports for Sale: The Case for Competition* (London, UK: *Adam Smith Institute*, 1984).

² Smith, Adam. *The Wealth of Nations: Book 1*, 1776.

³ Department for Transport, "Aviation 2050 - The future of UK aviation: A consultation," Cm 9714, *HM Government*, London, December 2018.

⁴ *ibid*

The Heathrow expansion will also be the largest privately funded infrastructure project in Europe. This does not mean, however, that there are no remaining public policy questions to be answered. The final design for constructing and subsequent operation of the expansion must now be approved in line with the Development Consent Order (DCO) process. Furthermore, the additional landing and takeoff slot capacity must be allocated. This provides an ideal opportunity to reassess the aviation industry with a view to increasing competition. The historic experience is that competition is king in the aviation sector. The benefits of airline competition – with choices from British Airways and Emirates to budget airlines like EasyJet and Ryanair – are well understood. When it comes to airport infrastructure, however, there is a lack of competition and the existence of substantial market power and state regulation. This report will assess the benefits that have come from privatisation and competition and will consider potential avenues for further competition in the context of the domestic and the international aviation experience.

THE BENEFITS OF AVIATION PRIVATISATION AND COMPETITION

For much of the 20th century British airports were owned by local authorities or with the Ministry of Civil Aviation. As commercial aviation expanded major airports were gradually transferred to civil control. In 1966, the government created British Airports Authority (BAA) to take control of Heathrow, Gatwick, Stansted, and Prestwick airports, and subsequently Edinburgh, Aberdeen and Glasgow airports. In 1987, the Conservative Government sold BAA, creating BAA plc, one of the largest privatisations of its day. This was part of the broader set of privatisations during this era, including the much-delayed sale of British Airways, also in 1987, and the sale of £60bn of publicly owned assets between 1979 and 1996.⁵ Airport privatisation was supported by the Adam Smith Institute report *Airports for Sale: The Case for Competition* by Dr Sean D Barrett of Trinity College, Dublin, published in 1984.⁶ Barrett wrote that the purpose of privatisation was to “reduce the present monopolistic powers and to encourage competition. This is in turn seen as a means to improve efficiency and sensitivity to consumer demand”.⁷ In economic theory, competition delivers a good or service that is directly responsive to demand. This results in higher products, an incentive to ensure efficient use of limited resources, and investment and innovation to increase potential returns.

Airport privatisation, combined with regulatory reform that has enabled the creation of new carriers, has revolutionised air travel for millions. Since privatisation and deregulation of European aviation, there has been substantial consumer benefits including the expansion of the number of flights and routes and lower flight prices, and investment in major projects such as Terminals 4 and 5 at Heathrow,

⁵ Aziz Boussofiane, Stephen Martin, and David Parker, “The Impact on Technical Efficiency of the UK Privatization Programme,” *Applied Economics* 29, no. 3 (March 1, 1997): 297–310.

⁶ See also David Starkie and David Thompson, *Privatising London’s Airports*, Institute for Fiscal Studies, 1985.

⁷ Barrett, *Airports for Sale*

the North Terminal at Gatwick, and the expansion of Stansted.⁸ Between 1997 and 2000 the number of passengers using London airports doubled, and has continued to grow.

Following Britain's leadership and success in privatisation, many countries have privatised airports and airlines.⁹ There are several options for privatised airports. These include private sector management contracts of publicly owned airports through build-operate-transfer (BOT) or trade sale/leases to private entities. As it stands, however, just 14% of global airports have private sector involvement in ownership.¹⁰ These airports punch well above their weight across a variety of measures. Over half of the world's top 100 airports are at least partially privately owned or operated. Airports with private sector involvement are responsible for handling 40% of global traffic and investing 44% of global capital expenditure on airports. Airports Council International has argued for greater private sector involvement in the provision of infrastructure to meet growing passenger demand.¹¹ The substantial capital expenditure required to fund airport expansion is best completed by the private sector. The alternative is to use limited taxpayer funds, that should be reserved for funding social goods, to support a largely profitable private industry.

THE BREAKUP OF BAA PLC

In the UK, the initial model of airport privatisation was flawed. The privatisation of BAA as a single entity, which owned the three major airports in London - Heathrow, Gatwick, and Stansted - unnecessarily created a de facto airports monopoly. This was contrary to the conclusions of Dr Barrett's 1984 ASI report which stated that "Privatization of the BAA airports as a single entity would not attain the goals of the privatization policy," namely, competition.¹² Barrett argued that splitting BAA into separate entities could reduce the short-term sale revenue for the government, however, in the long run, "competitive privatisation" was essential to ensuring the benefits of privatisation in practice – including competition, managerial efficiency, consumer benefits, reduction in state interference, and better investment decisions. The Government, however, chose a different path. BAA plc also acquired Glasgow and Edinburgh following privatisation.

This issue was ultimately resolved by the Competition Commission (CC), which is now known as the Competition and Markets Authority (CMA). In March 2009, after a lengthy investigation, the CC required BAA to sell Gatwick and Stansted airports, as well as either Glasgow or Edinburgh.¹³ Gatwick was sold in 2009, Edinburgh in 2012, and Stansted in 2013. The company also subsequently chose to

⁸ Karthik Reddy, "Airport Regulation in the United Kingdom," *Adam Smith Institute*, November 17, 2010.

⁹ For a discussion of the changing role of the state, see Giandomenico Majone, "The Rise of the Regulatory State in Europe," *West European Politics* 17, no. 3 (July 1, 1994): 77–101.

¹⁰ Airports Council International, "Creating fertile grounds for private investment in airports". Montreal, 2018. Accessed in June 2019.

¹¹ *ibid.*

¹² Barrett, *Airports for Sale*.

¹³ Dunkley, James. "BAA to be forced to sell Gatwick, Stansted and Edinburgh airports," *The Telegraph*, 17 December 2018.

divest from other airport assets, leading to the creation of Heathrow Airport Limited (HAL). Separate ownership of airports has made a big difference in the sector. The CMA found that a lack of competition had attracted “widespread criticism,” poor quality service for airlines and passengers, a lack of planning and investment in future infrastructure, and a willingness to limit capacity expansion by BAA to keep prices high.¹⁴ The CMA’s 2016 follow-up analysis concluded that the breakup was a success, contributing to expanded capacity – including 34 million additional passenger journeys from 2009 to 2015 – and led airports to make an effort to attract more airlines and passengers.¹⁵ The total benefit of the breakup is calculated to reach around £870 million by 2020, and includes improved service quality, facility investment, route development, and operational innovation.¹⁶

BUILDING COMPETITION IN THE AVIATION INDUSTRY

Competition has delivered substantial benefits in the aviation industry. Nevertheless, concerns remain about the effects of continuing high levels of regulation in the market, the substantial market power held by individual airports – in particular, Heathrow Airport – and the economically harmful nature of slot allocation. Despite the existence of a freer market due to regulatory and ownership changes, there is not yet a competitive free market in many parts of the aviation industry.

Firstly, the *Airports Act 1986*, which enabled the airport privatisation, created a highly regulated pricing system for what congested airports – including Heathrow, Gatwick, Stansted and Manchester – could charge airlines due to concerns about market power. Price controls continue to this day at Heathrow and Gatwick airports, which must charge airlines no more than a capped price set by the Civil Aviation Authority.¹⁷ The setting of prices is an inherently arbitrary process. Peter Scott of the University of Bath has previously written: “It is clear that the particular maximum price set by the regulator is not the result of the application of some clear economic rule but of informed judgment in the midst of great uncertainty”.¹⁸ The airline charges are based on an airport’s level of investment and ongoing costs, which also requires the regulator to make judgements about airport expenditure. This raises difficulties in determining the appropriate level of operation and, particularly, capital expenditure, and involves a costly process of regulation.

Secondly, landing and take-off slots for individual flights are not sold or auctioned but allocated by an independent slot coordinator following European Commission regulations. The slots are ‘grandfathered’ to the historic holder – if they continue

¹⁴ Clarke et al, “BAA airports market investigation: A report on the supply of airport services by BAA in the UK”, London: Competition Commission, March 2009. Accessed June 2019.

¹⁵ CMA, “BAA Airports: Evaluation of Remedies,” *HM Government*, May 2016.

¹⁶ *ibid.*

¹⁷ See Civil Aviation Authority, “Heathrow Price Control Review H7”.

¹⁸ Peter Scott, “Economic Regulation of Airports in the UK,” (University of Bath School of Management: Centre for the Study of Regulated Industries, 2004).

to use the slot at least 80 per cent of the time. New slots are allocated by the regulator based on such a formula. This system creates substantial inefficiencies, only partly tempered by secondary trading.¹⁹ These market features are a relic of the heavily state-controlled system of the 20th century. Slot auctions, particularly for new capacity, could help ensure the finite resource of slots is put to its best use, delivering more airline and route choices for consumers, encouraging innovation, and increasing competition in the industry.

These issues raise the potential for further competition and market mechanisms being introduced in line with previous, competition-inducing reforms. The following section considers two major reforms that would help address these issues.

TERMINAL COMPETITION IN CONSTRUCTION AND OPERATION

A terminal has a series of contained functions, including gates, passenger check-in performed by the airlines or their agents, baggage movement and loading, retailing and restaurants, and immigration and customs control – provided in the UK by Border Force, a part of the Home Office. These are largely self-contained services that require limited coordination with the rest of the airport, until a plane leaves the terminal apron or bags or passengers are moved to gates or transferred between terminals. This raises the possibility that terminals could be separately built, owned, and operated – and therefore compete with each other – incentivising terminals to be responsive to passenger needs and innovate to attract airlines. In practice this would require a larger airport with multiple terminals in which at least one of the terminals is separately owned. The separation of terminals has previously been described as Terminal Development Tendering (TDT), separate terminal operation and development (STOD), build-operate-transfer (BOT) and build-own-operate-transfer.

While continuing to note the substantial overall benefits of privatisation, the ASI has acknowledged “the lack of competition in many utility sectors” in recent years.²⁰ The heavy regulation of airports in the UK, in particular Heathrow and Gatwick, stems from a lack of competition and monopolistic position of the airport owners, who have captive customers including the passengers and airlines. This lack of competition can be linked to the high costs of major airport infrastructure, the small number of airports, runways and terminals, and the government preventing the building of more runways and terminals. Although a regulator can encourage efficient use of resources, it cannot enforce creative innovation and efficiency.

The existing regulatory system requires the CAA to make determinations in a world of limited knowledge about the appropriateness of prices and investment at airports. It is impossible, however, for CAA to have full information about every participant in the market, from the millions of passengers to the likely hundreds of suppliers. It is impossible to know the precise effectiveness of the regulation. It is possible to speculate, however, that additional competition could be beneficial, as

¹⁹ David Gillen and David Starkie, EU Slot Policy at Congested Hubs, and Incentives to Add Capacity, *Journal of Transport Economics and Policy*, Volume 50, Part 2, April 2016, pp. 151–163

²⁰ Hawkins, Nigel. “Utility Gains: Assessing the record of Britain’s privatized utilities.” London: Adam Smith Institute, 2015. Accessed in June 2019.

has proven the case at JFK Airport. Regulation of a single operator is less fruitful than competition between operators. There are, however, some potential downsides to an independently operated terminal, including the risk associated with an unproven developer and operator of an independent terminal, the need to create new regulatory arrangements, the addition of a new commercial interest at the airport, and the potential partial loss of economies of scale. It would be necessary to balance these considerations in the case of an independently operated terminal.

The CC has previously noted that separate ownership of airport terminals has an important role to play. The CC stated, during the 2009 investigation into BAA, that: “significant benefits could be derived from introducing terminal competition, particularly at airports that are under weak competitive constraints from other airports, either because of their isolated geographical position or because of some other unique characteristic which confers substantial market power on them”.²¹ The CC envisaged “new terminal facilities could be put out to tender by the regulator,” and pointed out that “the building and operation of Terminal 6 at Heathrow could be the subject of a tender managed by the CAA”.

There are various models for competition in airport infrastructure:

- (1) Separate private airport ownership (status quo);
- (2) All terminal(s) at an airport are owned by one entity and the runway(s) at each airport owned by a separate entity;
- (3) Each airport terminal is owned by a separate entity, which is also separate from the runway owner;
- (4) Some terminals owned by the same entity as the runway, while other terminal(s) owned by a separate entity;

As it stands the UK has had (1) since the breakup of BAA plc in 2009-12, however lacks any form of (2), (3), or (4). As discussed above, the adoption of (1) has provided many benefits. However, there are many factors limiting competition between airports, such as the strong preference of passengers for flying from their closest airport and the respective market power of each airport, in particular Heathrow as a key global hub.²² In some ways options (1) and (2) are functionally similar, since there would still be only one provider of the various services, rather than active competition. On the other hand, options (3) and (4) would create competitive pressures from terminal operators providing the same service, particularly at larger airports with multiple terminals and strong demand. Options (3) and (4) would create incentives on the terminal operators to make efficient investments and innovate to lower prices against their competitor(s) and therefore deliver advantages for consumers. Option (4) raises some regulatory issues, in particular the need to require the owner of the runway and other services to provide access to facilities on an equal basis to avoid anti-competitive overcharging and facilitate competition. In the past, EasyJet have gone as far as calling for all the existing terminal facilities

²¹ Clarke et al, “BAA airports market investigation: A report on the supply of airport services by BAA in the UK”, London: Competition Commission, March 2009, 285.

²² Elliot, Dan, “It should be terminal: An Innovative Approach To UK Airport Competition”, London, March 2009.

to be competitively tendered by the Civil Aviation Authority (CAA) to different operators - though this would raise the issue of expropriating assets that are privately owned.²³ In addition to an independent, third-party terminal owner, it is also possible for separate terminals to be operated by an airlines or airline partnership.

COMPETITION IN DESIGN AND CONSTRUCTION

The first potential benefit of terminal competition is in the design and construction phase. Construction is costly. A new terminal and associated buildings and infrastructure cost billions of pounds. Major projects have a long history of failing to meet targets for both cost and time. Bent Flyvbjerg of the University of Oxford has written that major projects are “over budget, over time, over and over again.”²⁴ Flyvbjerg argues that the root cause of major project failure is that “project planners tend to systematically underestimate or even ignore risks of complexity, scope changes, etc. during project development and decision-making”. That is, there is substantial overoptimism. Two recent examples include ‘unexpected challenges’ pushing up the cost of the Tideway Tunnel, a 16 mile tunnel under the River Thames, and the London Crossrail project being delayed and going over budget by billions of pounds.²⁵ In 2017, the Infrastructure and Projects Authority annual report concluded that almost 80% of projects are undeliverable, in doubt or facing significant issues, and less than 5% of projects are delivered on time, on budget and of high quality.²⁶

A potential solution to help address the tendency of overoptimistic planning is competition in the design and construction process. The cross-scrutiny provided by competing bids for construction could help raise different ideas for the location and design of a new terminal, providing options about how to best fulfil project requirements, such as reducing local disruption and environmental impact, at the lowest possible cost. This is clear historic precedent for considering multiple designs. The Airports Commission, when they were looking at the third runway for Heathrow, were presented with multiple proposals. Former pilot Jock Lowe set up a company proposing an alternative model, to extend the Northern runway to about 7km, then break it into two parts and have simultaneous landings using each half.²⁷ While this specific idea was not adopted, it does indicate that open processes attract thought-provoking alternative ideas.

It also presents the opportunity to regularly reconsider the specifications, such as the location and design of a new terminal, for a major project in the context of what are often multi-decade processes. It is essential to be constantly reexamining what is necessary, rather than depending on plans created years earlier. This ensures that ideas, developed years or in many cases decades earlier, are not favoured over

²³ “Regulation of capacity investment at Stansted Airport,” *Frontier Economics*, March 2008.

²⁴ Flyvbjerg, Bent, “Over Budget, Over Time, Over and Over Again: Managing Major Projects”. Oxford, April 2011.

²⁵ GCR Staff, “Unexpected challenges push London “super sewer” costs up 8%”, London: *Global Construction Review*, April 2019.

²⁶ Cheung, Aron. “Government delivery of major infrastructure - less is more,” *Institute for Government*, 4 June 2019.

²⁷ Heathrow Hub, “Heathrow Hub Extended Runway consortium seeks permission to appeal,” 2018.

newer ideas based on the changing demands and options for the project. Without competition there is little incentive to be regularly reconsidering the design and to keep costs down, risking cost blowouts. This is particularly important in the case of infrastructure upgrades at airports under press caps - Heathrow and Gatwick - as the regulator inevitably allows these companies to pass overrun costs onto the airlines, and therefore ultimately the passengers.

COMPETITION IN OPERATION

In the operational stage, separate terminal ownership creates incentives to keep ongoing and maintenance costs low for airlines, and therefore for passengers, by innovating. The major benefit would be an increase in airlines' bargaining power vis-à-vis the airport operator, therefore putting pressure on the terminal owner to be responsive with investment and innovation. In practice, different terminals could offer differential services to airlines at different costs, with service levels changed over time in response to airline demand. Competition would be most effective if there is some manner of product and price differentiation between terminals.

Currently, regulation is used to address issues of market power. However, competition is widely understood to deliver better outcomes in the economy. Many of the benefits of competition cannot be determined in advance. For example, when European aviation was deregulated and the number of airlines was allowed to be expanded, the specific model of RyanAir or EasyJet was not envisaged in advance, nor was an A380 first class suite. These were developed by innovative businesses who sought to identify a gap in the market. The existence of competition between airport terminals would diminish, if not alleviate, the need for other airport regulations and price controls. It would encourage investment in terminal capacity consistent with market demand, ensure terminal facilities are provided in an efficient manner, lower regulatory costs in the longer run, and reduce the need for price controls. The regulator, instead of setting price caps for per passenger charges, could focus on regulating the monopoly provision of runway usage, ensuring equal access no matter which terminal an airline uses.

Opponents of terminal competition have argued that it would lead to issues with coordination, such as transfers between terminals and loss of economies of scale in service provision while providing limited benefits if resulting in anti-competitive or collusion/oligopolistic behaviour. Frontier Economics, in a report commissioned by Heathrow Airport Limited (HAL), argued that third party design and operation could lead to less optimisation and coordination; that construction is already tendered; that an alternative builder would have access to similar financing; and that regulatory issues would arise in operation such as wholesale access charges to runways and other shared facilities.²⁸ Notably, this was the opposite position held by Frontier Economics when, in the aforementioned report commissioned for EasyJet, they called for separate terminal ownership at Stansted in 2008.²⁹ It would

²⁸ Elliott, Dan. "ECONOMIC REGULATION OF TERMINAL EXPANSION: A report prepared for Heathrow". London: *Frontier Economics*, 2018.

²⁹ "Regulation of capacity investment at Stansted Airport," *Frontier Economics*, March 2008.

be necessary to assess potential operational issues against the potential benefits provided by competition.

THE INTERNATIONAL EXPERIENCE OF TERMINAL COMPETITION

There are many international examples of airport terminal competition being pursued and implemented. While every airport is unique and particular implementation choices would have to be carefully analysed, these international examples show the potential for the UK and help address the broad concerns about issues such as coordination.

The Hartsfield-Jackson Atlanta International Airport has five runways, owned and operated by the City of Atlanta, a domestic terminal operated by a consortium of airlines since 1979. The international terminal which is outsourced to global airport operator, TBI Airport Management, following the construction of the new facility in 2012. Atlanta Airport is the busiest airport in the world with over 100 million passengers travelling through it annually. The airport ranks highly on measures of management and on-time statistics. The terminal separation appears to have been a success in Atlanta for decades.

John F. Kennedy International Airport in New York City, which is owned by the Port Authority of New York and New Jersey, has six separately operated terminals. It is among the biggest airports in the world. Five of the terminals are run by large airlines and one terminal, Terminal 4, is owned by Schiphol Group. This system is designed to allow the private airlines to finance the construction of the facilities and operate them efficiently. Each owner-operator is typically provided with a 50-year lease on the new facility and the Port Authority is involved in the design of the building. The Port Authority also ensures non-discriminatory third party access to the airline-owned terminals. The access charges for the terminal are the same no matter which terminal an airline is using. The separate ownership of terminals has not caused operational issues. Following the most recent terminal construction, Terminal 4, a report by the Transportation Research Board of the National Academies concluded that private sector involvement in the development and operation of the terminals has delivered “increased operating efficiency, enhanced levels of service for passengers and airlines, and reduced operating costs”.³⁰ The terminal choice has been broadly welcomed by smaller airlines. For example, following the opening of the new Terminal 4, 12 smaller airlines transferred.

The Port Authority operates a similar model at Newark Airport, which has three terminals and three runways. The Port Authority operates Terminal B, and United Airlines operates Terminal C and Terminal A. Terminal C was originally built by Continental Airlines in association with the Port Authority and opened in 1998. It came into United Airlines ownership following a merger with Continental in 2010, with a further 20 year lease signed in 2013 along with a commitment of \$150 million on ongoing improvement works.³¹

³⁰ Transportation Research Board of the National Academies, ‘Airport Cooperative Research Program Report 66 – Considering and evaluating privatization,’ 2012, 90.

³¹ United Airline, “United Airlines Extends Newark Agreement, Commits \$150M in Further Investment at Region’s Largest Hub”, *CISION*, April 8, 2013.

There have also been other attempts to separate terminals. The Irish Government sought expressions of interest in 2002 from parties to construct and manage a second terminal at Dublin Airport. This led 13 organisations to develop proposals. There was a subsequent independent review of this process, which found that the proposals outlined ideas for improvements of facilities, enhancement of operational capability, and lowering of costs, as well as the matching of the facilities with airline needs and reducing car parking costs.³² The independent review concluded that an independent terminal would help improve competition, give airlines greater choice, and potentially improve passenger experience. The report also acknowledged that issues such as equitable access to shared airport infrastructure, splitting the cost of individual components, and effective communication would be necessary, however, it was possible to address these issues. Consultancy Oxford Economics, in the context of the Dublin Airport expansion, noted that transitioning to a system of independent terminals would raise substantial risk in implementation, however could provide competitive benefits such as designing a differentiated terminal style that is responsive to market demand.³³ In the end the Government choose to not proceed with an independent terminal and awarded the building of the second terminal to DAA. Nevertheless, the existence of multiple proposals was advantageous as it created competition to improve designs.

It should be acknowledged that in other cases, separate terminal ownership has not proven successful. Toronto's Lester B Pearson Airport's third terminal's independent ownership was abandoned after six years. This was related to excessively high charges at Terminal 3 compared to the publicly owned Terminal 1 and 2. The independent operator concluded that it was not economically viable to maintain the terminal's separate ownership. In 1987, an additional Brussels Airport terminal was initially built and operated independently, however after a decade the airport was reunified on efficiency grounds – this was linked to differential pricing schemes between the airfield and terminal operators. In 2015, Qantas Airlines sold the lease of Terminal 3 at Sydney Airport back to Sydney Airport Corporation Limited, returning all terminals and runways to a single owner - four years earlier than the planned reversion of ownership to the airport.³⁴

These various cases indicate it is possible to successfully operate separate terminal ownership; and that precise arrangements for cost sharing and communication must be carefully designed to ensure the successful operation of independent terminals to deliver the competitive benefits of separate ownership. Furthermore, international experience shows that best practice for separate terminal ownership necessitates a regulator (in the UK's case the CAA) ensuring equal access charges for airlines regardless of terminal.

³² Panel Report to Minister for Transport (Ireland), "Dublin Airport – Review of Expressions of Interest for an Independent Terminal". Dublin: *The Government of the Republic of Ireland*, 2003.

³³ Goodwin, Andrew P "Review of Future Capacity Needs at Ireland's State Airports," *Oxford Economics*, August 2018.

³⁴ Freed, Jamie, "Sydney Airport buys Qantas terminal lease for \$535m", *Sydney Morning Herald*, August 18, 2015.

TAKEOFF AND LANDING SLOT AUCTIONS

The right to takeoff and land at a congested airport at a particular time is a scarce resource, raising the question about how to allocate said-resource. This is becoming an increasingly important question as demand for air travel grows and slots remain finite. Slot allocation impacts consumers both directly in terms of flight availability, and indirectly through the extent of competition in the sector. The access to land at certain times has been found to have a very direct consumer cost. Congestion at European airports during peak times has been estimated to cost European passengers €2.1 billion in higher fares.³⁵

THE EXISTING SLOT REGULATION

Britain's forthcoming exit from the European Union (EU) - potentially freeing the UK from EU-wide regulation on slots - and its expansion of the capacity at major airports presents an opportunity to reassess the efficiency of the current slot allocation system. The current system is governed by European Commission (EC) regulations (Council Regulation No. 95/93) that requires take-off and landing rights to be allocated in a non-discriminatory, administrative manner for congested airports.³⁶ This regulation follows the airline trade group International Air Transport Association (IATA)'s "Worldwide Scheduling Guidelines". Airlines do not pay for the ability to takeoff or land at a particular time (though they do pay a landing charge for the airport). Slots are 'grandfathered' to the incumbent owner year-on-year, as long as the airlines keeps using the slot at least 80 per cent of the time (the 'use it or lose it' rule), providing an indefinite right to retain slots for incumbent airlines. New slots, or ones surrendered by airlines, are administratively allocated. Half of the allocations are to new entrants and the rest can be claimed by incumbents. In the UK, the Airports Coordination Limited (ACL) makes the decision as to how slots are allocated, based on size and type of the market, frequency of usage, and further guidelines. Slots are allocated in this manner for 'coordinated airports', which in the UK include Heathrow, Gatwick, Stansted, Manchester, London Luton, and London City.

Airlines cannot formally 'sell' slots, however, they can trade slots for different times, allowing for an airline to trade a lower-value slot with an associated side payment for a higher-value slot. These side payments have substantially grown in size in recent years due to capacity limitations. In 2008, Continental Airlines paid \$209 million for four pairs of take-off and landing slots at Heathrow.³⁷ In 2015, American Airlines paid \$60m for a single slot from SAS.³⁸ In 2016, Oman Air paid Kenya Airways a record \$75 million for a single prime time slot at Heathrow.³⁹ In 2017, Scandinavian Airlines (SAS) sold two slots for \$75 million to an anonymous airline.⁴⁰ These trades show the size of the scarcity rents. The full value of all slot

³⁵ Burghouwt, Guillaume et. al., "The impact of airport capacity constraints on air fares," *SEO Amsterdam Economics*, 24 January 2017

³⁶ First developed in 1993, and updated in 2004, 2007, and 2008, see EEC, "Common rules for the allocation of slots at Community airports". No 95/93. Brussels: *European Union*, 1993.

³⁷ Done, Kevin, "Continental pays Heathrow record", London: *Financial Times*, March 3, 2008.

³⁸ McWhirter, Alex, "Kenya Airways sells its only Heathrow slot", *Business Traveller*, March 2, 2016.

³⁹ Ibid.

⁴⁰ McWhirter, Alex, "SAS sells more Heathrow slots for \$75 million", *Business Traveller*, March 30,

trades is unknown, with relatively few reported in the media. Secondary trading makes sure that slots are used more efficiently, however it is an imperfect system since relatively few slots are traded and it does not address the inefficiency of the initial allocation process.⁴¹

THE INEFFICIENCY OF ADMINISTRATIVE ALLOCATION

The current system of slot allocation has been criticised for failing to ensure the finite slot resource is put to its most efficient usage and benefiting incumbents.⁴² It leaves slots in the hands of their historic owners, leading to rigidity, preventing airlines from obtaining additional slots, launching new services, and competing in the market. In economic terms, slots are a valuable, scarce economic resources, but airlines get them for free. Airlines typically oppose changing the system which provides them with an increasingly valuable asset on a permanent basis at no cost. This system means slots are held by airlines that may not necessarily use them efficiently, reinforcing incumbent power and preventing small to medium airlines from building scale to compete. If one has a valuable asset, one tends to put it to its most valuable use in enriching oneself, though it might be more valuable in someone else's hands. The allocation system means, for example, that airlines operate smaller planes rather than surrender their slot to an airline who would use the slot for a busier route with a bigger plane that would reduce ticket prices and grow capacity.⁴³ An American study found that the US slot allocation systems, which follows similar guidelines to the UK, causes larger airlines to hoard slot allocations despite lower usage.⁴⁴ Aviation consultant and former head of government at IATA, Andrew Charlton, has warned that the system is “like the airlines have been given a grace-and-favour flat that they are allowed to mortgage, sell or swap” and called the current guidelines a “naked attempt to distort the market”.⁴⁵

Rather than encourage airlines to give up slots that they do not use, the use-it-or-lose-it rights has worsened inefficiencies and had the unintended consequence of airlines operating wasteful ‘ghost’ empty flights to maintain access to slots.⁴⁶ During the global financial crisis, Bmi (now owned and integrated into British Airways) flew ghost flights throughout 2008 to maintain access to landing slots reportedly valued at £770 million. In 2004, Qantas operated a ghost flight to maintain a valuable purchased slot while a new route was being created. In other cases, airlines must run empty flights because of the ‘pairing’ system, which pairs valuable prime time slots with corresponding useless, non-peak slots that must both be used for

2017.

⁴¹ This tendency was noted by Steer Davies Gleave, “Impact assessment of revisions to Regulation 95/93,” *European Commission*, March 2011.

⁴² Jones et al, “STUDY TO ASSESS THE EFFECTS OF DIFFERENT SLOT ALLOCATION SCHEMES”, *European Commission, DG TREN*, January 2004.

⁴³ This tendency was noted by Steer Davies Gleave, “Impact assessment of revisions to Regulation 95/93,” *European Commission*, March 2011.

⁴⁴ Fukui, Hideki, “Do carriers abuse the slot system to inhibit airport capacity usage? Evidence from the US experience”, *Journal of Air Transport Management*, 24, (2012), 1-6.

⁴⁵ *The Economist*, “The rules on allocating take-off and landing slots favour incumbents,” November 16, 2017.

⁴⁶ Cummins, Nicholas, “The Story Behind London Heathrow’s Ghost Flights”, *Simple Flying*, July 22, 2018.

the slot to be maintained. Even if the slots were allocated efficiently in the past, the grandfathering means that there is a possibility that the incumbent slot holders are not the most efficient owners. A relatively small number of slots - around 1% a year - are reallocated to new airlines or traded, leaving the large incumbents with most of slots.⁴⁷ The slot system is encouraging anti-competitive efforts to prevent competitor airlines from gaining access to the slots. Ultimately it is passengers that suffer as a result of effectively allocated slots - there are fewer airline and route choices, lower quality service, and higher fares.

The Government's *Aviation 2050* consultation document raises concerns that the "current allocation system is not designed to stimulate a competitive market environment and has no means of taking into account broader objectives". The Government has raised many issues with the existing allocation system for slot releases, including the failure to release new slots with enough time for airline planning; lack of transparency; the incentive by airlines to obtain and hoard as many slots as possible and subsequently profit through the secondary market or by preventing competition; new entrants' struggle to get enough slots for economies of scale for their operations; the grandfathering of slots to incumbents preventing necessary market dynamism over time; and the secondary trading market not being efficient enough because of airlines' unwillingness to trade.⁴⁸ A 2004 report for the European Commission concluded that the existing system provides "poor incentives to use slots efficiently".⁴⁹

AUCTIONING SLOTS FOR EFFICIENCY AND COMPETITION

The major alternative to the existing slot allocation method would be an auction system, in which airlines bid for the right to takeoff and land.⁵⁰ This could follow a similar model to the ongoing spectrum auctions, in which the Government has sold bands of the electromagnetic spectrum to assign the scarce resource. This experience presents an important learning opportunity for the designers of a slot auctions system. In practice, existing slots could be auctioned, requiring that existing rights are suspended and that incumbents bid for their slots against competitors, or new slot capacity could be auctioned, particularly related to new capacity at Heathrow and Gatwick airports.⁵¹ In either case, slot auctions, combined with a secondary trading market, would ensure that slots are used most efficiently. This is because, as with any other market, the price that each bidder is willing to pay would reflect the value of the slot to the airline, and the airline who is willing to pay the most would reveal that the slot is most valuable to them and their passengers. It would also present an opportunity for mid-sized carriers to expand, encouraging

⁴⁷ The Economist, "The rules on allocating take-off and landing slots favour incumbents," November 16, 2017.

⁴⁸ Department for Transport, "Aviation 2050 - The future of UK aviation: A consultation," Cm 9714, HM Government, London, December 2018.

⁴⁹ The Guardian, "Why slot sales are key to airlines' take-off", *The Guardian*, April 11, 2004.

⁵⁰ Congestion pricing at airports, as well as simply relying on secondary trading has also been discussed as market-based alternatives. In the UK, secondary trading does exist but it is a less than ideal solution since it does not address initial distributional issues. Congestion pricing would also have a similar issue.

⁵¹ Sheng et al, "Slot auction in an airport network with demand uncertainty," Wuhan, Elsevier, 2015.

innovation and avoiding the potential for arbitrary decision making and political interference.

The Competitions and Market Authority (CMA), in an advice paper for the Department for Transport, concluded that there are “strong arguments for moving to a market-based approach to slot allocation”.⁵² The CMA have found that the status quo is bad for consumers: “The current rules also restrict the ability of new and/or smaller airlines to enter and expand their offerings.”⁵³ The CMA argued that a market-based approach would lead to allocation of slots to “the most efficient user and may encourage greater innovation in the subsequent use of those slots”; encourage competition by making it easier for newer and smaller players to build up a portfolio of slots to expand their operations; and improve consumer outcomes, resulting in more choice and improved service quality. The CMA have also noted that while formally allowing secondary trading would alleviate some of the issues, it would not address the existing distributional inefficiency of the current process or prevent hoarding. The Adam Smith Institute and the Institute of Economic Affairs have also supported slot auctions on similar grounds.⁵⁴ Mexico’s competition regulator has similarly supported slot auctions.⁵⁵

Slot auctions have some inherent risks. Existing players could use their market power to bid up the cost of slots for new entrants, leading to more concentrated slot ownership and higher costs for passengers. Nevertheless, this might make economic sense to an extent, since incumbents can provide a better service with economies of scale and larger networks. The *International Air Transport Association* (IATA), who represent the world’s airlines, has warned that having to pay for slots would increase the cost of operation for airlines and would contradict the government’s aim of encouraging regional flights and more routes since airlines would have to prioritise lucrative long-haul routes.⁵⁶ Slot auctions have also been opposed by IAG, the owner of British Airways, for the same reasons. The opposition of incumbent airlines, and their representatives in the IATA, is perhaps unsurprising considering that auctions would reduce their slot rents and increase competitive pressures.⁵⁷

⁵² Competition & Markets Authority, “Advice for the Department for Transport on competition impacts of airport slot allocation”, London, *HM Government*, December 2018,

⁵³ Page, Stephanie, “Why we’re advocating the case for change in airline slots”, *Gov.UK*, March 18, 2019

⁵⁴ Adam Smith Institute, “100 Policies for Mrs May,” October 2018; Boyfield, Keith (Ed.), “A Market in Airport Slots”, *Institute of Economic Affairs*, London, 2003

⁵⁵ CPI Latinamerica, “Mexico: New COFECE ruling on Mexico City Airport ‘slots’,” *Competition Policy International*, July 2017.

⁵⁶ Paton, Graeme, “Selling Heathrow’s slots at auctions ‘will push up fares’”, *The Telegraph*, February 19, 2019.

⁵⁷ Ranieri, Andrea, et. al., “Airport slot allocation: Performance of the current system and options for reform: Towards a comprehensive performance framework,” Conference Paper, *The Sesar Innovation Days 2013*, November 2013.

These concerns about slot auctions could be alleviated with a number of specific policy decisions. The government could opt to allocate a certain proportion of slots to new entrants - as is currently the case - capping the number of slots that can be purchased by a single airline or group. This regulatory intervention, however, would undermine the efficient allocation of slots to their best usages, that may very well be under larger airlines.⁵⁸ In order to avoid excessive costs, it would also be necessary to auction a large number of slots simultaneously, to consider reauctioning existing slots, and to have a clear rollout plan for slot auctions over time. To avoid a large monetary impact on airlines' finances, the funds that are raised through slot auctions could be used to offset other airport access charges. In any case, the financial concerns should not be exaggerated, since, in a competitive market, the ability for airlines to pass along additional costs to consumers is limited. Additionally, it could not be worse than the existing system which requires challenger airlines to pay exorbitantly high payments for limited peak time slot access. If a slot auction process were to be pursued, many specifics - such as complementarities between slots, secondary trading, the market power of incumbents, the value of existing slot holdings, and the distribution of additional revenue - would have to be determined. Overall, there is a strong case for slot auctions.

THE INTERNATIONAL EXPERIENCE OF TERMINAL SLOT AUCTIONS

By comparison to airport terminal competition, there is relatively limited international evidence on slot auctions. In 2008, the Bush Administration sought to introduce a limited test of slot auctions at congested airports in New York.⁵⁹ However, following strong opposition, legal intervention by the airlines, and the Port Authority blocking the initiative, it was abandoned.⁶⁰ Nevertheless, some US airports have market mechanisms in slot allocation because of antitrust laws ruling out orthodox IATA guidelines. A number of high congestion airports permit the reselling of slots through condition-attached secondary markets. These airports are La Guardia and JFK in New York, O'Hare in Chicago, and Washington International, with O'Hare having the largest concentration of slot holdings. The research has suggested that there was "no indication that dominant carriers were hoarding poorly utilised slots" or leasing off slots with poor utilisation potential.⁶¹ Overall, "large airlines with large networks are more likely to obtain additional value from the use of the marginal slot".⁶² Nevertheless, reforms of slot auctioning at the four aforementioned airports, largely because of the phasing of the crucial slot-limiting "high density rule", has created delays as fewer slots were traded.⁶³

The only known experiment with initial allocation of slots with an auction is in China. In December 2015, the Civil Aviation Authority of China (CAAC) under-

⁵⁸ Fukui, Hideki, "Do carriers abuse the slot system to inhibit airport capacity usage? Evidence from the US experience", *Journal of Air Transport Management*, 24, (2012), 1-6.

⁵⁹ Chan, Sewell, "Debate Over Auctioning of Airport Landing Slots", *The New York Times*, June 18, 2008.

⁶⁰ Ibid.

⁶¹ Starkie, David, 'Allocating airport slots: a role for the market?', *Journal of Air Transport Management* 4 (1998), 111—116.

⁶² Ibid.

⁶³ Boyfield et al, "A Market in Airport Slots", *Institute for Economic Affairs*, London: 2003.

took a limited experiment with slot auctions at Guangzhou Baiyun Airport. Nine 3-year airport slots were auctioned with 34 airlines competing, raising ¥550m in total revenue (£62.6m).⁶⁴ However, the auction only applied to a limited number of domestic slots. The winners of the auction were the four largest carrier groups and their subsidiaries. *China Daily* reported an unnamed senior executive from a private carrier who said that the “The auction was too expensive for us”.⁶⁵ IATA, who represent the airlines and opposes slot auctions, claimed that the auction failed to provide a fair distribution in comparison to the usual allocation protocol. However, there are a number of reasons why the experience in China provides a poor case study of the viability and outcomes of slot auctions. Firstly, the number of slots that were auctioned was very small and limited to domestic usage. Only half of the additional capacity was auctioned, allowing the incumbents to monopolise slot spaces.⁶⁶ Further, as shown by their willingness to pay, the various incumbents could put the slots to the best use. Therefore it is not inherently objectionable that, in this case, smaller airlines could not access the slots. Secondly, the nature of domestic airline ownership in China is already, by itself, not particularly competitive and has a strongly corporatist culture. CAAC has now deferred secondary auctions to the “Slot Coordination Committee...established to further promote fair, efficient, competitive and incorrupt allocation of slot resources”.⁶⁷ Later reform encompassed “air carriers choosing slots from the slot pool according to the order of prioritized allocation”.⁶⁸

It would appear that opposition to slot auctions, largely from the airline industry, has prevented its widespread application. This presents an opportunity for post-Brexit Britain to lead the world in this field.

AUCTIONING AIRSPACE FOR DRONES AND AIR TAXIS

THE RAPID DEVELOPMENT OF VTOLS

Air taxis and drones carrying passengers and goods will soar above our cities in the not too distant future. What was once the realm of science fiction in television shows like *The Jetsons* and movies like *Back to the Future*, will soon be raising serious regulatory questions. The use of low-altitude airspace for vertical takeoff and landing aircraft (VTOL) is the next frontier for transportation and delivery. These vehicles will take flight around 200 feet to 5,000 feet above ground, with potentially hundreds of takeoffs and landings every hour congesting air space. Air taxis would be able to transport passengers from Heathrow Airport to the City of London in 8 minutes and from London to Brighton or Oxford in 23 minutes, and from London to Birmingham.⁶⁹

⁶⁴ Goh, Brenda, “China’s state-owned carriers sweep nation’s first airport slot auction”, *Reuters*, December 31, 2015.

⁶⁵ Wen, Wang, “Big airlines dominate first airport slot auction”, *China Daily*, December 31, 2015.

⁶⁶ Fukui, Hideki, “Do carriers abuse the slot system to inhibit airport capacity usage? Evidence from the US experience”, *Journal of Air Transport Management*, 24, (2012), 1-6.

⁶⁷ Civil Aviation Authority of China, “Methods for Management of Civil Aviation Slots to Be Implemented on April 1”, April 1, 2018.

⁶⁸ *Ibid*

⁶⁹ Author calculations. This is based on vehicles cruising altitude of 150mph plus 1 min take off and 1

This will form a large new sector of the economy. Consultancy firm PwC have estimated that drones, broadly defined, could contribute £42 billion to the UK economy by 2030, with an estimate of 76,000 drones in the sky generating 628,000 jobs across areas such as emergency services, retail, and agriculture, helping to boost the UK's productivity.⁷⁰ In the US, a NASA-funded study concluded that the air taxi industry could be worth half a trillion dollars and transport 10 million passengers per day.⁷¹ Others have estimated the global air taxi market could be worth \$615 billion and \$3 trillion by 2040.⁷² These services will help get congested cities moving, providing an entirely new transport class to thousands.

Drones and air taxis capable of carrying passengers and goods are a rapidly developing technology.⁷³ There have already been various test flights of VTOL vehicles in Dubai, New Zealand, and more coming soon in Singapore and San Francisco.⁷⁴ Uber has announced plans to start testing Uber Air in 2020, across Dallas and Los Angeles in the United States and Melbourne in Australia, with commercial operations launching in 2023.⁷⁵ Uber is already partnering with real estate companies to find "vertiports" that will be locations for take-off and landings and is working with charging technology companies. Uber has signed deals with five companies who are developing the VTOL aircraft including Aurora Flight Sciences, who is backed by the Pentagon, and electric plane maker, Pipistrel. Larry Page, the co-founder of Google, is also reportedly behind developing flying cars through the firm Zee. Aero.⁷⁶ It is widely expected that the technology will deliver VTOL services in a commercially viable, safe, and affordable manner over the coming years.

THE EXISTING REGULATORY ENVIRONMENT FOR DRONES

The key policy challenge is how to integrate VTOL aircraft into the airspace regulatory system. Last year was the busiest on record in the skies above the UK, with a record 2,557,780 flights and 8,854 flights in a single day.⁷⁷ The skies are expected to get even busier in the years ahead, particularly following the expansion of Heathrow

min landing time.

70 Whyte, E., Frances, J., Murray, J. and Evans, B. (n.d.). The impact of drones on the UK economy. PwC.

71 Fernando, C., Reiche, C., Goyal, R., Shaheen, S., Bonnefoy, P., Serrao, J., Kimmel, S., Nilsson, S., Cohen, A., McConachie, D., Thompson, R. and Chong, U. URBAN AIR MOBILITY (UAM) MARKET STUDY, 2018.

72 Reed, D., "Too Big To Fail: Projected Flying Cars Market Is So Big That A Few Of The 135 Makers Will Succeed," *Forbes*, 2019.

73 Sarsfield, Kate. 2019. "Pegasus Prepares VTOL Business Jet For First Outing". *Flightglobal.com*:<https://www.flightglobal.com/news/articles/pegasus-prepares-vtol-business-jet-for-first-outing-457986/>; Plummer, Libby. 2017. "What Is VTOL? A Beginner's Guide To Vertical Take-Off And Landing Technology". *Wired.Co.Uk*.<https://www.wired.co.uk/article/vtol-vertical-take-off-landing-explained>; Gardner, Richard. 2019. "The Evtol Disruption Goes Viral". *Sae.Org*: <https://www.sae.org/news/2018/06/the-evtol-disruption-goes-viral>; Hawkins, Andrew J. 2018. "Ehang'S Passenger-Carrying Drones Look Insanely Impressive In First Test Flights". *The Verge*: <https://www.theverge.com/2018/2/5/16974310/ehang-passenger-carrying-drone>

74 "Ehang Official Site-EHANG 184 Autonomous Aerial Vehicle," *Ehang.Com*, 2019; "Volocopter - Home". 2019. *Volocopter.Com*; "Cora," 2019. *Cora.Aero*. <https://cora.aero/>; "Joby Aviation". *Jobyaviation.Com*, 2019.

75 BBC News, "Uber Takes Its Flying Taxi Plans To Melbourne," *BBC News*, June 12, 2019.

76 Woods, Ben. "Larry Page Is Said To Be Secretly Developing Flying Cars". *Wired*, June 9, 2016.

77 NATS, "2018 Busiest Year On Record For Air Traffic," 2019.

Airport and growing demand for other airports. NATS, which provides air traffic control in the UK, has described existing small drones as a “growing challenge for air traffic control”.⁷⁸ NATS and the Civil Aviation Authority have launched the Drones Safe website to inform drone users on the rules.⁷⁹ Polling has found that three-quarters of the public are concerned that drones pose a threat to aircraft.⁸⁰ The current challenges related to the existing small drones are just beginning.

The current approach of the UK Government in relation to unmanned aerial vehicles (UAVs) or drones has been to introduce substantial new regulations.⁸¹ From 30 November 2019, the Government will require drone operators to register with the UK Drone Registration Scheme. This scheme, which will cost £16.50 per operator annually to cover costs, requires all drones between 250 grams and 20kg to be registered.⁸² Remote pilots will be required to take a safety test. Failure to comply will result in a £1,000 fine. The CAA expects 170,000 drone operators to register within the first 18 months. The government has also introduced stringent restrictions against flying drones above or in the vicinity of airfields.⁸³ (Though there has been a successful trial of drones completing on-airfield tasks in controlled airspace at Manchester Airport.⁸⁴) It is also illegal, across the UK, for small drones to fly above 400 feet (120 metres).⁸⁵ The EU is also currently expanding its regulatory responsibility in relation to drones through guidance from the European Union Aviation Safety Agency (EASA).⁸⁶

Light unmanned aircraft, which weigh from 20kg to 150kg, are currently subject to all aspects of UK aviation law, however the CAA notes that they will “be exempted from many of the requirements”.⁸⁷ These medium sized drones require a Safety Case be presented to the CAA to demonstrate that the aircraft can be flown safely. Unmanned aircraft above 150kg are currently subject to the same levels of stringent approval as traditional manned aircraft and must be certified by EASE, though there is scope for UK-only approval through the Safety Case process.⁸⁸

The regulatory environment for air taxis has not been settled. The CCA appear to be taking a positive and collaborative approach to new VTOL technologies. The CAA have said, in relation to VTOL passenger aircraft, that “We want to be ready

⁷⁸ NATS, “Drones - NATS,” 2019.

⁷⁹ Civil Aviation Authority & NATS, “Introduction - Dronesafe,” Dronesafe, 2018.

⁸⁰ NATS, “Public Remain Wary Of Drones As Incidents Continue To Rise,” 2018.

⁸¹ Department for Transport. “Taking Flight: The Future Of Drones In The UK Government Response”. London, UK: *HM Government*, 2019.

⁸² Civil Aviation Authority. 2019. “2019 Drone Registration Scheme: Charge Proposal Consultation Document”. London: *Civil Aviation Authority*.

⁸³ Civil Aviation Authority.. “Airspace Restrictions For Unmanned Aircraft And Drones”. London, UK: Her Majesty’s Government, 2015.

⁸⁴ NATS, “UK-First As Drones Fly Safely In Controlled Airspace.” 2018.

⁸⁵ Civil Aviation Authority, “CAP 1763 - Air Navigation Order 2018 And 2019 Amendments - Guidance For Small Unmanned Aircraft Users”. London, UK: Civil Aviation Authority, 2019.

⁸⁶ European Union Aviation Safety Agency, “Opinion 01/2018 Unmanned Aircraft System (UAS) Operations In The ‘Open’ And ‘Specific’ Categories,” Cologne, Germany: EASA, 2019.

⁸⁷ Civil Aviation Authority & NATS, “Introduction - Dronesafe,” Dronesafe, 2018.

⁸⁸ *Ibid.*

to deal with these new technologies now by working closely with all involved”.⁸⁹ They have developed an ‘Innovation Hub’ to “help innovators bring their new aviation and travel products and services to market.”⁹⁰ This includes a ‘Regulatory Sandbox’ to work with developers of new technologies to “test and trial innovative solutions in a safe environment.”⁹¹ In May 2019, the CAA launched an ‘Innovation Sandbox,’ working with six participants including Amazon and Volcopter, a company developing air taxis.⁹² If these technologies are to be viable in the UK, it will be important to continue this open regulatory approach.

THE VTOL POLICY CHALLENGE

VTOLs flying in air space, potentially already occupied by conventional aircraft, and/or creating a congested airspace, raise the classic economic question: how do we allocate the scarce airspace resource? Should air space over particular corridors be used for rapid commuting, luxury sight-seeing, freight, recreation or business? How do we fund terminals and other associated infrastructure? Air traffic control is set to get substantially more difficult with potentially thousands of new VTOLs in the sky. In the United States, NASA has been working closely with industry partners and the Federal Aviation Administration on their Unmanned Aircraft Systems (UAS) Traffic Management (UTM) technologies.⁹³ The challenge is to develop a safe system that can manage all this traffic and decide who gets to use what air space at what times. In the UK, drones have already proven disruptive, as shown by the incident which shut down Gatwick Airport over the busy Christmas period in late 2018.⁹⁴ Soon there could be thousands of VTOL in low airspace above UK cities.

In the past the government has responded to new aviation technologies with a command-and-control approach. Since the early 20th century, following the development of early flying machines, airspace above property in the UK has been public property.⁹⁵ The UK became the first country in the world to introduce an air traffic control regime. This is now managed by NATS Holdings, formally known as the National Air Traffic Services, which is a public-private with a 49% golden share owned by the UK Government. Other elements of the aviation sector, such as slot allocations discussed in the previous section, are administratively allocated. In the case of slot allocations, the existing system has led to inefficient use of the scarce resource to takeoff and land at airports. Fundamentally, this is because the regulator, no matter how well informed, lacks the knowledge as to who would best use a limited resource at a given time.

⁸⁹ Civil Aviation Authority. 2019. “Setting Up Our New Innovation Team And Helping The UK Be At The Forefront Of Urban Air Mobility”.

⁹⁰ Civil Aviation Authority, “The CAA Innovation Hub,” 2019.

⁹¹ Civil Aviation Authority, “The CAA Regulatory Sandbox,” 2009.

⁹² Civil Aviation Authority, “From Air Taxis To Artificial Intelligence In Air Traffic Control – UK Civil Aviation Authority Announces First Six Participants For New Innovation Work,” 2019.

⁹³ Lillian Gipson, “NASA Completes Its Latest Drone Traffic Management Flight Campaign,” NASA, June 8, 2017.

⁹⁴ Tom Burrige, “‘Sustained’ Drone Attack Closed Gatwick,” *BBC News*, February 20, 2019.

⁹⁵ Arthur K. Kuhn, “The Beginnings of an Aërial Law,” *American Journal of International Law* 4, no. 1 (January 1910): 109–32

In the case of VTOLs, the Government could decide to keep access and control in public hands through a “common access” approach. In order to avoid the tragedy of the commons - the overuse of the resource and congestion that could potentially lead to safety concerns - it would then be necessary to introduce some manner of air traffic control system to decide who uses corridors of space at particular times as demand grows. This is practically the approach currently being considered in the US and the UK.⁹⁶ This approach raises questions about how to centrally decide to allocate air corridors to particular usages as demand grows and how to set pricing. It is also unlikely to be responsive to changing technology and to help the early movers in the industry who receive permission to access the scarce resource - entrenching historic market positions. This would be akin to the special market position provided to older airlines who were given access to valuable landing slots at no cost.

AUCTIONING AIRSPACE FOR VTOLS

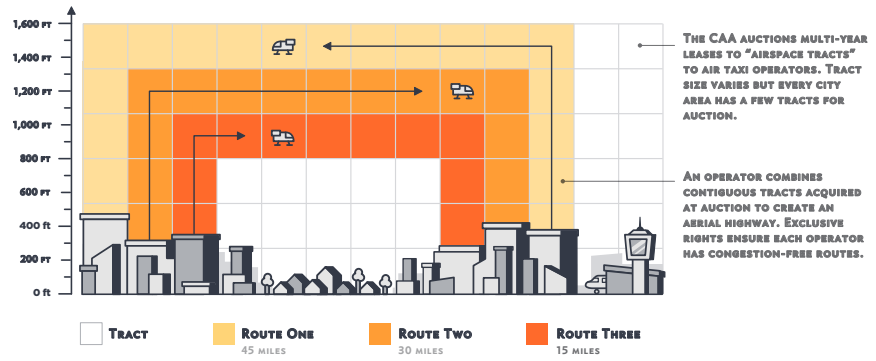
An alternative to the centralised approach would be for the government to sell rights for particular aerial travel corridors, over a delimited geographic path and altitude, through auctioning exclusive use licences for a period of time.⁹⁷ The licence holder could decide issues such as specific flight paths, speeds, terminal location, aircraft size, and pricing. These licences would likely be bought by particular VTOL providers, or companies that want to manage this space and resell the ability to use the corridor. The specific corridors put up for auction could be determined in consultation with experts and potential users. This process could enable substantial competition by the auctioning of different altitudes along the same route to different companies. These auctions, of the currently relatively unused resource, should be undertaken as early as possible before alternative arrangements are developed. This would allow regulators to get the approach right from the start, avoiding historic mistakes made in aviation.

The private sector, following the establishment of property rights, will be able to most efficiently manage the air space and the associated costs of air traffic management. The creation of a market in the usage of the space will ensure that those who need it the most, as signalled by their willingness to pay, will get access to the corridor at that particular time. Furthermore, the ability for the owners of the air space to resell the rights would ensure that the space is continuously put to its best usage. This follows the successful auctioning model used for radio spectrum licences. This would also provide the government with substantial revenue to help manage oversight and infrastructure development associated with the new technology. Additionally, it would also allow regulators, such as the Civil Aviation Authority, to focus on issues such as safety rather than the design of a complex new traffic management scheme.

⁹⁶ This is effectively what has been proposed in the US: Arwa S. Aweiss et al., “Unmanned Aircraft Systems (UAS) Traffic Management (UTM) National Campaign II,” in 2018 AIAA Information Systems-AIAA Infotech @ Aerospace (2018 AIAA Information Systems-AIAA Infotech @ Aerospace, Kissimmee, Florida: *American Institute of Aeronautics and Astronautics*, 2018). There also has been some discussion of developing similar regulatory systems in the UK, see Civil Aviation Authority, “Unmanned Aircraft Systems (UAS)”.

⁹⁷ This idea is inspired by Brent Skorup, see Skorup, Brent, “Auctioning Airspace,” George Mason University - Mercatus Center, November 14, 2018.

FIGURE 1. AUCTIONING AIRSPACE



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Brent Skorup of the Mercatus Center at George Mason University has advocated strongly for the auctioning of airspace for VTOLs.⁹⁸ Skorup argues that exclusive auctions would “reduce costly conflicts over resource use and allow for more dynamic efficiencies.” The owners of air rights would be able to constantly reassess whether the space is being put to the best usage, free from bureaucratic hurdles, allowing for innovation. Further, resales and subleasing would ensure that first movers do not excessively benefit from the system. It would also ensure truthful reporting of the value of the airspace tracts in the market process, since companies would have to declare the value of the asset in normal public reporting. The right to use air space would also encourage companies the certainty to invest in costly infrastructure, such as vertiports, rather than this falling on the taxpayer.

CASE STUDY: HEATHROW EXPANSION

Heathrow handles over 80 million passengers annually, making it the busiest airport in Europe. As it stands, Heathrow is near full capacity, particularly during peak times, often leading to delays. The operation of Heathrow near capacity raises serious issues related to competition. When there are capacity restraints, that is, supply is artificially restrained, it means that the owner of the limited resource can potentially charge higher prices, producing what is known as ‘scarcity rents’.

The proposals for expansion of Heathrow date back to the 1970s. In July 2015, the Davies Commission recommended the Government proceed with the third runway at Heathrow Airport following analysis of capacity utilisation, connectivity, and environmental impacts. The expansion, however, has not been uncontroversial. Opponents have raised concerns such as noise and pollution. Opposition has come from environmental groups such as Greenpeace and Friends of the Earth, nearby citizens and politicians, and London Mayor Sadiq Khan.⁹⁹ The expansion is strongly supported by business groups, such as the CBI.

⁹⁸ Ibid.

⁹⁹ BBC, “MPs Back Heathrow Airport Expansion,” June 26, 2018, sec. UK Politics.

In October 2016, the Government announced that Heathrow would be the location of an additional 3,500m runway in London, to be located north-west of the current two runways.¹⁰⁰ In June 2018, the plan was approved by the House of Commons, with a majority of 296.¹⁰¹ The planning application is due in 2020, and the third runway is expected to begin operating in 2026. The Department for Transport estimated that the overall benefit of the project to the economy would amount to £61bn, and that it would create up to 77,000 jobs over the 14 years of construction.¹⁰² This project, which would enable 260,000 more flights a year and could open up flights to as many as 40 new destinations according to Heathrow, is key to the Government's stated vision for a global, trading Britain.

HEATHROW'S DOMINANT MARKET POSITION

Heathrow maintains an elevated market position. Admittedly, Heathrow does compete with other European hubs for interlinking traffic, and other UK airports and London airports such as London City, Gatwick, Stansted, and Luton. Nevertheless, Heathrow's extensive array of international and domestic routes, terminal facilities, and two – and soon to be three – full length runways, makes it not only the UK's key airport, but also a key global hub.¹⁰³ This privileged position, which is exercised by gold plating its capital expenditure to increase the allowable prices it can charge airline, helps explain the very high landing charges and costs associated with the airport. The CMA has previously stated that “Heathrow's position as the only significant hub airport in the South-East, and indeed the UK, is itself a feature that restricts competition between airports”.¹⁰⁴

In response to Heathrow's substantial market power, the industry regulator, the Civil Aviation Authority (CAA), regularly reviews the market and sets the prices that Heathrow can charge airlines.¹⁰⁵ The CAA also has the power to regulate capital investment at the airport but has tended not to intervene and preferred to encourage constructive engagement between airlines and airports. This type of regulation is necessary when a player has substantial market power due to natural monopolistic or oligopolistic market features, such as in the water, energy and gas utilities. The CAA has determined that Heathrow Airport Limited (HAL) has “substantial market power”.¹⁰⁶ The CAA must balance the interest of the airport, which wants higher returns on its investment, with the interest of the airlines, who have relentlessly pushed for lower prices. This process is in itself a symptom of the lack of competition in the market, as well as capacity constraints and restrictions on expansion.

¹⁰⁰ Chris Johnston, “Third Runway at Heathrow Approved,” October 26, 2016, sec. Business.

¹⁰¹ BBC, “How Did Your MP Vote on Heathrow Expansion?,” June 26, 2018, sec. UK Politics.

¹⁰² Department for Transport, Updated Appraisal Report Airport Capacity in the South East, October 2017.

¹⁰³ Clarke et al, “BAA airports market investigation: A report on the supply of airport services by BAA in the UK”, London: Competition Commission, March 2009, 10.

¹⁰⁴ Clarke et al, “BAA airports market investigation: A report on the supply of airport services by BAA in the UK”, London: *Competition Commission*, March 2009, 14.

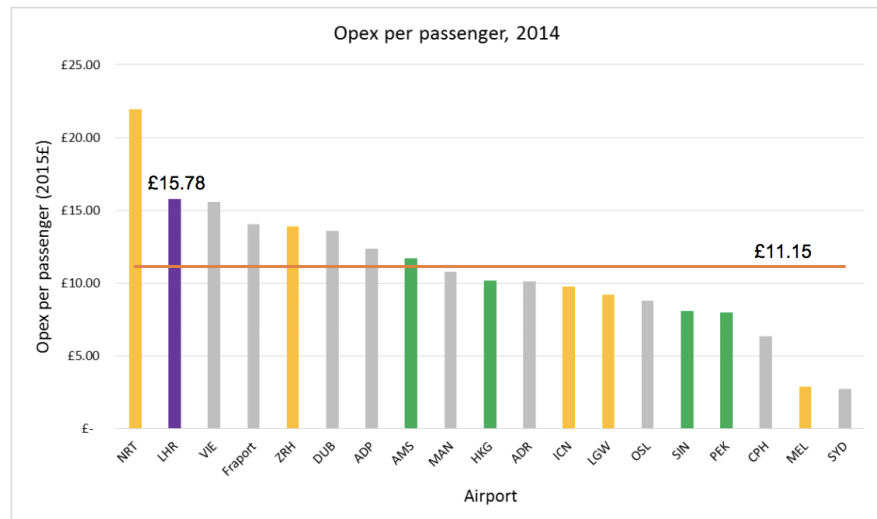
¹⁰⁵ Civil Aviation Authority, “Heathrow Price Control Review H7”.

¹⁰⁶ Civil Aviation Authority, “Market power determination in relation to Heathrow Airport – statement of reasons”, 2013.

There is evidence of Heathrow using its position to exercise market power from airlines, the initial customers, and ultimately passengers by gold-plating costs. A *Sunday Times* investigation published in March 2018 found evidence that Heathrow is charging excessive fees, for example, spending £74,000 to chop down three trees, adding a new car park that costs £61,000 per space – four times the typical amount – and a shelter and baggage system that cost twice as much as budgeted.¹⁰⁷ *The Sunday Times* suggested that the incentives for HAL are misaligned. HAL’s ability to charge airlines, and therefore their profits for shareholders, are dependent on the total value of Heathrow’s assets (known as the ‘regulatory asset base’ or RAB). In a market where the airport has substantial market power – if an airline wants to fly to Europe’s key hub they have no other choice – and in combination with price controls, they are incentivised to increase the value of their assets, a practice known as ‘gold-plating’. So if the expansion costs more than forecast, they would be able to charge more and profit more (though there is some regulatory oversight). This market is lacking in the usual competitive pressures. There are also concerns about a conflict of interest raised by a part-owner of HAL – Spanish construction giant Ferrovial – being extensively contracted by the airport. Further, according to *The Sunday Times*, there are ongoing claims that HAL lacks transparency and is not being properly scrutinised through proper audits.

Heathrow charges about £20 per departing passenger – among the most expensive in the world. According to benchmarking undertaken for the CAA by PA Consulting Group, Heathrow has the second highest operating expenditure per passenger of any major airport in the world (Figure 2).¹⁰⁸

FIGURE 2. OPEX PER PASSENGER (PA CONSULTING, 2017)



¹⁰⁷ John Collingridge, “Heathrow: The Cash Machine with an Airport Attached,” *The Sunday Times*, March 18, 2018.

¹⁰⁸ PA Consulting, “Benchmarking Of High Level Economic and Financial Metrics of Heathrow Airport”, London, June 2017.

Heathrow receives the third highest aeronautical revenue in the world (Figure 3), which has increased substantially in recent years (Figure 4).

FIGURE 3. AERO REVENUE PER PASSENGER, 2014

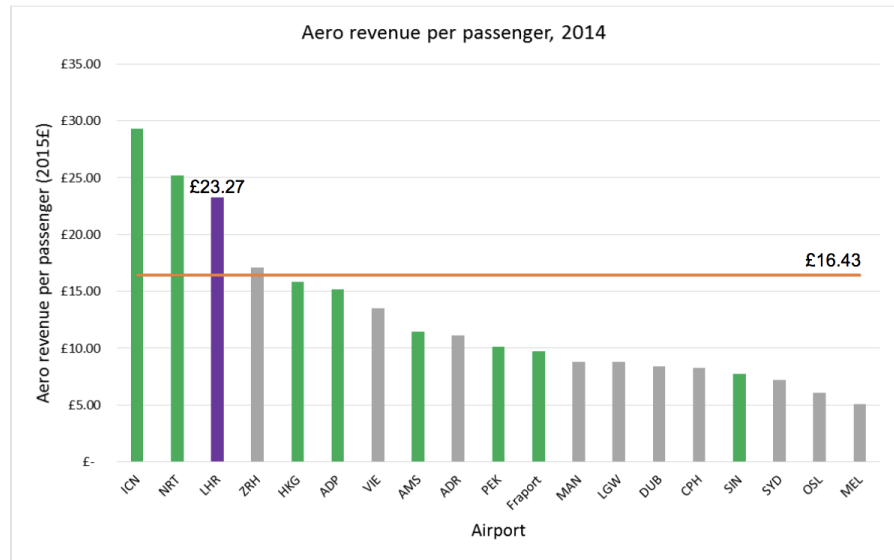
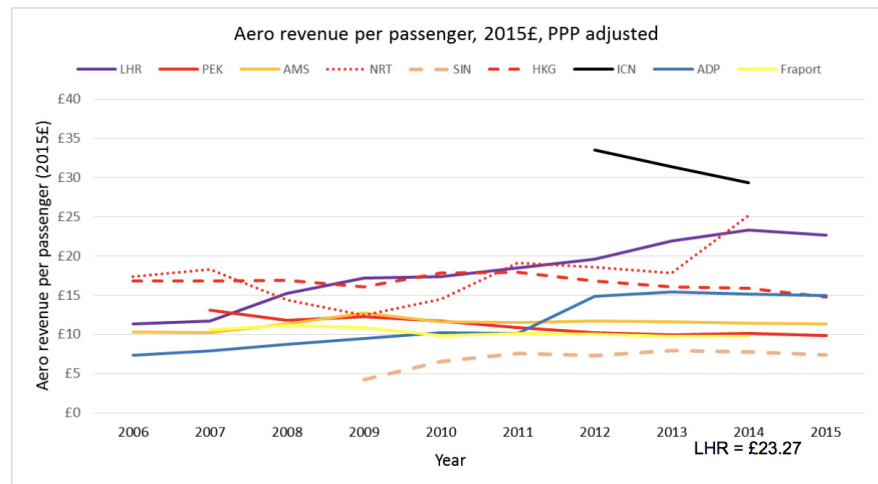
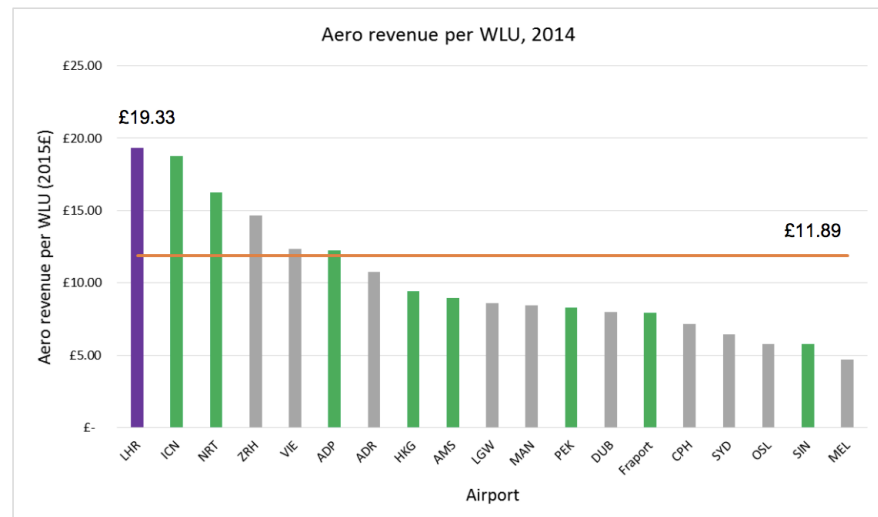


FIGURE 4. REVENUE PER PASSENGER, 2006-2015



Heathrow Airport is also bringing in the highest revenue per workload unit (WLU), which takes into account passengers and freight (Figure 5).

FIGURE 5. AERO REVENUE PER WLC, 2014



Heathrow Airport Limited has become a very profitable enterprise, paying shareholders a healthy of £3.1 billion of dividends between 2014 and 2018, a figure that is higher than the £2.9 billion spent on capital improvements in the same period.¹⁰⁹ There are ongoing concerns that Heathrow's financial success as an airport may be coming at the expense of the UK economy through higher prices for consumers and businesses using the key hub.¹¹⁰ The high prices charged by Heathrow is a potential indication that the currently regulatory regime is not working effectively, and could benefit from additional competition in the market

THE COMPETING HEATHROW EXPANSION PROPOSALS

The expansion of Heathrow presents an opportunity to consider the dominant market position held by HAL and consider alternatives. There has been substantial discussion of whether it would be possible for an alternative builder and operator of the associated additional terminal being built alongside the new runway. IAG, the parent company of British Airways, for example, has called for HAL to be broken up to increase competition and argued that the Heathrow expansion provides “a great opportunity for independent companies to design, build and run commercial facilities like terminals.”¹¹¹ Some airport services, such as runways and passenger transfer between terminals, make most sense to be operated by a single entity. However, terminals are different. Each one of the existing four terminals at Heathrow has the same function – such as passenger check-in and retail services – and are independent of each other. This raises the potential for a new terminal to be built and operated by a different company.

The Heathrow expansion is a Nationally Significant Infrastructure Project (NSIP), a large-scale development that requires a Development Consent Order (DCO) under the Planning Act 2008.¹¹² The NSIP process is activated following a National Policy Statement (NPS), in the case of Heathrow, the Airports National Policy Statement. This process removes the need to obtain separate consents, and is supposed to speed up the process for major projects, but also takes a number of years in consultation and analysis. The ultimate decision to accept a DCO proposal rests with the responsible Secretary of State, in the case of Heathrow, the Secretary of State for Transport.

The DCO process does not currently include a tender-like process in the case of multiple proposals. This is particularly problematic in the context of recent procurement failures by the Department for Transport (DfT). Following substantial public controversy, the DfT cancelled a £13.8m contract with Seaborne Freight to provide a ferry service in the case of a no-deal Brexit.¹¹³ Seaborne Freight was criti-

109 LLB Reporter, “Heathrow pays shareholders more than it invests in the last four years,” *London Loves Business*, March 15, 2018.

110 The Government's delay in approving the Heathrow expansion is also partly to blame.

111 Calder, Simon. “HEATHROW TERMINALS SHOULD BE RUN BY RIVAL OWNERS SAYS BRITISH AIRWAYS BOSS” *The Independent*, 4 February, 2018.

112 Smith, Louise, “Planning for Nationally Significant Infrastructure Projects,” Briefing Paper, Parliament, 06881, July 17, 2017.

113 BBC News, ‘Brexit: Seaborne Freight no-deal ferry contract scrapped’, February 9, 2019.

cised for owning no ships and Transport Network has revealed a lacklustre process in procurement oversight for the project.¹¹⁴ The DfT also struggled in relation to the bidding process for the West Coast Mainline, with the initial tender process scrapped due to “significant technical flaws” in the bidding process and mistakes by the department.¹¹⁵ The decision as to who should be responsible for particular projects must be carefully considered against all the relevant criteria.

The Airports National Policy Statement envisages multiple parties being responsible for the expansion at Heathrow Airport, stating that:

“For the avoidance of doubt, the Airports NPS does not identify any statutory undertaker as the appropriate person or appropriate persons to carry out the preferred scheme... It is possible that an applicant for development consent in respect of the preferred scheme will promote more than one application for development consent, dealing with different components individually.”¹¹⁶

HAL, the current owner and operator of the runways and terminals at Heathrow Airport, have put forward a £14.4 billion proposal for expansion – down from initial estimates of a £16.5 billion cost. Heathrow’s proposal includes a new runway of between 3,200 and 3,500 metres in length to the northwest; associated taxiways and realignment of the M25 motorway and other roads; development of an additional terminal and satellite buildings; additional aircraft stands and apron space; creation of flood storage; a bus station upgrade; development of associated facilities such as car parking and air traffic control; and temporary construction facilities.¹¹⁷ While the new runway is planned to be operational by 2026, the entire airport and terminal redevelopment would not be complete until 2035.

The cost of the airport expansion – except for surface infrastructure such as roads and trains – will ultimately be paid for by passengers through higher access charges for airline usage of airports. This raises the essential question about the cost, design, and construction of the additional runway and terminal. If the costs are kept to a minimum, then passengers are the ultimate beneficiary. As discussed, Heathrow currently charges about £20 per departing passenger, but this could increase to as much as £31 or higher per passenger to cover the cost of the expansion.¹¹⁸ If charges are too high, it could reduce airline competition at the airport and therefore ultimately reduce passenger choice. There have been substantial concerns raised about the ability and the incentives of Heathrow to keep costs down. To address

¹¹⁴ Browne, Dom, “Exclusive: DfT took shortcuts on cancelled Seaborne Freight procurement” *Transport Network*, February 9, 2019.

¹¹⁵ BBC News, “West Coast Main Line deal scrapped after contract flaws discovered”, October 3, 2012.

¹¹⁶ Department for Transport, “Airports National Policy Statement: New Runway Capacity And Infrastructure At Airports In The South East Of England”. London: *Department for Transport*, June 2018.

¹¹⁷ The Planning Inspectorate, “SCOPING OPINION: Proposed Expansion of Heathrow Airport (Third Runway) Case Reference: TRO20003”, June 2018.

¹¹⁸ Airports Commission, “Business Case and Sustainability Assessment”, July 2015, p 113.

this issue, there have also been calls from across the political spectrum for terminal competition in relation to Heathrow.

Luke Pollard, a Labour MP and Shadow Minister for Flooding and Coastal Communities, expressed support for the idea of additional competition in the airport expansion:

“I found much merit in the idea of competition in terminal operation in the new expanded Heathrow—we are talking about not only a new runway but new terminals. To keep costs down at Heathrow, which will be the largest privately funded infrastructure project in the world, the basic tenets of a market economy need to kick in. Competition—not always welcome on my side of the House—for Heathrow, in the private sector, should be looked at. Competition over terminal operation could keep charges low at the airport. That is something that has been pushed not only by Willie Walsh and Surinder Arora but by many others. We need to keep that option on the table throughout the process.”¹¹⁹

Secretary of State for Transport Chris Grayling said in June 2018 that while he “will always retain an open mind” he believed that Heathrow is the “only credible promoter who could deliver this transformational scheme in its entirety”. Grayling expects “Heathrow to engage in good faith with third parties” but also expects delivery within a timely manner.¹²⁰

There have been numerous alternative proposals put forward for the airport expansion. Airlines have called for the creation of “Buildco,” a special purpose company with responsibility to deliver the Heathrow expansion.¹²¹ This proposal reflects the belief by the airlines that HAL would be unable to deliver on time and on budget.¹²² IAG, the owner of British Airways, has said that they have “zero” confidence that the project will be delivered on time and on budget.¹²³ Heathrow and the airlines would have stakes in the new terminal, therefore adding pressure to keep costs in line. CAA, however have claimed that the Buildco proposal, as it currently stands, has “no detail on how this idea might work in practice”. The lack of development of this idea, however, is no reason to dismiss it in its entirety.

Heathrow Hub, a proposal that was shortlisted in the earlier Airports Commission report, called for the existing northern runway to be extended to 6,650 metres, instead of building a third runway.¹²⁴ This, they claim, would allow for simulta-

¹¹⁹ Pollard, Luke. HC218WH, *House of Commons*, 07 June 2018.

¹²⁰ Grayling, Chris, “Proposed Heathrow expansion: Statement by the Secretary of State for Transport about the proposed expansion of Heathrow airport,” *Gov.UK*, June 5, 2018.

¹²¹ Jon Ungeod-Thomas, “Airlines Plot to Hijack Heathrow Runway,” *The Sunday Times*, June 3, 2018.

¹²² Notably, Heathrow was capable of delivering Terminal 5 both on time and on budget, in a relatively unique case for a major project, see Rowan Moore, “On budget, on time -- now it just has to work,” *Evening Standard*, March 14, 2008.

¹²³ *ibid.*

¹²⁴ Heathrow Hub, “Heathrow Hub: Independent Innovation”.

neous take offs and landings to expand capacity, while costing substantially less and being less disruptive and noisy than building a new runway. This proposal was ultimately rejected by the government in the Airports National Policy Statement, which supports the building of an additional third runway at Heathrow. Heathrow Hub has sought legal avenues of appeal against the government on the basis that the government's plan is inconsistent with competition law.¹²⁵ The High Court refused permission to appeal the decision on 1 May, 2019, however Heathrow Hub are intending to appeal this decision. Former Advisor to the Airports Commission, David Starkie has called for the new runway to be built in stages, with an initial 2,500m runway constructed up to the M25 in the first stage and the costly expansion over the M25 being undertaken in a second stage after the shorter runway has come into operation.¹²⁶ This would reduce the risks associated with a difficult construction project.

Additionally, Arora Group – the owner of hotels and a substantial quantity of land at Heathrow – have put forward various alternatives. In 2017, Arora proposed an alternative runway design, claiming it would be as much as £5 billion cheaper.¹²⁷ This proposal included ideas to change the terminal design and taxiways, reducing the footprint of the construction project. Surinder Arora, the owner of Arora, said that “We want passengers to be at the heart of our plans and the current monopoly at Heathrow, which overcharges airlines and in turn raises fares for passengers, is not the right model for the future”.¹²⁸ “Heathrow needs competition and innovation which puts passengers and airlines at the heart of the expansion project.” These proposals were welcomed by IAG, the owner of British Airways. Arora has since withdrawn the proposal to build a new runway and agrees that HAL should build the government's preferred Northwest runway and undertake necessary works on the M25 - apparently preferring to focus on the more costly terminal part of the project.

In 2018, Arora put forward plans for an alternative terminal design, which envisages the creation of a “western hub” between the existing Terminal 5 building and the M25 motorway. This project proposal is now known as ‘Heathrow West’.¹²⁹ The project would include new and reconfigured terminal capacity; airfield expansion and new taxiways; changes to road and rail infrastructure; public transport upgrades; changes to river alignments and flood storage; associated support facilities, for example: car parking, fuel storage, and cargo; and other works.¹³⁰ Under these proposals, the Arora-built terminal would integrate with the HAL-build new runway. This is the most progressed alternative proposal. Arora have put in a 700-

¹²⁵ Heathrow Hub, “Heathrow Hub Extended Runway consortium seeks permission to appeal,” May 8, 2019.

¹²⁶ Starkie, David, “Heathrow: a solution to runway blunders,” London: *Institute of Economic Affairs*, January 29, 2018.

¹²⁷ BBC, “‘Cheaper’ Heathrow Runway Plans Proposed,” *BBC News*, July 9, 2017, sec. Business.

¹²⁸ *ibid.*

¹²⁹ The Planning Inspectorate, “Meeting Note between Arora Group and the Planning Inspectorate”, April 2019.

¹³⁰ The Planning Inspectorate, “Scoping Opinion: Proposed Heathrow Western Hub,” TR020004, March 2019.

page scoping application to the Planning Directorate for a Development Consent Order, presenting the first occasion since this system was developed of competing bids related to the same project.

This design, Arora claims, would be cheaper and less disruptive than redeveloping around terminals 2 and 3. Arora have also claimed that Heathrow have underestimated the cost of their expansion plans. HAL would lose out if an alternative construction and manager of the new terminals was chosen, and have repeatedly dismissed Arora's proposals. John Holland-Kaye, the chief executive of Heathrow, told the BBC that "They show a complete lack of understanding of airport operations and disregard for those living closest to the airport".¹³¹ Arora have hit back by claiming that Heathrow's plans would cost as much as £31 billion, not the currently suggested £14.4 billion.¹³²

CAA say that stakeholders have asked them to "consider issuing a licence to a new entrant to design, construct, own and operate a new terminal at Heathrow" and expressed concerns about HAL's "market power and the disparity between airlines' bargaining positions".¹³³ HAL responded that it believed a new operator could be slow to release new capacity (though HAL could also do the same), would require oversight that would delay the Heathrow expansion, would result in diseconomies of scale, would create operational challenges, and would lead to an over-provision of capacity (potentially indicating that Heathrow could be slow to release the capacity themselves). CAA has said that alternative proposals are "worthy of consideration" but has not taken a final view. CAA expect HAL "to engage with interested and credible parties on alternative commercial arrangements".

In March 2019, consultants Arcadis undertook an assessment of the Arora proposal for the CAA.¹³⁴ They found that the Arora proposal is consistent with the runway dimension guidelines, the proposed capacity, a phased development – however at this stage there is not enough information available as to whether it is deliverable within budget, compliant with the National Policy Statement, and will deliver for consumers. Arcadis concludes that Arora has the necessary consultants and expertise to put forward a development consent order but called for "more information and a greater level of detail". Arora responded to the Arcadis report by committing to undertake the outstanding activities, such as detailed analysis of terminal requirements and a surface access strategy. The CMA responded to Arcadis by stating there is insufficient detail to decide whether to develop a new regulatory regime, however, the CMA remains "open to further engagement".¹³⁵ In response to Arora's application for a Development Consent Order, the Planning Inspectorate have also called for "more detailed design information" before further assessment,

131 Chris Johnston, "Rival Heathrow Expansion Plan Revealed," *BBC News*, May 3, 2018.

132 PA, "Arora Group submits rival plan to expand Heathrow" *AOL.com*. April 15, 2019,

133 Consumers and Markets Group, "Economic regulation of capacity expansion at Heathrow: policy update and consultation", CAP1658, April 2018.

134 Nelis et al, "ARCADIS guidance to the Civil Aviation Authority on Heathrow Expansion Programme", ARCADIS, London: January 2019

135 Toal, Rob, "Economic regulation of capacity expansion at Heathrow: policy update and consultation", Consumers and Markets Group: London, March 2019.

but said that the existing scoping does fulfil the requirements of the regulations.¹³⁶ The Planning Inspectorate also stated that Heathrow’s proposal “lacks specific information” at the present time.¹³⁷

Terminal competition is possible within the existing legislative framework that governs airports. Nevertheless, as the land is privately owned, an alternative developer would have to work with and receive consent from Heathrow or Heathrow would have to be forced to facilitate the alternative terminal development by specific legislation by the CMA. “The legislation is there to allow for competition,” former CAA chief executive Andrew Haines has told MPs, “but it requires Heathrow’s consent. Neither the secretary of state nor the regulator has the powers; only the Competition & Markets Authority.”¹³⁸ In reverse, if Heathrow was given the go-ahead to construct the entire project, it is possible that they would have to use land currently owned by Arora.

In the direct legal sense, the barriers to having multiple operators is limited. In August 2018, the CAA stated that the existing legislation, the Civil Aviation Act, allows for multiple operators at the same airport and for CAA to regulate multiple operators, while noting that the precise regulatory arrangements cannot be determined at this stage.¹³⁹ The CAA can also, in principle, “make provision in HAL’s licence for the accommodation of an alternative operator which had been successful in obtaining a DCO to develop part of Heathrow airport, by requiring it to enter into contractual agreements or other arrangements for the delivery of capacity expansion.” The CAA would also likely have to undertake a new market power assessment, on HAL and a new operator, to determine the appropriate regulation in the future. In practice, this raises the possibility of abandoning of price controls if competitive pressures are sufficient.

When it comes to terminal competition there is a genuine question about whether the potential coordination and efficiency gains of joint ownership outweigh the potential benefits of competition. It is outside of the scope of this report to analyse the as-yet not fully known detail of the various proposals. It is clear, however, that this issue should be analysed with an open mind by the relevant regulators. It may appear ‘safer’ to opt for the incumbent and a single constructor and owner, and hold the competitor bid to a higher standard. At the very least, however, the competitive pressure provided multiple designs is a positive for the Heathrow project. Heathrow have already lowered the expected cost of their plan. There are likely further efficiencies to be gained. This should be, at the very least, an open process.

136 The Planning Inspectorate, “SCOPING OPINION: Proposed Heathrow Western Hub Case Reference: TR020004” London, March 2019.

137 The Planning Inspectorate, “SCOPING OPINION: Proposed Expansion of Heathrow Airport (Third Runway) Case Reference: TR020003”, June 2018.

138 Collingridge, John, “Heathrow: the cash machine with an airport attached”, *The Times*, February 18, 2018.

139 CAA, “Technical information note on the CAA’s approach to dealing with licensing issues raised by potential alternative developers of new capacity at Heathrow Airport”, London: August 2018

Heathrow expansion will increase the annual number of air traffic movements from 480,000 to approximately 740,000, with an associated 356 new daily slot pairs. Due to the growing congestion at the airport, the number of secondary slots traded at Heathrow skyrocketed from just 42 in 2000 to as many as 526 by 2012.¹⁴⁰ The building of additional capacity at Heathrow will help alleviate some of the capacity constraint issues that have resulted in extremely valuable slots, selling for tens of millions of pounds in some cases. However, even the new capacity, particularly during peak times, will be highly demanded and a method for allocation will have to be chosen.

Over half of the slots at Heathrow Airport are currently allocated to IAG, the owner of British Airways (BA). This is a substantial increase from BA's ownership of 36% in 2001, due to slot trading and airline mergers. How new capacity at the airport is allocated will have a substantial impact on competition and efficiency at the airport. As a broad principle, each slot should go to the airline that could put it to the best use. As a broad principle, each slot should be "used by those airlines able to make best economic use of it".¹⁴¹

The current formulaic slot allocation system, as discussed, is inadequate at ensuring slots are provided to the airline that has the greatest need for the slot, and thus, the airline that would use it most efficiently. The existing slot system was not designed for the release of substantial new capacity at an airport like Heathrow. An administrator choosing which airline gets each individual slot cannot know which airline places the most value on the slot. Secondary trading, which has come to be accepted by the European Commission, does partially alleviate some of this issue. The Centre for Aviation has concluded that following trades at Heathrow the average number of seats per plane increased from 135 to 255 (+90%) and the average sector flown rose from 575km to 6,900km (x12) - largely because the traded/purchased slots lead to airlines running larger planes on higher demand routes.¹⁴² However, the economic rents would largely go to the 'lucky' few or historic airlines that got initial access to valuable slots. It would also take some time for reallocations, delaying the benefit of Heathrow expansion.

The Government has acknowledged slot allocation is an important issue to address in the aviation strategy consultation, which states that:

In a situation where significant new capacity is released at a highly constrained airport, such as the once in a generation opportunity presented by Heathrow expansion, it is the government's view that

¹⁴⁰ Whitlam, Sarah. "Heathrow Airport: An introduction to Secondary Slot Trading." Powerpoint, *Heathrow Airport Ltd*, London, September 30, 2012.

¹⁴¹ Ranieri, Andrea, et. al., "Airport slot allocation: Performance of the current system and options for reform: Towards a comprehensive performance framework," Conference Paper, *The Sesar Innovation Days 2013*, November 2013.

¹⁴² Centre for Aviation, "Heathrow Airport's Slot Machine: Hitting the Jackpot Again?," *CAPA*, May 8, 2013.

current regulations may not promote fair and competitive growth and are unlikely to produce the best outcome for the consumer.¹⁴³

The CEO of Virgin Atlantic, Shai Weiss, has declared an interest in expanding and started that “there is a compelling case for overhauling the current system for allocating the new runway capacity at the airport.”¹⁴⁴ The Heathrow expansion is an ideal opportunity to adopt slot auctions to deliver proper ongoing competition in the market, allowing small to medium size airlines to expand their offerings, and ultimately ensure that valuable new slots are put to their best use - as signalled by the slots going to the airlines with the highest willingness to pay.

An auction system would deliver each slot to the airline that has the highest willingness to pay, a clear indication that they are the airline that they can generate the highest value from the slot. Slot auctions would help raise part of the necessary revenue to fund the new infrastructure associated with the Heathrow expansion, both the private infrastructure such as the runway and terminal and the public infrastructure such as underground and road links. It is difficult to precisely establish the value of the slots at Heathrow Airport, particularly considering that the value of almost all sales on the secondary trading market are not published.

In September 2012, Heathrow’s Head of Network Development Sarah Whitlam estimated that slotpairs were valued at £15 million during the morning peak, £10 million during the day, and £5 million during the evening. By July 2015, Heathrow estimated slot values had reached as high as £30 million during the morning peak, down to £21 million for midday flights, and £15 million during the evening.¹⁴⁵ However, some more recent slot pair purchases have cost airlines as much as US\$75 million.¹⁴⁶ Based on Heathrow’s 2015 estimated average value of a slot pairing, it can be estimated that auctioning slots for the Heathrow Airport expansion could raise as much as £7.4 billion (See Table 1).¹⁴⁷

143 Department for Transport, “Aviation 2050 - The future of UK aviation: A consultation,” Cm 9714, *HM Government*, London, December 2018.

144 Shai Weiss, “Heathrow’s expansion will demonstrate that Britain is open for business,” *The Telegraph*, June 18, 2019.

145 Centre for Aviation, “Gulf Airlines in London Heathrow: Slot Purchases Expand Capacity Further, Improving Connectivity,” *CAPA*, February 23, 2016.

146 *Ibid.*

147 There is substantial uncertainty in this estimate. Firstly, it is based on a 2015 valuation of the slots. It is likely that the values have changed since this time (presumably upwards). Secondly, it does not account for the dynamic market value that would eventuate in a proper auction of new capacity. The release of more capacity alleviating scarcity could lead to a decrease the per slot value. Alternatively, it is equally possible that the current slot trading values are reflective of the value for the respective airlines and therefore they could remain around this level or even increase. Thirdly, the precise dynamics in the market will depend on the nature of the slot pairing and the timing of the release, including whether all the slots are auctioned at the same time or separately. The purpose of the estimate is to give a broad indication of the value of these slots and show the high level of potential revenue.

TABLE 1. AN ESTIMATE OF HEATHROW EXPANSION SLOT AUCTIONS ADDITIONAL REVENUE

TIME OF DAY	NUMBER OF SLOT PAIRS	VALUE	REVENUE
Early morning	84	£30 million	£2,490 million
Midday morning	150	£21 million	£3,150 million
Evening	122	£15 million	£1,830 million
	356		£7,470 million

The CMA have concluded strongly in favour of allocating additional slot capacity at Heathrow through an auction.¹⁴⁸ The CMA have also noted that an early auctioning of the expanded capacity would provide an opportunity for airlines to plan their future operations and terminal access in advance, providing another opportunity front-loading the capital necessary for the expansion.

Consultancy firm Steer Davies Gleave found that auctioning slots in itself would lead to a greater expansion of capacity at Heathrow compared to the existing allocation system. They found a 10% increase in slot capacity would be associated with an 8.4% increase in passengers transported if the existing slot allocation system was used, compared to a 10.6% increase in passengers if slots were auctioned.¹⁴⁹ They estimated that a 10 per cent increase in slot capacity allocated by auction compared to administrative allocation would equate to 1.6 million more passengers a year, £34.2 million additional economic benefit per year, 9,144 direct airport and airline jobs and 2 per cent cheaper fares. Extrapolating this analysis out to the entire Heathrow expansion, which increases the number of slots by about 50%, slot allocation by auction would mean 16 million more passengers and £171.2 million annual economic benefit compared to by administrative allocation.

TABLE 2. HEATHROW EXPANSION ADDITIONAL SLOT ALLOCATION: AUCTION VERSUS EXISTING ADMINISTRATIVE SYSTEM

AUCTION VS. EXISTING ADMINISTRATIVE SYSTEM	
Annual passengers	16 million passengers annually
Economic benefit	£171.2 million annually

¹⁴⁸ Competition & Markets Authority, "Advice for the Department for Transport on competition impacts of airport slot allocation", London, *HM Government*, December 2018.

¹⁴⁹ This tendency was noted by Steer Davies Gleave, "Impact assessment of revisions to Regulation 95/93," *European Commission*, March 2011.

The benefits of the Heathrow expansion will be substantially higher if slot auctions are adopted. This is largely because if the existing system of allocation is used, it would result in a large number of slots going to small airlines and relatively unpopular routes, rather than the slots going to medium and larger size airlines who could use them to expand their popular long-haul operations. Steer Davies Gleave notes that under a slot auction system Virgin Atlantic would be able to increase frequencies on popular routes, US carriers would be able to increase flights to American hub airports, and EU airlines such as Air France could access more slots for their flights to their respective home airports. It would also likely benefit low cost carriers Ryanair and Easyjet expanding their operations. British Airways would still be able to gain many new slots, potentially more so than under an administrative allocation.

CONCLUSION AND RECOMMENDATIONS

A key feature of free markets is competition, which ensures that the limited resources of society are continuously put to their best use and encourages innovation and responsiveness to consumer demands. Competition does not work when there is only one operator in the market. Further, competition tends to be undermined by state allocation processes. When one or a few entities dominate they can become inefficient and gain scarcity rents through excessively high prices.

The privatisation of part of the aviation industry, including airlines and airports, has delivered substantial benefits, but only when combined with the enabling of competition in the industry. When there are high fixed costs, limited supply, and one provider, the customer has ended up losing out - such as in the case of BAA plc's joint ownership of Heathrow, Gatwick, and Stansted before the forced breakup. Regulation is a poor substitute for actual competition and efficient markets, since regulators struggle to mimic the positive benefits of competition.

To the extent to which competition and market mechanisms can be introduced into highly regulated industries, such as airports and air travel, they should be pursued.

(1) INITIATE AN INDEPENDENT PROCESS TO ASSESS THE POTENTIAL BENEFITS OF THE COMPETING DEVELOPMENT CONSENT ORDER (DCO) APPLICATIONS FOR THE HEATHROW AIRPORT EXPANSION, WITH A VIEW TO THE POTENTIAL BENEFITS PROVIDED BY TERMINAL COMPETITION INCLUDING AT THE DESIGN, CONSTRUCTION, AND OPERATIONAL STAGES

The approval of an additional runway at Heathrow is a welcome step in the right direction to alleviate capacity issues that limit competition. However, the potential for competition will be undermined if proper consideration is not given to alternative proposals to build and operate the new terminal. Competition is necessary to fuel innovation and capacity development, therefore providing more access to flights for consumers at lower costs. It is now necessary for the government to pursue a terminal development tendering process, which would mean competitive tendering for the development consent order (DCO) to build Terminal 6 at Heathrow.

Putting aside the direct issue of competition, there is inherent value in a thorough tender process for the decision to award Terminal 6. This would create competitive pressures to ensure the best design is developed and constructor and operator is chosen. If an alternative proposal included independent terminal ownership, there will be an opportunity to experiment with separate terminal ownership in relation to the other terminals at Heathrow and other airports such as Gatwick in the future.

(2) INTRODUCE SLOT AUCTIONS FOR THE ALLOCATION OF ADDITIONAL LANDING AND TAKE-OFF CAPACITY AT HEATHROW AND GATWICK AIRPORTS, AND CONSIDER AUCTIONING SOME, IF NOT ALL, GRANDFATHERED SLOTS, FOLLOWING BRITAIN'S EXIT FROM THE EU

The existing slot auction system is antiquated. It allows for hoarding, benefiting historic airlines, and prevents competitor airlines from expanding their capacity. Britain's exit from the EU could allow the UK to diverge from the EU-wide system for slot auctions. Slot auctions would ensure that the limited resource is put to its most efficient use. It would provide opportunities for airlines to expand, and avoid the risk of arbitrary decision-making and political interference.

(3) AUCTION LOW-ALTITUDE AIRSPACE FOR NEW FORMS OF TRANSPORT SUCH AS AIR TAXIS AND AUTONOMOUS FREIGHT DRONES

In the coming years the emergence of new technologies will create new challenges in the aviation space. The imminent arrival of air taxis capable of carrying passengers and large drones capable of freight transport raise a series of regulatory issues. It is imaginable that certain travel coordinators (i.e. London Heathrow to London City) will face substantial demand. Policymakers will have to decide how to allocate this scarce capacity. The historical mistakes of administrative allocation should be avoided. The government should adopt a system of auctioning air rights to operate along specific coordinators, at specific altitudes to ensure the space is put to its best use.