

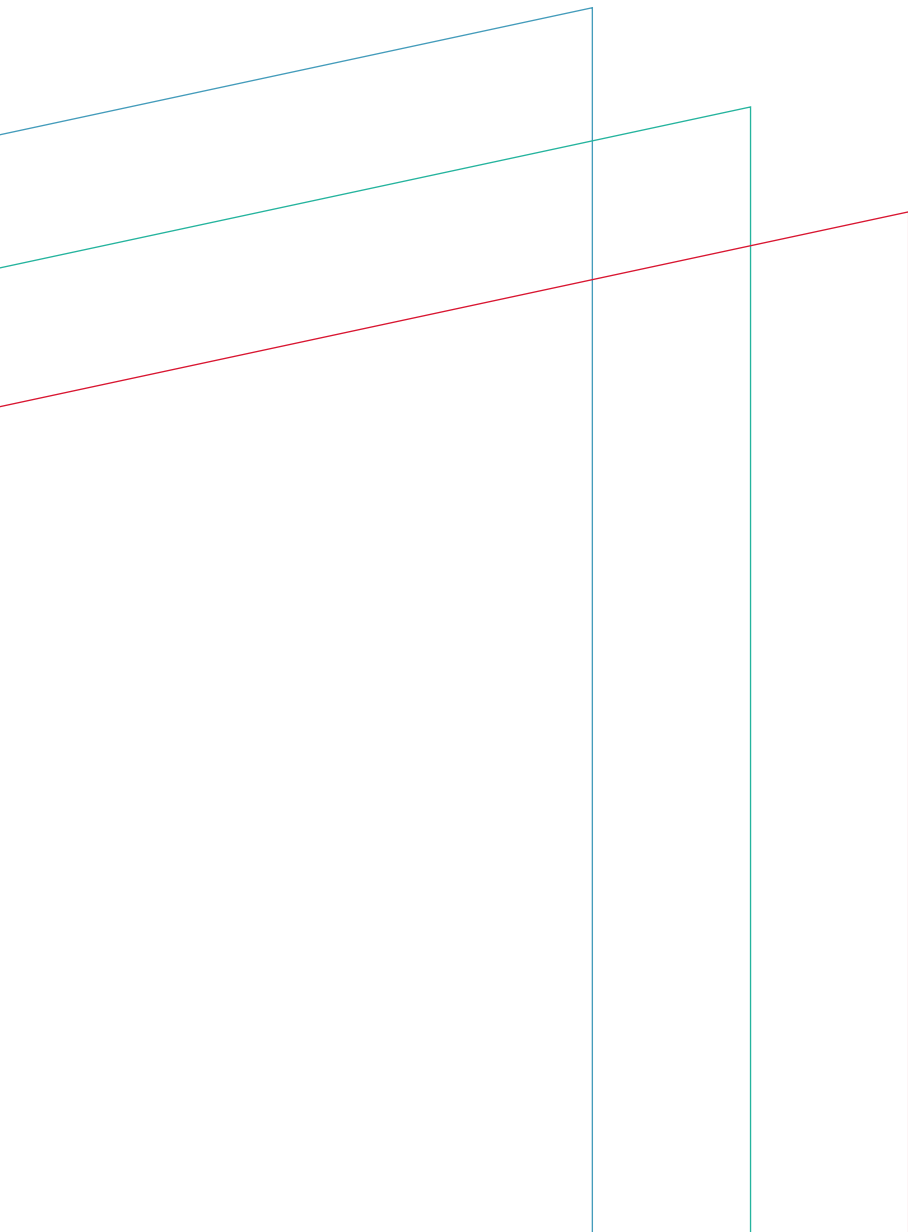


NEW
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LOSING ALTITUDE

THE ECONOMICS OF AIR
TRANSPORT IN GREAT BRITAIN

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EXECUTIVE SUMMARY

The environmental downsides of growth in flight numbers are significant. The sector has no short-term technological solution to its greenhouse gas emissions; over the medium to long term, much uncertainty remains as to the pace of emissions reduction achievable. All scenarios published by stakeholders such as the Climate Change Committee, the Department for Transport (DfT), and air transport sector bodies, suggest that future air traffic growth would necessitate the use of costly, and unproven, carbon capture technologies.

Despite these risks, the government continues to provide conditional support to air capacity growth on the (often tacit) basis that the economic upsides outweigh the negative impacts and future risks. But, the economic assumptions that underpin this position favouring growth are dated and have not been reviewed for some years. Given the urgent and sizeable nature of the climate risk, it is imperative that the evidence, and relative balance, of the economic and environmental impacts of air transport growth are kept up to date and under constant review.

This report shows that since the government's last comprehensive review of the economic impacts of air transport in 2012, trends in the British air transport sector have changed dramatically. Contrary to expectations, growth in business passenger numbers has effectively ceased and new passengers now derive exclusively from the leisure market. In particular, passenger growth has been driven by wealthy British residents rather than foreign tourists or those on lower incomes. Early evidence suggests the pandemic has accelerated this trend. This report reviews the current evidence on the impact of air transport growth across four core economic domains: welfare, jobs and wages, tourism, and wider facets of economic growth, business productivity, and trade.

The **welfare impact** of broad access to international travel (ie the experiences and relationships it enables), while challenging to quantify, brings social benefits to UK residents. As an argument for air capacity growth in the UK however, the welfare case is undermined by the share of new capacity which is typically captured by a small and wealthy subset of the British population while, each year, around half of British residents do not fly at all. Furthermore, the welfare benefit must now be offset against welfare losses resulting from greater environmental damage; these are substantial, as NEF has shown in prior work.¹ Growth in air traffic implies a significant transfer of welfare from the majority, who suffer the ill effects of greenhouse gas emissions, noise, and reduced air quality, to a wealthy minority of frequent flyers.

Narratives around **job creation** in air transport often confuse the current footprint of aviation with the relative merits of growth. As a sector, air transport supports a large number of British jobs, but the amount of employment created by growth has been diminishing over time. The sector is, in fact, one of the poorest job creators in the economy per pound of revenue. It has achieved productivity growth through automation and efficiency savings, so much so that the rapid rise in passenger numbers seen between 2015 and 2019 was not sufficient to return direct employment to its pre-financial crisis peak in 2007.

Productivity growth in air transport has not translated into increased wages; after considering inflation, wages in air transport were significantly lower in 2022 than they were in 2006. This wage squeeze has been felt exclusively by middle and lower-paid workers, with real wages at the top seeing real-terms growth. Overall, between 2008 and 2022, air transport saw the largest real-terms pay decline of any sector in Britain and therefore worsened the country's wider wage stagnation problem. The gains of productivity growth have accrued to higher-paid staff and shareholders.

Two decades of evidence now confirms that air transport growth runs counter to the interests of the **UK's domestic tourism industry**. While the pandemic triggered a reprieve, before lockdown, domestic tourism expenditure had stagnated and instead, flows of cash were headed overseas as household spending patterns shifted towards foreign holidays. The net national effect is a large travel spending deficit which contributes to the UK's overall current account deficit. While there is an argument that some of the cash which leaves the UK via outbound tourism may return in forms such as foreign direct investment (FDI) and lending, the trends described are unlikely to be positive for the health of the UK economy and its currency.

This negative diagnosis is reinforced by the regional dynamics of tourism spending flows. London and the South East see a travel spending surplus thanks to their receipt of the lion's share of foreign tourist spending. The UK's wider (and on average poorer) regions have seen their already-significant travel spending deficits grow rapidly. To compound this trend, cash returning to the UK in the form of FDI also concentrates heavily in London and the South East. The current dynamics of British air transport are likely pushing against the government's levelling-up agenda and domestic tourism objectives, yet these dynamics are actively encouraged by government taxation policy, which provides a competitive advantage to overseas holidaying.

The final core dimension of air transport's interaction with the economy is its impact on **wider business processes** such as trade, investment, productivity, and ultimately gross domestic product (GDP) growth. Proponents of the sector have long argued that growth in air connectivity – and business passengers utilising that connectivity – drives improvement in various macroeconomic indicators. Contrary to the prevailing assumption underpinning the political and sectoral narratives, however, we do not find strong evidence of this link in contemporary Britain.

The research presents strong evidence that in less developed and less connected nations, air capacity growth can be a causal driver of economic growth. This relationship also appears to hold for nations with a strong inbound tourism bias such as Europe's Mediterranean destinations. But in a nation such as the UK, already one of the best connected in the world, and seeing a strong outbound tourism bias, the case for growth appears to rely almost entirely on the presence of business air passengers. As net business air passenger growth has effectively ceased, the macroeconomic benefits of British air capacity growth appear to have diminished.

In support of this proposition are a limited number of academic studies, summarised in this report, which isolate the UK context from other developed and developing nations. These studies do not identify a causal link running from air capacity growth to economic/jobs growth in the UK. Furthermore, there are several comparable case studies, particularly from Germany, which highlight contexts in which air capacity growth can be detrimental to a region's economic wellbeing, particularly when it comes to smaller regional airports.

This is not the first time the conditionality of air transport's economic benefits on business travel and net positive tourism effects (both of which are absent in the UK in 2023) have been flagged. These were shared with the DfT in a report by academics from Leeds University in 2018,² but the ramifications for modern air transport policy and planning appraisal appear not to have filtered through.

Recommendations

- The government should conduct a new, comprehensive, call for evidence and review of the economic case for the expansion of the UK air transport sector in terms of passenger departure and air traffic capacity.
- In light of the findings of this review, the government should consider the consistency of its air capacity policies with those of climate change, domestic tourism, and its levelling-up agenda.
- Given the proven and significant environmental damage delivered by air travel, set against uncertain and declining economic benefits, it might be prudent to pause airport expansion proceedings until said review has been completed.
- Economic impact analysis capacity at different layers of government decision-making should be improved. Delegated decision-makers, such as the Planning Inspectorate and local authorities tasked with appraising large and complex air transport proposals, should have greater access to economic training and independent technical support. This capacity would assist decision-makers in navigating several often misrepresented, opaque and/or ignored issues surrounding air transport appraisal, including:
 - Ensuring comprehensive inclusion of all socioeconomic costs and benefits in economic impact assessments of air transport proposals, and application of welfare weighting to account for the equity of impacts (in line with the government's Green Book).
 - Scrutinising claims made around growth in business passenger departures and resulting productivity gains.
 - Estimating and quantifying greenhouse gas emissions impacts in economic welfare impact assessments, according to government guidance.
- Ensuring routine measurement of the impact of proposed air transport growth on the flows and balances of tourism spending.
- Delivering consistent assessment of the displacement of impacts between sectors and regions and the presence of national-level impacts.
- Providing an expert opinion on the currency, relevance, and credibility of data cited on air transport's economic benefits.

1. INTRODUCTION

The years 2020 and 2021 were exceptionally challenging for the air transport sector worldwide. Passenger numbers collapsed as a result of public health measures imposed in response to the Covid-19 pandemic. The cost of living crisis, which is now putting pressure on household finances and wellbeing, is likely to stall the recovery. Yet, in stark contrast to this, a significant number of British airports have been pursuing major capacity expansion plans, paving the way for a significant future rise in annual passenger departures. Expectations of future passenger growth appear to be shared by the government. The *Jet Zero Strategy*, published by the DfT in 2022 includes forecasts which suggest passenger numbers could grow from their record pre-crisis (2019) level of 300 million per year to over 480 million by 2050.³

Airport expansion has long been controversial at the local level, with the significant negative noise, air quality, and traffic impacts experienced by residents being set against the economic benefits claimed by scheme proponents. Over the past four decades, with some minor exceptions, including closures and bailouts of smaller regional airports, the argument in favour of growth and expansion has won out, airport capacity has grown greatly, and increased air traffic has followed. But, with the air transport sector's carbon footprint substantial,⁴ its mitigation unresolved,⁵ and the global climate crisis escalating,⁶ the relative balance and merits of air transport growth must be kept under constant review.

1.1 PREVIOUS REVIEWS OF THE ECONOMICS OF AIR TRANSPORT

To date, the UK government has maintained a position of general support for air transport growth, but has, at least in theory, delegated ultimate decision-making on individual airport expansion schemes to planning authorities. Somewhat confusingly, however, one of those bodies is the Planning Inspectorate of which the Secretary of State (ie the government) is the ultimate decision-maker. Multiple layers of government decision-making authority are examining the pros and

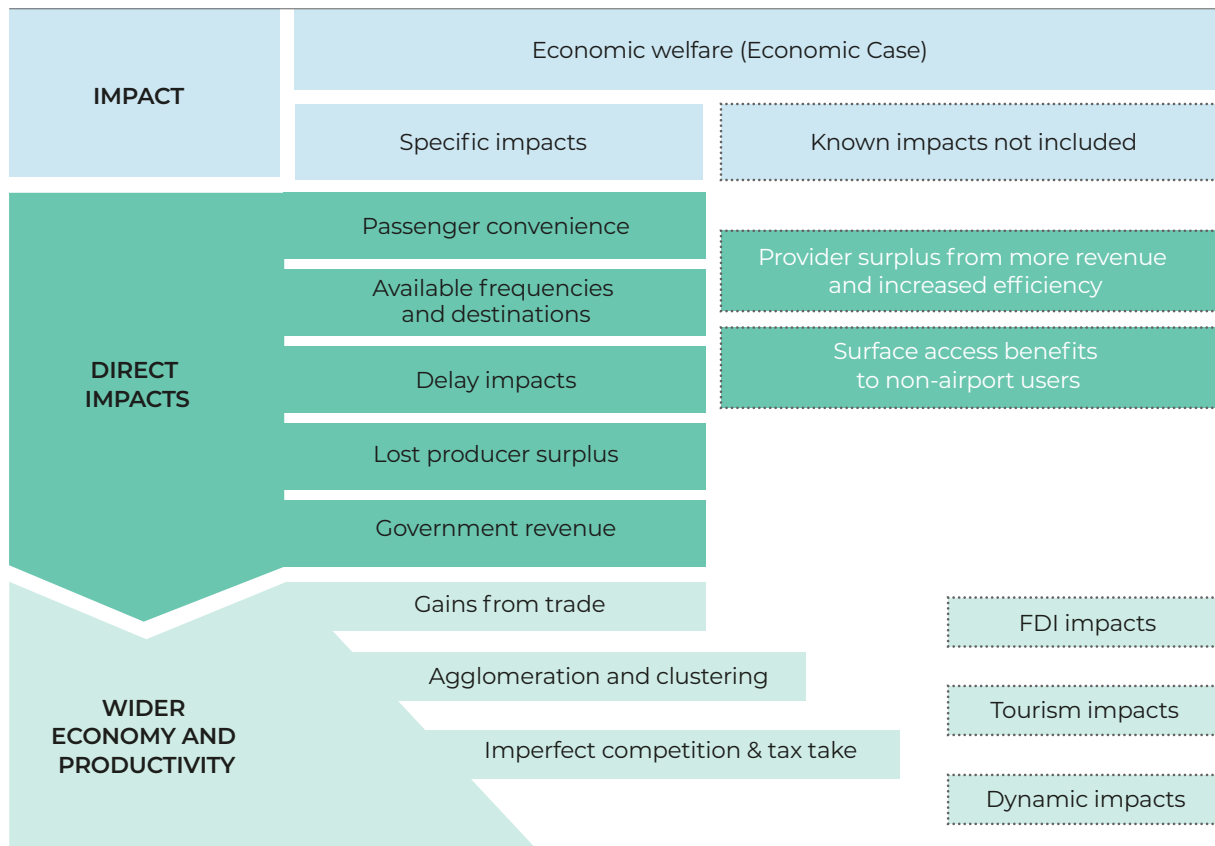
cons of growth in air transport in the UK, whether in policy or planning, on a regular basis. Those decision-makers are required by government policy (in this case the Making Best Use of Existing Runways Policy Statement)⁷ to weigh up evidence on economic and environmental impacts, both positive and negative, to arrive at a decision. This is reinforced by the government's Green Book appraisal guidance,⁸ which requires that "all significant costs and benefits that affect the welfare and wellbeing of the population" be considered.

Despite these mandates, the breadth and quality of the economic analysis applied to air transport interventions in recent years have often been questionable.⁹ The Planning Inspectorate and local authorities must possess the necessary resources and expertise to adequately evaluate economic arguments presented by applicants and to take a more rigorous stance in challenging opaque assessments of claimed economic benefits. The deliberations of these bodies have not been helped by a relative lack of high-quality, UK-focused, independent and/or academic research on the economic impacts of air transport interventions.

The environmental impacts of air transport are the subject of a considerable body of ongoing research but the economic impacts are surprisingly understudied in the British context, despite their pivotal importance to the case for air transport capacity growth. A body of evidence is available from the private consultancy sector. These reports, however, are invariably funded by the air transport industry itself, and are subject to selection bias – it is unlikely that the industry would publish a commissioned report which was unfavourable to its case for growth, especially when a key purpose of those commissioned reports is often submission of evidence to planning proceedings examining expansion applications.

It has been some time since the UK government has conducted and/or commissioned assessments of the marginal economic impact (ie the impact of growth) of the UK air transport sector (or sections of it) While there have been several aviation-related consultations and policies over the past five years including the *Jet Zero Strategy and Aviation 2050*, these have largely steered clear of attempting a new, comprehensive assessment of air transport's contemporary economic impact.

FIGURE 1: AIRPORTS COMMISSION ECONOMIC IMPACT FRAMEWORK



The most recent assessment involving a detailed review of economic impacts was that of the Airports Commission and subsequently, the DfT, which examined the economic case for additional airport capacity in the South East between 2014 and 2017.¹⁰ Notably, the input data to this assessment already looks dated, as data on key trends which emerged between 2014 and 2019, described in Section 3 of this report, would not have been available, nor could the long-term implications of the global pandemic have been considered.

Figure 1 shows the impacts the Airports Commission explored, but highlights that even this substantial endeavour left out some critical areas, such as impacts on tourism and FDI. Indeed, the *Updated Appraisal Report* produced by the DfT in support of the government’s subsequent policy on airport capacity in the South East and the expansion of Heathrow lacked a single mention of tourism. This seems a notable absence given that the primary function of British passenger air travel is to ferry tourists, both inbound and outbound, to their holiday destinations.¹¹

Historically, the case for expanding air transport has relied heavily on its contribution to other economic domains, particularly business productivity and GDP. This growth is broadly said to arise from two core services provided: (i) the transport of business travellers thereby facilitating new business opportunities at cheaper prices, to more destinations, and/or in less time, and (ii) the transport of goods, thereby increasing trade and enabling new and/or more efficient industries.

These impact domains (i and ii) were addressed by the Airports Commission in their work for the government through an experimental modelling approach termed Spatial Computable General Equilibrium (S-CGE). The approach was ambitious, effectively attempting to simulate the core economic functions of the entire UK economy, and produced some high estimates of the impact of air capacity growth on GDP. The approach, however, encountered several methodological challenges, which cast doubt on the results, and led ultimately to the DfT deciding that it would “not recommend using these figures to inform a decision”.¹² This left the DfT’s appraisal of the options for airport

capacity in the South East incomplete, and indeed unfavourable to expansion (as highlighted by NEF in 2018¹³ and 2020¹⁴), but the Airports National Policy Statement was nonetheless passed by a vote of parliament in 2018.

Looking further back in time, before its work examining the economic case for expansion in the South East, the government gathered and published economic evidence to support its Aviation Policy Framework 2013. This was the last comprehensive assessment considering the national economic case for air transport growth. While this passed into law in 2013, the consultation took place in 2012, and input data would have related to 2011 at the latest. At this point, the air transport sector's recovery from the 2007/2008 financial crisis had barely begun, and the sector would go on to transform dramatically in the subsequent decade. A fresh look at the evidence of air transport's marginal economic impact is overdue.

1.2 RESEARCH SCOPE AND QUESTIONS

In this report, we review the state of the science, and the latest official data regarding the primary economic impacts of the air transport industry. As the industry is already well established in the UK employing a significant number of people, it is important to distinguish the impact of growth (ie the sector's marginal impact), a current point of contention in the UK, from what might be termed the current 'footprint' of the sector in the UK economy. The findings of this paper relate primarily to the context in Great Britain and while data referred to often derives from UK-wide datasets, there may be important contextual differences in Northern Ireland.

While there are large numbers of potential impacts on the wider economy of growing air transport, we explore the evidence in what we regard to be the sector's primary domains of impact: welfare, jobs and wages, tourism, and wider facets of economic growth, business productivity, and trade. The economic dimensions of the environmental impacts of air transport are also important, but were already discussed in Chapman and Postle (2021) and are not the focus of this work.¹⁵ We focus predominantly on the passenger air travel segment, the driver of capacity growth, with less emphasis on the cargo and aerospace sectors. This informs a series of recommendations on both the treatment of air transport economics in decision-making and the need for further research.

2. FINDING THE FOCUS – FOOTPRINT VERSUS MARGINAL IMPACT

When publicly promoting the UK's air transport sector, government, industry, and other stakeholders often cite economic data on the footprint of the sector in the UK economy. This footprint can be measured at different scales, extending from just those activities most directly related to air travel to activities in the industry's supply chains, and further into non-air-travel-related sectors which are either located in, or agglomerate around, airports (including the services such as cafés and restaurants inside the airport, as well as business in industries, such as logistics, which locate to the vicinity of the airport). In some cases, the air transport and aerospace sectors are also conflated, despite representing highly distinct sectors of the economy and being only tangentially related – aerospace being focused on the global manufacture, supply, and export of aircraft and flight technologies, and air transport being focused on the UK-based sale of tickets and transport of passengers.

In a 2022 speech promoting the government's *Jet Zero Strategy*, then Minister for Transport Grant Shapps stated:

*Pre-pandemic, aviation contributed at least £22 billion to our economy and 230,000 direct jobs across the country. We must support the rapid development of technologies that can maintain the benefits of air travel.*¹⁶

This £22bn figure has been widely used, also cited by the government in its *Aviation 2050* consultation paper in 2018, and describes some elements of air transport's direct and supply chain footprints.¹⁷ The foreword to the *Jet Zero Strategy* reveals that this figure includes both the air transport and aerospace sectors.

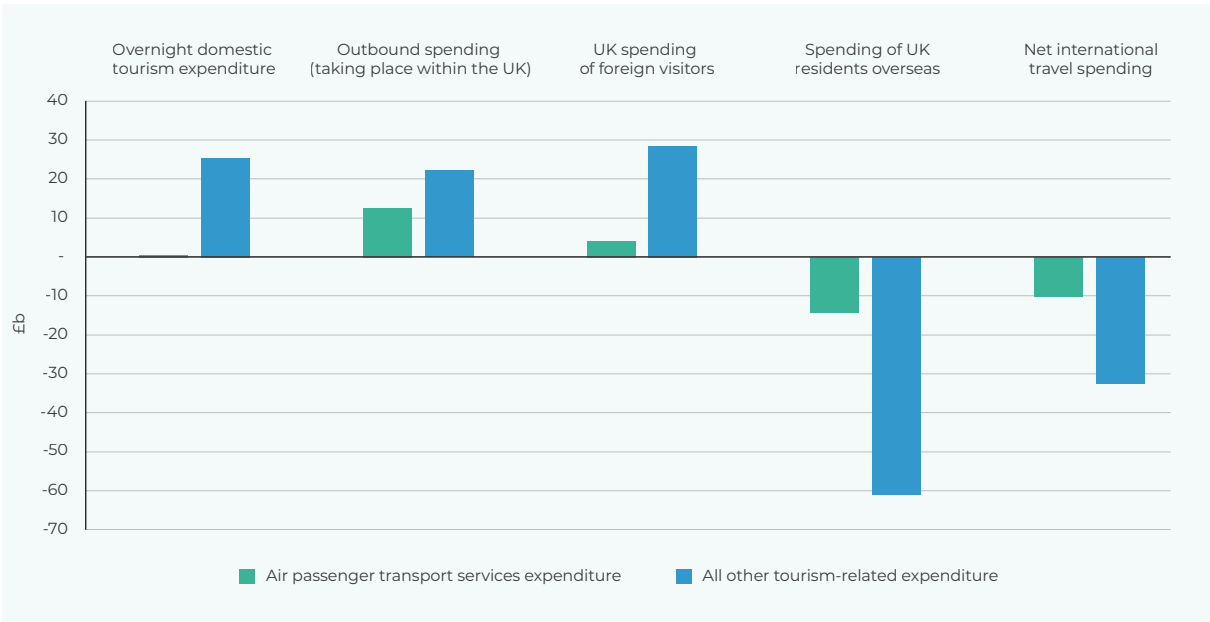
While air transport undoubtedly employs many people in the UK, figures on the footprint of air transport in the economy do a poor job of describing the net impact of air transport on the economy. More than half (£12.5bn or 57%) of the £22bn figure cited by the government represents spending on flight tickets by UK residents leaving the country on holiday. In 2019 those air travellers subsequently spent some £61bn outside the UK. In the same year, air transport facilitated spending of inbound foreign visitors in the UK worth £28bn (Figure 2). This facilitated spending, with a total value of £89bn in 2019, is not factored into the description of air transport's footprint, but is clearly of great relevance to understanding the sector's impact on the UK economy. Zhang and Graham (2020) in their comprehensive review of the linkages between air transport and the economy state:

*An anatomy of aviation's economic benefits should involve decomposition of the underlying inbound and outbound monetary flows. However, the imbalance rarely features in discussions about the value of aviation to the economy.*¹⁸

While it is true that air transport has a large presence in the UK economy, supporting a large number of jobs and economic activity, there is a counter-argument that, given the imbalance in flows in and out of the UK economy, air transport's net impact is a drain on UK economic activity. This example highlights the importance of assessing the net marginal impact at the system scale, rather than simply reporting a sector's footprint. Making such an assessment requires more nuance and examination of a variety of different impact routes. The overall case that economic benefits derive from air transport growth is not established. As Pot and Koster (2022) recently put it,

*Airports are often portrayed as drivers of economic growth, even though the empirical evidence on this relationship is inconclusive still.*¹⁹

FIGURE 2: INBOUND, OUTBOUND, AND DOMESTIC TOURISM EXPENDITURE IN 2019



Source: ONS UK Tourism Satellite Account

In a report provided to the DfT looking at the issue of regional air connectivity in 2018, Laird and Mackie set out three key diagnostic tests for establishing whether positive wider economic impacts will result from additional air traffic, specifically²⁰:

- i. Is the traffic likely to be diverted from land modes, other air routes or generated? If generated, is it displaced from elsewhere in the UK?
- ii. Is the air service under consideration likely to generate additional business travel from the region?
- iii. Is it likely to generate net positive tourism to the region (i.e. the increase in tourism to the region more than compensates for any increase in outbound tourism)?

In the remainder of this report, we review first the footprint of air transport in the British economy, its unique features and how it has been changing over time. We then look at the evidence surrounding the marginal economic impact of air capacity growth, considering impacts in Laird and Mackie’s three key domains (i–iii).

3. THE FOOTPRINT OF AIR TRANSPORT IN THE BRITISH ECONOMY

3.1 RISE OF AIR TRANSPORT AND INTERNATIONAL TRAVEL CONSUMPTION

Air travel demand, despite intermittent setbacks, has grown significantly over recent decades. As shown in Figure 3, before the pandemic (2019) passenger numbers were up 26% on their level in 2006 (the peak before the last crisis-driven dip in air travel demand, the 2007/2008 financial crisis). Passenger journeys peaked at around 300 million per year following a surge in growth between

2014 and 2019 but have fallen back following the global pandemic. The latest forecasts from EUROCONTROL, the European Organisation for the Safety of Air Navigation, suggest European air travel demand will return to 2019 levels in 2025.²¹ However, there is a high potential for a slower-than-expected recovery in air travel demand resulting from the current economic downturn.

The past two decades of air travel growth have been driven by strong passenger demand for travel, the competitiveness of international tourist destinations, low ticket prices, and growing air travel capacity. The latter three factors have been supported by UK government policy. This has included a tax relief package, in which air travel receives an exemption from fuel duty and VAT which is only partially offset by the levying of Air Passenger Duty.²² Additional support for growth has been provided through the planning regime, which has prioritised airport expansion over local opposition.²³

FIGURE 3: AIR PASSENGER NUMBERS IN THE UK, THEIR TREND, AND CHANGE COMPARED WITH 2006, INCLUDING 2030 AND 2050 FORECAST PASSENGER NUMBERS IN THE 2022 JET ZERO STRATEGY



Source: DfT Jet Zero Strategy dataset, ONS Travepac and the Civil Aviation Authority

As the UK's passenger numbers have increased, so too has its connectivity. Connectivity can be measured in multiple ways. Different indexes are available. Most use a composite of data points such as seat and route availability to different destinations, and the size, or capacity, of destination airports reachable. The International Air Transport Association (IATA), a trade association for the world's airlines, produces a connectivity index. This index suggested that in 2019 London was the most connected city in the world, while the UK was the most connected country in Europe (both in absolute terms) – likely, at least in part, due to being an island nation.²⁴ The UK's air connectivity was estimated to have grown 28% between 2014 and 2019.

In July 2022, the UK government launched its *Jet Zero Strategy*, setting out its plans for the air transport industry over the next three decades and how it intends to reconcile the sector's significant carbon footprint with the UK's climate targets. Analysis accompanying *Jet Zero* projects significant future growth in UK air travel demand. The DfT's modelling suggests the government's favoured scenario could result in an over 65% rise in passenger numbers on 2019 levels (some 200 million additional passengers per year, as shown in Figure 3), and a 33% rise in the number of aircraft movements (some 720,000 additional flights per year) by 2050.

3.2 JOBS, WAGES, AND GDP

Air transport's footprint in the economy is defined principally by employment and by extension the productivity of each worker and business. The sector's contribution to employment can be measured across four indicators: (i) jobs in businesses directly delivering air transport services (eg air crew, airplane maintenance), (ii) jobs delivering other services in the vicinity of airports (eg retail, food, and accommodation) and/or in the service of air travel (eg travel agencies), (iii) jobs operating in air transport's supply chain (eg supplying fuel or other parts to air transport companies), and (iv) jobs which are 'induced' by air transport employment (ie jobs supported by the everyday expenditure by air transport sector employees). Measuring absolute levels of employment in these four groups presents challenges, particularly when it comes to measuring change over time. All four groups can be affected by the issue of displacement/substitution (Box 1) which may render estimates unreliable, particularly when it comes to forecasting net national employment contribution.

Government employment data can be used to track the direct employment of air-transport-related industries over the past two decades. As of 2019, an estimated 138,000 people were employed in sectors directly delivering, or directly supporting, scheduled and non-scheduled air transport services.ⁱ

BOX 1: DISPLACEMENT, ADDITIONALITY, AND SUBSTITUTION

In economics, displacement refers to the relocation of economic activity (such as employment and spending) from one location to another in response to an intervention in the market (such as the creation or expansion of an airport) in one or both locations. Additionality refers to whether the economic activity created by an intervention in a location (eg a town or community) is new, or has been relocated (displaced) from another location or market.

Displacement can occur between businesses within the same sector (eg passengers relocating from one airport to another), but can also occur between sectors. In this case, substitution refers to the decision by a customer to switch spending on one good, such as purchasing a new car, to another, such as an international holiday. Substitution can also lead to a situation in which an intervention in a market creates new business within that sector, but does not lead to a net increase in total economic activity at the national level, because activity in another sector has reduced.

i Data from the Business Register and Employment Survey (BRES) available at www.Nomisweb.co.uk, 2023, Standard Industrial Classification (SIC) codes 51101, 51102, 51210, 52230, 52242. Prior to the ONS revisions to the SIC in 2008 these codes map to codes 6210, 6220, and 6323.

FIGURE 4: NATIONAL EMPLOYMENT DELIVERING AND SUPPORTING THE DELIVERY OF SCHEDULED AND NON-SCHEDULED AIR TRANSPORT SERVICES (LEFT AXIS), AND EMPLOYMENT PER MILLION PASSENGER MOVEMENTS (RIGHT AXIS)



Source: Business Register and Employment Survey (Nomisweb) and the Civil Aviation Authority

Subsequent pandemic-affected data suggests employment had fallen to 131,000 by 2021. The year 2018 was the only year in which employment in the sector reached the peak seen before the financial crisis in 2007, surpassing 140,000 jobs.

As shown in Figure 4, the number of jobs supported by air transport on a per-passenger basis has been declining steadily over time, falling from 695 jobs per million passengers in 2000 to 459 jobs in 2019. Office for National Statistics (ONS) data suggests that as of 2015 this meant the air transport sector ranked among the least productive sectors in the economy when it came to generating jobs: 108th out of 129 sectors.²⁵ The job creation potential of air transport fell significantly between 2015 and 2019 (Figure 4) and as such its ranking may well have fallen further since the ONS’s last round of analysis. The impact of the pandemic on this trend will start to become clearer over the next few years. The closely linked sector described by the ONS as ‘travel agency, tour operator, and other reservation services’ occupies 100th place in the ranking.

The ONS employment effect estimates imply that for each additional £1m of air transport sector revenues, around 7.5 direct and indirect jobs were produced in 2015. Those sectors performing worse than air transport predominantly constitute highly specialised manufacturing sectors as well as gambling, telecommunications, and financial services. Other sectors produced far more jobs. The Sports Activities and Amusement and Recreation Activities sector produced 46.6 jobs per £1m of turnover and Residential Care and Social Work Activities, produced 36 jobs per £1m.

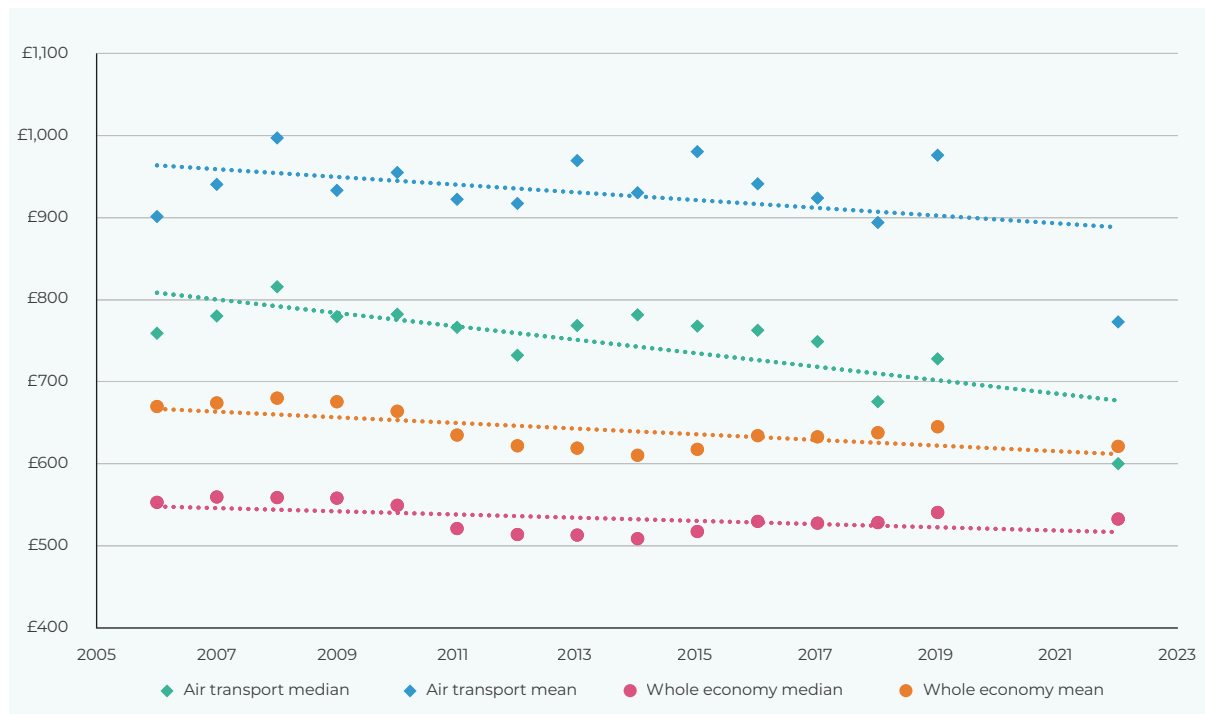
Employment at airports stretches beyond just the air transport sector jobs, notably including retail and hospitality. Yet employment at British airports shows similar trends to the air transport sector. Data presented at the 2022 Luton Airport Planning Inspectorate inquiry suggests that employment at the airport fell from 865 jobs per million passengers in 2013, to 622 jobs per million in 2019, a 28% decline in the job intensity of the airport in just seven years.²⁶ This decline exposed previous jobs forecasts by Luton Airport’s consultants as over-

optimistic. Analysis for the airport in 2012 projected 13,350 jobs (with a wide range from 10,100 to 17,450) when the airport reached 18 million passengers per annum (mppa).²⁷ The true figure, when 18 mppa was reached in 2019, was 10,900, a figure which does fall within the broad projected range, but some 2,450 jobs (18%) fewer than the central projection, and 6,550 jobs (38%) below the upper bound. Airport-based employment is not tracked at the national level in official statistics.

In some schools of economic thought, high and/or increasing revenue per job might be described as an economic benefit, reflecting a high productivity sector. Higher productivity may imply lower job numbers and even redundancies, but the cost to society might be offset if this productivity leads to higher wages. This has not been the case in air transport. While air transport has historically paid higher wages than the whole economy average,

ONS data from the Annual Survey of Hours and Earnings (ASHE) suggests that the air transport sector (SIC code 51) and supporting activities (SIC code 5223) have seen significant real-wage declines over the past two decades. After adjusting for inflation, average (mean) gross weekly pay across the two groups was down 14% on 2006 levels in 2022, while median pay was down 21% over the same period (Figure 5).ⁱⁱ On both metrics, the air transport sector performs significantly worse than the wider economy, which saw a mean change of -7% and a median change of -4% over the same period of the ASHE survey.ⁱⁱⁱ The air transport sector has been a contributor to the UK's wider wage stagnation issues. Indeed direct air transport employment (ie SIC code 51) ranks worst out of all 96 sub-sectors of the UK economy in terms of the real-terms median pay decline seen over the period 2008 and 2022 and second worst over the pre-pandemic period between 2008 and 2019.^{iv}

FIGURE 5: MEAN AND MEDIAN REAL WEEKLY GROSS PAY OVER TIME IN AIR TRANSPORT (SIC CODES 51 AND 5223) AND THE WHOLE ECONOMY, WITH TRENDLINES SHOWN. DATA IS NOT AVAILABLE FOR THE YEARS 2020 AND 2021



Source: ONS ASHE

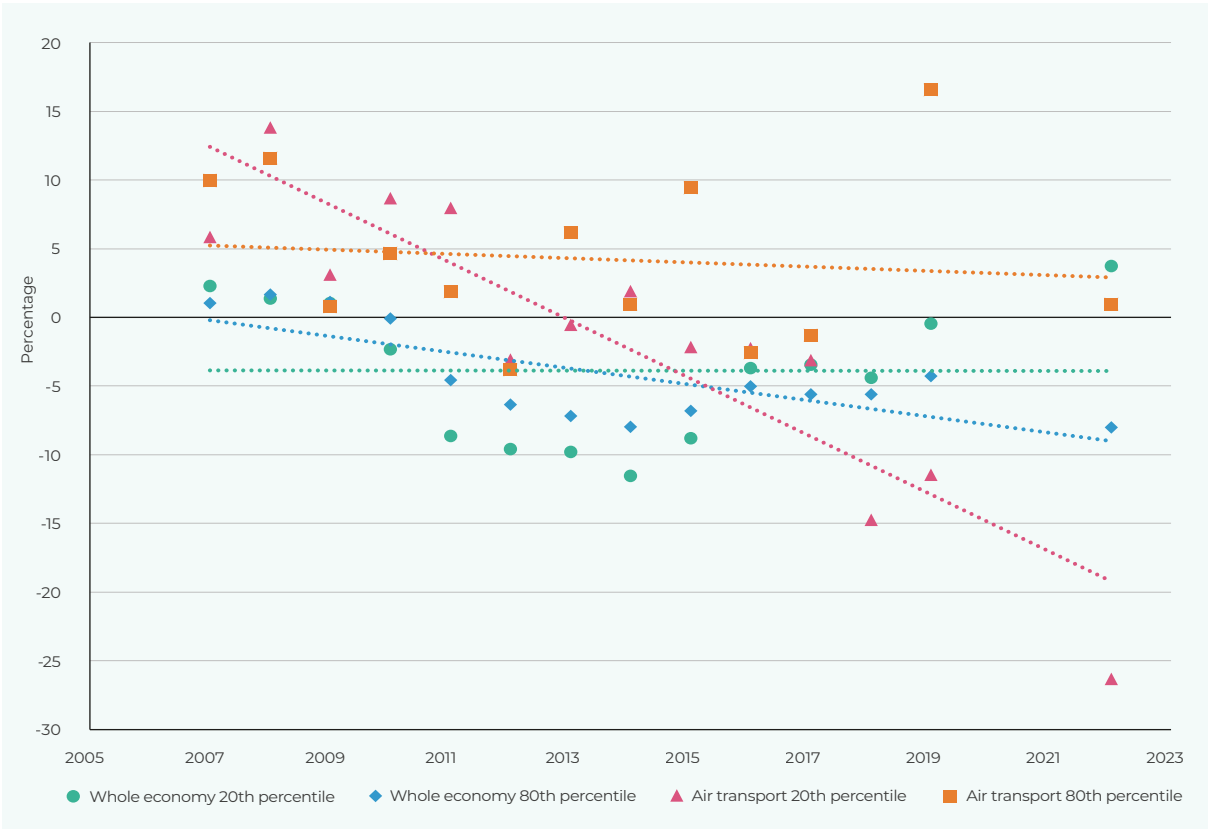
- ii Estimates for the average real weekly gross pay across the two primary air transport employment codes (SIC code 51 and 5223) are calculated using averages weighted by employment, as reported in the BRES survey, under each code.
- iii The ASHE survey produces lower estimates of pay growth than the Average Weekly Earnings (AWE) dataset published by the ONS which is often used in mainstream reporting of earning growth. AWE data suggests real-terms weekly earnings grew by 0.9% between 2006 and 2022. The ASHE survey data remains useful for inter-sector comparisons.
- iv Gross weekly median pay is adjusted for inflation using the ONS CPI index. The choice of 2008 as the start point for the analysis reflects that 2008 was the earliest year for which comparable sectoral breakdowns were available following the shift from SIC 2003 to SIC 2007.

The significant gap between the median and mean pay rates in air transport can only be explained by unequal trends between higher and lower earners. Again, looking just at direct air transport employment (SIC code 51) ASHE data suggests that earners in the 20th percentile (ie lower-paid workers) saw average gross pay declines of 26% between 2006 and 2022 while earners at the 80th percentile (i.e. higher-paid workers) saw an increase of 1%. Data on the very highest earners was not disclosed by the ONS, but the differential between the mean and the median reveals that the top earners must have seen larger increases in real pay, potentially as high as 15% over the same period. These changes buck the national trend in the ASHE data which, at least in terms of gross pay over the period, shows a 4% real pay rise in the 20th percentile, and an 8% real pay decline in the 80th percentile (Figure 6).

Overall, this data suggests that the gains from increased productivity in air transport have accrued mostly to shareholders, partly to higher-paid workers, and not to middle and low-wage workers. More broadly, air transport has been pushing the UK economy in a more unequal direction.

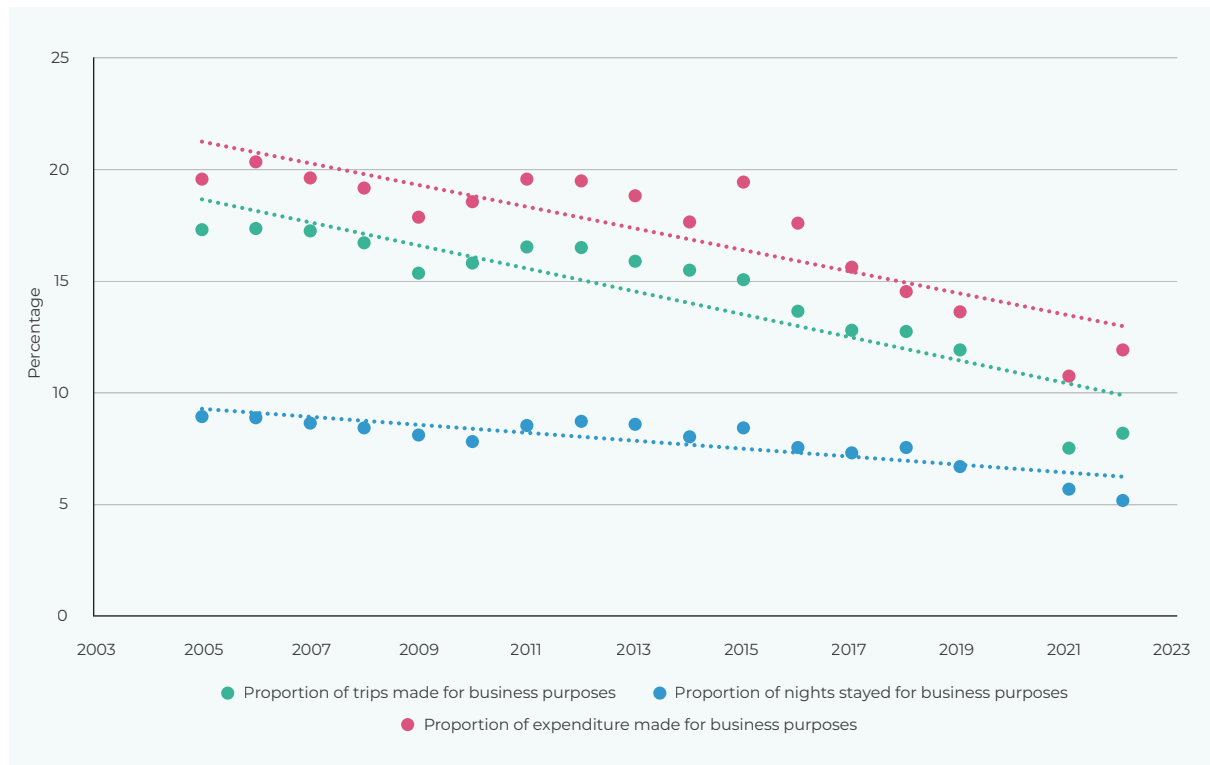
Air transport ranks slightly better when it comes to impacts on GDP, ranked 33rd out of 105 sectors in 2019 (the most recent data available) in the ONS ranking of output multipliers. In other words, each additional £1m of turnover in air transport produced £1.8m of total economic output in the economy after additional indirect spending was considered. However, the same dataset highlights that spending on air transport services also involves a significant amount of expenditure on imports. In 2019, air transport was the ninth most import-heavy sector out of 105 sectors, with each additional £1m in revenues increasing imports by £350,000. This feature likely relates to the prevalence of foreign-domiciled airlines in the UK

FIGURE 6: PERCENTAGE CHANGE IN REAL GROSS WEEKLY PAY OVER TIME VERSUS 2006 AMONG LOW-PAID (20TH PERCENTILE) AND HIGH-PAID (80TH PERCENTILE) WORKERS IN AIR TRANSPORT (SIC CODE 51), AND IN THE WHOLE ECONOMY, WITH LINEAR TRENDLINES SHOWN



Source: ASHE

FIGURE 7: TRENDS OVER TIME IN THREE MEASURES OF THE UK BUSINESS AIR TRAVEL MARKET



Source: NEF analysis of ONS Travepac

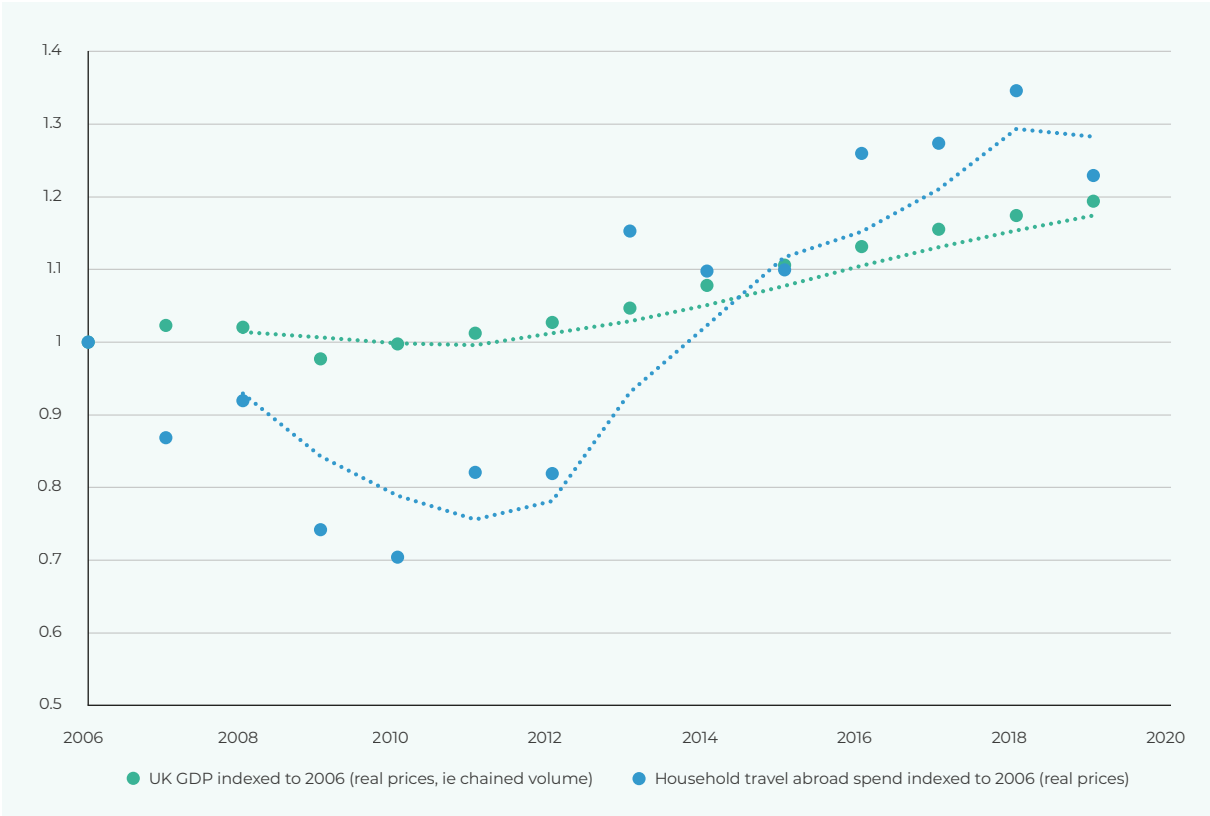
market, as well as the industry’s use of imported jet fuel. In sectors which add significant value to their imports, and/or also export a significant amount of their output, such reliance might not be a problem. But air transport performs neither of these functions and indeed ranks third lowest out of 105 sectors when it comes to gross value added (GVA) according to the same dataset. In this context, the sector’s high use of imports only weakens the UK’s overall trade and current account position.

These GDP multiplier estimates present an incomplete picture of air transport’s economic impact. They neither factor in the induced spending on inbound and outbound tourism nor the potential wider impacts on business productivity. Figure 2 highlights the significantly smaller scale of the expenditure made on air travel services in the UK, compared with the size of the expenditure made on overseas tourism facilitated by air transport, and the government’s air transport and tourism policies. These issues are discussed further in Section 4.

3.3 AIR TRANSPORT CONSUMER

As shown in Figure 3, the rapid growth seen in air passenger numbers over the period 2014 to 2019 was driven exclusively by the leisure travel market, which saw a surge in demand. Within this market are two groups, the holiday market, which contributed approximately two-thirds (65%) of the growth, and the visiting friends and relatives market, which contributed one-third (33%). Hidden by the headline growth trend, the market share of business passengers has been in decline. In absolute terms, business passenger numbers peaked in 2006 before the financial crisis, when they made up 1 in every 6 passengers (17.4%). By 2022, their share of the market had declined to just 1 in every 12 passengers (8.2%). As regards total travel-related expenditure, business travellers make up a slightly larger, but also declining share, falling from 20% in 2006 to 12% in 2022 (as measured by ONS Travepac data). UK air travel is dominated by UK-resident passengers, who made up over 71% of the market in 2022. This share has remained stable throughout the 21st century. This contrasts with nations such as Spain and Italy which, as a result of their stronger tourism pull, see air travel markets dominated by foreign residents.

FIGURE 8: HOUSEHOLD EXPENDITURE ON INTERNATIONAL TRAVEL AND GDP (CONSTANT PRICES) INDEXED TO 2006 WITH A THREE-YEAR MOVING AVERAGE SHOWN

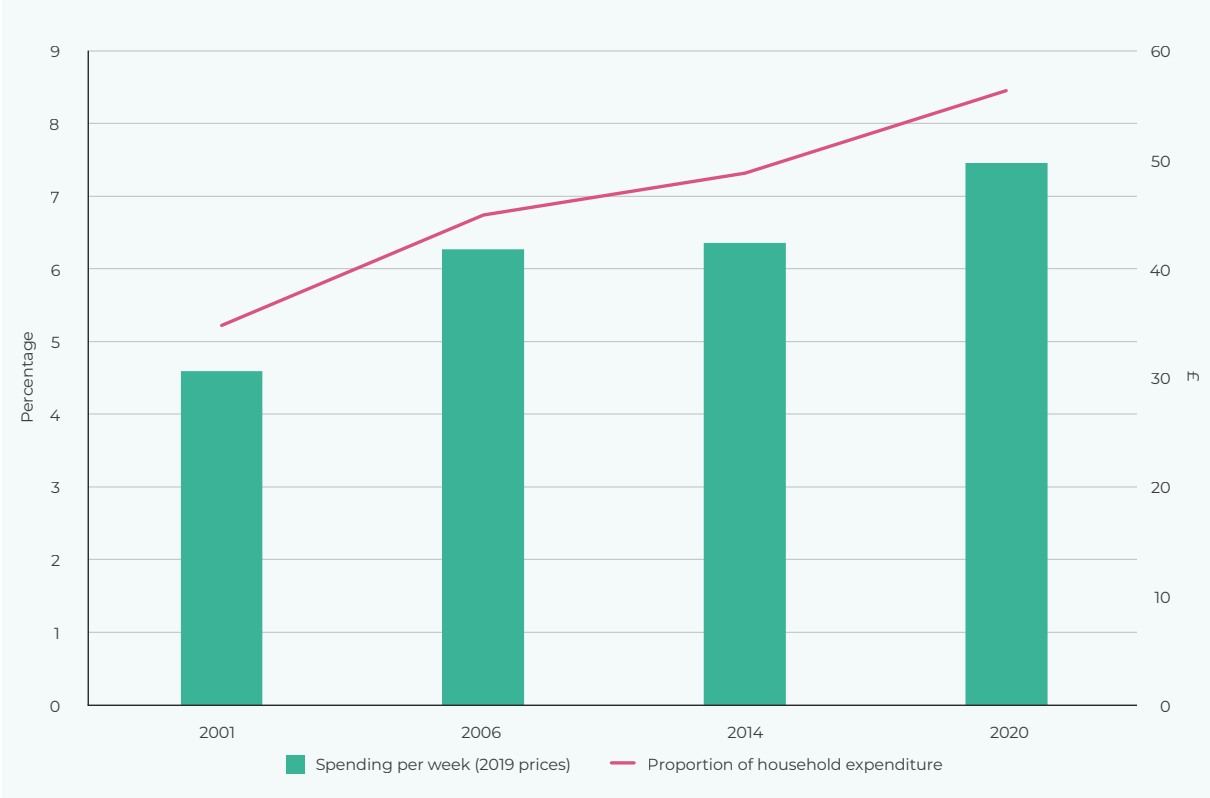


Source: ONS (Travel Trends, UK Economic Accounts Time Series), ONS (Family Spending Workbook, inclusive of international air fares, international package holidays, and money spent abroad)

In line with the rise in UK-resident air passengers, ONS data suggests that household expenditure on travel abroad has been rising. Expenditure by UK households on travel abroad has risen faster than UK GDP (Figure 8). This could indicate a rise in the footprint of the air transport sector within the UK economy (ie expenditure on pre-travel items,

tickets, and packages) but, as the data shows, growth has not led to an increase in employment, and the sector’s macroeconomic fundamentals are weak. More likely, this growth points to rapid rises in tourism imports and the spending which takes place within foreign nations. This is discussed further in subsequent sections.

FIGURE 9: HOUSEHOLD SPENDING ON TRAVEL ABROAD PER WEEK (RIGHT AXIS) AND AS A PROPORTION OF TOTAL SPEND (LEFT AXIS) IN FOUR YEARS OF THE ONS FAMILY SPENDING WORKBOOK. DATA FROM 2001 AND 2006 RELATES TO CALENDAR YEARS; DATA IN 2014 AND 2020 RELATES TO THE FINANCIAL YEAR ENDING



Source: ONS Family Spending Workbook

Driving this trend was not the overall growth of household spending power but a tangible shift of spending priorities. ONS data suggests between 2001 and 2019 the overall (real terms) envelope for household spending changed very little. Average weekly household expenditure rose from £587 to £588 in 2019 prices²⁸; meanwhile, average

household expenditure on international travel rose from just over 5% of all household expenditure, to well over 8% (Figure 9). These trends will have shifted dramatically during the pandemic and energy price crisis era, and it remains uncertain to what extent they will return as (if) the economy recovers.

As shown in Table 1, rises in spending on travel abroad over the past two decades rank among some of the largest expenditure increases in an average household budget. On the other hand, expenditures on everyday items such as clothing, household goods, audio-visual equipment and computers, and books and newspapers have seen significant declines. While further study would be required to understand if there has been a direct substitution of high street spending for

international travel, there has been a clear re-allocation of spending. The rise of international travel spending in part reflects household spending preferences but has also been encouraged by the preferential tax treatment given to air transport services, specifically, the tax cut implied by Fuel Duty and VAT exemptions, net of Air Passenger Duty. Changes in household demand for international travel may also reflect the relative competitiveness of foreign destinations.

TABLE 1: REAL CHANGES IN CASH AND PERCENTAGE TERMS IN KEY LINES OF HOUSEHOLD EXPENDITURE BETWEEN 2001-02 AND 2019-20

	Top ten biggest increases			Top ten biggest declines		
	Expenditure line	Change between 01/02 and 19/20 (£)	Change (%)	Expenditure line	Change between 01/02 and 19/20 (£)	Change (%)
1	Net rent	£21.09	111%	Mortgage interest payments	-£14.53	-39%
2	Contributions to pensions	£14.90	124%	Purchase of vehicles	-£11.74	-31%
3	Air travel	£13.22	742%	Clothing	-£8.79	-32%
4	Capital repayment of mortgages	£12.29	77%	Household goods and services	-£8.46	-19%
5	Package holidays – abroad	£8.25	48%	Audio-visual, photographic and information-processing equipment	-£7.25	-62%
6	Council tax, domestic rates	£7.75	42%	Cigarettes	-£4.70	-64%
7	Home improvements – contracted out	£6.91	39%	Alcoholic drinks (away from home)	-£4.68	-36%
8	Diesel	£5.70	197%	Recreation and cultural services	-£4.24	-18%
9	Car leasing	£4.58	407%	TV, video, and computers	-£3.63	-56%
10	Restaurant and café meals	£4.20	26%	Newspapers, books, and stationery	-£3.62	-40%
15	Money spent abroad	£2.94	32%			

Source: NEF analysis of the ONS Family Spending Workbook (Living Costs and Food Survey)

3.4 EQUITY AND WELFARE

This analysis, looking at the expenditure of an average household on travel abroad, hides significant variation between households. Air travel in the UK is dominated by a sub-group of frequent flyers. Prior NEF analysis identified that pre-pandemic, an estimated 70% of all flights were taken by just 30% of the population.²⁹ The surging growth seen pre-pandemic saw the group of UK residents who report taking over four flights per year grow by 60% between 2011 and 2019. Meanwhile, just under half of UK residents (48.2% in 2019) do not take any international flights at all.^v Civil Aviation Authority (CAA) data suggests that this group is dominated by wealthier residents of the UK.^{vi} Another interesting characteristic of the UK's frequent flyers is their age. While holiday air traffic is often presented as UK families with children flying abroad for their summer holiday, children and young people are notably underrepresented among the flying group. While individuals aged 19 and younger made up 23.4% of the UK population in 2019, the 2019 CAA passenger survey suggests that just 6.4% of flying passengers were in this group.

From a welfare perspective, the benefits of increasing access to air travel predominantly accrue to a wealthy group of travellers, who already travel frequently every year. The welfare argument is stronger for travellers flying to visit friends and family, a market which enables Britain's immigrant communities to stay connected to their loved ones. In all cases, the welfare benefit of air capacity growth must be contrasted with the negative welfare impacts, predominantly environmental damages, which affect everyone on Earth, but particularly poorer groups in developing countries, younger people (who will live longer with the worsening effects of climate change), and groups living in the vicinity of airports (also in many cases poorer communities). HM Treasury provides a guide on how to consider the equity dimensions of welfare impacts through a process called 'welfare weighting', but this assessment is not routinely applied in assessments involving the air transport sector.³⁰

There are multiple routes available to quantify the harmful welfare effects of the increased greenhouse gas emissions which result from air traffic growth. These are discussed in more depth in Chapman and Postle (2021).³¹ Various estimates of the social cost of carbon are available; these monetise the value of the damages done to society by each additional tonne of CO₂ emissions. At the rate published by Rennert et al. in the journal *Nature* in 2022 of £150 per tonne,³² the social cost of the CO₂ emissions from the UK air transport sector in 2019 was around £5.8bn per year. When factoring in the non-CO₂ emissions made at high altitudes using a standard multiplier approach recommended by the UK government,³³ this value rises to at least £11bn.

An alternative method to valuing greenhouse gas emissions is used by the UK government.³⁴ The government's 'carbon values' reflect the monetary value society places on a tonne of carbon, but utilise a methodology which aligns the value used to the UK's international emissions reduction targets. Using the latest values published by BEIS which puts the value per tonne of CO₂ emissions at £241, the total value of the UK's air transport sector CO₂ emissions was £9.3bn in 2019, rising to at least £17.7bn when other gases are considered. These values are indicative and illustrate the scale of the social welfare downsides resulting from air travel which must be weighed in the balance against the aforementioned welfare benefits.

3.5 STAGNATION OF DOMESTIC TOURISM

The UK's international air travel market is dominated by UK residents heading abroad on holiday. ONS data shows that in 2019, UK residents made more than double the number of international trips by air made by foreign residents visiting the UK, at 79.5 million and 32.1 million, respectively.³⁵ The size of the gap between UK-resident and foreign-resident flight totals rose from 23.6m in 2000 to 47.4m in 2019, indicating that as the international travel sector grows, so does the absolute size of the UK-resident/ foreign-resident passenger gap (or 'deficit'). The overall ratio of UK to foreign residents travelling by air to/from the UK has remained relatively stable over the past two decades, with UK residents making up around 70% of travellers. UK residents made up around

v NEF analysis of the DfT's National Travel Survey.

vi The Civil Aviation Authority passenger survey samples from an subset of UK airports which are typically responsible for around 75% of all passenger departures. London airports are always included in the sample; other airports are included on a rolling basis. As such, users of London airports may be slightly over-represented in the sample.

62% of passengers travelling on international sea routes, and around 60% of passengers utilising the Channel tunnel.

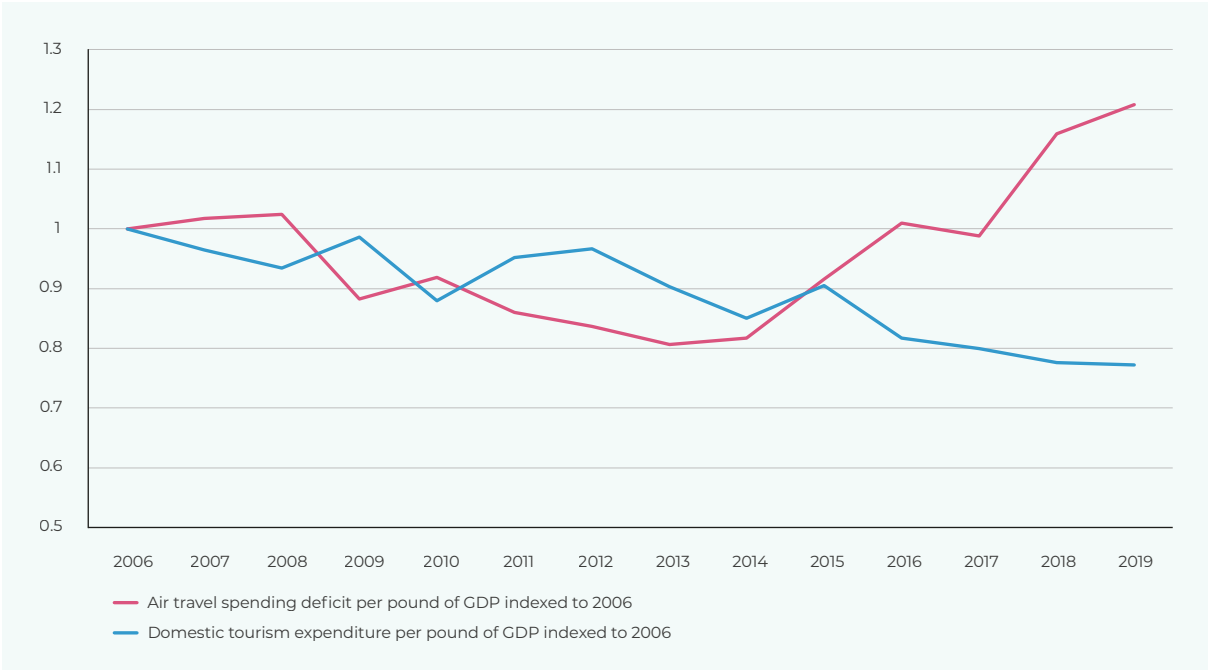
A larger outbound leisure travel market likely comes at the expense of the domestic tourism market. While international tourism and domestic tourism are not perfect substitutes, there is strong evidence from academic research that substitution occurs. Appendix A highlights a selection of academic research articles which support this proposition. While only a descriptive analysis, Figure 10 hints at an inverse relationship between the size of the domestic tourism market and the

size of the deficit in international travel spending. In other words, the larger the gap between flows of spending from incoming foreign travellers and domestic residents travelling and spending abroad, the worse the performance of the domestic tourism market. A notable surge in the size of the travel spending deficit can be seen in the years preceding the pandemic (2014–2019), and this is matched by stagnation in the domestic tourism sector when viewed relative to overall GDP growth. The size of the domestic tourism sector shrank relative to the wider economy over the period 2006–2019.

BOX 2: CHEAP AIR TRAVEL AND BRITAIN’S SEASIDE RESORTS

Of England’s 318 district authorities, many historic seaside destinations rank among the most socially deprived, including Blackpool (1st), Great Yarmouth (22nd), East Lindsey (31st), Tendring (32nd), and Torbay (49th), while pockets of severe deprivation can also be found in Weston-super-Mare and Rhyl.³⁶ The challenges faced by these towns are not exclusively a product of the proliferation of cheap international flights, but it has undoubtedly played a significant role. In recent years, politicians have debated extensively the challenges and solutions to re-invigorate the UK’s left-behind coastal communities³⁷; the continued growth in the (net) flow of leisure spending overseas makes this task harder.

FIGURE 10: TRENDS OVER TIME (INDEXED TO 2006) IN THE SIZE OF THE UK DOMESTIC TOURISM SECTOR AND THE TRAVEL SPENDING DEFICIT (VIA AIR ROUTES) RELATIVE TO GDP



Source: VisitBritain, GB Tourism Survey, ONS UK economic accounts, ONS Travel trends

The negative effects of the tourism spending deficit have not seen much public discussion in recent years, but are recognised by key tourism bodies. The UK Tourist Authority (VisitBritain), in its annual reports, frequently recognises the deficit as disadvantageous to the UK’s position and in 2020 wrote to the Cabinet Office calling for action to reduce this deficit.³⁸ VisitBritain has also raised the environmental dimension to the issue stating:

VisitBritain believes that in order to mitigate the environmental impact of outbound tourism, there should be more emphasis on encouraging British tourists to holiday at home and reduce the outbound tourism deficit.³⁹

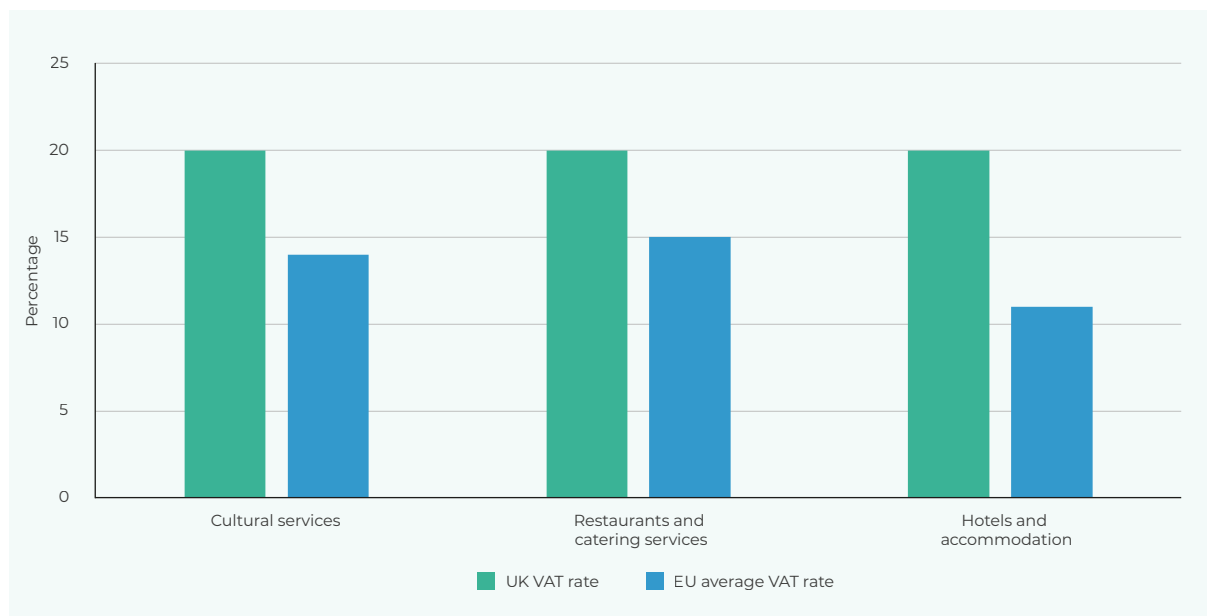
Less directly, the government itself has signalled a desire to reduce the travel spending deficit, stating in its *Tourism Recovery Plan*⁴⁰ following the Covid-19 pandemic, that it wants to:

[..] embed domestic travel as a sustained customer behaviour – ensuring not only that people enjoy the Great British Summer in 2021 but

that people who take domestic trips across the UK this year do so again and again in years to come.

But this aim would seem at odds with a number of the government’s policies and decisions. The rise of international travel is not the only driver of the stagnation of the UK’s domestic tourism market. Many argue that the UK’s taxation of tourism and leisure industries puts businesses at a disadvantage against their competitors in the UK’s main international tourist destinations. Most notably, VAT on hotel accommodation in the UK is levelled at 20%, compared to an EU average of just 11% (Figure 11). Tax on restaurants and catering is also levied at 20%, compared to an EU average of 15%. Over the period in question, this differential grew; having sat at 17.5% at the turn of the millennium, UK VAT reached 20% in 2010. Air transport’s exemption from VAT meant it was unaffected by this increase, while UK domestic tourism destinations saw a decline in their competitive position.

FIGURE 11: VAT RATES IN THE UK VERSUS THE EU



Source: UK government and European Union

TABLE 2: TRAVEL SPENDING SHARES BETWEEN LONDON AND NON-LONDON REGIONS OF THE UK IN 2019

	London share	London value	Non-London share	Non-London Value
Share of population	13%	8,982,000	87%	58,238,000
Share of outgoing travel spend	22%	£14,001m	78%	£48,324m
Share of incoming travel spend	56%	£15,725m	44%	£12,108m

Source: ONS Travel and tourism

3.6 REGIONAL INEQUITY IN TOURISM FLOWS

There is evidence to suggest that when domestic tourism declines, regional inequity rises. While not a perfect redistributor of revenues around the country, those regions that see large domestic tourism revenues are disproportionately concentrated in the UK’s held-back, or more deprived, areas. Analysis by the Resolution Foundation highlights areas such as East and West Wales, Yorkshire, the South West, and the North East as having economies particularly dependent on domestic tourism.⁴¹

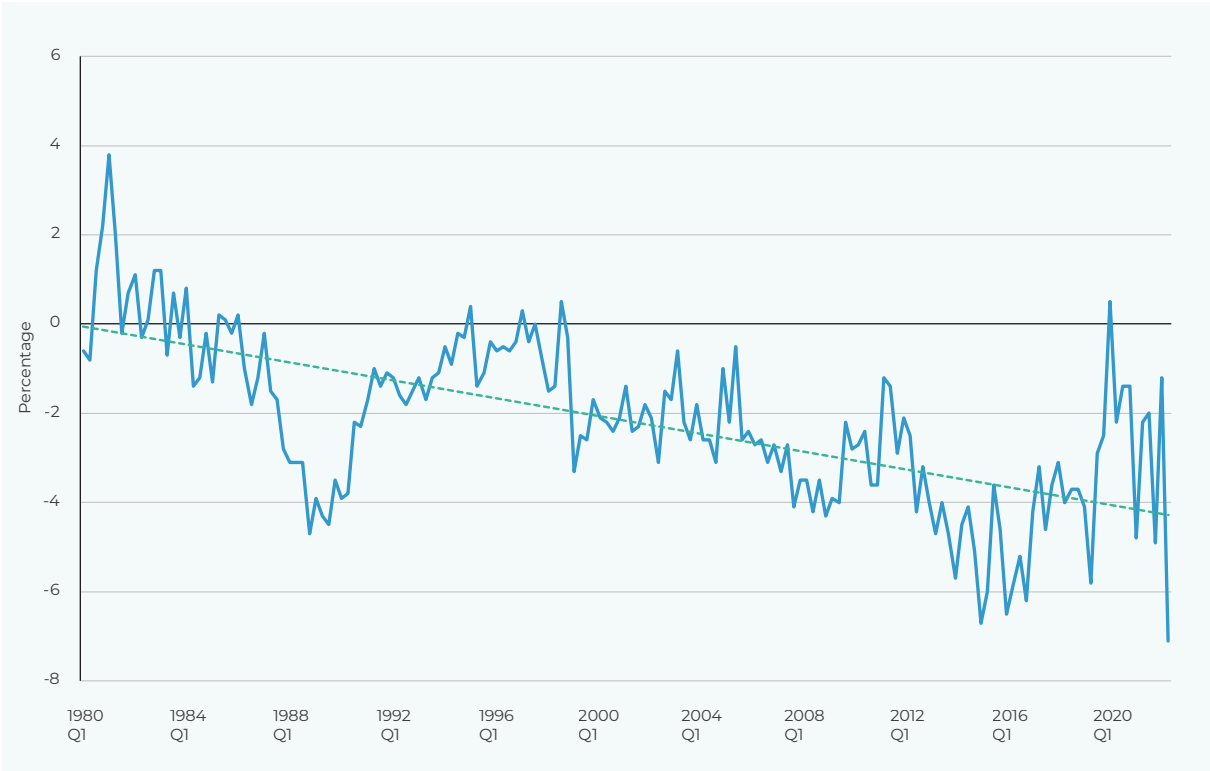
The regional imbalance delivered by the current policy bias is further compounded by the nature of inward flows of spending by foreign residents. While the UK as a whole operates a travel spending deficit, at the sub-national level there is significant variation. New NEF analysis of ONS data highlights the scale of this imbalance (Table 2). Despite hosting just 13.4% of the UK population, outside of crisis times London accounts for 22% of overseas travel spending by UK residents.⁴² However, these figures are dwarfed by London’s share of spending by foreign visitors to the UK, which amounted to 56% in 2019. As a result, London operates a travel spending surplus, attracting a net inflow of £1.7bn in 2019, equivalent in size to 0.4% of the region’s GVA. By contrast, the rest of the UK experienced a travel spending deficit of £36bn, equivalent to 2.5% of GVA in the same year.

While areas outside London have proportionately fewer air travellers, they nonetheless account for all of the net cash drain. To date, the growth of air travel has only entrenched this disparity. Between 2014 and 2019, passenger numbers grew by 24%. Over the same period, the travel spending deficit of regions outside of London grew in real terms by £16bn, while London remained in surplus. Furthermore, recent experimental ONS analysis suggests that a significant majority of FDI, one of the routes through which overseas spending can return to the UK, is also heavily concentrated in London and the South East. London and the South East accounted for 61% of the growth in the total value of inward FDI between 2015 and 2019, despite accounting for just 27% of the population.⁴³

3.7 MACROECONOMIC TRENDS

As well as its effect on domestic and international tourism demand, international travel spending has macroeconomic impacts on the UK’s financial flows (ie the balance of payments). The UK operates a significant current account deficit – this means that we buy (ie import) more from international markets than we sell (ie export) internationally. The spending of money on tourism overseas is similar in effect to the import of goods as it moves pounds into the hands of foreign residents. Our international travel spending deficit is therefore a contributor to the UK’s large current account deficit. During the pandemic, the travel spending contribution to the current account deficit shrank by over 90% as international tourism all but ceased, but with the rapid return of international travel and the travel spending deficit, this will not last.

FIGURE 12: QUARTERLY CURRENT ACCOUNT BALANCE AS A PERCENTAGE OF GDP, INCLUDING LINEAR TREND (DOTTED LINE)



Source: ONS Balance of payments time series

Economists have historically been relaxed about the impact of running a current account deficit, believing the macroeconomic effects to be manageable. But the size of our deficit has continued to grow (Figure 12), driven particularly by the import of goods, and concerns among commentators, economists, and politicians are now rising.⁴⁴ In Q1 of 2022, the UK’s current account balance hit its worst level on record, at -7.1% of GDP.

To date, the expansion of the UK’s overall current account deficit has been financed through the sale of UK assets to foreign owners, assisted by the financialisation of the UK economy which has unfolded since the 1980s. It is questionable whether this trend is beneficial or sustainable. Since 2017, foreign companies have held a more valuable stock of FDI (inward position) in the UK than UK companies have held overseas (outward position), reversing a decades long trend in favour of UK-based investors.⁴⁵ As well as the loss of control over domestic assets this implies, there is a vulnerability

to the perceptions of foreign investors as to the value of UK assets which could have knock-on effects on the value of the pound and the stability of our international trade. As former Governor of the Bank of England Mark Carney put it: “Most fundamentally, the UK relies on the kindness of strangers at a time when risks to trade, investment, and financial fragmentation have increased.”⁴⁶ Indeed, some economists argue that the size of the current account deficits of Italy, Greece, and Spain at the onset of the 2007/2008 financial crisis contributed significantly to their subsequent economic turmoil.⁴⁷

In 2019, the UK’s deficit in travel spending was equivalent in size to around 23% of the overall current account deficit. On the one hand, the travel spending deficit is a relatively modest contributor to the UK’s overall outgoings, equivalent in size in 2019 to around 10% of the UK’s deficit in goods trade. On the other hand, it is an area in which the UK is an international outlier. While 11 countries in Europe operate travel spending deficits, only the

UK and Romania operate both a current account deficit and a travel spending deficit (Table 3). Many others, such as Germany, the Netherlands, Norway, and Sweden operate significant overall

current account surpluses meaning these countries can afford to be more relaxed about their tourism spending deficits.

TABLE 3: CURRENT ACCOUNT AND TRAVEL SPENDING BALANCES OF DIFFERENT COUNTRIES

	Current account balance (%GDP) 2015-2019 average	Travel spending balance 2019 (%GDP)
United Kingdom	-2.7	-1.5
Belgium	0.1	-1.8
Norway	6.5	-2.7
Germany	7.6	-1.3
France	-0.5	0.4
Netherlands	9.3	-0.3
Spain	1.7	3.7
Romania	-4.9	-1.0
USA	-2.7	0.3

Source: Eurostat, U.S. Department of Commerce, National Travel and Tourism Office

4. THE MARGINAL ECONOMIC IMPACT OF AIR TRANSPORT GROWTH

4.1 UNDERSTANDING CAUSALITY IN THE RELATIONSHIP BETWEEN AIR TRANSPORT GROWTH AND ECONOMIC GROWTH

The economic health of a region can be described and measured through several different indicators. In general, NEF adopts a position that many of the commonly used indicators, including employment, GDP, gross national income (GNI), labour productivity, trade, and investment are not good indicators of the overall wellbeing of a society. Nonetheless, as these indicators are those most often used in third-party research to measure the impact of air transport growth, it is these indicators to which we refer when describing 'economic growth' herein.

Zhang and Graham (2020) present perhaps the most comprehensive recent review of the academic evidence on the relationships between air transport growth and economic growth.⁴⁸ The authors show that a large array of international academic studies over the past three decades have evidenced a positive correlation between different measures of air transport growth and economic growth. However, several obstacles hinder our ability to superimpose these findings onto the UK economy in the 2020s.

From a methodological perspective, a major obstacle is the significantly smaller pool of evidence able to contribute on the issue of causality. From the perspective of appraising the benefit of expanding UK air capacity, there is a material difference between (i) growth in air travel demand that is driven by wider economic growth, and (ii) economic growth that is driven by air capacity/traffic growth.

Zhang and Graham (2020) describe evidence suggesting that during a particular phase of a nation's economic development, wider economic growth drives air travel demand (i).⁴⁹ This might relate, for example, to households deciding to spend newly gained disposable income on foreign leisure trips. This type of growth, while useful for wellbeing purposes, is perhaps of lesser value from a purely economic perspective. Growth of this nature will cause expansion of the footprint of air transport in the economy, at least in terms of ticket revenues, but is less likely to drive wider productivity, or what is sometimes called 'spillover' effects, such as boosts to trade and investment. In any case, Zhang and Graham (2020) suggest that once a certain threshold is reached in a nation's economic development, this relationship begins to weaken; many advanced economies are now approaching market maturity in this domain of growth.⁵⁰ That is to say, increased incomes may no longer drive the uptake of air travel. Other factors, such as population growth (particularly migrant population) and changing consumer preferences, may remain relevant drivers of air travel demand.

On the other side of the causality loop, Zhang and Graham (2020) identify a subset of studies which suggest there is a causal relationship in which air transport capacity growth, or connectivity growth, drives economic growth.⁵¹ In this case, growth might derive from features such as the opening up of new destinations (ie markets), via new and/or improved (ie faster or cheaper) connectivity. The presence of this causal relationship could make a stronger case for the marginal economic benefits of air capacity growth.

The academic evidence base on causality running from air capacity and connectivity to the economy presents several practical challenges. From a methodological perspective, there are both weaknesses in the calculations used to prove causality. From an evidential point of view, studies are highly inconsistent in their findings. Some find causality, others do not. This variability could be down to a large number of methodological and contextual factors. For example, two studies that include the UK in their samples and also found no causality running from air transport to GDP include Küçükönel and Sedefoğlu (2017) who found no causal relationship in their OECD

sample data spanning 2000–2013,⁵² and Mikkala and Tervo (2013) who only identified the causal link in peripheral regions of Europe but not “core” regions.⁵³

When it comes to transferring findings to the contemporary British context, further problems arise. Zhang and Graham (2020) present 15 studies that do support the causal relationship running from air transport to economic growth, but just one of the 15 cited includes the UK in its input data, and in this case, the UK is parcelled with the rest of Europe.⁵⁴ This means that any findings on the relationship between economic growth and air travel growth will not be specific to the UK context. The relationship produced will be influenced by effects seen in very different economies, including less connected economies (according to IATA this includes most European nations),⁵⁵ tourist-receiving economies (such as the Mediterranean states), and less economically developed states (eg nations in eastern Europe).

A second practical problem with the academic literature base cited by Zhang and Graham (2020) is its dated nature. The average date range of the input data used by the 15 studies cited is 1981–2003.⁵⁶ It is questionable, for example, whether a study focused on the development of air transport in Brazil between 1966 and 2006 can tell us much about the relationship between air transport and the UK economy in 2023. However, a review of some of the more recent research published since Zhang and Graham’s 2020 review can glean some useful insights for understanding how air transport might interact with the economy in the UK context.

4.2 RECENT EVIDENCE ON THE CAUSAL LINK BETWEEN AIR CAPACITY GROWTH AND ECONOMIC GROWTH

One of the strongest bodies of research available on the relationship between air transport and the economy focuses on employment in the USA. Sheard (2021) evidences a causal link between air transport growth and employment growth which suggests that a 10% increase in local air traffic can deliver a 1.2% increase in local employment.⁵⁷ This relationship is sometimes termed the ‘elasticity’ connecting air travel demand with employment. The key limitation of Sheard’s analysis is that the majority of the new employment created is shown to be taken by new migrants to the area, and the

analysis does not capture potential reductions in employment which might take place elsewhere as a result. This issue, which is often termed ‘displacement’ (Box 1), is a recurring weakness of much of the analysis on the impacts of air transport growth. Lenaerts et al. (2021) suggest that “...As a result, existing studies are likely to overestimate the wider economic impact of aviation.”⁵⁸ The issue of spatial variability arises not just between regions with and without airports, but also between airports. Sheard’s analysis homogenises the majority of the USA’s air transport network, hiding nuances between airports and places that have critical contextual differences, such as in the balance of sending versus receiving passengers.

In aggregate, the USA is a net recipient of international tourists and spending, meaning more people fly in to visit than fly out, a major difference from the UK context, as shown in Figure 2. The same issue prevails in places like Australia, another net recipient of international tourism spending. Khanal et al. (2022) evidence a positive causal link between air transport and economic growth, but treat air passenger traffic as a direct proxy for the health of Australia’s domestic tourism market.⁵⁹ Similarly, air transport has also been identified as a driver of economic growth in Spain, Europe’s largest net recipient of tourism expenditure.⁶⁰ As shown in earlier analysis, air transport growth weakens domestic tourism expenditure in the UK cutting off this route to potential wider economic benefits.

A limited number of studies are available that both include the UK in their sample and disaggregate their results to allow isolation of the UK effect, specifically, van de Vivjer et al. (2016)⁶¹ who look at links between air passenger transport and employment and Volkhausen (2022) who looks at links between air transport and GDP (only including airports with fewer than 3 million passengers in their sample).⁶² These studies present, overall, a positive link between air capacity growth and increases in employment and GDP, but when that effect is broken down to the UK level, in both cases, the relationship disappears; no statistical relationship is found. Indeed, Volkhausen’s analysis would suggest there is a possibility that regional airport growth in the UK has driven negative outcomes for local economies. The areas of Europe driving the positive relationship are typically the

nations which see the largest net receipt of tourism spending, notably Spain, France, and Austria in the case of Vivjer et al. and Spain, France, and Greece in the case of Volkhausen.

Germany presents a more complex case. Both papers suggest that some regions of Germany show a causal relationship between air transport and economic growth, despite the nation's negative tourism balance. Other papers provide strong evidence that a subset of small to medium size airports in Germany does not provide any benefit. Breidenbach (2020) states: "There is no empirical evidence that the expansion of regional airports translates into regional growth."⁶³

Allroggen and Malina (2014) suggest that capacity growth at larger German airports supported economic growth in the early 2000s by facilitating the connectivity of business travellers.⁶⁴ By contrast, Allroggen and Malina show that the growth effects of some airports (in this case smaller airports) can be negative where that growth expands leisure travel rather than business:

*Although leisure flights create private benefits, they do not foster connectivity through air services, which cater to business travelers. On the contrary, additional leisure-related air services might actually weaken a regional economy by diverting expenditures away.*⁶⁵

These findings have been reinforced by more recent, Europe-wide research by Pot and Koster (2022). These authors also find that smaller airports deliver little to no economic benefit to their regions. Furthermore, while larger airports are shown to deliver benefits to the wider economy, these benefits are stronger when there is a strong inbound tourism economy.⁶⁶

As the UK is not a net recipient of tourism spending, this evidence shows the importance of business passengers to the case for the wider economic benefits of UK air transport growth. Perhaps as a result of the general absence of UK-specific academic evidence connecting air capacity/traffic growth to economic growth, British private sector consultancies have developed their own elasticities, similar to that of Sheard (2021),⁶⁷ connecting indicators of air travel growth with

economic growth. One elasticity in particular, developed by Oxford Economics in 2013, continues to be cited widely by UK airports seeking expansion in 2023,⁶⁸ despite its reliance on input data spanning 1980–2010, a different era of Britain's economic development.⁶⁹

The relationship developed by Oxford Economics suggests that a 10% increase in business travel and/or freight will result in a 0.5% increase in economic productivity. This relationship should be treated with a great deal of caution. Not only is the input data outdated, but several methodological questions are inadequately addressed. In particular, it is not clear if the issue of causality has been addressed. Nonetheless, this relationship reinforces the dependence of wider economic benefits of passenger air transport on business passenger growth. If the Oxford Economics relationship holds, then the growth of passenger air transport at the national level has produced no additional economic productivity – and hence no GDP growth – since 2006 when business passenger numbers peaked.

To summarise, there is evidence from several periods and regions of a causal relationship between air transport growth and economic growth. This impact appears strongest in areas which are net recipients of tourism spending, and where business travel is being facilitated. In the UK, and particularly England, where there is a heavy tourism spending deficit, and demand for business travel is diminishing, the case for wider economic benefits arising from air traffic growth appears weak.

4.3 DIMINISHING ECONOMIC RETURNS ON INCREASING AIR TRAVEL CAPACITY

Diminishing returns are fundamental to most economic relationships. Global and multi-country studies of the relationship between air transport growth and economic growth commonly observe that benefits accruing tend to be larger among less developed economies, pointing to diminishing returns. AitBihiOuali et al. (2020), who analyse a large panel of different nations, for example, highlight:

As such, our results suggest the development of the aviation section generates overall economic gains for both [sic] developed, developing and emerging economies [...] results are larger for areas including more emerging economies.⁷⁰

Pot and Koster (2022) confirm this finding in relation to “medium” sized airports:

The absolute level of total air accessibility is negatively associated with a positive impact on GDP per capita for medium airports. This links to the notion of diminishing returns. In regions where air accessibility is already high, an expansion of a medium-sized airport may not bring many benefits.⁷¹

Indeed, Arvin et al. (2015) draw a stronger conclusion, suggesting that the saturation point has already been reached in their panel of developed countries (inclusive of the UK):

In the developed group [air] transportation intensity bears no causal relationship to economic growth in the short run (presumably because transportation intensity has reached a point of near saturation).⁷²

Writing on the benefits of air transport capacity growth back in 2013, aviation sector consultancies York Aviation and Oxford Economics said:

There is some evidence to suggest that connectivity is likely to suffer from diminishing returns. This is intuitively sensible. An initial single connection makes trade possible where it was not before with attendant economic benefits. A second connection makes trade easier and will bring benefits but in all likelihood not at the same level as the first connection. This could apply both to frequencies of service or to the balance between direct and indirect connections. Extending this analogy would seem reasonable.⁷³

These reflections address the issue of saturation in connectivity, but the impact of the pandemic and modern technological enhancements broaden the issue of diminishing returns into a question of underlying demand. While it may be the case

that adding a third air connection to a destination produces less benefit than creating the first, it could also be that, over time, the value of any connection reduces due to declines in the relative benefit to the business of air travel. Every advancement in digital communication technologies and every shift in the expectations and norms of business interaction towards distance communication diminishes the value of additional air connections and brings forward the market saturation point. This issue will have become more salient since the pandemic but is less studied.

Some considerations around market saturation on the demand side are usually baked into passenger forecast models. The DfT’s modelling, underpinning their aviation forecasts, suggests saturation in business passenger demand will not be reached until 2080.⁷⁴ But these estimates were calculated on data spanning the period 1986 to 2008, a period of booming business passenger growth which does not seem an appropriate benchmark in 2023. As it happens, the DfT was questioned by their own academic peer reviewer (Dr Fowkes) about the risk that the relationship between passenger growth rates and the economy (ie the elasticities) had changed post-2008. Fowkes stated in his review of the DfT’s forecast modelling:

Special attention should be paid to parameter changes in later years, for example post financial crisis. I was surprised that ‘constant’ terms had not been included, but was assured they had been tried but found non-significant. I am concerned that shortage of degrees of freedom may have prevented the estimation of separate pre- and post-crash elasticities for all 3 drivers and trend growth, and shortage of time may have prevented separate models for all break points (eg 2007, 2008, 2010 etc.) being run.⁷⁵

As shown in Table 4, Dr Fowkes was right to be concerned. The period used to inform the DfT’s analysis saw average business passenger growth of around 4.4% per year. Since then, the trend has reversed.

TABLE 4: CHANGE IN ABSOLUTE BUSINESS PASSENGER NUMBERS OVER SELECTED PERIODS

Period	Change	Change per year
1984 to 2008	170.77%	4.38%
1984 to 2006	184.47%	4.99%
2006 to 2019	-5.26%	-0.38%
2008 to 2019	-0.46%	-0.04%

Source: ONS Travepac (1993-2019) and Government Statistics Service (1984-1992)

Projecting forward, their model suggested that in 2030, business passenger numbers would rise by almost 30% over 2016 levels (Table 5). Today, it would take an exceptionally fast recovery from the

pandemic (twice the pace seen after the 2007/2008 financial crisis) for numbers even to return to their pre-pandemic level by 2030.

TABLE 5: CHANGE IN TOTAL BUSINESS PASSENGER DEPARTURES OVER 2016 LEVELS IN THREE DfT AVIATION FORECASTS 2017 SCENARIOS

	2030	2040	2050
Low market maturity	+30.6%	+60.0%	+93.7%
Central (including Heathrow Northwest Runway)	+28.6%	+52.5%	+78.8%
High market maturity	+23.1%	+40.4%	+57.5%

Source: DfT Aviation Forecasts 2017

With the benefit of data spanning the period post-2008, it now appears that a shift in the relationship between the wider UK economy and the business travel sector took place between 2000 and 2006 (Figure 13). The precise pivot point is obscured by the impact of 9/11 terrorist attack in the USA in 2001, which temporarily suppressed air travel demand but beyond this point, business air travel growth appears to ‘decouple’ from economic growth.

None of the economic growth, productivity growth, connectivity growth, or wider air passenger growth seen over the past 15 years has produced business air passenger numbers equivalent to those seen in 2006 (Figure 3). Following the Covid-19 pandemic, which accelerated business shifts towards online communication, this trend will only have entrenched. A reasonable conclusion would be that

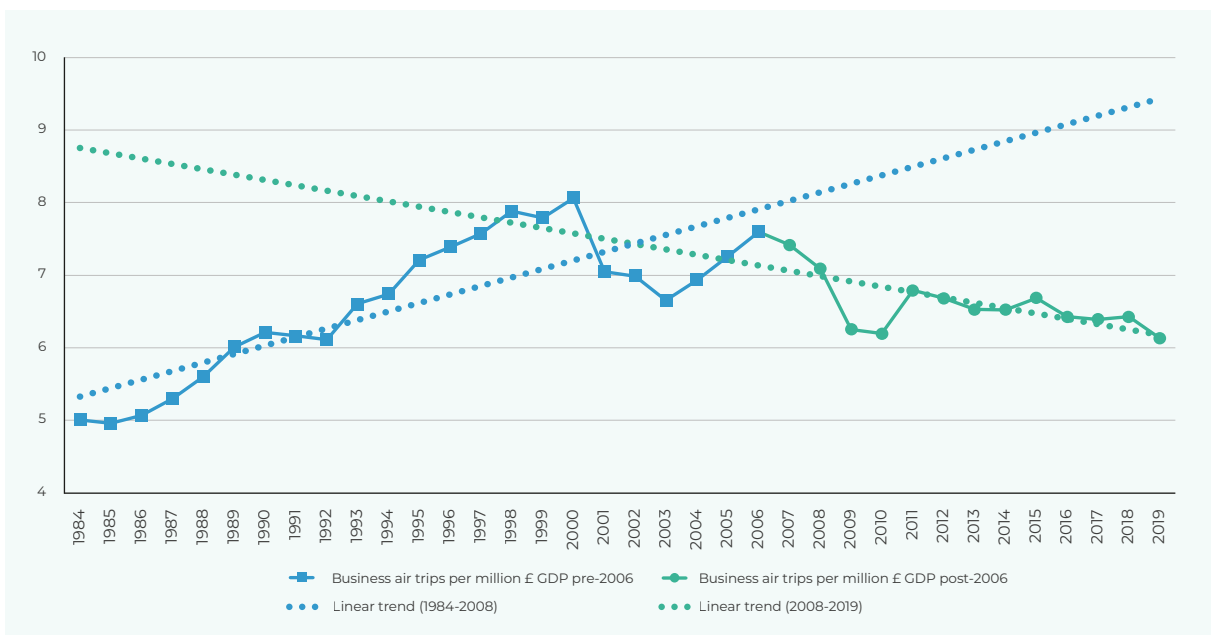
the date of business passenger market saturation has been brought forward several decades, and may even have been reached. The DfT’s forecasts and those consultancies that rely on the DfT’s underlying elasticities and saturation assumptions in their own forecasts (such as those produced for the 2023 Luton Airport expansion application) will be subject to a systematic error.

Earlier-than-expected market saturation does not imply that new routes will never produce positive productivity returns. Benefits could still arise from reduced travel times or ticket prices, or routes to destinations with more business opportunities. The crux of the matter is that these benefits can be accessed through the optimisation of the existing UK air capacity and volumes and do not depend on growth.

The price elasticity (ie the change in demand resulting from a change in ticket price) of air travel further supports this proposition. Most sources suggest business demand for air travel is extremely price-inelastic, far less elastic than leisure air travel demand. In other words, businesses can, and will, pay significant amounts of money for air travel, where and when they desire it. The DfT suggest that a 10% increase in prices would produce just

a 2% fall in business passenger demand, whereas leisure passenger demand would fall by 7%.⁷⁶ Increases in ticket prices, which might constrain leisure demand, will have a considerably lower proportionate impact on business. As a result, routes preferred by business travellers should take precedence in the route planning of airlines, and new capacity will not be required for business demand to be met.

FIGURE 13: BUSINESS AIR TRIPS PER MILLION £GDP OVER TIME, WITH PRE AND POST-2006 TRENDS HIGHLIGHTED



Source: ONS National economic accounts, ONS Travepac

5. CONCLUSION AND RECOMMENDATIONS

The UK air transport sector has been through 15 years of upheaval, but despite this, and the continuing legacy of the pandemic, the sector is seeking rapid expansion. Thus far this growth has received strong government backing, both in policy terms and through a package of generous tax breaks. The government's last comprehensive assessment of the economic merit of the air transport sector's growth, which broadly endorsed a pro-growth policy, was conducted over a decade ago. We have presented strong evidence, grounded in government data and academic research, which suggests that the economic merit of expanding the UK's air transport sector has diminished considerably since that last assessment.

While academic research into air transport growth as a driver of economic growth broadly endorsed the existence of a causal mechanism, this is heavily caveated and it is doubtful whether this relationship holds true in the UK context. There are two principal concerns.

The first (i) is that the level of business productivity benefit accruing to growth has diminished greatly resulting both from businesses switching away from face-to-face meetings and from the diminishing returns delivered when adding new capacity to an already highly connected economy.

The second (ii) relates to the UK's deficit in tourism spending. The large majority of research endorsing the value of air transport growth originates from nations that are net recipients of international tourism spending. There is little evidence to suggest that the UK, on the other hand, with its very significant tourism spending deficit, sees net economic and employment growth as a result of additional air transport capacity. Furthermore, it is notable that the existing trends of travel spending are highly unequal between London, which is a net tourism spending recipient, and the rest of the country which is a major net loser.

Air transport has a large footprint in the UK economy, supporting a large number of jobs. It is notable, however, that the employment potential of air transport has been declining rapidly in recent years as a result of efficiency savings or so-called productivity growth. In 2015, the air transport sector was among the sectors with the lowest jobs creation potential in the UK.

The argument that growth in air capacity would bring net economic benefits is not substantiated. Indeed, we are not the first authors to highlight that wider economic benefits from air capacity growth are not a foregone conclusion, and in fact are heavily influenced by (i) whether any business travel will be generated, (ii) whether the tourism impacts are net positive to the region in question, and (iii) whether the activity is newly created or simply diverted (displaced) from other locations/modes. These tests were highlighted in 2018 by Mackie and Laird in a report to the DfT,⁷⁷ but subsequent public scrutiny via the planning system and government policy announcements appears to lack consideration of these issues.

5.1 RECOMMENDATIONS

- The government should conduct a new, comprehensive, call for evidence and review of the economic case for the expansion of the UK air transport sector in terms of passenger departure and air traffic capacity.
- In light of the findings of this review, the government should consider the consistency of its air capacity policies with those of climate change, domestic tourism, and its levelling-up agenda.
- Given the proven and significant environmental damage delivered by air travel, set against uncertain and declining economic benefits, it might be prudent to pause airport expansion proceedings until said review has been completed.
- Economic impact analysis capacity at different layers of government decision-making should be improved. Delegated decision-makers such as the Planning Inspectorate and local authorities tasked with appraising large and complex air transport proposals should have access to greater

levels of economic training and independent technical support. This capacity would assist decision-makers in navigating several often misrepresented and/or ignored issues surrounding air transport appraisal, including:

- Ensuring comprehensive inclusion of all socioeconomic costs and benefits in economic impact assessments of air transport proposals, and application of welfare weighting to account for the equity of impacts (in line with the government's Green Book).
- Scrutinising claims made around growth in business passenger departures and resulting productivity gains.
- Estimating and quantifying greenhouse gas emissions impacts in economic welfare impact assessments, according to government guidance.
- Ensuring routine measurement of the impact of proposed air transport growth on the flows and balances of tourism spending.
- Delivering consistent assessment of the displacement of impacts between sectors and regions and the presence of national-level impacts.
- Providing an expert opinion on the currency, relevance, and credibility of data cited on air transport's economic benefits.

APPENDIX A

TABLE A1: EVIDENCE IN ACADEMIC RESEARCH OF A SUBSTITUTION EFFECT BETWEEN DOMESTIC AND INTERNATIONAL LEISURE TRAVEL AND TOURISM

Reference	Key quote
Davison, L. & Ryley, T. (2016). An examination of the role of domestic destinations in satisfying holiday demands. <i>Journal of Transport Geography</i> , 51, 77–84. Retrieved from https://doi.org/https://doi.org/10.1016/j.jtrangeo.2015.11.007	“This research reinforces the findings of Scott and Becken (2010), that international destinations can be substituted with domestic choices based on holiday activities.”
Lu, H. & Rohr, C. (2021). <i>Factors influencing domestic tourism in the UK and abroad and the role of publicly funded domestic tourism marketing</i> . Phase 2 scoping report. RAND Europe for DCMS. Retrieved from www.gov.uk/government/publications/domestic-tourism-rapid-evidence-assessment	“We found that international tourism can influence demand for domestic tourism (for example, as a potential substitute).”
Eugenio-Martin, J. L. & Campos-Soria, J. A. (2011). Income and the substitution pattern between domestic and international tourism demand. <i>Applied Economics</i> , 43(20), 2519–2531. Retrieved from https://doi.org/10.1080/00036840903299698	“Overall, it seems that domestic tourism and international tourism are substitutes.”
Mohammed, I. (2019). Estimating tourism import demand elasticities for four countries using the general-to-specific approach. <i>Journal of Applied Business and Economics</i> , 21(3). Retrieved from https://doi.org/10.33423/jabe.v21i3.2081	“Outbound tourism may be regarded as a close substitute for the domestic tourism industry.”
Athanasopoulos, G., Deng, M., Li, G., & Song, H. (2014). Modelling substitution between domestic and outbound tourism in Australia: A system-of-equations approach. <i>Tourism Management</i> , 45, 159–170. Retrieved from https://doi.org/https://doi.org/10.1016/j.tourman.2014.03.018	“The empirical results reveal significant substitution relationships between Australian domestic tourism and outbound travel to Asia, the UK and the US.”
Massidda, C. & Etzo, I. (2012). The determinants of Italian domestic tourism: A panel data analysis. <i>Tourism Management</i> , 33(3), 603–610. Retrieved from https://doi.org/https://doi.org/10.1016/j.tourman.2011.06.017	“Additionally it appears that, for Italian tourists, domestic and international destinations behave as substitutable goods.”

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COVER IMAGE BY:

Lisa-Blue (iStock Photos)

PUBLISHED:

July 2023

NEF is a charitable think tank. We are wholly independent of political parties and committed to being transparent about how we are funded.

WRITTEN BY:

Dr Alex Chapman

PEER REVIEWER:

John Siraut, Committee Chair, European Transport Conference: Transport Economics, Finance and Appraisal

THANKS TO:

This work was kindly supported by the Aviation Environment Trust.

The author wishes to thank John Siraut (ETC), Alfie Stirling (Joseph Rowntree Foundation), Christian Jaccarini (NEF), Lukasz Krebel (NEF), and Marc Postle (NEF associate) for their insightful comments.