



Let Britain Fly



THE IMPORTANCE OF AIR FREIGHT TO UK EXPORTS

The impact of delaying the runway capacity
decision on UK international trade growth

A report by the Centre for Economics and Business Research
for the Let Britain Fly campaign
September 2016

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Authorship and acknowledgements

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Let Britain Fly is the campaign to build cross-party political support to expand airport capacity in London and the South East. It is an independent campaign coalition whose founding statement has support from more than 100 senior business leaders from Britain's top companies, trade and professional associations, unions and educational institutions, along with business organisations including the British Chambers of Commerce, London Chamber of Commerce and Industry, London First, Institute of Directors, Federation of Small Businesses and the British Hospitality Association.

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FOREWORD

David Sleath,
Chief Executive, SEGRO

Whilst we come to terms with the vote to BREXIT there has never been a more important time for the Government to send out a positive message to the rest of the world that Britain is open for business.

A quick and decisive decision on airport expansion provides that opportunity in a time of economic uncertainty. Because, one of the most compelling arguments for building a new runway is the role it would play in promoting UK trade, in particular boosting British exports.

It may come as a surprise, but air cargo accounts for forty per cent of the value of Britain's exports. From Scottish salmon to pharmaceuticals, Brompton bikes to formula 1 cars, the UK products that are valuable, perishable or are required just-in-time, will travel by air and probably via Heathrow the UK's only hub airport.

In fact, over a quarter of all our exports go via Heathrow. Recommended by the Airports Commission as the preferred airport for a new runway, more goods leave Britain via Heathrow than all the other UK airports combined. With 95% of these goods carried in the belly-holds of passenger planes, the UK's success in exporting both services and products are intrinsically linked.

The world is changing. Whilst Europe will remain an important market for UK exporters, most of the future growth in the world is in Asia, Africa, North and South America. By value 51% of UK exports to non-EU countries currently go by air and for the UK to succeed in the global economy we need more frequent and direct flights to these destinations. We trade twenty times more with countries with whom we have a direct air link. So it is clear why investment in our airports infrastructure is critical to the UK's economic success.

UK businesses are already losing out to their French and German rivals in the race to do business with China. Paris and Frankfurt have 60 weekly flights to China compared to 40 at Heathrow, making it more difficult for many British firms to compete effectively. To rebalance and strengthen the economy, the UK needs a hub airport that can compete with our unconstrained hub rivals abroad, providing direct air links to new markets and opportunities.

Decades of uncertainty on airport expansion is putting Britain at an economic disadvantage. As our research suggests, for every year that passes without a new runway in operation, the UK could be losing out on as much as £9.5bn in trade with the top ten fastest growing emerging market economies. One year has already passed since the Airports Commission published its final report and we still don't have a final decision. Can the Government afford to delay further?

We believe the results of our research send a clear and compelling message to politicians that further delay on this issue will undoubtedly impact on the British economy and UK exporters both large and small. Indecision on this nationally important issue needs to end.

The simple question for government to address is this: what type of country does Britain want to be? Do we want to be a global player, operating seamlessly for business, helping exporters to grow and attracting inward investment? Or do we want to fall further behind our European competitors?

So the message from businesses right across the UK is clear. The Government must make a final decision quickly and back the Airport's Commission recommendation to build a new runway.

EXECUTIVE SUMMARY

The decision of where to build a new runway in London and the South East has proved to be a highly contentious issue. Whilst there is general agreement that there is a requirement for new runway capacity in London, the decision of where to build it has divided public, and political, opinion.

The Airports Commission was tasked with recommending to government where airport capacity should be expanded. It narrowed down the potential options to three at two airports - London Heathrow (LHR) and London Gatwick (LGW). In July 2015, the Commission published its final report recommending the northwest runway option at LHR. However in December 2015, due to environmental concerns, the Government delayed its final decision until *at least* summer 2016. Following the vote to leave the EU the Government has announced a *further delay* until *at least* October 2016.

Further delaying the decision has clear implications for UK trade, which is what this study, by the Centre for Economics and Business Research (Cebr) on behalf of London First and the Let Britain Fly campaign, seeks to examine. Based on the analysis and conclusions set out in this report, the message is clear. The Government needs to get on with building a new runway in order not to stifle further growth in trade and FDI between the UK and the fast growing emerging market economies. Not doing so is, and will, ultimately be to the benefit of the UK's European competitors that have plenty of spare airport capacity at their key hub airports.

Aviation plays a key role in facilitating international trade in both goods and services. It provides businesses with a rapid and global transport network, crucial where speed of delivery is of the essence. It also affords businesses access and entry to new markets and enables them to better manage their supply chains. It is most often high value goods which are transported by air, with HMRC's overseas trade statistics illustrating that over half (51%) of the UK's exports to non-EU countries by value were transported by air in 2015, but just 1% by volume.

The importance to trade of the London airports

Exports

- In 2015, the total volume of goods exported from the UK amounted to 154 billion kilograms (kg) with a total value of approximately £305 billion. Of the total by volume, 30% went to non-EU countries (45.7 billion kg), of which 1% (479 million kg) was sent by air. By value, exports to non-EU countries accounted for 56% of the total (£171 billion), of which £87.2 billion (51%) was transported via air.

- The proportion of total exports by air to non-EU countries that travelled from the London airports was 74% in 2015. By value, LHR accounted for the largest proportion of total exports by air to non-EU countries at 77% (or £67.3 billion) in 2015. The value of exports travelling through London's airports has increased rapidly since 2009, from £35.5 billion to £72.8 billion in 2015 (growth of 105%).
- Historically, the largest export market by volume for goods travelling by air is Asia and Oceania, followed by North America. LHR carried 77% (134 million kg) of the total UK aviation goods exports, by volume, to Asia and Oceania in 2015.
- By value, the majority of exports travelling by air from London are destined for Asia and Oceania. 32% of non-EU exports by value from London went to this continent in 2015, worth approximately £23.4 billion.

Imports

- In 2015, the total volume of goods imported to the UK was approximately 287 billion kg. The total value of goods imported into the UK amounted to £412 billion in the same year.
- Of the total imports by volume, 61% arrived from non-EU countries, with 0.4% of this arriving by air. By value, non-EU countries accounted £192 billion (47%) of the total value of goods imported, of this, £67.1 billion (47%) was transported via air.
- By volume, the proportion of imports from non-EU countries arriving in the UK via London airports amounted to 72% of all imports arriving by air from non-EU countries in 2015. The majority were from Asia and Oceania and arrived at LHR.
- By value, in 2015, the London airports accounted for the largest proportion of non-EU imports arriving by air – 78% of the total in 2015, with LHR accounting for 69% (£52.6 billion) of this. The majority of imports from non-EU countries arriving by air in the UK come from North America (38%, with a value of £28.8 billion in 2015).

Goods trade from London and the South East

- In 2015, approximately 52% of the UK's exports by value were destined for non-EU countries (£146 billion). The majority of these came from businesses based in England (76%), with 28% coming from the economies of London and the South East, compared with 48% from the other English regions – from the North East to the South West. For instance, 12% of all UK exports by value destined for non-EU countries originated in the West Midlands in 2015, amounting to £12 billion. The remainder, 24%, comes from elsewhere in the UK – Wales, Scotland and Northern Ireland.

- By volume, the majority of exports to non-EU countries originated in London in 2015 (18% of the UK total). For those exports destined for the EU, the majority by value again originated in London and the South East (24%).
- 11% of exports to the EU by volume originated from businesses located in London in 2015 (12.2 million tonnes), an increase of 71% on the previous year. A significant volume of exports to the EU also originated from businesses based in the North West and Yorkshire and the Humber, at 8% of the UK total.

Trade from other regions passing through London

- We have estimated the value of exports to non-EU countries from the regions other than London and the South East that are moved through the London airports. With goods worth £41.2 billion of exports to non-EU countries originating from businesses located in London and the South East, we estimate that approximately £24.6 billion of this was moved through London airports in 2015.
- HMRC records £72.8 billion worth of goods being exported through the London airports system to non-EU destinations in 2015. On this basis, it is clear that a significant proportion of this originates from the other regions of England and the rest of the UK – including Wales, Scotland, Northern Ireland, as well as the northern English regions, the Midlands and the South West. Our estimates suggest that in 2015, £48.2 billion worth of the goods exports that passed through London airports, destined for non-EU countries, originated in businesses located outside London and the South East.
- This very clearly highlights the importance of runway capacity in London and the South East in supporting exporting businesses located throughout the UK, not just those in London and the South East.

Goods trade with non-EU countries by product category

- For the UK as a whole, across all ports, the largest export by value in 2015 was machinery and transport equipment. However, for the London airports, the largest export by value was commodities/transactions not classified elsewhere, which amounted to £25.3 billion in 2015.
- In 2015, the other main categories of export by value transported through the London airports included machinery and equipment (£18.6 billion, 62% of total UK exports in this category) and miscellaneous manufactured articles (£14.3 billion, 30% of the total from the UK in this category).
- By volume, the largest export category across all UK ports was mineral fuels, lubricants and related materials

(18.5 billion kg exported in 2015). However, by air, the most significant categories were machinery and transport equipment and miscellaneous manufactured articles.

- The London airports are prominent. For example, 86% of food and live animal exports by volume to non-EU countries were moved through the London airports in 2015 (70.3 million kg), and 84% of miscellaneous manufactured articles.

UK trade in services

Beyond being important for trade in goods, aviation also plays a major role in trade in services, as well as in supporting tourism. For the UK, aviation is particularly important for its services sectors, which are highly dependent on fast, timely business travel enabling face-to-face contact both with existing clients, and when establishing new ones.

According to the Pink Book, the UK's services exports have been steadily increasing over time, with a significant portion of these exports coming from London. In 2014, service exports from the UK amounted to £220 billion, with £115 billion of this originating from businesses located in London.

According to ONS International Trade data, total services to the USA far exceeded those to any other country in 2014. In that year, services exports to the USA amounted to £27.8 billion. Meanwhile, exports to the EU consistently account for around 35% of the total services exports.

Foreign Direct Investment

Aviation is an important and well-recognised contributor to encouraging FDI. The link between aviation connectivity and FDI largely relates to the requirement to move staff around the globe, thereby facilitating the transfer of knowledge. Aviation connectivity helps inward investment by creating a more favourable environment for foreign firms and their workers.

For the UK, FDI is attracted to regions such as London for reasons including the quality of its aviation links. It has been estimated that FDI contributes more than £52 billion each year to London's economy.

The relationship between trade, FDI and air transport links

We undertook econometric modelling to establish a statistical relationship between aviation connectedness, trade and investment flows. To do this, we drew on a number of different data sources, including HMRC on UK goods trade, Eurostat's Balance of Payments database for trade in services data, and the Civil Aviation Authority (CAA) for data on routes, flights and

passenger numbers. The CAA data spans a ten-year period from 2002 to 2012, the time period that this part of our study examines. Although the period of analysis is limited, there are good reasons for choosing one that ends in 2012. These are:

- *The ‘dither clock’*: The analysis in this section leads ultimately to the ‘dither’ clock developed in Section 5 below. This imagines trade growth being spread smoothly and continuously through time, and considers what is potentially being lost in trade terms by delaying the runway capacity decision. The Airports Commission was established in 2012, and this represents the start date of the dither clock – the year the Government decided to create a lengthy commission rather than reach a decision itself.
- *Minimising distortions of the relationships*: with LHR operating at capacity and LGW close to capacity, and the fact that new routes tend to push others out, it made sense to go back in time a little to minimise the potential for routes dropping in and out to distort the relationships we are endeavouring to establish.

In developing the econometric model, we considered the number of routes, flights and passengers travelling between the UK and two groups of ten partner countries, referred to in this report as the ‘mature-trade’ markets and the ‘emerging markets’. The countries included in each list are presented in Table 1 below.

Table 1: UK trade partner countries, defined as ‘mature-trade’ markets or ‘emerging markets’

Mature-trade markets	Emerging markets
Belgium	Poland
France	Turkey
Germany	South Africa
Ireland	Nigeria
Italy	Mexico
Netherlands	Brazil
Spain	India
Switzerland	China
USA	Malaysia
Hong Kong	Thailand

Source: Cebr analysis

The ‘mature-trade’ markets group refers to the ten partner countries with which the UK has the most mature trading

relationships in goods and services. This was identified through an examination of historic trends in trade between the UK and its partner countries. The 'emerging' markets group refers to ten economies that are among the fastest growing in the world, and according to the IMF's and Cebr's own forecasts, are expected to contribute an increasing proportion of the world's economic growth over the next 5 years. In particular, by 2020, the contribution to world GDP of the mature-trade markets is expected to decline to 37% while the emerging markets' share is estimated to rise to 28%. By as early as 2029, we estimate that the contribution to world GDP made by the emerging markets group could overtake the mature-trade markets' contribution.

As the balance of economic strength and significance shifts away from the mature-trade markets towards the emerging markets, strong connectivity to the UK will become imperative for the UK to capitalise on new export and investment opportunities.

Our econometric analysis of the data for the mature-trade group confirms a statistically significant relationship between aviation connectedness and the level of total trade, and between aviation connectedness and the level of total FDI. We estimate that a 10% increase in the connectedness variable (the product of routes, flights and passengers by country) across the mature-trade markets can be associated with an increase in UK trade of 1.2%. Similarly, we estimate that in any given year, a 10% increase in connectedness has the potential to increase total UK FDI flows by 0.7%.

Estimated potential boost to UK trade in goods and services

Our analysis suggests that if aviation connectedness between the UK and the emerging markets group reached similar levels as that seen between the UK and the mature-trade economies, the UK could benefit from a boost to trade of approximately £28.2 billion per annum by 2030.

This prediction is based purely on the estimated statistical relationship. However, at the aggregate level, there are a range of factors requiring consideration that are beyond what a statistical model can take into account, such as political institutions, historic links and so forth that make it easier or harder to trade with these countries. By accounting for these factors we calculate a lower bound estimate of the trade that could be sacrificed by not having additional runway capacity. In reality, the true impact is likely to lie somewhere in the range of this lower bound and the upper bound suggested by the unadulterated statistical model.

Accounting for such factors that may increase or constrain any potential trade gains to the UK, such as varying trading conditions, economic growth, political stability of individual emerging markets, we estimate the UK could benefit from a boost to trade of approximately £8.6 billion by 2020, and £10.1 billion by 2030.

But this includes exports and imports, so narrowing the focus on exports (using the current UK export-import split) gives lower bound estimates of £3.2 billion by 2020 and £3.7 billion by 2030.

Estimated potential boost to UK FDI

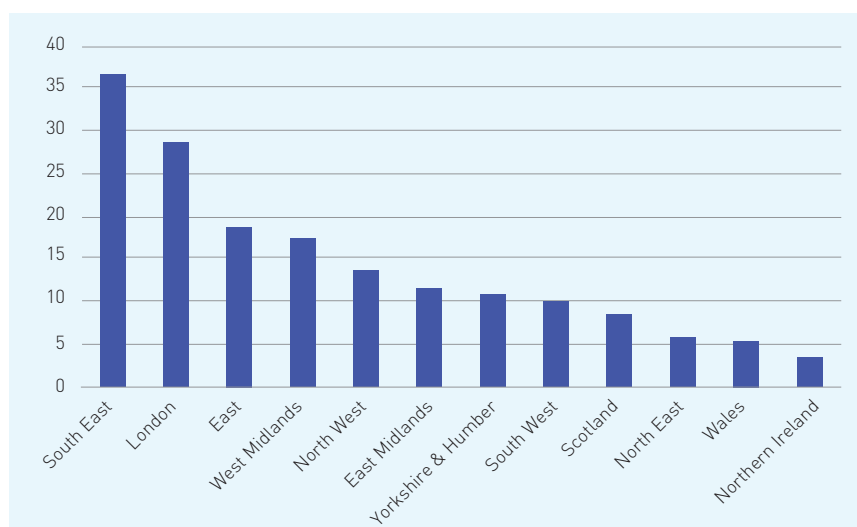
In 2012, the value of total (inward and outward) FDI flows between the UK and the emerging markets group totalled approximately £8.0 billion. If the average level of aviation connectedness between the UK and the emerging markets were to reach parity with that between the UK and the mature-trade economies, our analysis suggests that the UK could benefit from a boost to total FDI flows of approximately £1.7 billion per annum.

The 'dither-clock'

We use the analysis above to estimate the value of lost trade due to a lack of connectedness between the UK and the emerging markets. We consider this over the time period in which connectedness with emerging markets would grow if additional runway capacity were made available. This has been coined as the 'dither clock'. The 'dither clock' imagines trade growth being spread smoothly and continuously through time for illustrative purposes.

Given this, we estimate the total value of potential exports that the UK could gain from could reach a cumulative £63.6 billion over the 18 years from 2012 to 2030. Based on current trends in regional trade, we estimate that the South East of England could be hurt the most, as the region could potentially lose out on approximately £36.6 billion of total trade over the 18 year period (Figure 1). London could also be disadvantaged, losing out on roughly £28.6 billion of trade between 2012 and 2030.

Figure 1: The value of lost potential trade over the 18 year period, by region (£ billions)



Source: HMRC, Cebr analysis

To illustrate what this means by unit of time, we have produced the 'dither clock' shown in Table 2 and Table 3 below.

This analysis suggests that the UK could be losing out on as much as £9.5 billion for each year that passes without runway capacity expansion. For every month that the level of air connectedness between the UK and the emerging markets remains under-developed due to a lack of new runway capacity, the UK could be losing £790 million of trade, equivalent to approximately £182 million per week. On a daily basis, the loss is approximately £26 million worth of trade with the emerging markets group. This is equivalent to a loss of approximately £1.1 million per hour, or £18,000 per minute.

Table 2: The ‘dither clock’: the value of lost potential trade over time

Value of lost potential trade, £	Per unit of time
£9.5 billion	Year
£790 million	Month
£182 million	Week
£26 million	Day
£1.1 million	Hour
£18,000	Minute

Source: Cebr analysis

Narrowing the focus to exports only gives the ‘dither clock’ estimates shown in Table 3, which is based on the current ratio of exports to imports to the emerging markets group.

Table 3: The ‘dither clock’: the value of lost potential exports over time

Value of lost potential trade, £	Per unit of time
£3.5 billion	Year
£294 million	Month
£68.0 million	Week
£9.7 million	Day
£0.4 million	Hour
£6,700	Minute

Source: Cebr analysis

ONE

Introduction

This study, by the Centre for Economics and Business Research (Cebr) on behalf of London First and the Let Britain Fly campaign, examines the importance of air freight to UK trade. It also considers the implications for international export growth of delays in making the decision on where to deliver new runway capacity in London and the South East of England.

1.1. Background and context

On 7 September 2012, the Government announced its intention to create an independent commission, chaired by Sir Howard Davies, to identify and recommend options for maintaining the UK's status as a global aviation hub. In July 2015, the Airports Commission published its final report which set out its recommendations to government for expanding airport capacity in the UK. It narrowed down the potential solutions to three options at two airports – London Heathrow (LHR) and London Gatwick (LGW) – and recommended the new northwest runway option at LHR. However, the Government has now delayed the decision as to whether a third runway could even be allowed at LHR until summer 2016, as a result of environmental concerns.¹

In response to political procrastination on the issue and in an attempt to help break the political deadlock, in September 2013 London First initiated the Let Britain Fly campaign. The aim of the campaign is to build cross-party political support to build new runway capacity. It is supported by a broad strategic campaign coalition that includes business leaders, business organisations, trade and professional associations, trade unions, think tanks, academics and economists.

Aviation connectivity plays a key role in facilitating international trade in both goods and services. It provides businesses with freight access to export markets, as well as enabling business travellers to meet new and existing clients. Given the Government's initiatives around exporting for growth, aviation can provide businesses with important routes to market for their goods and services, supporting growth and employment in the UK and ensuring that the UK remains internationally competitive.

¹ www.bbc.co.uk/news/business-35062739

Therefore, this study seeks to help London First and the Let Britain Fly campaign illustrate the importance of air freight to UK exports and in turn, the negative consequences for export growth of delaying airport expansion in London and the South East.

1.2. Structure of the report

The rest of the report is structured as follows:

- **Section 2: London's airports and their role in UK trade**
Cebr illustrates the share of goods trade passing through airports in London and the South East and where the goods originate from in the UK. It also considers how this picture varies by industry sector.
- **Section 3: The relationship between trade, FDI and air transport links**
Using econometric analysis we establish relationships between aviation connectivity, trade and investment flows for the UK. We specifically consider the ten partner countries with which the UK has the most mature trade and FDI relationships and how these correlate with air transport routes and their density in terms of both flight frequency and passenger throughput.
- **Section 4: The growth potential and cost of delaying the new runway decision**
An analysis of how trade could be impacted if the amount of air links to the ten fastest-growing economies were to increase to varying degrees.
- **Section 5: The 'dither clock'**
We present the estimated value of trade lost per year, month and day over the period of time taken for the ten fastest growing economies to reach similar levels of trade as existing links with the ten partners with which the UK has the most mature trading and investment relationships.

TWO

London's airports and their role in UK trade

Aviation plays a key role in facilitating international trade in both goods and services. It provides businesses with access and entry to new markets and enables them to better manage their supply chains. This section illustrates the importance of trade from the UK to both EU and non-EU countries and the role of the London airports in this trade.

Aviation links provide businesses with a rapid, worldwide, transport network, and as such, it plays an important role in facilitating trade, particularly where speed of delivery is crucial. In addition, air freight is more sensitive to weight than other options of transportation, such as rail or sea. Therefore, it is smaller, lighter and higher value goods that are transported by air. This is echoed in HMRC's overseas trade statistics (OTS) which show that in 2015, over half (51%) of the UK's exports to non-EU countries by value were transported by air, but just 1% by volume.

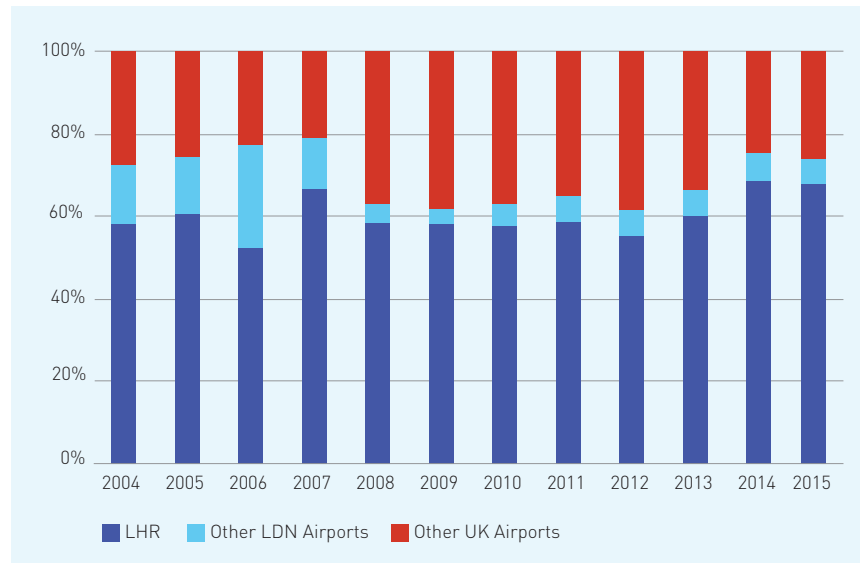
2.1. Value and share of goods trade to non-EU countries travelling through airports in London and the South East

Using the OTS, we have built up a picture of the value and volume of trade passing through London airports which is destined for, or arriving from, non-European Union (EU) countries. The equivalent data (at port level) for trade with EU countries is not currently made available by HMRC.

Exports by volume

The total volume of goods exported from the UK in 2015 was approximately 154 billion kilograms (kg). Non-EU countries accounted for 30% of this total volume exported, that is, 45.7 billion kg. Of this, 479 million kg (1%) was transported by air. Figure 2 below breaks this down by the airports from which the goods were exported.

Figure 2: Proportion of exports to non-EU countries transported by air, through London vs. rest of the UK, by volume



Source: HMRC, Cebr analysis

The share, in volume terms, from the London airport system² has been steadily increasing since 2009, after declining significantly as a result of the global recession. Between 2009 and 2015, these volumes have increased by 29%, from 286 million kg to 368 million kg. But this is still below the pre-recession peak of 463 million kg.

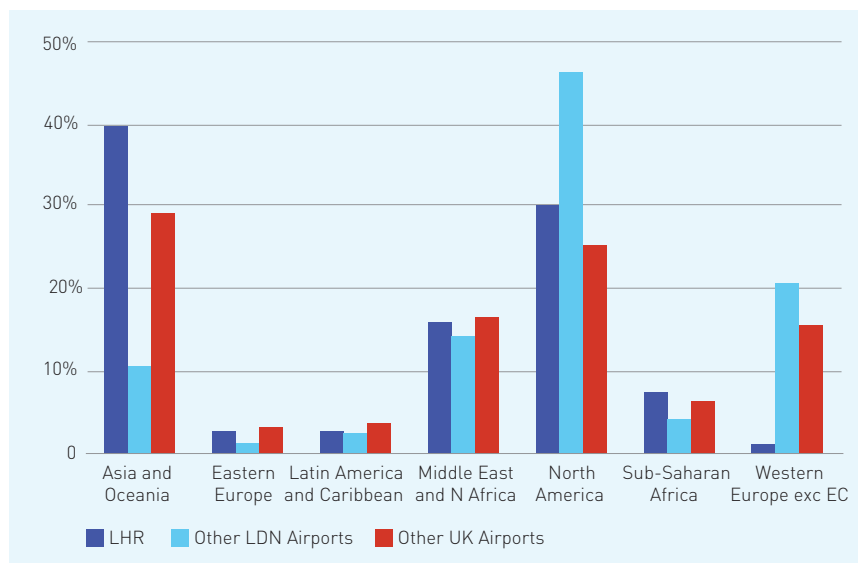
The proportion of exports to non-EU countries from London airports, relative to total exports by air, peaked in 2007 at 79%. After remaining at around 63% in the following years, London's share increased again in 2013 and 2014 (to 67% and 75% respectively) before falling back slightly in 2015 to 74%.

LHR individually accounts for the largest proportion of aviation export trade in both London, and the UK as a whole. In 2015, LHR exports by volume amounted to 68% of total exports by air to non-EU countries.

The proportion of exports which travel by air to different non-EU regions follow broadly the same pattern for London as for all UK airports. Historically, at LHR and at the non-London airports, the largest non-EU export market by volume for goods travelling by air is Asia and Oceania, closely followed by North America (Figure 3). For the other London airports, the largest share goes to North America, followed by Western Europe (excl. the EC) and the Middle East and North Africa.

² The London Airports system consists of London Heathrow Airport (LHR), London Gatwick Airport (LGW), London Stansted Airport (STN), London Luton Airport (LTN), London City Airport (LCY) and London Southend Airport (SEN).

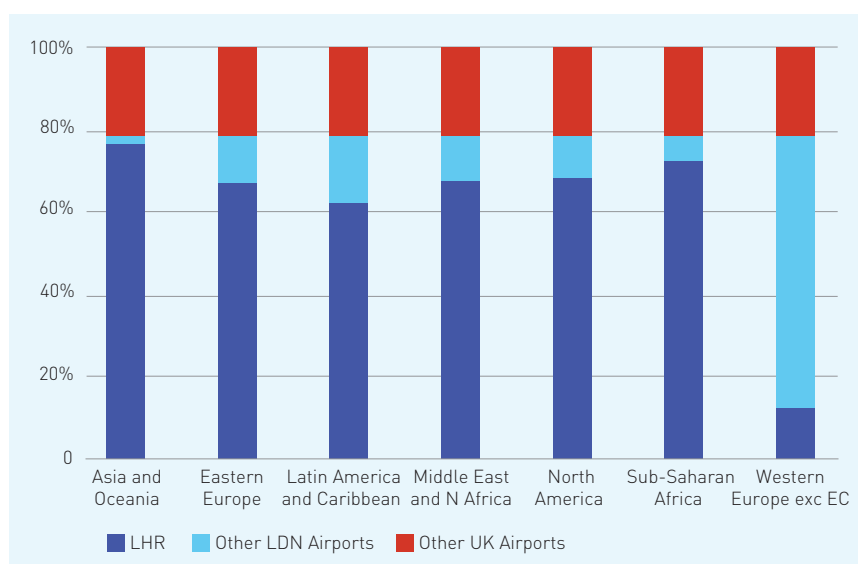
Figure 3: Proportion of UK's air exports by volume, by UK airport and non-EU destination, 2015



Source: HMRC, Cebr analysis

As illustrated in Figure 4 (which provides the non-EU regional breakdown of the 2015 data presented in Figure 2 above, LHR carried 77% (134 million kg) of the total UK goods exports by air to Asia and Oceania, and 72% (25 million kg) of those to sub-Saharan Africa.

Figure 4: Share of exports travelling by air to different non-EU regions by airport, volume



Source: HMRC, Cebr analysis

Exports by value

The total value of goods exported from the UK in 2015 was approximately £305 billion. Non-EU countries accounted for

56% of this, that is, £171 billion. Of this, £87.2 billion (51%) was transported by air.

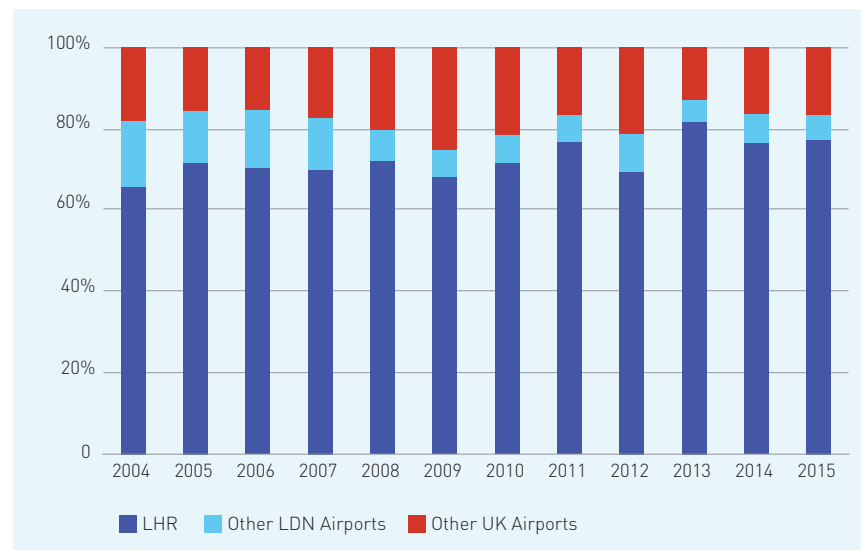
As with the volume of exports travelling through the London airports to non-EU countries, the value has increased rapidly since 2009, although at a faster rate than volume, from £35.5 billion to £72.8 billion in 2015 (representing growth of 105% over the entire period).

The London airports system accounted for more than four-fifths of the total value of exports transported by air to non-EU countries from the UK in 2015 (84%). This is slightly down on 2013 when they accounted for 87%. This is illustrated in Figure 5.

By comparison, LHR accounted for the largest proportion of total exports via air by value from the UK, making up 77% (or £67.3 billion) in 2015. This represents growth of 108% since 2009.

On these measures, 39% of the total value of all UK exports to non-EU countries (£171 billion) were transported through LHR, up by 8 percentage points from its share in 2009.

Figure 5: Proportion of exports to non-EU countries travelling by air, London vs. rest of the UK, by value

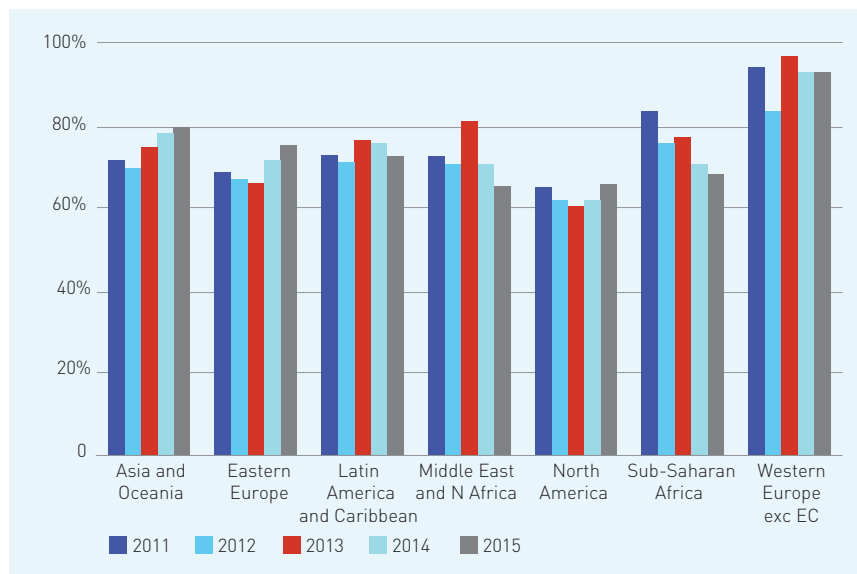


Source: HMRC, Cebr analysis

The majority of exports by value travelling by air from London go to Asia and Oceania. In 2015, the total value of exports to this region from the London airports were worth approximately £23.4 billion. This amounted to 32% of total non-EU exports by value from London's airports, which was £72.8 billion in 2015, as noted at the beginning of this subsection.

As illustrated in Figure 6 below, in value terms LHR accounts for significant shares of goods being transported by air to the various non-EU markets for which UK airport-specific data were available. Figure 6 shows how the 2015 data on LHR in Figure 5 above breaks down across the non-EU regions.

Figure 6: Proportion of UK exports to each non-EU region which travel from London Heathrow Airport, by value



Source: HMRC, Cebr analysis

Imports by volume

The total volume of goods imported to the UK in 2015 was approximately 287 billion kg. Non-EU countries accounted for 61% of this total volume, that is, 174 billion kg. Of this, 775 million kg (0.4%) were transported from non-EU countries to the UK by air.

Imports by volume to London airports amounted to 560 million kg in 2015, 72% of all imports from non-EU countries arriving to the UK via air. The total volume of imports arriving to the UK via air declined significantly as a result of the global financial crisis, but London's share of the total has remained high. This is despite the absolute value of imports by air declining in 2015, both in the UK as a whole, and in London.

The majority of imports arriving through the London airports come from Asia and Oceania, with the total volume of imports arriving at London airports from this region amounting to 257 million kg (46% in 2015). Of these imports, the vast majority arrived at LHR, with imports from this region amounting to 247 million kg (that is, 96% of the total from this region passing through the London airports or 44% of the total volume of imports by air arriving at the London airports from all non-EU regions).

Imports by value

The total value of goods imported to the UK in 2015 was approximately £412 billion. Non-EU countries accounted for 47% of this total value, that is, £192 billion. Of this, £67.1 billion (47%) was transported by air from non-EU countries to the UK.

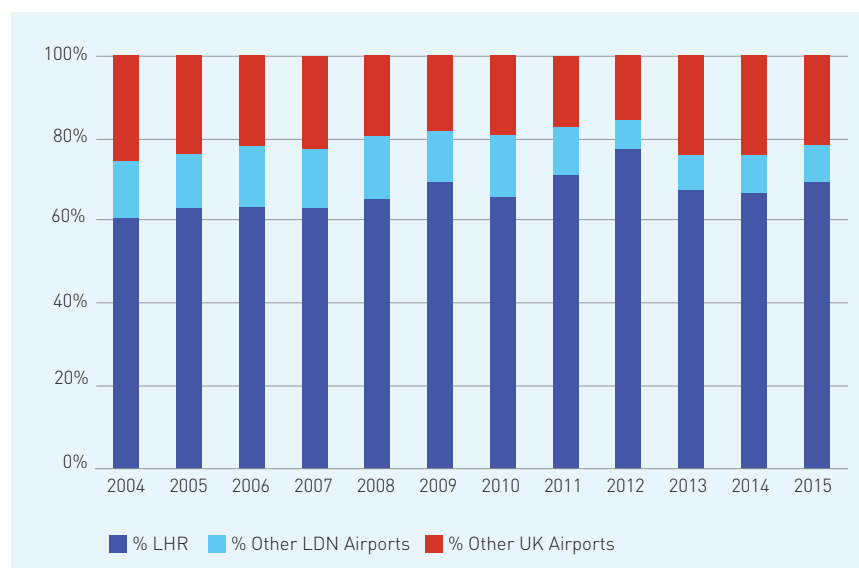
London airports consistently account for the largest proportion of all UK imports from non-EU countries arriving by air. In 2015, they accounted for 78% of the total, with LHR accounting

for 69% – the latter amounting to £52.6 billion worth of goods in absolute terms. This amounts to a share for LHR of over 27% of the value of all imports to the UK from non-EU countries.

Figure 7 illustrates the proportion of the value of imports from non-EU countries arriving via air to the UK which come through the London airports, LHR specifically, and the other airports in the UK.

Underlying the picture in 2015, 97% of UK imports arriving by air from Sub-Saharan Africa arrived at London's airports, with 99% of the total at London airports arriving at LHR.

Figure 7: Proportion of imports by value which arrive by air at the London airports vs. other UK airports



Source: HMRC, Cebr analysis

The majority of imports from non-EU countries arriving by air to the UK come from North America (38%). The story is similar looking at the London airports specifically, with 36% of total imports by value from non-EU countries at London airports coming from North America. In 2015 imports by air to London airports from North America were worth £28.8 billion.

2.2. Goods trade from London and the South East

Non-EU exports

According to HMRC's regional trade statistics (RTS), in 2015, approximately 52% of the UK's exports by value were destined for non-EU countries (amounting to £146 billion).³ In that year, of all the exports from the UK headed for non-EU countries, the

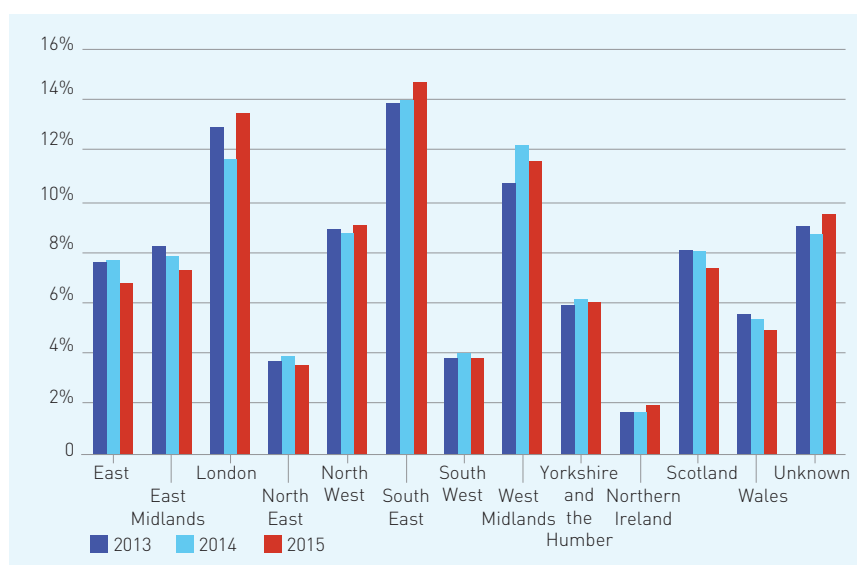
³ We note the difference between this number and the £171 billion noted in Subsection 2.1 ('Exports by value'). The lower £146 billion is taken from the Regional Trade Statistics (RTS) dataset, which excludes certain items that are included in HMRC's Overseas Trade Statistics (OTS). The items excluded from RTS are, specifically, trade in non-monetary gold and what are called 'late response estimates', an estimate of exports by businesses that have responded too late to the relevant survey to have the data included in RTS. See HMRC (2016), 'Regional Trade Statistics: Fourth Quarter 2015', London. Available at www.uktradeinfo.com/Statistics/RTS/Pages/default.aspx

majority were from businesses based in England (76%), and over a quarter (28%) came from the economies of London and the South East.⁴ This means that 48% originated from businesses located in the North, Midlands and South West of England and that 24% originated in Wales, Scotland and Northern Ireland.

In absolute terms, the value of exports from the South East amounted to £21.5 billion (15%) in 2015, the highest value since 2012, when exports from this region amounted to £22.5 billion. In 2015, the value of exports from London amounted to approximately £19.7 billion (13%). A significant amount of exports by value also originated in the West Midlands in the same year – £12.0 billion or 12% of all UK exports destined for non-EU countries.

The proportion of total UK exports to non-EU countries originating from businesses in each of the UK regions has remained reasonably stable over time, as illustrated in Figure 8.

Figure 8: Proportion of exports to non-EU countries by UK region, by value 2013–15



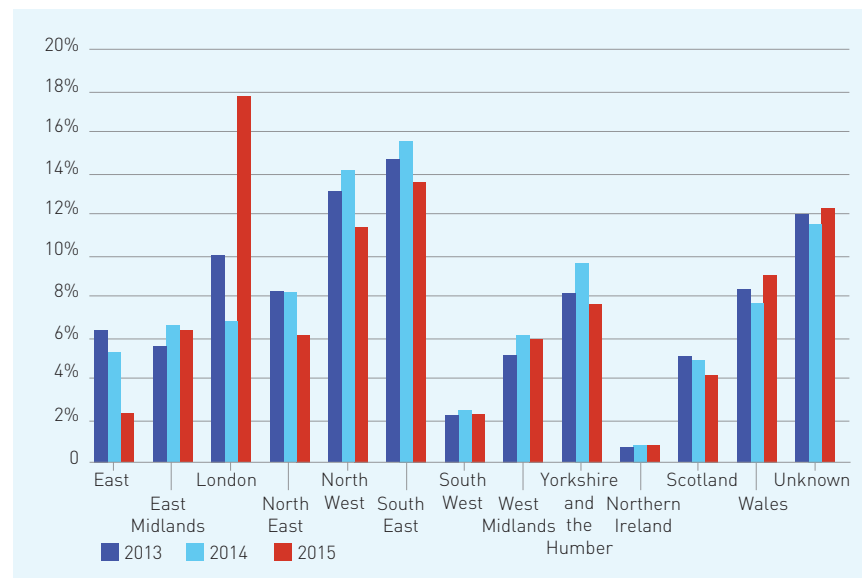
Source: HMRC, Cebr analysis

In volume terms, the vast majority of exports to non-EU countries in 2015 were from businesses based in London (18% of the UK total and 24% of the England total). This was a marked increase of 177% on 2014, increasing from 2.9 million tonnes to 8.1 million tonnes. This was primarily driven by a significant increase in the volume of exports of petroleum, petroleum products and related materials to South Korea. Over the same period, the volume of exports originating in the South East declined by 0.5% to 6.2 million tonnes. Exports from that region have also seen a more general decline over time.

⁴ The Regional Trade Statistics (RTS) take data primarily from Customs systems for non-EU trade and the Intrastat survey for EU trade. HMRC does not receive information in respect of goods that move wholly within the UK, nor in intangibles and services such as banking or tourism. In RTS, trade is mainly allocated to regions according to the postcode associated with a company's VAT registration.

74% of exports from the UK to non-EU countries originated in England in 2015, amounting to 33.6 million tonnes, a 5% increase since 2014. Figure 9 illustrates the share of the volume of UK exports originating in each of the regions heading for non-EU destinations over the past three years.

Figure 9: Proportion of exports to non-EU countries by originating UK region, by volume, 2013–15



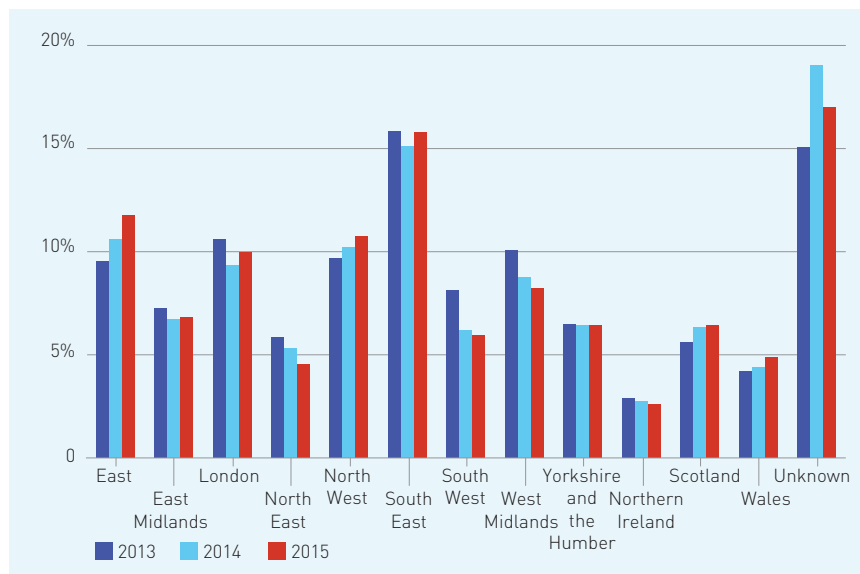
Source: HMRC, Cebr analysis

Exports to the EU

By value, the South East and London are the originating destination for a large proportion of the UK's exports to the EU. In 2015, these two regions were the originating location for 24% of all UK exports to the EU by value. However, exports originating in the South East were noticeably higher than those originating in London, £19.0 billion (or 14%) as opposed to London's £12.7 billion (or 10%) in 2015.

As with non-EU export destinations, the proportion of exports originating in different regions has remained fairly stable over the past five years. However, there are a few regions that have seen a more noticeable decline in the value of goods originating there, as shown in Figure 10. Most noticeably, the North East, South West and the West Midlands.

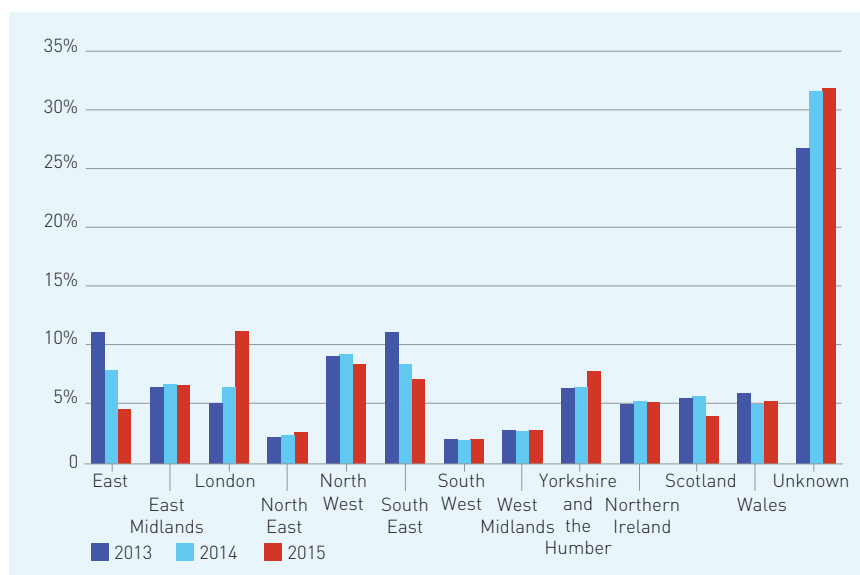
Figure 10: Proportion of exports to EU countries by originating UK region, by value, 2013–15



Source: HMRC, Cebr analysis

By volume, 11% of exports to the EU originated in London in 2015 (12.2 million tonnes), a 71% increase on 2014. Its share has increased substantially from 2013, when it accounted for just 5% (5.6 million tonnes) of total UK exports to EU countries in that year. Exports by volume from the South East to the EU comprised a smaller portion of the total, accounting for just 7% in 2015. This is significantly down from 11% in 2013. In absolute terms, this is a decline in volumes from 12.3 million tonnes to 7.7 million tonnes.

Figure 11: Proportion of exports to EU countries by originating UK region, by volume, 2013–15



Source: HMRC, Cebr analysis

However, in volume terms, there were a significant amount of exports from businesses based in the North West and Yorkshire and the Humber (both 8% of the UK total). Furthermore, businesses in the East used to account for more of UK exports to the EU than London (11% in 2013) but has since declined to just 5% of the total.

2.3. Trade from other regions passing through London

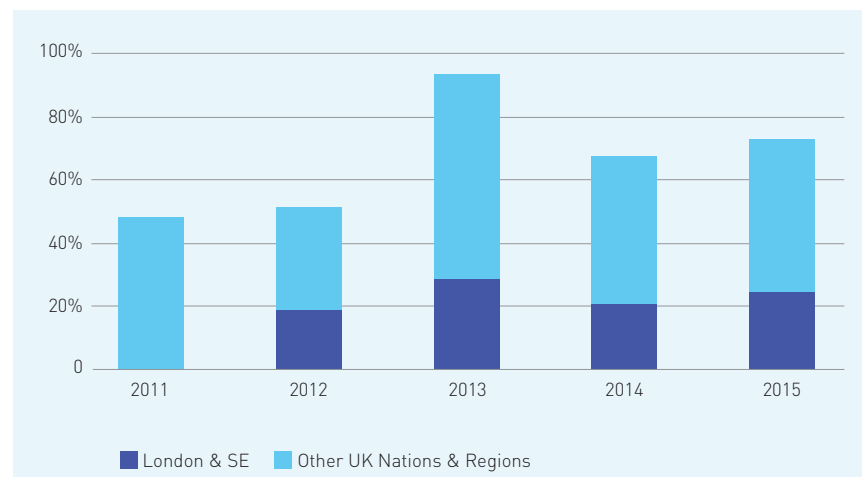
Combining the analysis from the earlier two sub-sections, we have estimated the value of exports to non-EU countries from other UK regions which travel through the London airports. Our analysis is based on the simplifying, yet reasonable, assumption that all trade from London and South East regions passes through the London airport system. We focus the analysis on exports by value, given that high value goods are invariably transported by air and the more representative picture that it paints.

Goods worth approximately £41.2 billion were exported from businesses based in London and the South East to non-EU countries in 2015. By applying the proportion of all exports that travel via air to non-EU destinations (by value), based on data from HMRC, we estimate that £24.6 billion worth of exports from London and the South East travelled through London airports.

However, HMRC records £72.8 billion worth of goods being exported through the London airport system to non-EU destinations in 2015. On this basis, it is clear that a significant proportion of the total exports that travel via air from the other UK regions to non-EU countries pass through the London system.

Based on our estimate of the amount from London and the South East, the residual of £48.2 billion of the exports by value passing through the London airports (over 60% of the total) originate from other UK nations and regions in 2015, as illustrated in Figure 12.

Figure 12: Exports by value travelling through the London airports, by originating regions, £ billion



Source: HMRC, Cebr analysis

This very clearly highlights the importance of runway capacity in London and the South East in supporting exporting businesses from elsewhere in the UK, as well as London and the South East.

2.4. Goods trade across product categories

In this section we consider the types of goods that are transported via air to non-EU continents. The equivalent data for trade with EU countries is not available.

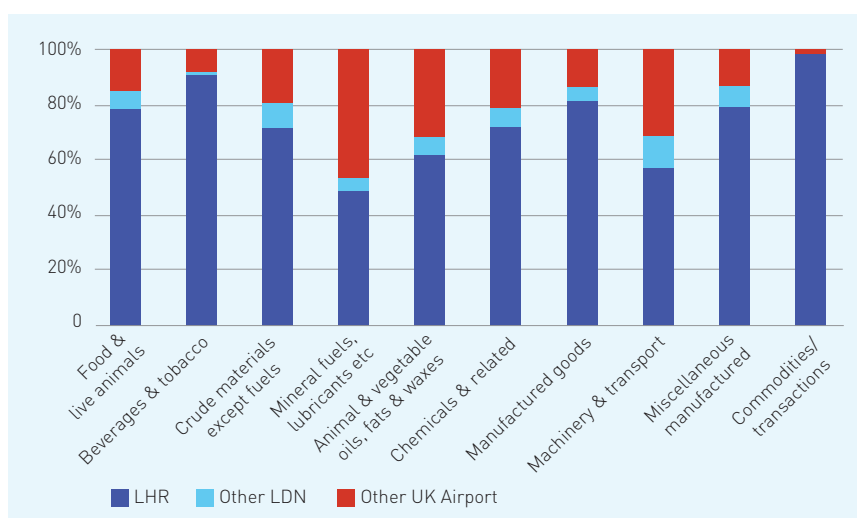
Exports by value

For the UK as a whole, across all ports, the largest export by value in 2015 was machinery and transport equipment.⁵ The value of these exports amounted to £62.4 billion in 2015. However, for the London airports, the largest export by value was commodities/transactions not classified elsewhere,⁶ which amounted to approximately £25.3 billion in 2015. Exports through the London airports in this SITC category accounted for 95% of the UK total (through all ports).

The other main categories of export transported through the London airports include machinery and transport equipment (£18.6 billion, 62% of the UK total) and miscellaneous manufactured articles (£14.3 billion, 30% of the UK total).

The vast majority of exports transported via the London airport system leave through LHR. This is clearly illustrated in Figure 13 below, in which LHR accounts for significant shares of total exports by air under all of the SITC categories and 99% in the largest category (commodities/ transactions not classified elsewhere).

Figure 13: Total aviation exports by value travelling by air in 2015, by SITC



Source: HMRC, Cebr analysis

5 This category includes power generating machinery and equipment, machinery specialised for particular industries, metalworking machineries, general industrial machinery, office machines, telecoms and sound recording, road vehicles, other transport equipment.

6 This category includes special transactions and commodities not classified according to kind; coin (other than gold coin) not being of legal tender; gold, non-monetary (exc gold ores and concentrates) and gold coin not of legal tender; military arms and ammunition.

As highlighted previously, the majority of exports from LHR to non-EU destinations travel to Asia and Oceania. The most sizable amount of exports to this continent are of commodities/transactions not classified elsewhere (£8.4 billion in 2015), followed by machinery and transport equipment (£6.0 billion). However, exports from LHR of chemicals and related products mostly go to North America, with their value totalling £5.2 billion in 2015.

Exports by volume

By volume, the largest export category across all UK ports is mineral fuels, lubricants and related materials, with 18.5 billion kg exported in 2015. However, when considering exports carried by air, the most significant categories are machinery and transport equipment (151.2 million kg) and miscellaneous manufactured articles (129.7 million kg).

London's airports transport over half of the exports which travel via air in each SITC category, aside from crude materials. Most significantly, London airports transported 86% of food and live animal exports by volume (70.3 million kg) and 84% of miscellaneous manufactured articles. LHR accounts for over 90% of the exports for each SITC category travelling by air from London, highlighting LHR's importance for exporting a variety of different goods, not just high-value items.

From LHR, the largest volume of exports are destined for Asia and Oceania. Of these exports, the most significant in volume terms were miscellaneous manufactured materials (40.7 million kg) and machinery and transport equipment (39.1 million kg) in 2015.

2.5. UK trade in services

Aviation is not only important for trade in goods, it also plays a major role in trade in services, helping businesses to establish and maintain fruitful business relationships. Being an island nation, aviation is also crucial in supporting tourism and labour supply, creating the conditions necessary (the ability to fly to visit friends and relatives) to incentivise productive inward migrants to work in the UK.

The UK has a very strong services sector, including financial services, insurance and the creative industries. These businesses are highly dependent on fast, timely business travel enabling face-to-face contact both with existing clients, and when establishing new ones. This led to the Airports Commission highlighting that the services sector is particularly reliant on aviation, as the industry is dominated by highly-globalised firms which serve an international client base.⁷ This is reflected in the high degree of expenditure related to aviation within these sectors.

According to the Pink Book, UK services exports have been steadily increasing over time, with a significant portion of these exports coming from London, as illustrated by Figure 14. In 2014,

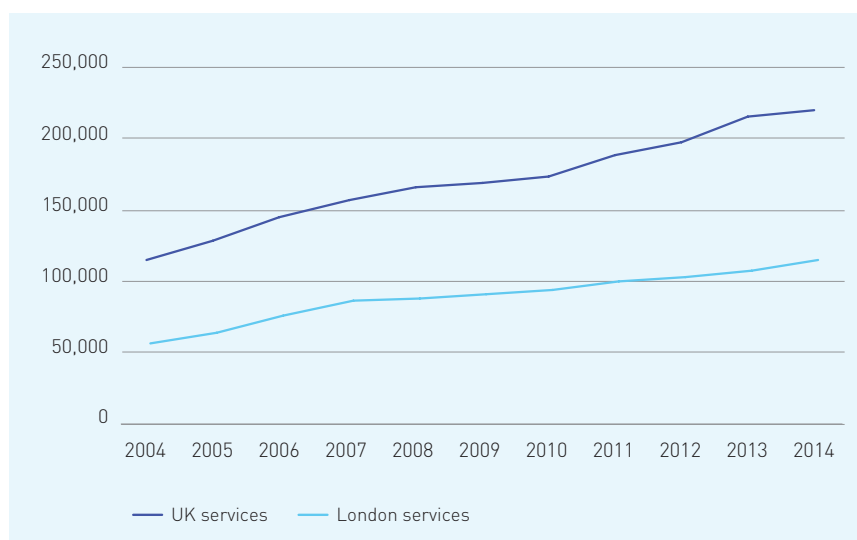
⁷ Airports Commission (March 2013), 'Discussion Paper 02: Aviation Connectivity and the Economy'. Available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/138162/aviation-connectivity-and-the-economy.pdf

services exports from the UK amounted to £220 billion, with London's services exports accounting for over half of this, approximately £115 billion. For the UK as a whole, services exports have increased steadily over time, from £129 billion in 2004. The majority of exports come from financial and other business services, amounting to £49.2 billion and £57.1 billion in 2014, respectively.

Given London's high level of services exports, it is essential that there are strong aviation links in place to support the city's services industries. Furthermore, as some international routes are only served by LHR, it is likely that for service-based businesses throughout the UK, without strong aviation links from London, it would be difficult for them to trade abroad.

Meanwhile, services imports have not grown as strongly over the same ten year period. In 2014, total services imports to the UK amounted to £130.6 billion, a 2% decrease on 2013. The UK consistently runs a trade surplus in services. Strong aviation links are essential to ensure that the UK's strength in this area continues.

Figure 14: London and UK services exports, £m, 2004–14

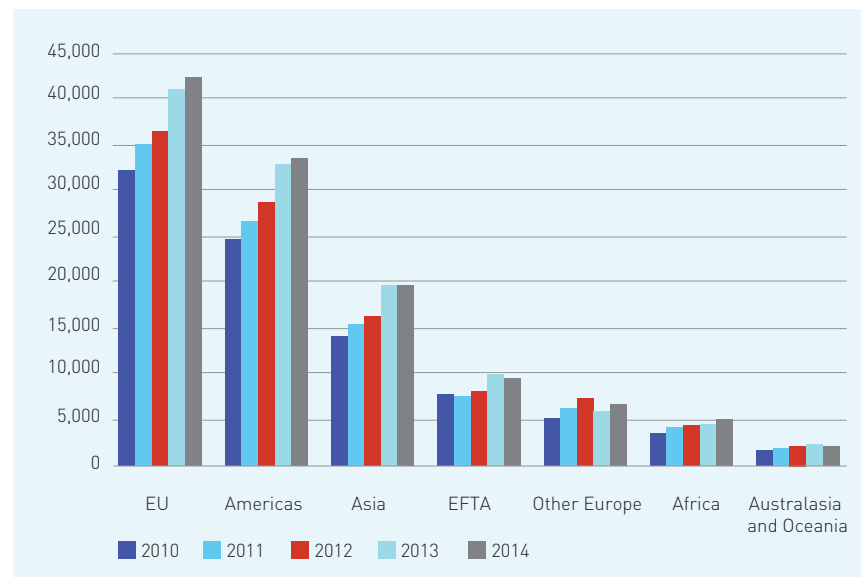


Source: ONS Pink Book, GLA Economics

According to ONS International Trade data,⁸ total services exports to the USA far exceeded those to any other country in 2014. In total, services exports to the USA amounted to £27.8 billion in that year, the largest amount of services exports to an individual country. Total services exports to the EU amounted to £42.5 billion in 2014, equating to 35% of the UK total.

Figure 15 illustrates the absolute amount of UK services exports flowing to each continent and how these amounts have changed over the past five years. Over time, the proportion of services exports to each continent has remained fairly constant, with exports to the EU consistently amounting to around 35% of the total, and the Americas 28%.

⁸ Note that in this dataset, trade in services excludes travel, transport and banking.

Figure 15: UK services exports, by destination continent, £m

Source: ONS, Cebr analysis

Similarly to exports, the majority of services imports come from Europe, specifically the EU. Services imports from there amounted to £24.6 billion in 2014. This was followed by imports from the Americas, which amounted to £14.9 billion, with a significant portion of this comprised of the US (£12.9 billion).

2.6. Foreign direct investment

Aviation is also an important, and well-recognised, contributor to encouraging FDI. The air connections made between cities and markets can produce an important element of the infrastructure required to attract FDI. Previous research by Banno, Mutinelli & Redondi (2011)⁹ suggests that FDI increases by 50% after a first direct air connection to a foreign region is established.

The link between aviation connectivity and FDI relates in large part to the requirement to move staff around the globe, thereby facilitating the transfer of knowledge. Aviation connectivity helps inward investment by creating a more favourable environment for foreign firms and their workers. A survey by the European Cities Monitor found that transport links (including predominantly by air) are an essential factor in the location decision of 52% of companies.¹⁰ Oxford Economics (2013)¹¹ has also highlighted the importance to businesses of considering aviation connectivity in investment and location decisions. Increased aviation connectivity also enables UK firms to more easily invest outside of the UK.

⁹ Banno, M., Mutinelli, M., & Redondi, R. (2011). 'Air connectivity and Foreign Direct Investments, the economic effects of the introduction of new routes'.

¹⁰ Heathrow Airport Ltd, (2013), "Airports Commission Discussion Paper 02: Aviation Connectivity and the Economy". See www.heathrow.com/file_source/Company/Static/PDF/Companynewsandinformation/Aviation_connectivity_and_economy.pdf. The highest ranking factor is generally the availability of a highly-skilled workforce.

¹¹ Oxford Economics, 2013, "The Economic Value of International Connectivity".

For the UK, FDI is attracted to regions such as London for reasons including the availability of a pool of skilled labour and the quality of its aviation links. It has been estimated that FDI contributes more than £52 billion each year to London's economy.¹² In 2014/15, the UK attracted 1,988 FDI projects, an increase of 12% on the previous years. This strong performance saw the UK's inward FDI stock i.e. the value of accumulated FDI in the UK, exceed £1 trillion for the first time. This is the highest amount of FDI in a single country in Europe, and the third highest in the world behind the US and China.

Statistics from UKTI show that FDI into the UK came from more than 70 countries, including emerging markets. However, the majority of the UK's inward investment continues to come from the US, with a total of 564 projects in 2014/15, followed by France and India.

The US investment position in the UK amounted to £253.0 billion in 2014, whilst the EU countries as a whole had an investment position amounting to £496 billion in the same year.

¹²The Mayor of London's Response (2011), 'Developing a sustainable framework for UK aviation: scoping document'. Available at: <http://content.tfl.gov.uk/developing-a-sustainable-framework-for-uk-aviation-scoping-document-full.pdf>

THREE

The relationship between trade, FDI and air transport links

This section of the report presents the findings of our econometric analysis which aimed to establish the relationship between aviation connectivity, trade and investment flows in the UK. We begin by detailing the approach taken to the analysis before presenting the results.

3.1. Mature vs. emerging markets

In developing our econometric model to assess the relationship between aviation connectivity, trade and investment flows, we drew on a number of different data sources. We relied on HMRC to obtain UK goods trade data, Eurostat's Balance of Payments database for trade in services data, and the Civil Aviation Authority (CAA) for data on flights, passengers and routes. The CAA data spans a ten-year period from 2002 to 2012, the time period that this part of our study examines. Although the period of analysis is limited, there are good reasons for choosing one that ends in 2012. These are:

- *The 'dither clock'*: The analysis in this section leads ultimately to the 'dither' clock developed in Section 5. This imagines trade growth being spread smoothly and continuously through time, and considers what is potentially being lost in trade terms by delaying the runway capacity decision. The Airports Commission was established in 2012, and this represents the start date of the dither clock – the year the Government decided to create a lengthy commission rather than reach a decision itself.
- *Minimising distortions of the relationships*: with LHR operating at capacity, LGW close to capacity, and the fact that new routes tend to push others out, it made sense to go back in time a little to minimise the potential for routes dropping in and out to distort the relationships we are endeavouring to establish.

In developing the econometric model, we considered the number of routes, flights and passengers travelling between the

UK and two groups of ten partner countries, referred to in this report as the ‘mature-trade’ markets and the ‘emerging markets’ (see Table 4 for the list of countries included in each). The former group refers to the ten partner countries with which the UK has the most mature trading relationships in goods and services. This was identified through an examination of historic trends in trade between the UK and its partner countries. The latter group refers to ten economies that are among the fastest growing in the world, and according to the IMF’s and Cebr’s own forecasts, are expected to contribute an increasing proportion of the world’s economic growth over the next 5 years.

Table 4: UK trade partner countries, defined as ‘mature-trade’ markets or ‘emerging markets’

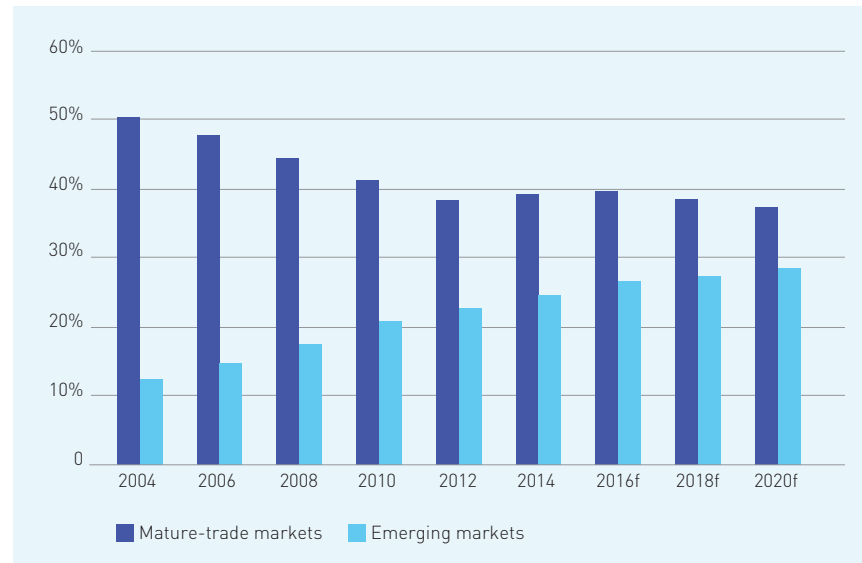
Mature-trade markets	Emerging markets
Belgium	Poland
France	Turkey
Germany	South Africa
Ireland	Nigeria
Italy	Mexico
Netherlands	Brazil
Spain	India
Switzerland	China
USA	Malaysia
Hong Kong	Thailand

Source: Cebr analysis

3.2. The growing importance of aviation links to emerging markets

It is increasingly important for the UK to be well connected with emerging markets. In 2014, the mature-trade markets accounted for almost two-fifths (39%) of the world’s GDP, compared with the emerging markets group, which contributed 25%. By 2020, the mature-trade markets’ contribution to world GDP is expected to decline to 37% while the emerging markets’ share is estimated to rise to 28% (as illustrated by Figure 16). We estimate that emerging markets’ contribution to world GDP could surpass mature-trade markets’ contribution to world GDP by as early as 2029.

Figure 16: Mature-trade markets' and emerging markets' share of global GDP, 2004–2020



Source: Cebr analysis

As the balance of economic strength and significance shifts away from the mature-trade markets towards the emerging markets, strong connectivity between the UK and these emerging markets will become imperative for the UK to capitalise on new export and investment opportunities.

3.3. Connections, trade and investment with mature vs. emerging markets

Trade

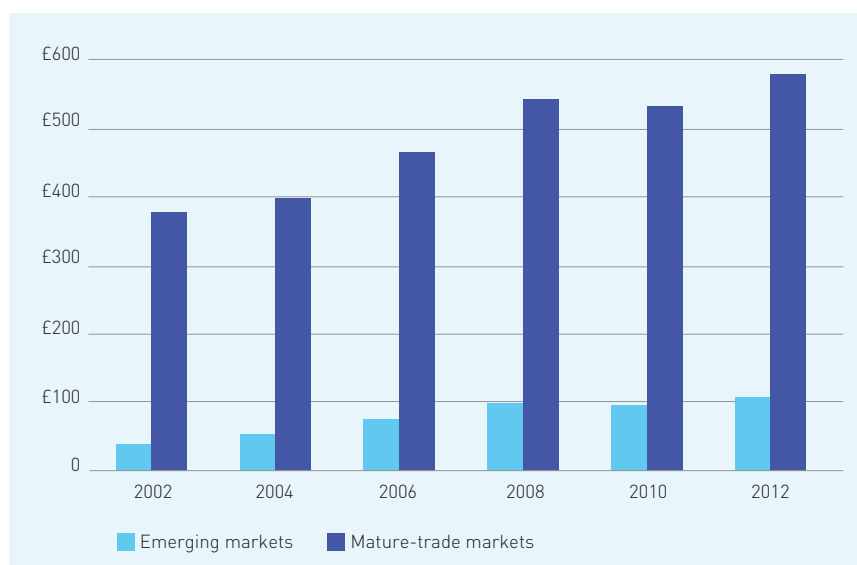
The value of trade in goods and services between the UK and the emerging markets are comparatively lower than the value of trade between the UK and the mature-trade markets (Figure 17). The total value of trade in goods and services between the UK and the mature trade markets reached approximately £580 billion in 2012, this includes exports and imports.

By comparison, the value of trade between the UK and the emerging markets was almost 5 times lower, totalling approximately £107 billion. Despite a time lag in the fall in trade following the financial crisis in 2008, by 2012 the value of UK trade between both groups of markets had surpassed 2008 levels.

Growth in trade between the UK and countries such as South Africa and India (93% and 88% respectively between 2002 and 2012) has driven trade with the emerging markets group. Such high growth rates are a reflection of the low base from which UK trade with these countries is increasing from. By comparison, while trade growth between the UK and mature-trade economies is comparatively low, this is a reflection of the much

higher base from which it is increasing and the maturity of the trade relationships involved.

Figure 17: Total trade (exports and imports) in goods and services between the UK and the emerging markets group and the mature-trade markets group, (£ billions), 2002–2012



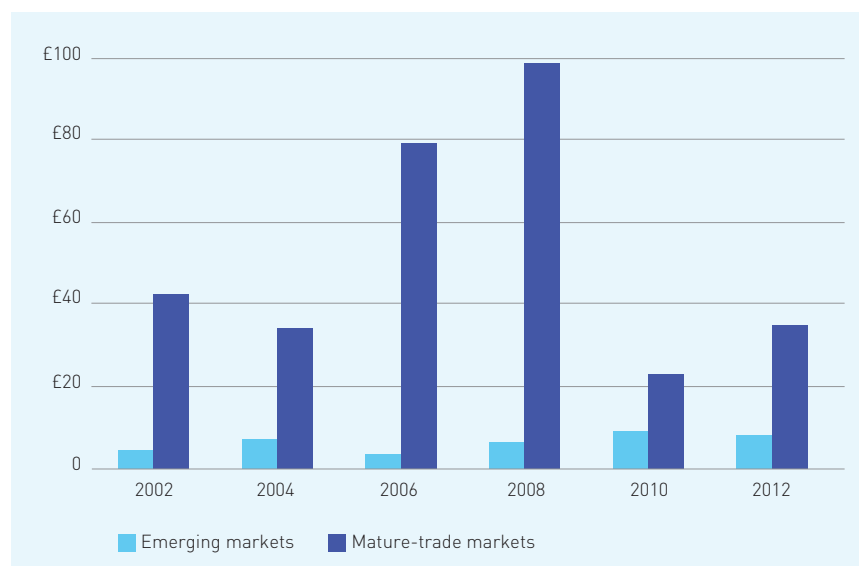
Source: HMRC, Eurostat, Cebr analysis

Foreign direct investment

In 2012, the value of total (inward and outward) FDI flows between the UK and the mature-trade markets was approximately £34.9 billion (Figure 18). By comparison, in the same year, the value of total investment between the UK and the emerging markets was almost 4 times lower, at £8.0 billion. Similarly to the value of trade between the UK and mature-trade markets, by 2012 the value of total investment flows had yet to reach the levels experienced in 2008. In contrast, the value of total investment flows between the UK and emerging markets in 2012 had exceeded pre-financial crisis levels.

Furthermore, the value of investment flows between the UK and the mature markets declined by almost 77% between 2008 and 2010. Over the same time period, investment between the UK and the emerging markets increased by 40%, and only declined relative to 2010 levels in 2012. This trend could be indicative of the UK's shifting focus of investment opportunities away from the mature-trade economies and towards the emerging markets, in particular after the financial crisis, which arguably affected Europe and the US more immediately than it affected the emerging markets.

Figure 18: Total (inward and outward) FDI flows between the UK and emerging markets and mature-trade markets each, (£ billions) 2002–2012

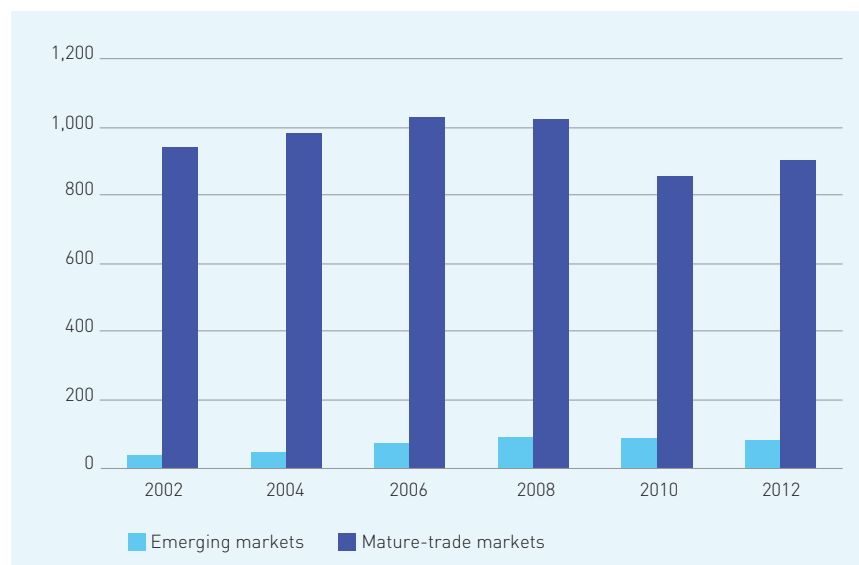


Source: OECD, Cebr analysis

Aviation connections

In 2012, approximately 83,000 flights travelled between the UK and the emerging markets. By contrast, in the same year almost 11 times more flights (904,000) travelled between the UK and the mature-trade economies. Figure 19 illustrates the higher number of connections between the UK and the mature economies and the emerging markets, respectively.

Figure 19: Total flights between the UK and emerging markets and mature-trade markets each, (thousands) 2002–2012



Source: CAA, Cebr analysis

Between 2002 and 2012, connections between the UK and both groups of markets followed a similar pattern to that of the associated levels of trade and investment. The number of flights travelling between the UK and both mature-trade and emerging groups fell following the financial crisis, and by 2012, levels had yet to reach those experienced before the global economic slowdown in 2008.

The numbers of passengers travelling between the emerging and mature-trade economies followed a similar trend to that of the number of flights between 2002 and 2012 (Figure 20). However while the number of passengers travelling between the UK and mature-trade economies peaked in 2006 (117 million), the number of passengers travelling between the emerging markets and the UK has increased steadily since 2002.

Figure 20: Total passengers travelling between the UK and emerging markets and mature-trade markets, (millions) 2002–2012



Source: CAA, Cebr analysis

Figure 21 illustrates the growth in the number of new routes between the UK and the emerging markets and mature-trade economies. Following the trajectory of China's economic and export strength, the number of new routes between China and the UK expanded by 4.0% between 2010 and 2012. Several emerging markets feature at the top end of the scale, such as Poland and Brazil, where the number of new routes to the UK grew by 3.5% and 1.6% respectively.

Figure 21: Percentage growth in the number of routes between the UK and emerging markets and mature-trade markets between 2010 and 2012



Source: CAA, Cebr analysis

3.4. The relationship between aviation connectedness and trade and investment

In undertaking the analysis, we chose to use a panel data econometric modelling approach.¹³ This enabled us to capture trends in the relationship between air links, and trade and investment across both time and between countries. By analysing the data, we identified a strongly statistically significant relationship between total trade and an 'aviation connectedness' variable constructed as the product of routes, flights and passengers. We also identified a statistically significant relationship between this variable and total Foreign Direct Investment (FDI) flows.¹⁴

Our econometric analysis of the data identifies a statistically significant relationship between the number of flights and the level of total trade, and the number of flights and the level of total FDI. We estimate that a 10% increase in the number of flights between the UK and the mature-trade economies is each associated with a 1.2% increase in UK trade in goods and services, and a 0.7% increase in FDI (all other factors remaining constant).

The number of flights, passengers and routes between the UK and the emerging markets and the mature-trade markets is illustrated in Figure 22.¹⁵ While in absolute terms the level of connectedness between the UK and the mature-trade markets remains significantly higher than between the UK and the

¹³Details on the econometric approach used in this study can be found in the Appendix.

¹⁴FDI flows denote the new investment made during the year, and capture equity capital, reinvested earnings and the borrowing and lending of funds.

¹⁵Throughout the remainder of this report we refer to the product of the number of flights and the number of passengers (effectively all passengers) and routes as a measure of connectedness.

emerging markets, Figure 22 suggests that this trend may not continue in the coming years. This presents our connectedness variable on a logarithmic scale, and illustrates the narrowing of the gap in the UK's connectedness with the emerging markets group and the mature trade markets group.

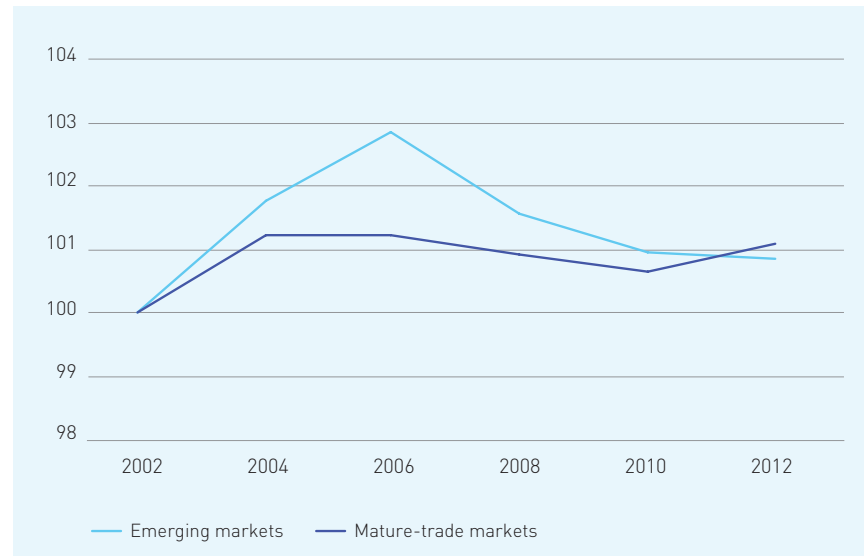
Figure 22: The logarithm of the number of flights, passengers and routes between the UK and emerging markets and mature-trade markets respectively, 2002–2012



Source: CAA, Cebr analysis

Figure 23 illustrates that between 2002 and 2012, growth in the level of connectedness between the UK and the emerging markets was, on average, higher than the average growth between the UK and mature-trade markets, as illustrated in Figure 22. The low growth rates in connectedness with the mature-trade markets reflect, as noted earlier, the high base of existing air links from which they are growing. This is in contrast to the connectedness with emerging markets, where the higher growth rates reflect the fact that each additional air link represents a larger proportion of the much lower base of existing connections.

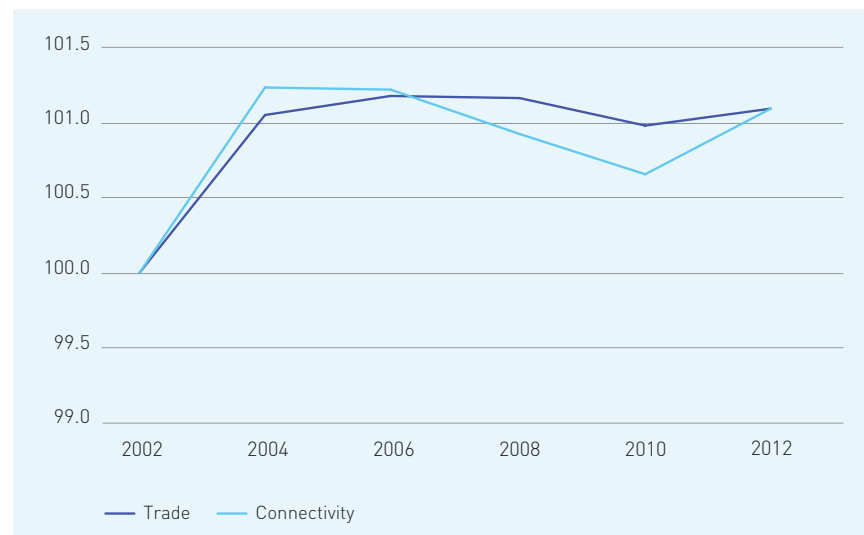
Figure 23: Growth of flights, passengers and routes between the UK and emerging markets and mature-trade markets respectively, (index = 2002), 2002–2012



Source: CAA, Cebr analysis

While bi-lateral trade is driven by a range of factors such as each country's economic growth, labour costs, historical ties and proximity, a highly positive relationship between UK trade with the mature-trade markets and connectedness with those markets is illustrated in Figure 24.

Figure 24: Growth in total UK trade with mature-trade markets and growth of total flights, passengers and routes, (2002 = 100)

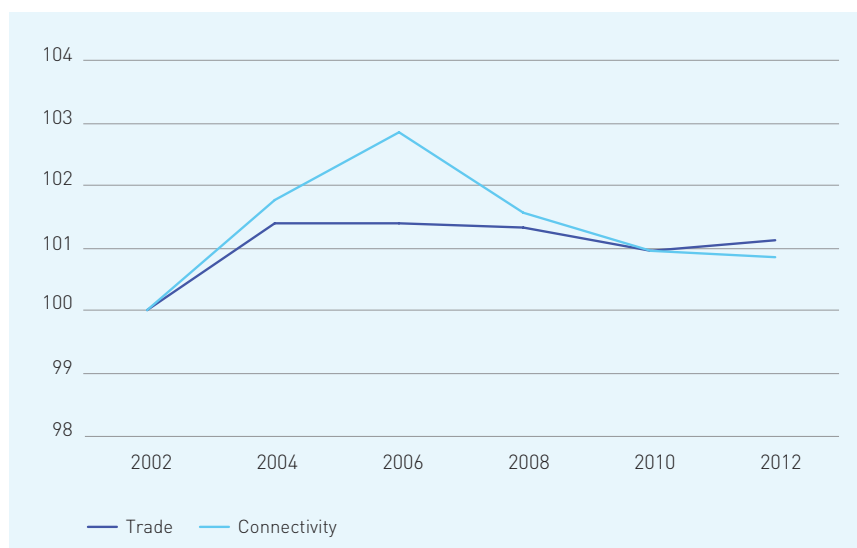


Source: HMRC, CAA, Eurostat, Cebr analysis

A positive relationship between the UK trade with the emerging markets and connectedness with those markets can be observed in Figure 25. Growth in trade and connectedness between the UK and the mature trade markets appear relatively stable, reflecting

the established relationship between the UK and individual mature-trade partners (Figure 24). By comparison, growth in connectedness and growth in trade between the UK and the emerging markets appears to be slightly more volatile (Figure 25).

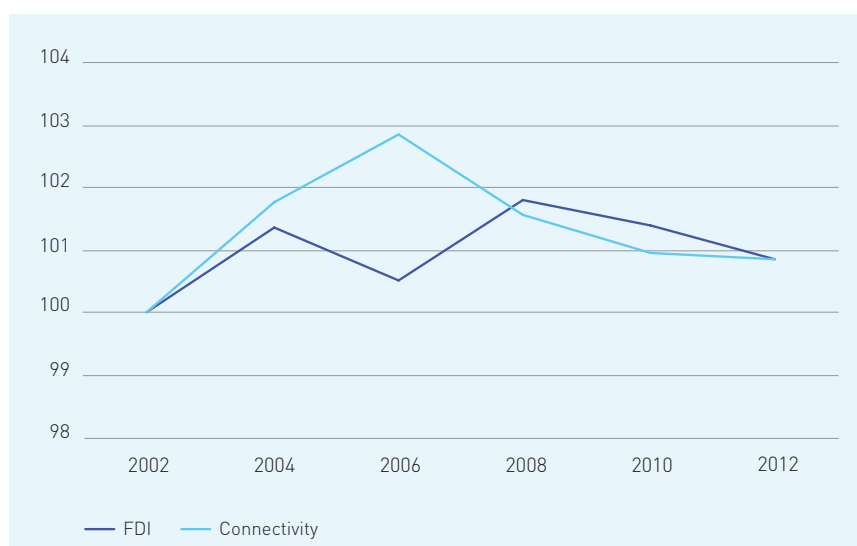
Figure 25: Growth in total UK trade with emerging markets and growth of total flights, passengers and routes, (2002 = 100)



Source: HMRC, CAA, Eurostat, Cebr analysis

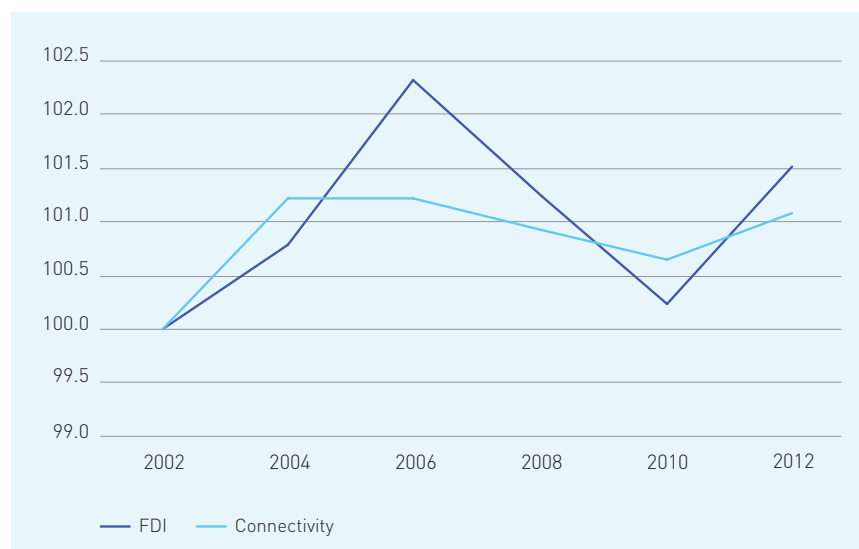
The relationship between total UK FDI and connectedness, as illustrated by Figure 26 and Figure 27 for each of the emerging markets and mature-trade markets, is not as clear as the association between trade and connectedness. This is to be expected and is a reflection of the volatile nature of FDI, which is driven by a range of factors such as market concentration and regulatory and institutional frameworks.

Figure 26: Growth in total UK FDI flows between emerging markets and growth of total flights, passengers and routes, (2002 = 100)



Source: CAA, OECD, Cebr analysis

Figure 27: Growth in total UK FDI flows between mature-trade markets and growth of total flights, passengers and routes, (2002=100)



Source: CAA, OECD, Cebr analysis

FOUR

Growth potential and the cost of delaying the runway decision

Given the Government's focus on exports as a source of UK economic growth, it is imperative that the Government supports UK businesses in moving beyond domestic markets and developing connections with high-growth and new emerging markets. However, for this to happen, the required airport infrastructure needs to be in place. At present, the runway capacity constraint in London and the South East risk seriously impacting the UK's ability to grow new routes, establish these business relationships and serve new markets.

In this section, we consider the impact on UK trade and investment opportunities if there were an increase in the number of air links to the ten fastest growing economies under a range of scenarios.

We assume that, as LHR is operating at capacity and is also the principal freight airport in the London system (and in the UK as a whole), the trade impacts we identify here can be equated with what could be lost as a result of not having a new runway in place in the London area. In the current circumstances, in order to create new air links, old links would have to be sacrificed, resulting in losses elsewhere.

4.1. Estimated potential boost to UK trade in goods and services

As in the 2011 Frontier Economics report for Heathrow Airport,¹⁶ we first present the results suggested by our econometric modelling. We use these results to calculate a number of benchmarks around potential trade growth that could arise with various types of increase in the number of air links to the ten fast-growing economies (our emerging markets group). These benchmarks are comparable in magnitude to those produced by CBI in its 2013 report.¹⁷ However, at the aggregate level, there are a range of factors requiring consideration that are beyond what a statistical model can take into account, such as political institutions, historic links and so forth, that make it easier or harder to trade with

¹⁶Frontier Economics (2011), "Connecting for Growth: the role of Britain's hub airport in economic recovery", report prepared for Heathrow, September, London.

¹⁷CBI (2013), "Trading places: Unlocking export opportunities through better air links to new markets", London.

these countries. By accounting for these factors we calculate a lower bound estimate of the trade that could be sacrificed by not having additional runway capacity. In reality, the true impact is likely to lie somewhere in the range of this lower bound and the upper bound suggested by the unadulterated statistical model.

From our econometric analysis of the data, we estimate that in any given year, a 10% increase in our measure of aviation connectedness with the mature-trade markets can be linked with an increase in UK trade with those markets of 1.2%. This result was highly statistically significant, thus confirming the positive correlation between air links and trade. We used this relationship to quantify and examine the potential impacts on UK trade under various scenarios that boost the UK's connectedness with the emerging markets group, all other factors remaining equal.

In 2012 the UK traded £107 billion with the ten emerging countries examined in this study. Based on the statistical relationships established above, our analysis suggests that an additional average flight to one of these emerging markets has the potential to boost UK trade by £57,000 (Table 5). By facilitating an additional 1,000 passengers to one emerging market, UK trade has the potential to rise by £307,000. We estimate that creating an additional route to one emerging market with existing average flight density has the ability to boost UK trade by £34.2 million. An additional route to all ten emerging markets with a daily flight on each has the potential to increase UK trade by as much as £0.4 billion.

Table 5: Potential boost to UK trade (£) from scenarios involving additional flights, passengers and routes from the UK to emerging markets

Scenario	Potential boost to UK trade
1 additional flight	£57,000
An additional 1,000 passengers	£307,000
1 additional route	£34.2 million
1 additional route and 1 additional flight	£0.41 billion
Flights-parity with mature-trade markets	£28.2 billion

Source: Cebr analysis

We then assume a scenario in which average levels of aviation connectedness between the UK and the emerging markets reaches the same levels as between the UK and the mature-trade economies. In this scenario, the analysis suggests that the UK could benefit from a boost to trade of approximately £28.2 billion. This assumes that the economies and trading conditions in the emerging markets continue to improve to resemble those of the

mature-trade economies. As a result, our findings do not account for the other factors that could constrain the ability to grow trade to this extent, such as institutional, regulatory and market openness issues.

In addition to conducting standard robustness tests to ensure the statistical significance of our results, we used an alternative methodology to sense-check our approach. This test involved comparing the level of UK trade with 24 emerging markets with at least one UK daily flight, with the level of UK trade with 8 emerging economies without a daily UK flight connection.¹⁸ The discrepancy, after adjusting for the size of each emerging market's economy, provided results similar to our findings above, thus broadly confirming the robustness of these calculations.

At the aggregate level, as noted earlier, we took account of a range of factors that the statistical model cannot capture, factors that can make it easier or harder to trade with these countries. In other words, we attempt to account for the extent to which trading conditions between individual emerging markets and the UK is expected to develop over the next 15 years. This was informed by Cebr's propriety forecasts of world trade and those of other institutions like the IMF. This approach suggests a lower bound for the trade that could be lost as a result of poor connectedness to emerging fast-growing economies of £8.6 billion by 2020, growing to £10.1 billion by 2030. However, this includes exports and imports, so narrowing the focus to exports (using the current UK export-import split) gives lower bound estimates of £3.2 billion by 2020 and £3.7 billion by 2030.

4.2. Estimated potential boost to UK FDI

A similar approach to identifying the relationship between air links and trade was adopted to examine the association between air links and FDI. We estimate that in any given year, a 10% increase in the number of flights, passengers and routes across the mature-trade markets has the potential to increase total UK FDI flows by 0.7%. We used this relationship to quantify the potential impacts on UK FDI flows under several scenarios that boost connectivity between the UK and emerging markets, all other factors remaining equal.

In 2012, the value of FDI flows between the UK and the ten emerging markets examined in this study totalled approximately £8.0 billion. Our analysis suggests that an additional average flight to one emerging market could potentially boost UK FDI flows by £4,000 (Table 6). By facilitating an additional 1,000 passengers to one emerging market, the value of UK FDI flows has the potential to rise by £23,000. Alternatively, creating

¹⁸For this test we assume an average of 5 flights per week between the UK and each emerging economy.

a new route to one emerging market with existing average flight density has the ability to boost total UK FDI flows by £2.5 million. Creating a new route to all ten emerging markets a daily flight on each route has the potential to increase UK FDI flows by as much as £29.7 million.

Once again, we assume a scenario where the average number of flights between the UK and the emerging markets reaches parity with the average number of flights between the UK and the mature-trade economies. Our analysis suggests that the UK could benefit from a boost to total FDI flows of approximately £1.7 billion. Our approach assumes that the economies and trading conditions in the emerging markets continue to improve to resemble those of the mature-trade economies. As a result, our findings do not account for the other factors that influence investment.

Table 6: Potential boost to UK FDI (£) from scenarios involving additional flights, passengers and routes from the UK to emerging markets

Scenario	Potential boost to UK FDI
1 additional flight	£4,000
An additional 1,000 passengers	£23,000
1 additional route	£2.51 million
1 additional route and 1 daily flight	£29.7 million
Flights-parity with mature-trade markets	£1.70 billion

Source: Cebr analysis

We have not sought to produce a lower bound figure for FDI flows as the manner of producing the estimates above (driven off existing trade with the emerging markets) has resulted in what we deem to be reasonably conservative estimates that are not inconsistent with other studies.

FIVE

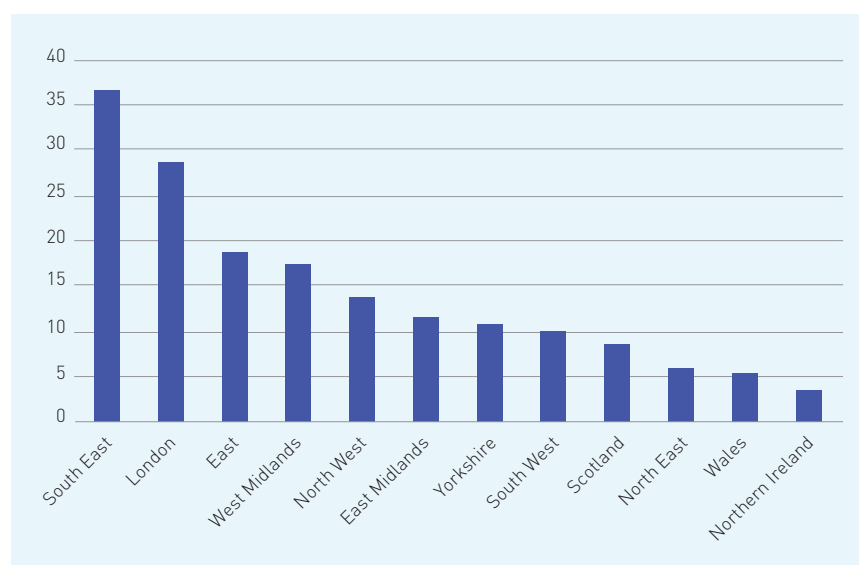
The 'dither clock'

We use the analysis above to estimate the value of lost trade due to a lack of connectedness between the UK and the emerging markets. We consider this over the time period in which connect- edness with emerging markets would grow if additional runway capacity were made available. To do this, we have calculated the value of additional trade that could be lost without new runway capacity up to 2030.

We estimate that if similar levels of connectivity could be achieved by the year 2030 at least, the total value of potential trade that the UK could gain from could reach approximately £170.6 billion (over the 18 year period, from 2012).

Given this, we estimate the total value of potential exports that the UK could gain from could reach a cumulative £63.6 billion over the 18 years to 2030. Based on current trends in regional trade, we estimate that the South East of England could be hurt the most, as the region could potentially lose out on approximately £36.6 billion of total trade over the 18 year period (Figure 28). London is also estimated to be heavily disadvantaged, losing out on roughly £28.6 billion of trade up to 2030. These, and the potential losses to the other regions of the UK, are illustrated in Figure 28 below.

Figure 28: The value of lost potential trade over the 18 year period, by region (£ billions)



Source: HMRC, Cebr analysis

To illustrate what this means by unit of time, we have produced the 'dither clock' shown in Table 7 and Table 8 below. This analysis suggests that the UK could be losing out on as much as £9.5 billion for each year that passes without runway capacity expansion. For every month that the level of air connectedness between the UK and the emerging markets remains under-developed, due to a lack of new runway capacity, the UK could be losing £790 million of trade, equivalent to approximately £182 million per week. On a daily basis, the loss is approximately £26 million worth of trade with the emerging markets group. This is equivalent to a loss of approximately £1.1 million per hour, or £18,000 per minute.

Table 7: The 'dither clock': the value of lost potential trade over time

Value of lost potential trade, £	Per unit of time
£9.5 billion	Year
£790 million	Month
£182 million	Week
£26 million	Day
£1.1 million	Hour
£18,000	Minute

Source: Cebr analysis

Narrowing the focus to exports only gives the 'dither clock' estimates shown in Table 8, which is based on the current ratio of exports to imports to the emerging markets group.

Table 8: The 'dither clock': the value of lost potential exports over time

Value of lost potential trade, £	Per unit of time
£3.5 billion	Year
£294 million	Month
£68.0 million	Week
£9.7 million	Day
£0.4 million	Hour
£6,700	Minute

Source: Cebr analysis

SIX

Conclusions

This report clearly demonstrates the links between aviation connectedness, trade and foreign direct investment. In doing so, it has provided illustrative figures on what could be sacrificed in terms of trade and FDI growth by delaying the runway capacity decision in London and the South East.

On this basis, the message is clear. The Government needs to get on with building a new runway in order not to stifle further growth in trade and FDI between the UK and the fast growing emerging market economies. Not doing so is, and will, ultimately be to the benefit of the UK's European competitors that have plenty of spare airport capacity at their key hub airports.

Without the new runway, the UK could be sacrificing a cumulative £63.6 billion in new export growth over the 18 years to 2030. This could amount to:

- An average of £3.5 billion of exports per annum;
- £294 million for every month that the UK does not have a new runway in London and the South East;
- £68.0 million for every further week of dithering; or
- £9.7 million per day.

On 7 September 2012, the Government announced its intention to create an independent commission, chaired by Sir Howard Davies, to identify and recommend options for maintaining the UK's status as a global aviation hub. In July 2015, the Airports Commission published its final report which set out its recommendations to government for expanding airport capacity in the UK. It narrowed down the potential solutions to three options at two airports - LHR and LGW - and recommended the new northwest runway option at LHR. However in December 2015 the Government delayed the decision as to whether a third runway could even be allowed at Heathrow until summer 2016, as a result of environmental concerns, following the vote to leave the EU the decision has now been further delayed until *at least* October 2016.

In response to political procrastination on the issue and in an attempt to help break the political deadlock, in September 2013 London First initiated the Let Britain Fly campaign. The aim of the campaign is to build cross-party political support to build new runway capacity. It is supported by a broad and wide strategic campaign coalition that includes business leaders, business organisations, trade and professional associations, trade unions, think tanks, academics and economists. This report provides objective evidence on which *Let Britain Fly* can draw to support the campaign's message.

Aviation plays a key role in facilitating international trade in both goods and services. It provides businesses with access and entry to new markets and enables them to better manage their supply chains, as well as enabling business travellers to meet new and existing clients. Given the government's initiatives around exporting for growth, aviation can provide businesses with important routes to market for their goods and services, supporting growth and employment in the UK and ensuring that the UK remains internationally competitive.

Aviation links provide businesses with a rapid, worldwide, transport network, and as such, it plays an important role in facilitating trade, particularly where speed of delivery is important. In addition, air freight is more sensitive to weight than other options of transportation, such as rail or sea. Therefore, it is smaller, lighter and higher value goods that are transported by air. To facilitate continued growth in the export of these high value goods in particular, as well as of high value-adding services, the Government must accelerate the decision-making process and get whatever site is chosen shovel-ready as soon as possible.

APPENDIX

Methodology

In undertaking the analysis presented in this report, we choose to adopt a panel data econometric modelling approach. This enabled us to account for information in our data that varies both over time and between countries. Furthermore, a panel data approach allows us to account for any relevant but unobservable or difficult to measure information in our data such as cultural links, regulatory frameworks and international agreements. Our data covers the time period 2002 to 2012 and the mature-trade economies defined in Section 3.1.

We conducted several statistical tests to confirm the relevance and robustness of our chosen model. The results of the Hausman test strongly confirmed our use a Random Effects panel data approach, in order to control for unobservable variables that vary over time but are constant between countries, and other unobservable variables that are constant over time but vary between countries. The Breusch-Pagan test confirmed the presence of random effects in our data.

In addition, several correlation tests were conducted to avoid any bias imposed by multicollinearity in the model. Due to the limited time series element of our model, autocorrelation tests were not conducted. Throughout our analysis we controlled for any presence of heteroscedasticity.

Following this, we estimate Equation 1 using STATA:

$$1. \text{trade growth}_{j,t} = \alpha + \beta_1 \text{product of routes, flights and passengers}_{j,t} + u_{j,t}$$

Where $\text{trade}_{j,t}$ represents growth of total trade of goods and services between the UK and an individual mature-trade market j and time t . In addition α represents a constant over time and individual country, and β_1 represents the relationship between trade growth and our measure of connectedness between the UK and an individual mature-trade market j and time t : the product of routes, flights and passengers.

The results enable the identification of the contribution of additional flights, passengers and routes to total UK trade growth. By applying the results to observed trends in aviation connectivity between the UK and the mature-trade and emerging markets, the potential boost to UK trade from greater connectivity with emerging markets from increased airport capacity can be estimated.

We estimate that in any given year, a 10% increase in the product of flights, passengers and routes across the mature-trade

markets has the potential to increase UK trade by 1.2%. This result was highly statistically robust and thus confirmed the relationship between air links and trade. We used this relationship to quantify and examine the potential impacts on UK trade under various scenarios that boost the connectivity between UK and emerging markets, all other factors remaining equal.

Following a similar approach, using STATA, we estimate Equation 2 to identify the statistical relationship between growth in total (inward and outward) FDI flows and connectivity growth:

$$2. \text{ FDI flows growth}_{j,t} = \alpha + \beta_1 \text{product of routes, flights and passengers}_{j,t} + u_{j,t}$$

We estimate that in any given year, a 10% increase in the product of flights, passengers and routes across the mature-trade markets have the potential to increase total UK FDI flows by 0.7%. We used this relationship to quantify the potential impacts to UK FDI flows under several scenarios that boost connectivity between the UK and emerging markets, all other factors remaining equal.

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