NEW ECONOMICS FOUNDATION

NEW ECONOMICS FOUNDATION (NEF)

WRITTEN REPRESENTATION

The economic and environmental impacts of an expanded Luton Airport

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About the New Economics Foundation

1. This Written Representation was prepared by Dr Alex Chapman on behalf of the New Economics Foundation (NEF). NEF is a charitable think tank with a mission to create an economy that works for people and the planet. Further detail on our charitable objectives can be found on our website. This is an independent submission for which we received no external funding.
2. Dr Chapman, on behalf of NEF, has previously been commissioned by community groups in the vicinity of Bristol, Leeds Bradford, Luton and Gatwick Airports to act as a consultant and/or expert witness on economics and climate change in relation to expansion planning applications.

NEF's view

3. NEF does not support the expansion of Luton Airport. The economic benefits are overstated by the applicant, and the economic and environmental downsides are ignored and/or understated. When the relevant scheme costs, benefits, their balance of equity, and the long-term societal risks are taken into account, the scheme's overall balance is negative and entails unreasonable levels of risk to local, national and international wellbeing.

Supporting evidence

4. Alongside this representation NEF has submitted a copy of our July 2023 report titled *Losing Altitude: The economics of air transport in Great Britain*. The report reviews the national economic dynamics of air transport in 2023, analysing the latest available public data and academic research. The report was peer reviewed by leading UK transport economist John Siraut, Chair of the European Transport Conference Transport Economics Committee.

Principle areas of disagreement

5. NEF's principle areas of disagreement relate to the following documents submitted by the Applicant:
    i. 7.04: The Need Case
    ii. 5.01: Environment Statement – Chapter 11 – Economics and Employment
    iii. 5.01: Environment Statement – Chapter 12 – Greenhouse Gases

Core position on the merit of air transport growth

6. The past two to three decades of the UK's economic development have seen a broad consensus surrounding the economic good of air transport capacity and connectivity growth. This consensus was supported by a body of academic research published through the 1990s and early 2000s and was subject to only limited challenge, most often in relation to local concerns about noise and air quality. In subsequent years both the context and research base have shifted. In 2023, following a global pandemic which has dramatically, and permanently, shifted our ways of working, and in the face of an escalating climate crisis, the established consensus is outdated and in urgent need of review.
7. Government's position favouring the national economic benefits of air transport growth has not been comprehensively reviewed in over a decade. The aviation sector continues to promote its interests through an array of commissioned, consultancy-led, studies which, at-best, display selection bias, and at worst promote flawed analysis. A more nuanced look at the contemporary, independent, academic evidence paints a very different picture of the merits of air transport growth in the UK in 2023.
8. As evidenced in NEF's 2023 report,[1] recent research suggests that the economic benefits of air transport growth are subject to diminishing returns. In an already highly connected economy such as the UK, wider economic

[1] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation.

benefits arising from air transport growth are particularly dependent on the presence of (i) net inbound tourism and (ii) business travel growth,[2] both of which are absent in the UK today. As such, in the context of a major climate risk, and expensive unproven decarbonisation options, it is highly questionable whether air transport capacity growth offers a net economic benefit to UK society in 2023.

Business impacts

9. The impact of the scheme on business travel and hence the benefit to business productivity is grossly overstated by the applicant.
10. At the national level, and in the London Airport system, business air passenger numbers peaked in 2006 (Figure 1). The modest rate of recovery seen since the 2007/08 financial crisis was not sufficient to return levels to their previous peak. Business passenger numbers at Luton Airport recovered slightly faster than the national average, managing to exceed their pre-2007/08 financial crisis peak in 2019 (Figure 1), before falling back as a result of the pandemic. Luton Airport's performance can be linked to a redistribution of passengers around the London system during the pre-pandemic period, with Heathrow Airport seeing a decline in business passenger numbers of over 3 million over the same period.
11. The proportion of passengers travelling for business at Luton Airport fell from 22.0% in 2006 to 12.8% in 2019.[3] National-level data suggests this will have fallen further since the pandemic. The ONS' Travelpac dataset suggests the national market share of business passengers had fallen to 8% by 2022, down from 17% in 2006.[4] Overall business passenger numbers have also collapsed since the pandemic, and have thus far seen a markedly slower recovery than the leisure travel market.

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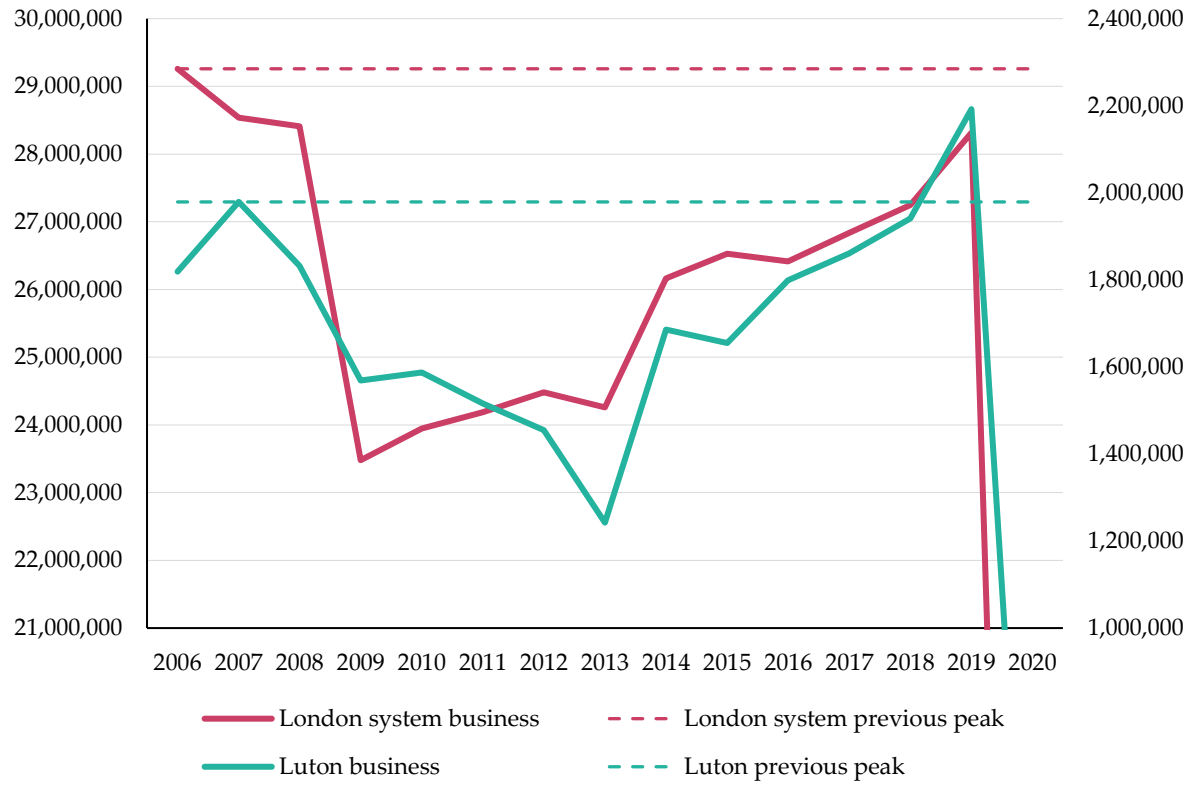
[2] See for example: Peak Economics. (2018). Wider economic impacts of regional air connectivity. Report to the Department for Transport.
[3] CAA Passenger Surveys 2006 and 2019.
[4] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation.

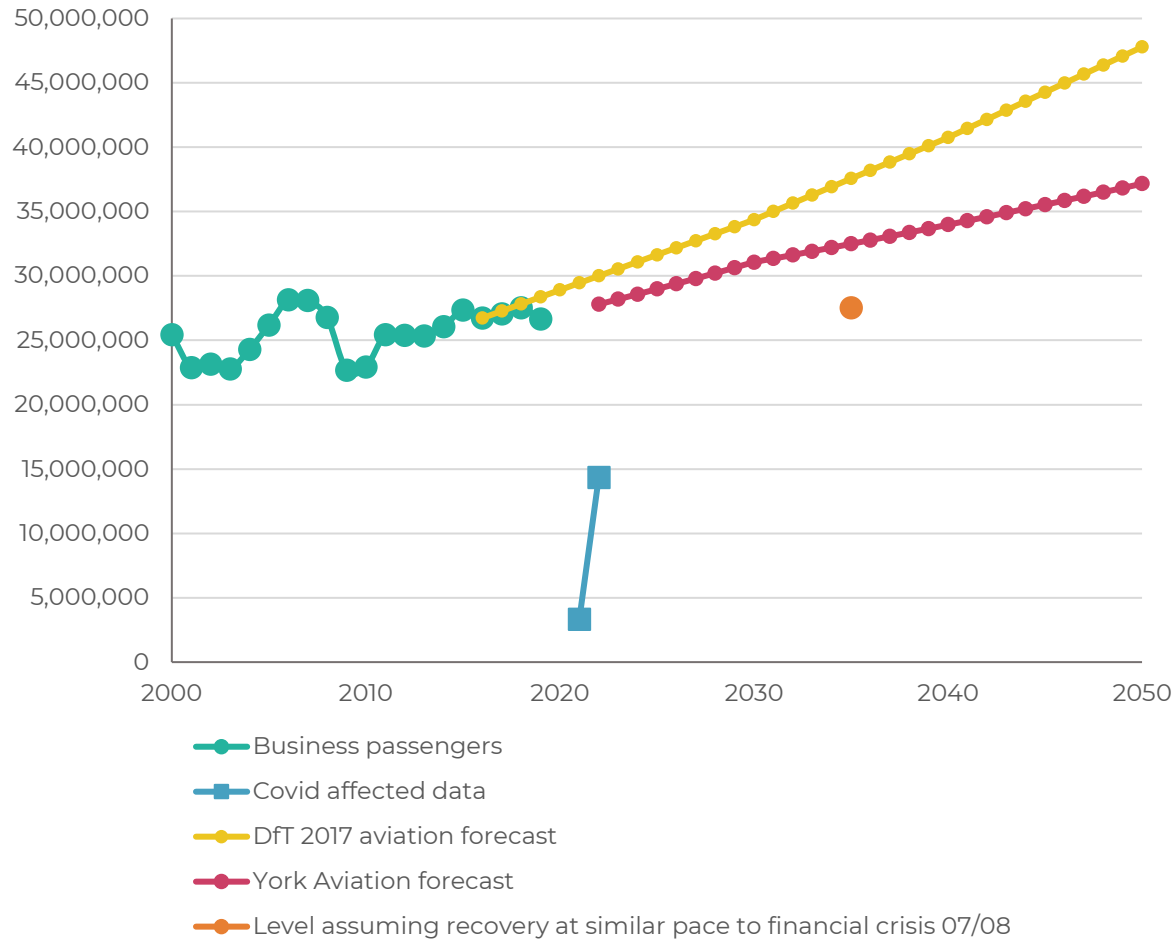
Figure 1: Annual business air passenger numbers in the London Airport System (left axis) and at Luton Airport (right axis)



Source: CAA Passenger Survey

12. The forecasts set out by the applicant in the Need Case project underlying international business passenger demand growth of 1.4% per year between 2019 and 2030, and 0.9% between 2031 and 2050 (p.104). This trend is illustrated in Figure 2. These projections are not credible. While business passenger numbers were growing prior to the pandemic, fifteen years on from the 07/08 financial crisis total numbers have still not recovered.
13. The global pandemic, along with growing environmental awareness, is likely to have placed significant downward pressure on underlying business demand which appears not to be adequately factored into the applicant's forecast model. If demand recovers at a rate similar to that seen after the financial crisis, business passenger numbers will not return to the pre-crisis (2019) level until around 2035 (Figure 2). If the pandemic, as well as perceptions of the escalating climate crisis, have shifted business practices more dramatically than the 2007/08 financial crisis, which seems highly likely, then business passenger numbers may never return to their peak in 2006.

Figure 2: Forecasts of business passenger growth



Source: CAA passenger survey, Environment Statement Need Case, DfT 2017

14. New airport capacity is not required to serve current, or future, levels of business travel demand. This premise is further supported by the demand dynamics of the different air travel segments. Capacity constraints do not generally suppress business passenger demand. The reason for this is explained by the DfT in its 2017 aviation forecasts:

"Table 31 repeats the analysis in Chapter 6 (in Table 29) for the case when demand is constrained by baseline capacity and it makes the comparison with the unconstrained case. Business passengers remain a low proportion of total travellers, but their numbers are little changed from the unconstrained case, continuing to travel mainly because of their willingness to pay higher fares." (p.99)[5]

[5] DfT (2017) UK Aviation Forecasts 2017. Department for Transport

In other words, business passengers have a higher willingness to pay than leisure travellers and as such, in a capacity constrained scenario, any latent business demand will displace leisure travel and business passengers will continue to fly.

15. There is no credible case that the overall growth in passenger numbers requested will create any net additional business passengers against the baseline, no intervention, case. Business productivity gains (primarily time savings) may still be achievable via optimisation of the routes available, and improvement of infrastructure, across the London Airport system, but these gains do not require additional passenger capacity, nor additional air traffic movements.
16. Having presented an overly optimistic forecast of business passenger growth (Figure 2), the applicant then proceeds to convert this growth into wider GDP impacts. This analysis is shown at page 54 of Chapter 11: Economics and Employment of the Environment Statement. A simple relationship, originally developed by Oxford Economics, is used to convert business passenger growth into productivity growth.

"*This has been combined with an econometric relationship developed by Oxford Economics (Ref 11.52) that relates the level of business air travel and air cargo in the UK economy to the level of productivity. This says that a 10% increase in business travel and cargo relative to GDP will raise productivity by around 0.5%.*" (5.01, p. 54)

17. Taken at face value, the Oxford Economics relationship has an unexpected implication not discussed by the applicant. As there has been no net business passenger growth in the UK since 2006 the relationship implies that there has been no net additional contribution from business air travel to wider national economic productivity since 2006. In other words, the applicant's own economic relationship actually undermines the case for wider economic benefits arising from contemporary air transport growth.
18. Furthermore, as Luton Airport's expansion is highly unlikely to be a driver of net additional business passenger movements, even if the Oxford Economics relationship is assumed true, no additional productivity benefits will result.

19. In any case, the Oxford Economics relationship is not fit for purpose. The Oxford Economics paper was published in 2013, and the input data used to develop the relationship spans 1980-2010. Clearly, the relationship between air transport growth and economic productivity in the 80s and 90s, an era of booming business travel growth, is not an appopriate guide to that relationship in 2023, post-pandemic. The law of diminishing returns almost certainly applies to air capacity growth. Indeed, another 2013 paper, jointly authored by Oxford Economics and York Aviation states:

"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." (p. 34)[6]

20. The claim that air transport growth brings wider economic benefits to the economy in the UK in 2023 is in fact highly dubious. As set out in NEF's recent report,[7] it is difficult to find any academic studies, or studies otherwise independent of the aviation industry, which evidence a causal relationship running from air transport growth to economic productivity and employment. Government itself has not reviewed the economic dynamics of air transport for many years, and certainly not since the global pandemic restructured the business travel market.
21. NEF's review identifies evidence supporting wider economics benefits to air transport growth in less developed and less connected economies, and in economies which see a net inflow of tourism. As neither of these features apply in the UK, such benefits appear highly dependent on the presence of business travel, and in the present moment, we can have no confidence that

[6] Oxford Economics and York Aviation. 2013. The Economic Value of International Connectivity. A report for Transport for London.
[7] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

there is any potential for net additional business passenger growth beyond 2019 levels on the horizon.

Tourism and travel spending impacts

22. Luton Airport's primary service is the sending of UK residents overseas on leisure trips. International leisure trips by UK residents account for around 55% of all passengers at the airport, compared with just 28% who are foreign residents arriving to visit the UK for leisure.[8] The absence of any quantification of the impact of outbound and overseas travel and tourism spending, and the net balance of tourism impacts, is skewing the scheme's presentation.
23. Assessing this net impact was identified in a report commissioned by the DfT in 2018 as one of three "*key diagnostic tests*" of an air transport intervention's merit.[9] Multiple academic studies cited in NEF's 2023 report also highlight the importance of analysing this impact, and the potential negative effects of incentivising outbound tourism.[10] Furthermore, the UK government's Tourism Recovery Plan (2021) has an explicit objective to "*embed domestic travel as a sustained consumer 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*" (p.33).
24. VisitBritain, the UK's national tourism agency, has raised concerns related to the outbound travel spending deficit on multiple occasions, including writing to the Cabinet Office in 2020 calling for a reduction in the deficit and policy to encourage British tourists to holiday at home. VisitBritain stated:

[8] CAA 2019 passenger survey
[9] Peak Economics. (2018). Wider economic impacts of regional air connectivity. Report to the Department for Transport.
[10] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

"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."[11]

25. There is a clear need to assess the proposed scheme's impact in this domain, yet no such assessment has been conducted. Excluding from detailed analysis the impact of this intervention on incentivising outbound international leisure travel over other forms of domestic expenditure flies against the fundamental principles of appraisal and skews the assessment of the scheme. Given the significant resource that has gone into the application it would have been possible to develop a far more sophisticated understanding of the implications of the Airport's net tourism balance and its wider ramifications.
26. Table 8.7 of the Need Case (p.202) presents a set of outputs from a simple calculation of inbound tourism expenditure, claiming that inbound tourists would create £818m of additional GDP and 11,550 more jobs at the UK level in 2043. Why have losses resulting from the outbound flow not be calculated in the same way? It is highly irregular for a comprehensive appraisal to assess only one direction of a bi-directional flow. The justification provided by the applicant in paragraph 8.5.19 represents little more than conjecture and, with no secondary evidence provided, does not stand up to scrutiny.
27. The applicant's first point (a) amounts to a claim that displacement would take place and, if the airport were not expanded, outbound travellers would travel via other means. If true, this undermines the Need Case for the scheme. Furthermore, this would also apply to inbound tourists, who might also travel to the UK via other means. We could identify no evidence that the applicant has adjusted for such displacement in their inbound tourism analysis in Table 8.7 - although insufficient detail on methodology is provided to be certain. Furthermore, the proposition that in the no-intervention case, travellers would take fewer, but longer, outbound trips again questions the need for the scheme, and describes a win for the environment, with less greenhouse gas emissions resulting.

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[11] VisitBritain (2020) Annual Report and Accounts: Year Ended 31 March 2020. British Tourist Authority – Trading as VisitBritain and VisitEngland

28. The applicant's remaining claims also face a range of issues and are not supported with evidence. It is true that outbound tourism involves some spending within the UK (point b), much of this spending takes place within the airport and airlines and therefore is already represented elsewhere in the analysis. However, most of this spending would be subject to 100% displacement, as it would be spent elsewhere in the UK economy were it not spent on outbound tourism. As shown in NEF's 2023, the scale of outbound spending which takes place within the UK (worth £34bn in 2019) is dwarfed by spending taking place overseas (worth £75bn in 2019).[12]
29. Point c) of the same paragraph (8.5.19), suggesting that individuals might not otherwise spend within the UK economy, represents little more than conjecture and should be supported with evidence. The claim also ignores the fact that there are societal benefits if, as the applicant suggests, in the no-intervention case money were saved instead of spent. Finally, point d) also describes a feature which is already captured within the applicant's analysis. The welfare benefits accruing to passengers from international travel are expressed through the air fare and journey time savings described in Table 8.8 of the Need Case. This once again highlights a pattern within the application of counting the benefits and ignoring the costs.
30. There are a range of key issues which would need to be addressed for us to gain a systemic understanding of the net impact of this scheme on flows of inbound and outbound spending. Macro-economic impacts on the health of the UK's current account and international investment position, and equity impacts on the UK's domestic tourism destinations and their economies are particularly relevant given recent developments and policy priorities.
31. These issues are addressed in greater detail in NEF's recent review.[13] In particular this review highlights how the current dynamics of outbound spending unbalance the UK economy and direct flows of cash and investment out of the wider regions and into London and the South East. London

[12] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

[13] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

operates a travel spending surplus, while the rest of the UK operates a significant deficit. In Luton's case, for example, there are outbound flows from the East of England and East Midlands, while the majority of inbound flows go to London.

32. Cash spent overseas can return to the UK in the form of Foreign Direct Investment (FDI) but FDI is also disproportionately concentrated in London and the South East, further compounding the investment mismatch.[14]
33. Approving this scheme, despite the significant environmental risks inherent, would represent a decision to hand a further competitive advantage to outbound tourism over expenditure in the domestic economy, potentially diverting money away from UK holiday destinations and the highstreet. Coastal destinations, such as Great Yarmouth, the 22nd most deprived locality in England (out of 318), and easily reachable to most users of Luton Airport, have suffered the economic consequences of such decisions over recent decades.[15] The UK will not make progress on high-level ambitions such as 'levelling-up' until such trade-offs are properly integrated into decision making.

Jobs and GDP

34. The applicant's approach to job creation is messy and difficult to follow. The issues created feed through into the applicant's GDP forecasts as these are derived through the application of a multiplier to the jobs forecasts. Job creation related to the operation of the airport is discussed extensively in both the Need Case and Chapter 11 of the Environmental Statement (Economics and Employment), underpinned by projections from Oxford Economics. The Oxford Economics analysis however, relates only to the 'footprint' of the airport and not its net impact on the economy. This is clarified by Oxford Economics at page 7 of their report:

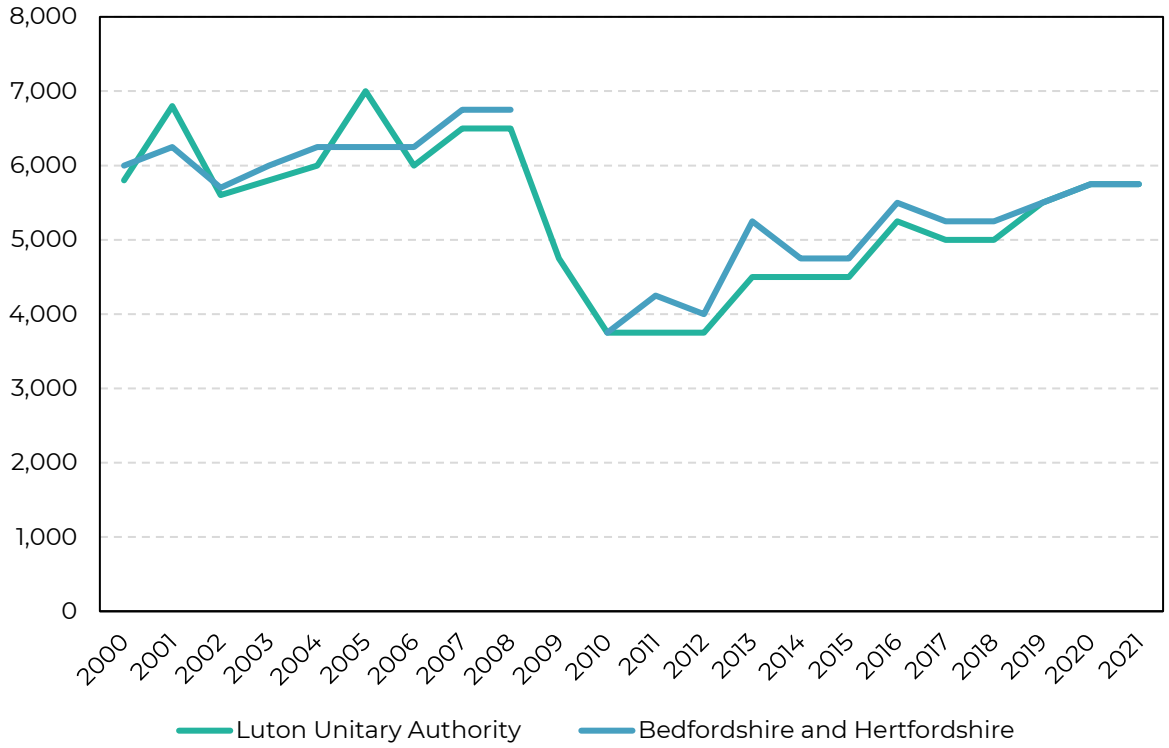
[14] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation
[15] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

"The economic impact results in this report are presented on a gross basis. That is, we estimate and forecast the economic contribution of London Luton Airport, but we do not make any assessment of the extent to which the contribution identified will be additional to what would have occurred in the absence of its future development."

35. The applicant tries to partially address this issue in Chapter 11 of the Environmental Statement through the application of a displacement rate (para 11.9.28). This reduces Oxford Economics' employment forecasts by 5% at the Luton Unitary Authority level, and by 95% at the national level. The same adjustment is not made in the Need Case. This inconsistency, and the tendency of the applicant to refer to the unadjusted data, risks misleading readers. For example, the executive summary of the Need Case (PDF pg.8 points a. to d.) makes a claim regarding "*additional GDP*" which is created "*across the UK*" by the scheme. The applicant's own economic assessment in fact shows that the figures cited in the Need Case are gross, and not net, and as such are incorrectly identified as "*additional*".
36. The 95% displacement assumption applied at the national level seems realistic, and is more or less in line with TAG guidance. There has been no net national growth in air transport sector jobs since 2006.[16] This scheme is not likely to be a creator of jobs at the national level. This features needs to be considered against other scheme impacts, such as on the climate, which are likely to predominantly additional even at the national level.
37. The 5% displacement assumption applied at the Luton Unitary Authority level seems optimistic. Air transport (and supporting services) jobs in Luton Unitary Authority peaked in 2005, and in the wider Bedfordshire and Hertfordshire area in 2007 (Figure 3).[17] Despite a doubling in the number of passengers seen over the intervening period, jobs in air transport (and supporting services) were around 1,000 below their peak in both geographies in 2021.

[16] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation
[17] NUTS UKH2 region

Figure 3: Employees in air transport and service activities incidental to air transport in Luton Unitary Authority and Bedfordshire and Hertfordshire



Source: Business Register and Employment Survey (BRES), SIC2007 codes 51 and 5223 and SIC2001 codes 62 and 6223

38. The Applicant has a history of being over-optimistic in its jobs projections. As evidenced at the 2022 planning inquiry, documentation submitted by Luton Airport associated with a previous expansion application in 2012 dramatically overestimated the scale of employment creation that would result.[18] Halcrow made a central estimate of future employment when the scheme capacity was reached of 13,350 jobs, Oxford Economics, in their latest report for Luton Airport, now suggest that when that capacity was reached in 2019, there were 10,900 jobs at the airport, a shortfall of 2,450 jobs.
39. The adjustment made for displacement in Chapter 11 of the Environment Statement still does not amount to an assessment of the net additional jobs impact of the scheme. The adjustment is made to the jobs impact of the airport operations (i.e. footprint). No aggregate figure for net jobs impact across the

[18] Halcrow (2012) Employment and Economic Assessment. For London Luton Airport Operations Limited. London Luton Airport Planning Application, December 2012.

economy is provided. At various points throughout the Need Case, other job creation figures are mentioned, including jobs created by inbound tourism, and jobs created by business travel. Again, these figures appear not to be adjusted for displacement. These figures are not methodologically robust and will almost certainly not materialise, as discussed above. Moreover, jobs impacts have been chosen selectively, focusing only on potential positive impacts. System-wide impacts such as jobs lost on the high street or in domestic leisure and tourism destinations are ignored. This issue repeats a failure identified by the ExA in its 2019 Manston Airport Report of Findings and Conclusions:

"The ExA therefore concludes and recommends that displacement effects of the Proposed Development would inevitably mean the loss of some jobs elsewhere in the UK, both at a regional and national level. These have not been examined in the same way by the Applicant as the benefits from the Proposed Development have been considered (for indirect and induced, and catalytic jobs)." (p.397)

40. NEF's 2023 report highlights a collection of academic evidence which in fact brings into question whether or not air transport growth drives wider jobs and economic growth at all.[19] The report provides evidence that in less connected, and/or less developed nations, air connectivity can drive employment and productivity growth. But in developed nations, positive impacts are dependent either on a net tourism surplus (not present in the UK today) or business travel growth (also not present in the UK today).

Job quality

41. The quality of the jobs created is also questionable. Wages paid to lower and middle earners in air transport have been declining rapidly in real-terms in recent years. Indeed the Air Transport sub-sector has seen the fastest decline in real wages of any sector in the UK economy between 2008 and 2022.[20] An outstanding question is how wages have changed over time at London Luton

[19] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

[20] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

Airport, and whether the rapid passenger growth seen over the pre-pandemic period translated into improved conditions for workers.

42. The Oxford Economics report suggests that the average wage for London Luton Airport workers in 2019 was £41,100 (see page 17). While there are some methodological issues to consider, it is still informative to compare this with data presented by Halcrow for London Luton Airport in 2012.[21] Table 7.1 of the Halcrow report can be analysed to reveal that the estimated average wage being paid in 2012 was £40,468. This figure can be adjusted for inflation over the period to show that it would be worth £45,423 in 2019. This would suggest that the real wages of airport employees had fallen by 9.5% between 2012 and 2019. Oxford Economics (2019) utilise a different method to Halcrow to arrive at the total level of employment at the airport. This is detailed in Appendix 1 of the Oxford Economics report. It seems unlikely however, that this update to the method used to estimate total employment would result in such a significant change in the average wage of the worker cohort. It seems reasonable to conclude that wage trends at Luton Airport have followed the national picture, and the returns to growth have not accrued to workers. The Applicant might be invited to submit evidence on this matter.
43. A final area of interest is the respective benefit of the wages paid to Bedfordshire workers in relation to so-called 'levelling-up'. Data in the Oxford Economics report shows that in 2019, while the average airport worker was paid £41,100, the average airport worker resident in Luton and Bedfordshire was only paid £30,800. Pay levels received by residents of Luton and Bedfordshire employed by the airport were similar to the average for the county, providing minimal 'levelling-up' of wages in in the region.[22]

[21] Halcrow (2012) Employment and Economic Assessment. For London Luton Airport Operations Limited. London Luton Airport Planning Application, December 2012.
[22] See Oxford Economics report, page 19.

Environmental impacts

Environmental principles

44. The proposed scheme would almost certainly result in significant, unmitigated, short-term damage to the environment and entails a high risk of very significant long-term damage to the environment. It is highly questionable whether the proposed intervention is aligned with the UK government's guiding approach to environmental protection, as set out in the Environmental Principles Policy Statement (EPPS), 2023.[23]
45. **The first principle of the EPPS is that of prevention.** All new greenhouse gas emissions have a negative impact on society and should be prevented if possible. Even if emissions are ultimately re-captured through a technology such as carbon capture (upon which the Jet Zero Strategy relies heavily) this still comes with an opportunity cost to the detriment of society, ie. such technology might otherwise be put to other, potentially more valuable, uses.
46. The proposal from the applicant is to allow greenhouse gas emissions to proceed on the basis that future developments described in the Jet Zero Strategy's 'high ambition' scenario might come to fruition. The majority of these developments are not enforced by any form of binding legislation, and future technological development remains uncertain. No solution is identified for non-CO_2 emissions. The Government describes the Jet Zero Strategy as a "vision" and its preferred scenario represents an "ambition".
47. The Applicant seeks to dismiss aviation emissions as an issue to be dealt with at 'the national level'. In fact, nowhere in policy does the government advocate <u>not</u> considering emissions at the scheme level. *Making Best Use of Existing Runways (MBU)* policy clearly mandates planning authorities to take account of *"all relevant considerations, particularly economic and environmental impacts"*. Nothing within the MBU policy, nor in Jet Zero, sanctions ignoring greenhouse gas emissions in the appraisal process.
48. **The second principle of the EPPS is that of 'rectification at source'.** The applicant does not have means to rectify the climate damage resulting from

[23] DEFRA (2023) Environmental Principles Policy Statement. Policy paper, January 2023.

increased air traffic at the present time. Such technologies may or may not materialise over the next three decades but these are unlikely to address emissions at source (high altitude), rather involving carbon capture at ground level.

49. **The third principle of the EPPS is that the polluter pays.** Under current policy arrangements the polluter will not pay for the large majority of the damage resulting from this application. As it stands, no price is paid by the aviation sector on emissions resulting from flights to non-EU destinations, and no price is paid on emissions of non-CO_2 gases. The price currently being paid by airlines for emissions linked to flights to EU destinations under the UK ETS is currently either zero (where free allowances are provided) or around £60 per tonne (as of August 2023). By contrast, the social cost of carbon has been estimated at around £150 per tonne[24] and the BEIS net zero-aligned carbon value (central) is £252 in 2023, rising to £378 in 2050.[25] Even where a price is paid for carbon emitted, that price is significantly below the true societal cost of carbon.
50. **The fourth principle of the EPPS is the precautionary principle.** This principle states:

"where there are threats of serious or irreversible environmental damage, a lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation"[26]

The Applicant's approach to non-CO_2 emissions runs contrary to the precautionary principle. Scientific uncertainty is used as an excuse not to act, rather than a reason to take preventative action. Neither the Applicant, nor the government's Jet Zero strategy, propose any viable mechanism for mitigating the non-CO_2 impacts of air travel and their impacts are grave, potentially causing more damage than the carbon emissions of the scheme.

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[24] Rennert et al. (2022) Comprehensive evidence implies a higher social cost of CO_2. Nature, 610, 687-692.
[25] BEIS (2021) Valuation of greenhouse gas emissions in policy appraisal. Policy paper, September 2021. Department for Business, Energy and Industrial Strategy.
[26] DEFRA (2023) Environmental Principles Policy Statement. Policy paper, January 2023.

51. There is growing scientific consensus that the climate impact of air travel emissions is roughly two to three times the size of the carbon impact alone.[27] On this basis, (assuming the applicant's emissions figures at Table 12.18 are accurate) the proposed scheme would lead to total carbon equivalent emissions (CO_2e) of between 800,000 and 1.2 million tonnes at its peak (2043), not including arriving flights. This is equivalent (conservatively) to putting between 650,000 and 920,000 new petrol cars on the road.

Assessing proportionality

52. As shown in the simple comparison above, by any reasonable measure, the emissions impact of this scheme is extraordinary. NEF strongly disagrees with the benchmarking process undertaken to assess the scale of the scheme's emissions, which does not reflect the gravity of this impact. It is clearly illogical to compare the emissions of one airport expansion scheme with the carbon envelope of the entire sector. With such an approach, virtually any scheme emissions can be shown to be of small magnitude. The precedent the approach sets is dangerous and if applied more widely would almost certainly lead to the breach of the UK's climate obligations.

Understanding opportunity cost

53. If the emissions associated with this scheme are allowed there will be a short-to-medium term acceleration in planetary warming, with unavoidable negative consequences for nature and society. In order to reach Net Zero, at some future point, larger amounts of, likely expensive, carbon capture will be required.
54. Carbon capture is the fall back of the Jet Zero Strategy, which does not find direct means of reducing aviation emissions to zero by 2050. The Strategy assumes at least 15 million tonnes of carbon capture is deployed by 2050. As a result, additional emissions produced by this scheme come with an opportunity cost involving greater competition for limited carbon capture

[27] Lee et al. (2021) The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018. Atmospheric Science, 244.

technology, potentially crowding out other important sectors, and other less wealthy nations.

55. To embrace this opportunity cost, the economic benefit of the proposed scheme must be overwhelmingly beneficial. It is not. Use of nascent carbon capture capacity to re-capture air transport emissions made from further, non-essential air travel, predominantly taken by wealthy frequent flyers, represents an inefficient and unjust use of capacity and should count against the scheme.

Monetising emissions in the application

56. At various points in the application the Applicant seeks to claim that the climate cost of the scheme should not be analysed in the economic assessment because it is "already accounted for within the demand forecasts" (Need Case, footnote 251, p. 204). This is an oft-repeated claim that is not aligned with government appraisal guidance, as set out in TAG, the Green Book, and supplementary guidance from BEIS.[28] BEIS advise:

"All changes in emissions should be valued by using the carbon values presented in table 3 of the accompanying spreadsheet. This includes emissions captured within trading schemes, such as the UK Emissions Trading Scheme." (p.14)

57. BEIS further clarify that emissions outside of the target framework should be valued, and specifically cite aviation's non-CO_2 emissions as an example.

"Where appropriate, proportionate and possible to identify the impact of the proposal on emissions overseas or that occur outside the target framework (e.g. radiative forcing from aviation), the change in emissions overseas should be valued at the Value of Carbon" (p.16)

58. Forecast models do include assumptions about carbon prices. This is done in order to check that future demand will be robust to any future government policies which increase the carbon price and hence the ticket price. However, such policies are not currently in place, as discussed above.

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[28] BEIS (2023) Valuation of energy use and greenhouse gas (GHG) emissions. Department for Business Energy and Industrial Strategy.

59. Climate costs should be calculated in the economic assessment in order to highlight to decision makers the total cost that will be levied on society as a result of the emissions. As well as helping to guage the level of risk these emissions entail, and their potential for societal damage if not adequately mitigated, this also helps decision makers understand the opportunity cost of the scheme. As the applicant rightly states (para 8.6.1, point e) Need Case) the resource spent on the climate cost of the scheme might otherwise be spent elsewhere in the economy, likely in a more socially advantageous way.
60. As a second order step, analysts can then calculate the proportion of the climate cost that is internalised within the aviation sector. This is the component that, on the basis of current policy, will be paid for, ultimately, by air passengers. In 2022, NEF estimated this proportion at around 26% at Luton Airport.[29] Future policy developments may increase this proportion, and might be analysed as a sensitivity test.
61. The majority of the climate cost of this scheme is not internalised within the aviation sector. This is because non-EU departures and non-CO_2 emissions are not captured under the UK ETS and, in its current design, CORSIA is unlikely to have any material impact on UK aviation. Emissions that are priced under the UK ETS are very significantly under-valued, compared with the true societal cost or value of carbon (or equivalent) emissions.

Cost benefit analysis

62. The applicant's cost-benefit analysis (CBA) -Table 8.8 of the Need Case- is confusing, selective and follows no standard methodology.
63. Key scheme costs are missing, including monetised noise and air quality impacts, as well as non-CO_2 impacts. Noise esimates are particularly relevant given the potential welfare impact on communities of night time flights.
64. The approach taken to ticket prices, and consumer and producer surpluses is non-standard and hence may be flawed. Airport profits are included, but airline losses resulting from the reported air-fare savings are not.

[29] Chapman, A. (2022) The £62bn carbon giveaway [Online]. New Economics Foundation.

65. The applicant has included air fare savings which accrue to foreign residents. The numbers look strange, with savings at the UK level made by foreign residents worth £3.9bn in net present value coming in at more than double the saving made by UK residents of £1.5bn, and making foreign residents the largest beneficiary of the scheme. These numbers require further explanation from the applicant. Interestingly, if the savings made by foreign residents are removed from the applicant's assessment the scheme has a negative net present value.
66. An inconsistency is created by the inclusion of airfare benefits to foreign residents in the CBA. To our knowledge, the applicant has only included the cost of carbon associated with departing flights in the CBA, excluding costs associated with arriving flights (ie. costs experienced by foreign residents). This assumption is based on the description of matters scoped-in in Table 12.6 of Chapter 12 of the Environmental Statement. Including arriving flights would almost double the carbon costs of the scheme. Including arriving flights in the CBA may be justified, as BEIS guidance[30] specifically encourages the inclusion of emissions impacts overseas:

"*the change in emissions overseas should be valued at the Value of Carbon" (p.16)*

67. Valuation of greenhouse gas impacts appears not to have been accurately performed in the scheme's economic assessment. NEF's calculations suggest that the applicant has underestimated the scheme's base carbon cost by around £500m (Table 1). However, as we do not have access to the detail of the applicant's method we cannot be certain where this discrepancy arises.
68. Non-CO_2 impacts have also not been quantified. These issues are skewing the results of the applicant's cost-benefit analysis. A multiplier of 1.7 is recommended by DESNZ in their latest guidance (June 2023) for the purpose of calculating an indicative figure of the full climate cost of emissions.[31] This can be applied to the NEF and applicant estimates (Table 1). However, recent

[30] BEIS (2023) Valuation of energy use and greenhouse gas (GHG) emissions. Department for Business Energy and Industrial Strategy.
[31] DESNZ (2023) Greenhouse gas reporting: conversion factors 2023. Department for Energy Security and Net Zero. https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

research has suggested that the non-carbon impacts of air travel could increase the climate impact by as much as three times.[32] We have also illustrated this scenario as a sensitivity test.

Table 1: Net present value (60 years) of greenhouse gas emissions impacts (aviation only) under different assumptions

	Cost of carbon (departing flights)	Cost of greenhouse gas emissions (1.7x multiplier)	Cost of greenhouse gas emissions (3x multiplier)
Applicant	-£1,535m	-£2,610m	-£4,605m
NEF	-£2,026m	-£3,445m	-£6,079m
NEF including arrivals	-£4,052m	-£6,890m	-£12,158m

Source: NEF analysis of applicant aviation emissions projections. Linear interpolation has been applied between forecast years. Emissions beyond 2050 are assumed to remain constant. Standard Green Book discounting has been applied.

69. Other scheme benefits are overstated, including the assessment of tax impacts which ignores a variety of potential tax losses that are likely to arise, particularly in lost VAT linked to reduced spending in other sectors.
70. The equity of impacts has not been considered and is particularly relevant as the passengers who enjoy the benefits of ticket savings are likely to be wealthier than average. The climate costs, on the other hand, are borne by society at large, and typically experienced disproportionately by poorer citizens with less capacity to adapt. If welfare weighting were applied to the CBA, as per the Green Book (discussed further below), it would further diminish the net balance of the scheme.
71. Taken together, the above issues will serve to reduce the scheme benefits and significantly increase the scheme costs. Given that the scheme's current profile already relies on benefits accruing to non-UK residents to deliver a net positive outcome, it seems highly unlikely that this scheme has net positive social value.

[32] Lee et al. (2021) The contribution of global aviation to anthropogenic climate forcing for 2000 to 2018. Atmospheric Science, 244.

Appraisal practice

72. Robust appraisal practice has not been adhered to by the Applicant. Core sections of the application, such as the Cost-Benefit Analysis presented in the Need Case, diverge from best practice in ways which inflate the attractiveness of the scheme. Running throughout the application is a reluctance to address potential negative impacts of the scheme in a fair and robust manner.
73. The decisions to downplay non-CO_2 impacts and the implications of increased outbound tourism, two of the primary impacts of the scheme, do not align with the high level principles of government impact assessment guidance. Guidance (TAG) clearly states that "*as many of the impacts of a scheme or option as possible*" should be presented in monetary terms in the cost-benefit analysis. Where this is not possible *"supplementary techniques should be used to weigh up non-monetised impacts"*.[33]
74. Insufficient sensitivity testing has been performed. A wide array of key model parameters, elasticities, and multipliers, have not been tested. The decision to focus only on faster and slower growth scenarios misses the point of sensitivity testing. The testing of core model input parameters will provide users with far more information regarding the robustness of the Applicant's assumptions. For example, only one scenario of business productivity impacts is shown in the Need Case, despite the relationship relying overwhelmingly on a single, dated, elasticity estimate. Similarly, only one scenario of inbound tourism impacts is presented, despite the impacts of the pandemic on tourism spending patterns remaining uncertain.

Equity

75. In 2023, appraisal of major transport schemes which result in serious environmental damages must be comprehensive and systemic. Government appraisal guidance has a renewed focus on the equity of impacts. The equity dimensions of the scheme have not been presented by the applicant. Key scheme impacts such as air fare savings, tourism impacts, and greenhouse gas

[33] DfT (2018) TAG Unit A1.1: Cost benefit analysis. Department for Transport

impacts have not been considered through an equity lens. Comprehensive methods for assessing the equity of impacts, such as 'welfare weighting' are discussed in Annex A3 of the HM Treasury Green Book.

76. The scheme will likely exacerbate inequity and run counter to the government's levelling-up agenda. Expanding the existing airport capacity is likely to hurt the UK's held-back regional economies that consistently face a travel and tourism spending deficit while London sees a travel spending surplus.
77. Reducing ticket prices will incentivise air travel, which already enjoys a range of tax exemptions, and encourage household spending to shift overseas and away from the UK high street and domestic tourism destinations. This shift is documented in further detail in NEF's 2023 report, which shows how household expenditure patterns have shifted towards air travel and overseas expenditure over the past two decades.[34]
78. Furthermore, the question of ticket price savings (consumer surplus) should be considered not just in aggregate terms, but also with regard to which groups in society benefit. This can be set against the range of groups which lose out from the scheme's wider costs (environmental and economic). Climate costs are disproportionately experienced by poorer groups in society, in the UK and abroad, with less ability to adapt to new conditions. Frequent flyers, who dominate air travel demand, typically have above average incomes.
79. Much of the Applicant's narrative around its impact focuses on jobs and productivity at the airport and in the Luton Borough. This analysis largely ignores, however, that the airport's higher paid employees predominantly live outside of Luton and Bedfordshire.[35] While the airport undoubtedly employs many Luton residents, it employs fewer air transport workers now than it did in 2006 (see Figure 3). Evidence presented above also suggests these workers are paid less on average than they were ten years ago. This is

[34] See Chapman (2023) Losing Altitude: The Economics of Air Transport In Great Britain. New Economics Foundation

[35] See Figure 10, Oxford Economics (2023) London Luton Airport Expansion.

supported by national data which shows that since 2006 there has been extraordinary suppression of lower and middle income air transport workers' wages. These trends have all played out despite rapid growth in passenger numbers. The extent to which further passenger growth will contribute to the prosperity of deprived communities in Luton and Bedfordshire is questionable. What benefit might be derived from local (likely low paid) job creation must be set against the noise, air quality and climate change impacts of the scheme, all of which are likely to penalise some of the most deprived areas of Luton the most.

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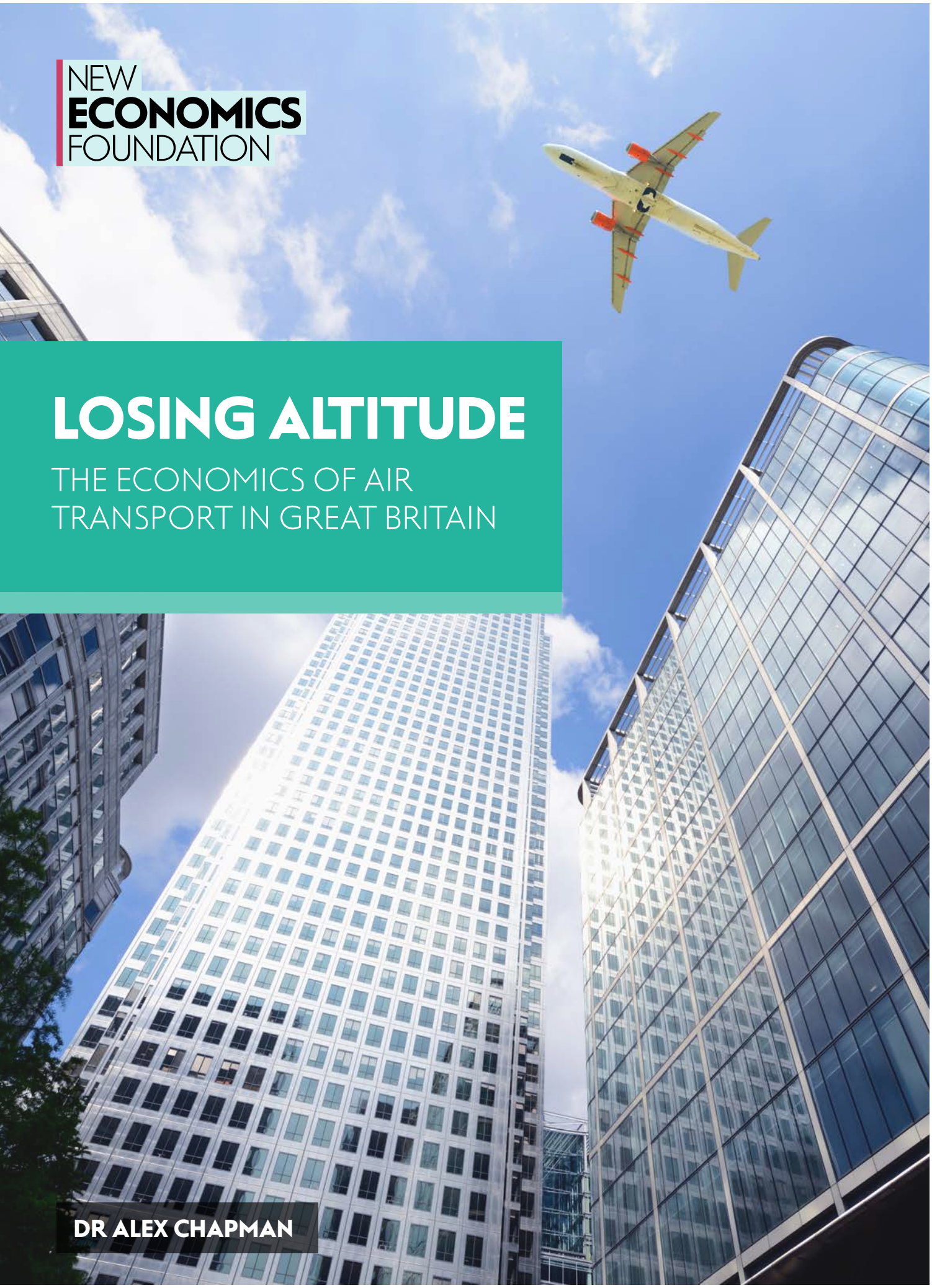
Appendix A – Losing Altitude: The economics of air transport in Great Britain

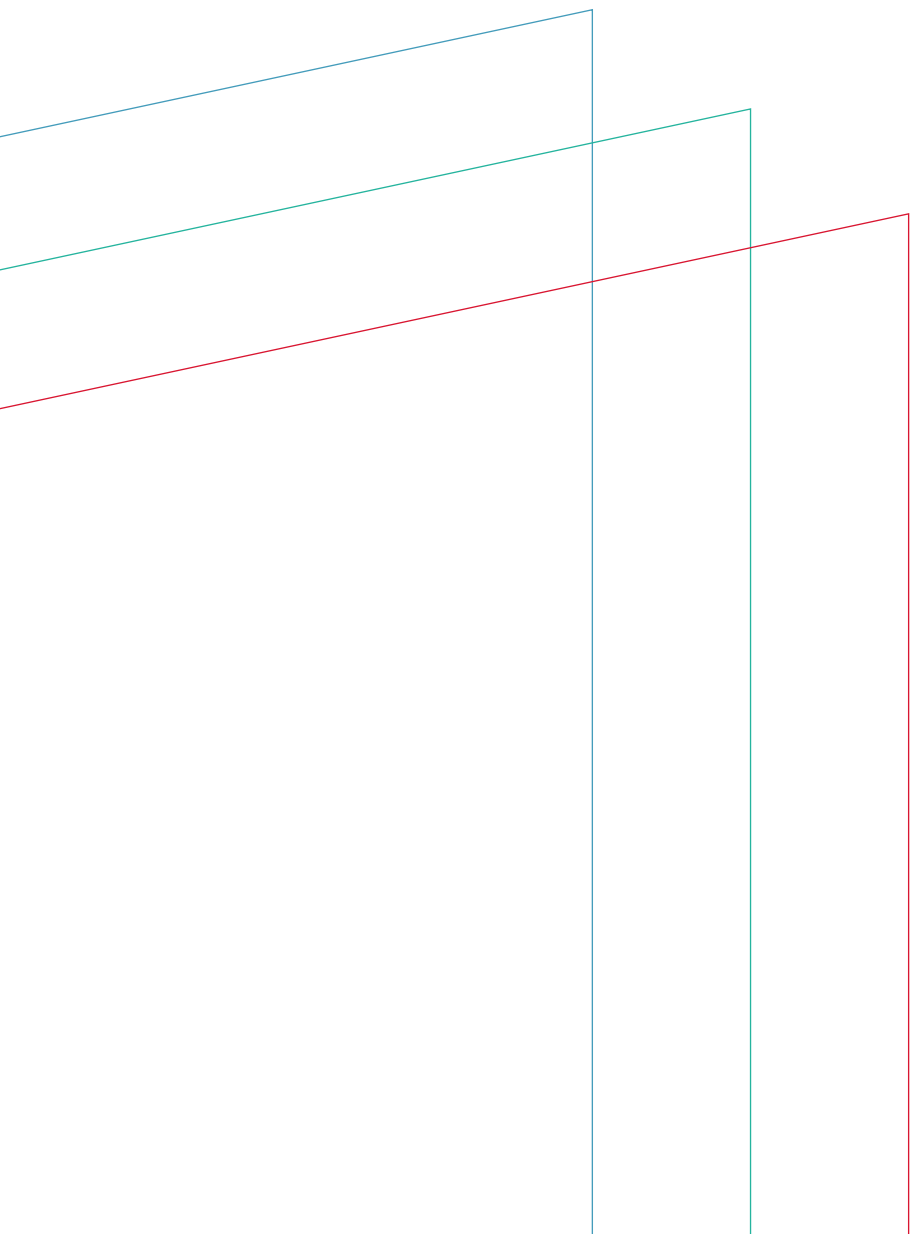
NEW ECONOMICS FOUNDATION



LOSING ALTITUDE

THE ECONOMICS OF AIR TRANSPORT IN GREAT BRITAIN

DR ALEX CHAPMAN



CONTENTS

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

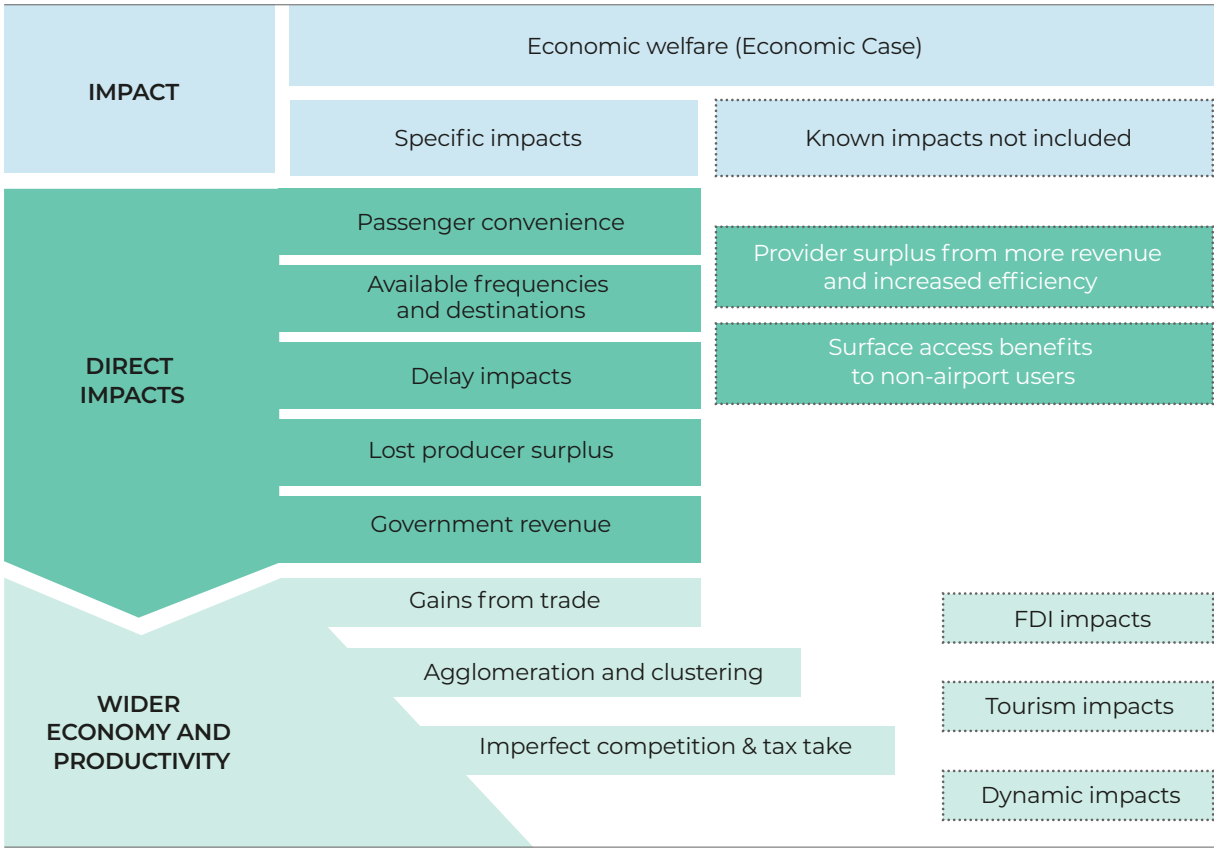
To date, the UK government has maintained a position of general support for air transport growth, but has, at least in theory, delegated ultimate decision-making on individual airport expansion schemes to planning authorities. Somewhat confusingly, however, one of those bodies is the Planning Inspectorate 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 2018[13] and 2020[14]), 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.

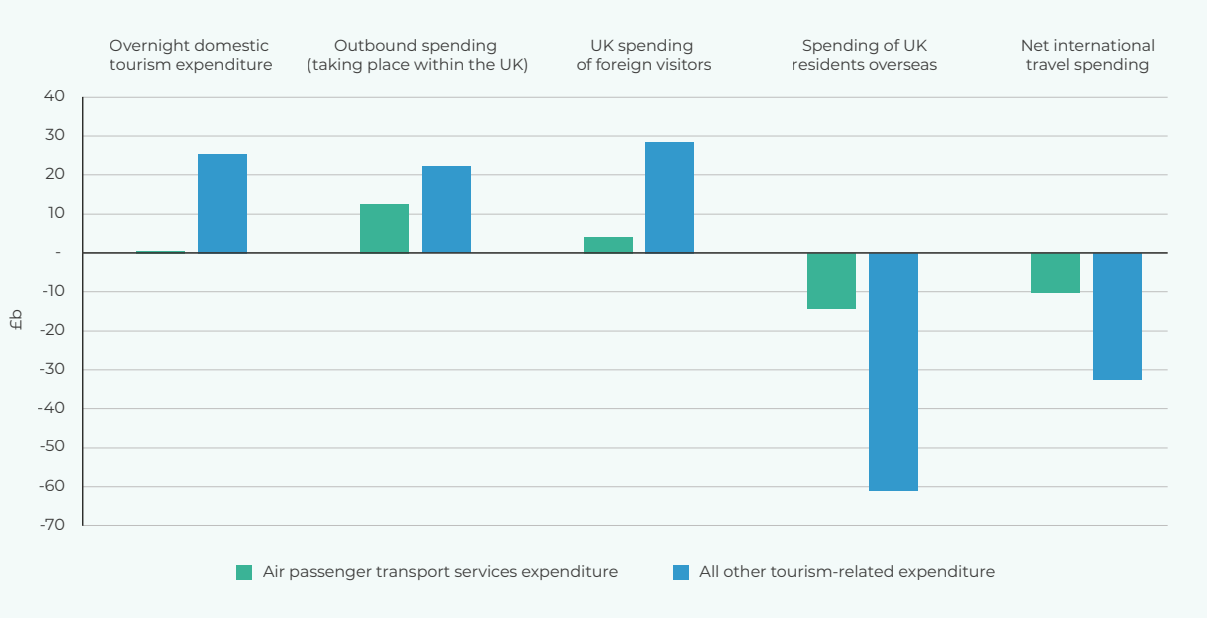
While air transport undoubtedly employs many people in the UK, figures on the footprint of air transport in the economy do a poor job of describing the net impact of air transport on the economy. More than half (£12.5bn or 57%) of the £22bn figure cited by the government represents spending on flight 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 Satelite 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, specifically[20]:

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).

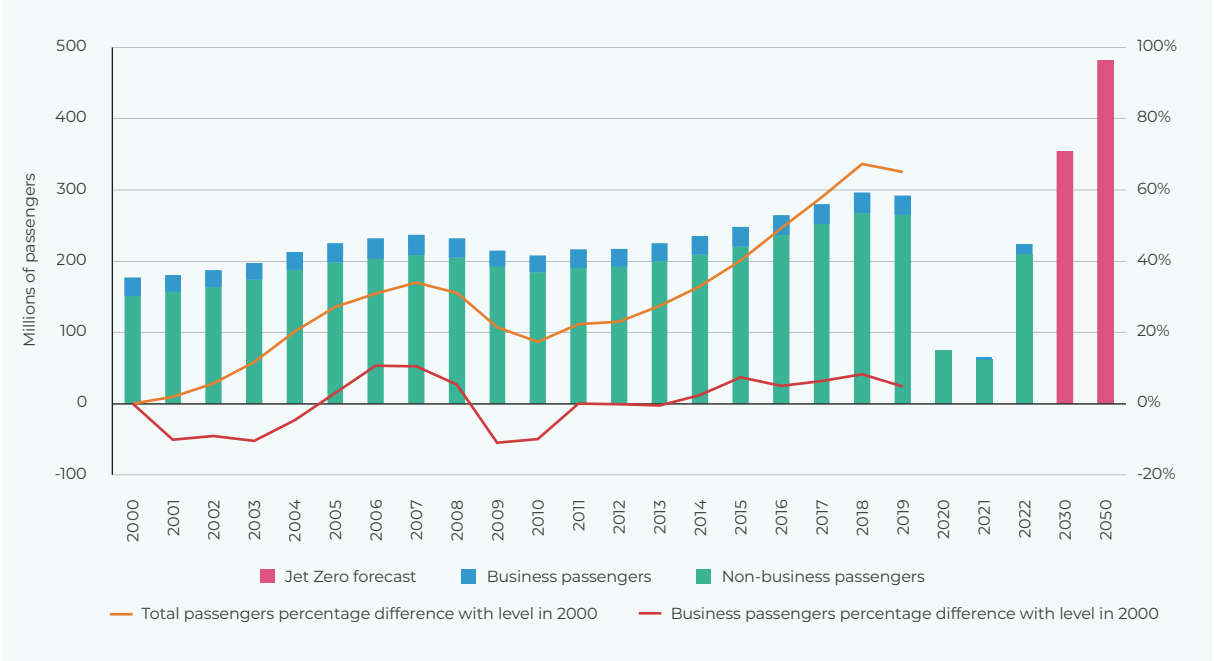
3. THE FOOTPRINT OF AIR TRANSPORT IN THE BRITISH ECONOMY

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 Travelpac 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. Substition 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.

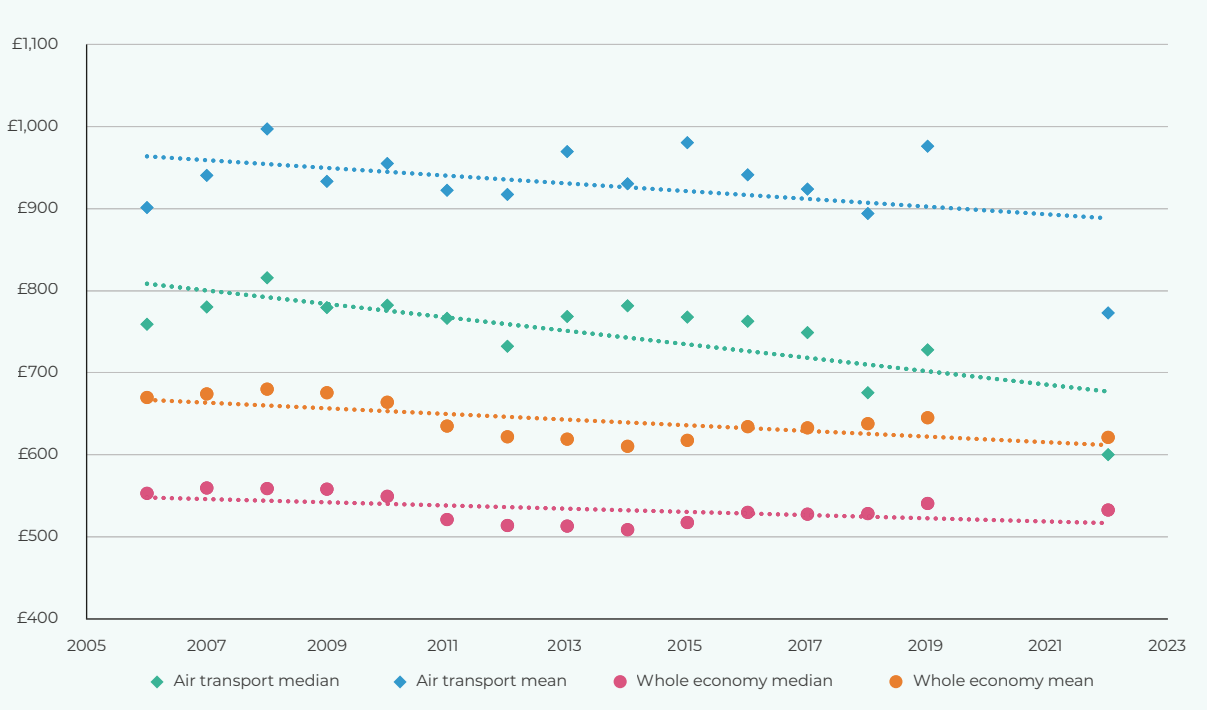
The ONS employment effect estimates imply that for each additional £1m of air transport sector revenues, around 7.5 direct and indirect jobs were produced in 2015. Those sectors performing worse than air transport predominantly constitute highly specialised manufacturing sectors as well as gambling, 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.

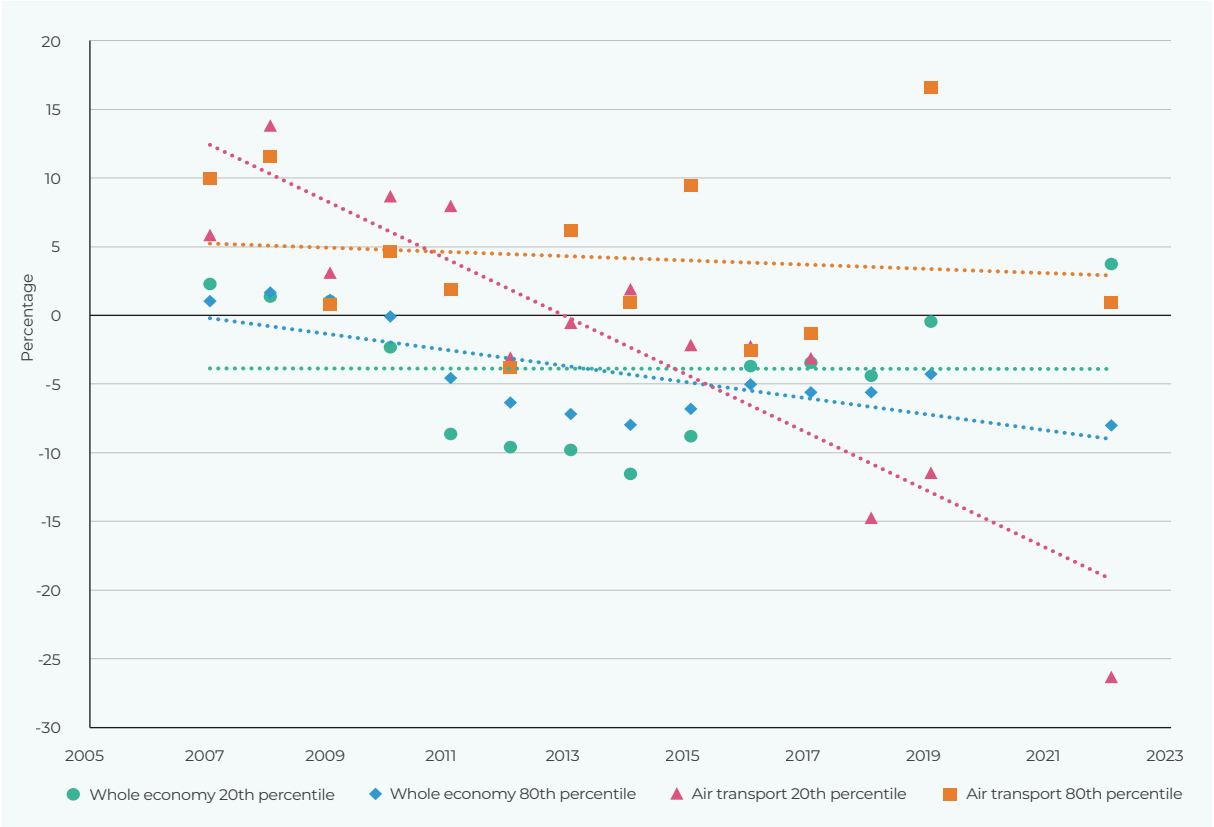
iv Gross weekly median pay is adjusted for inflation using the ONS CPI index. The choice of 2008 as the start point for the analysis reflects that 2008 was the earliest year for which comparable sectoral breakdowns were available following the shift from SIC 2003 to SIC 2007.

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.

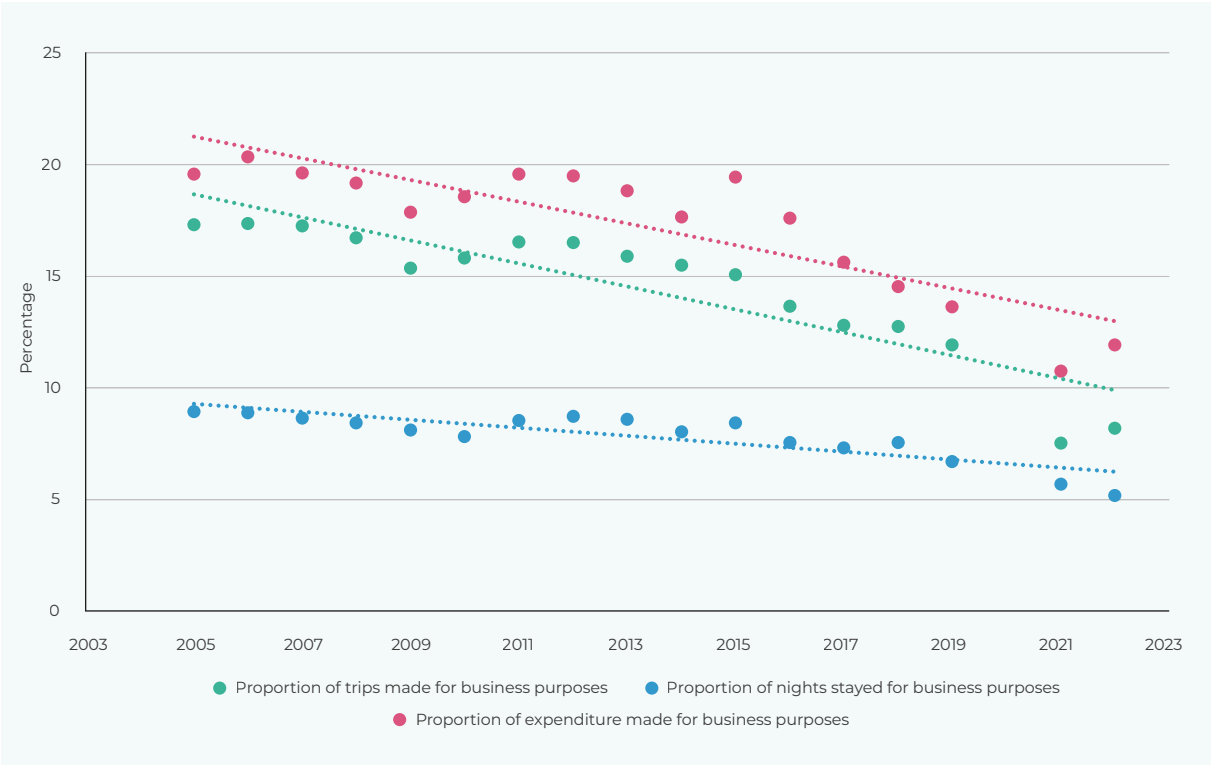
Air transport ranks slightly better when it comes to impacts on GDP, ranked 33rd out of 105 sectors in 2019 (the most recent data available) in the ONS ranking of output multipliers. In other words, each additional £1m of turnover in air transport produced £1.8m of total economic output in the economy 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 Travelpac

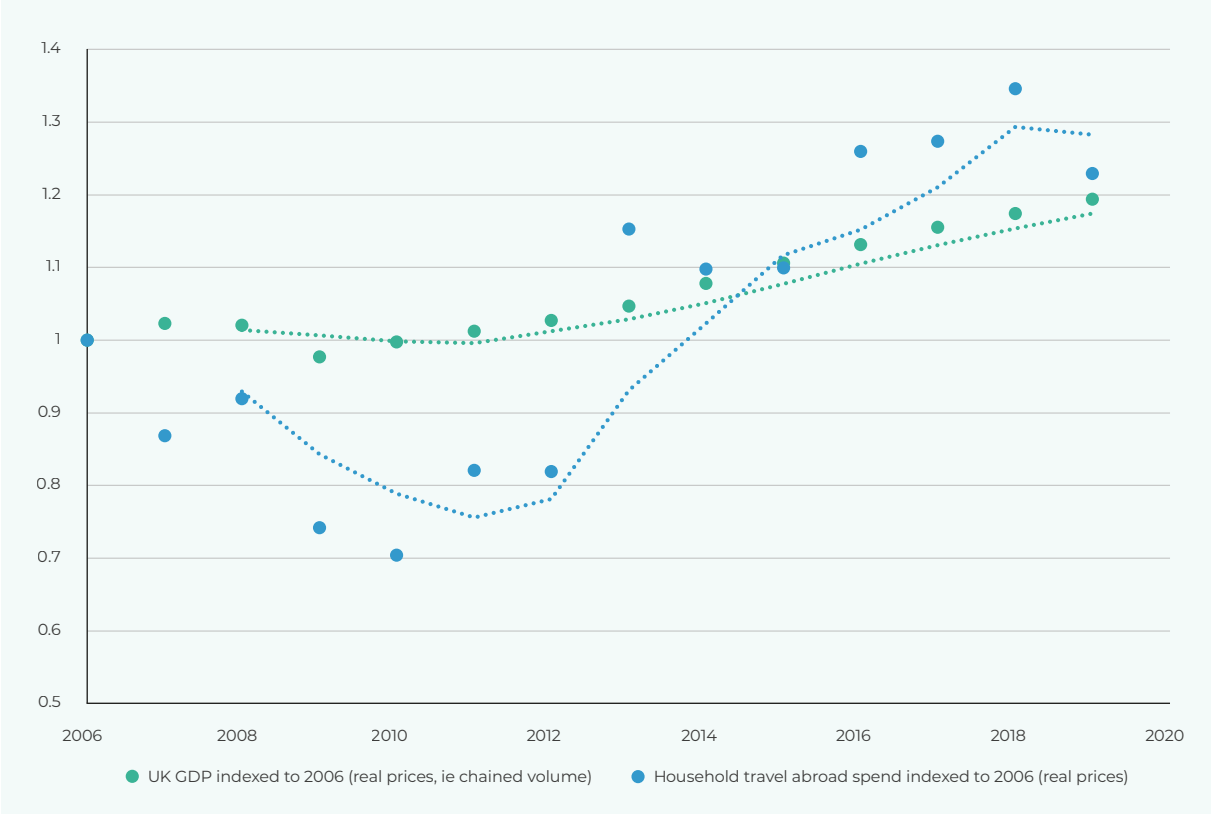
market, as well as the industry's use of imported jet fuel. In sectors which add significant value to their imports, and/or also export a significant amount of their output, such reliance might not be a problem. But air transport performs neither of these functions and indeed ranks third lowest out of 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 Travelpac 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.

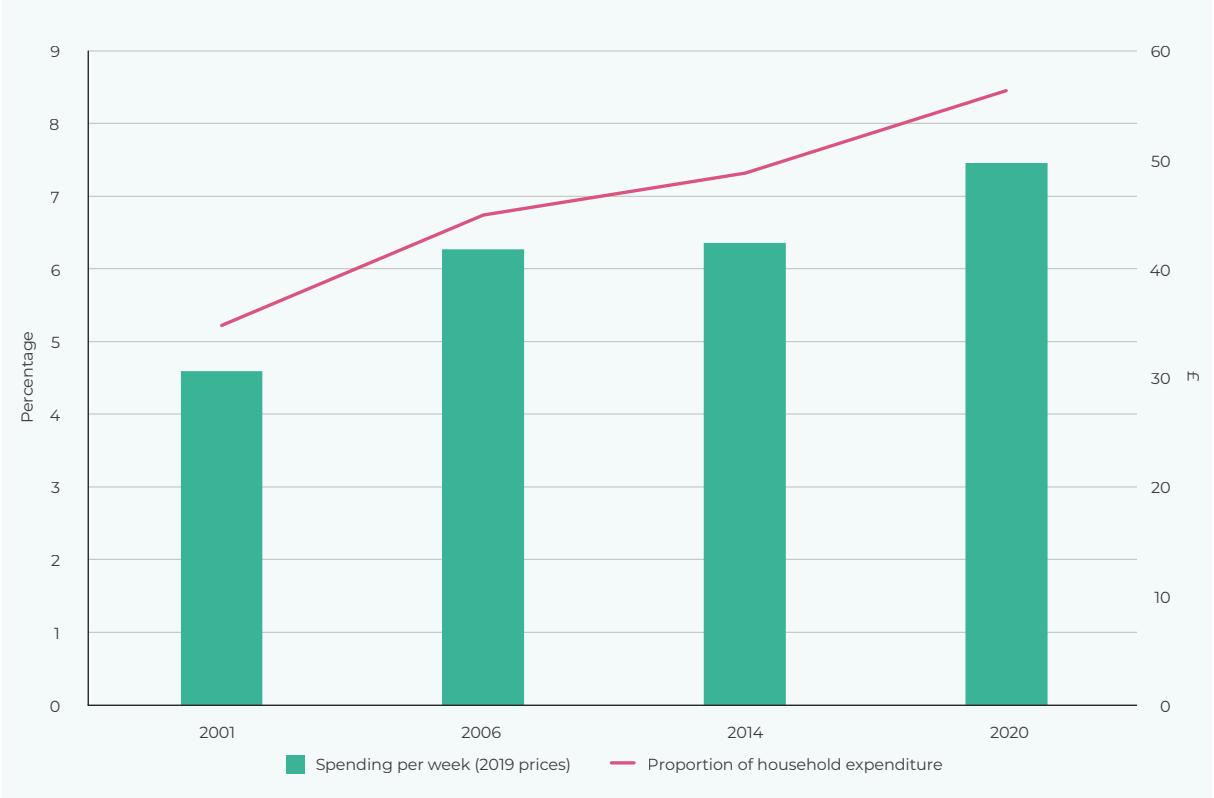
FIGURE 8: HOUSEHOLD EXPENDITURE ON INTERNATIONAL TRAVEL AND GDP (CONSTANT PRICES) INDEXED TO 2006 WITH A THREE-YEAR MOVING AVERAGE SHOWN



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 prices[28]; 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 effect 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.

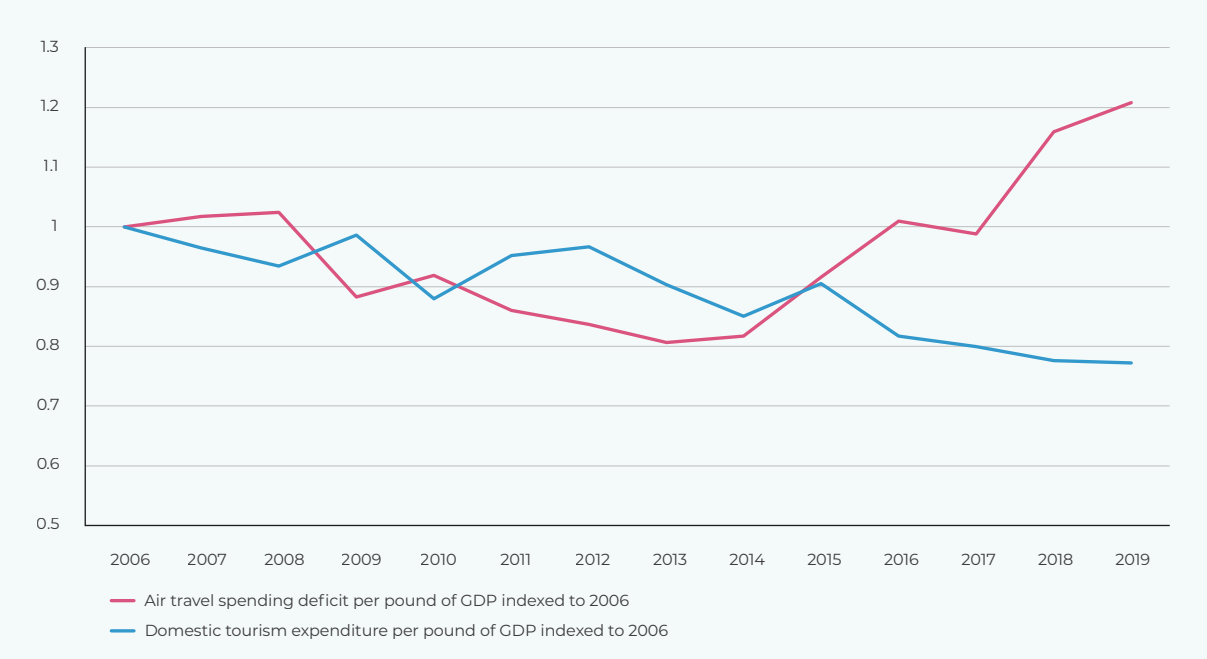
62% of passengers travelling on international sea routes, and around 60% of passengers utilising the Channel tunnel.

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 communities[37]; 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:

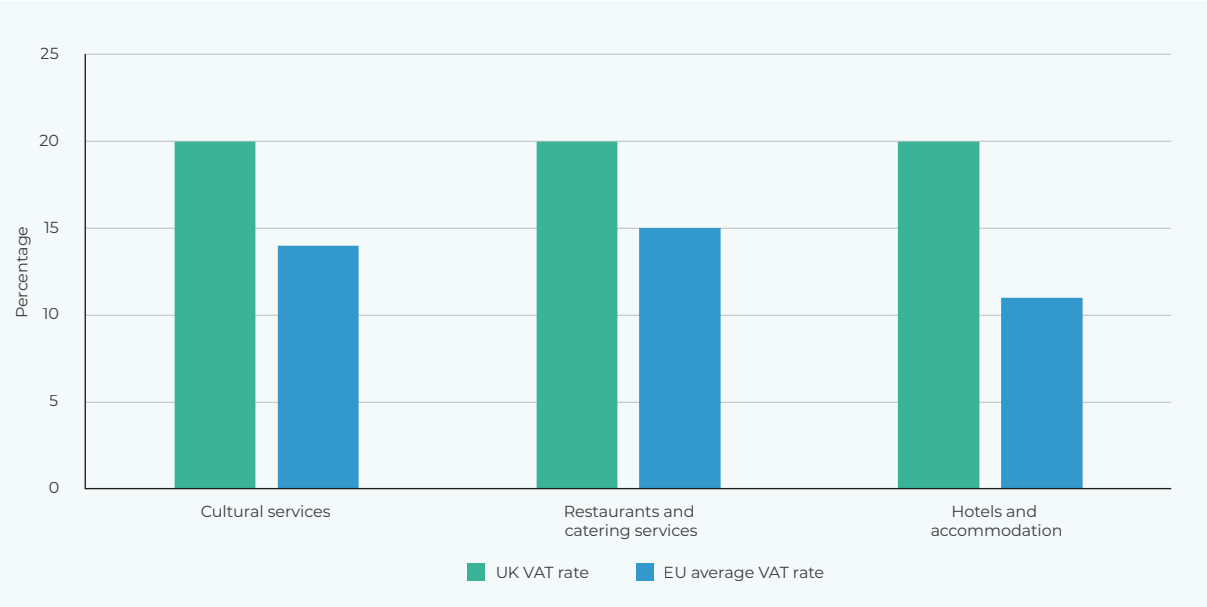
> *VisitBritain believes that in order to mitigate the environmental impact of outbound tourism, there should be more emphasis on encouraging British tourists to holiday at home and reduce the outbound tourism deficit.*[39]

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]

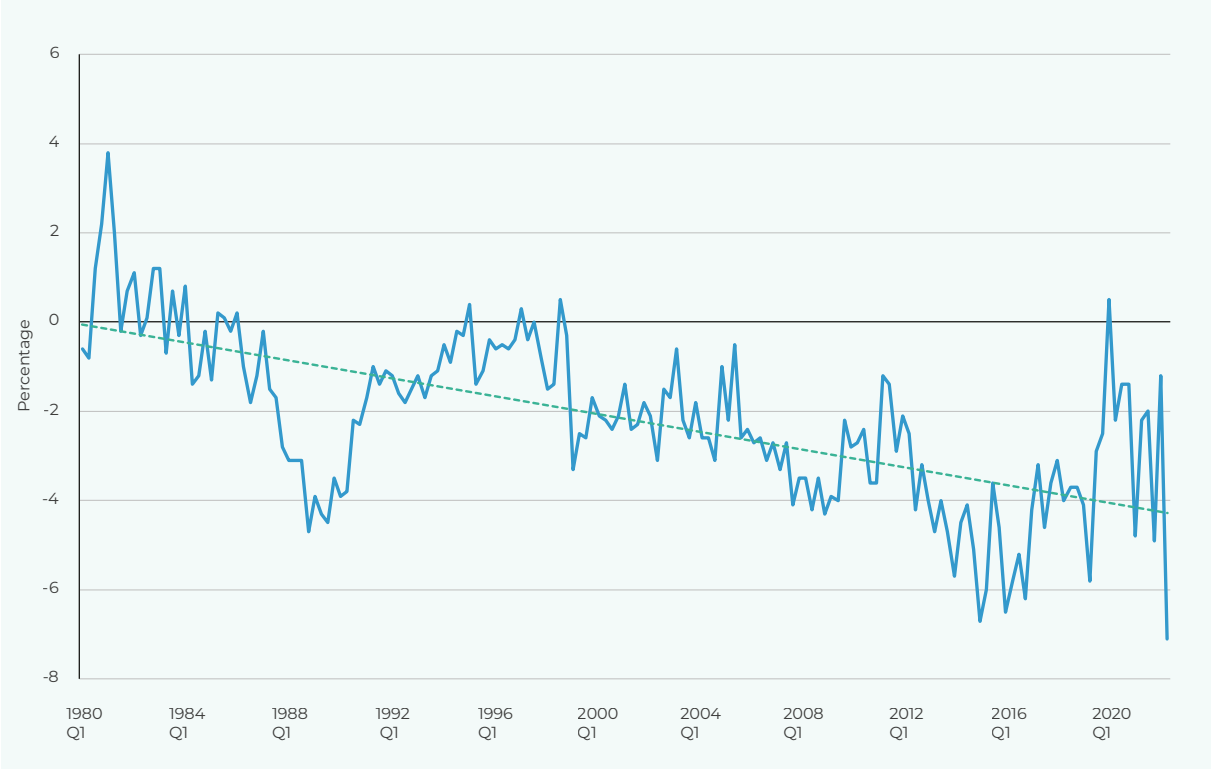
The regional imbalance delivered by the current policy bias is further compounded by the nature of inward flows of spending by foreign residents. While the UK as a whole operates a travel spending deficit, at the sub-national level there is significant variation. New NEF analysis of ONS data highlights 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 Küçükönal and Sedefoğlu (2017) who found no causal relationship in their OECD

sample data spanning 2000–2013,[52] and Mukkala 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 re-inforces 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 Travelpac (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*

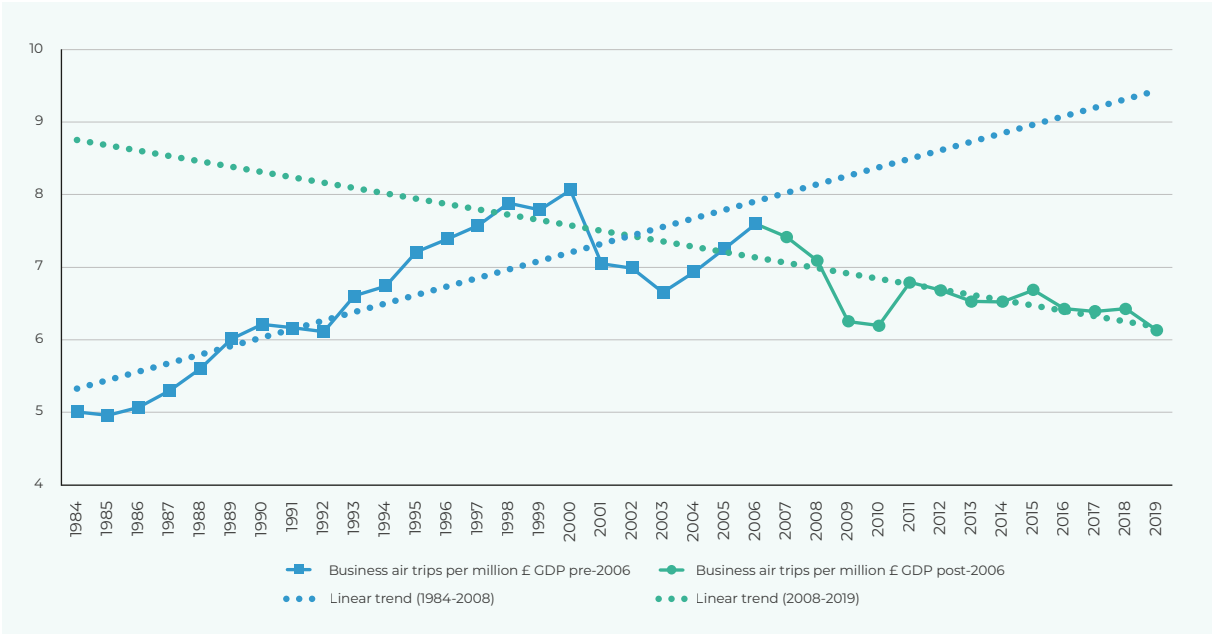
With the benefit of data spanning the period post-2008, it now appears that a shift in the relationship between the wider UK economy and the business travel sector took place between 2000 and 2006 (Figure 13). The precise pivot point is obscured by the impact of 9/11 terrorist attack in the USA in 2001, 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 Travelpac

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. *Journal of Transport Geography, 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). *Factors influencing domestic tourism in the UK and abroad and the role of publicly funded domestic tourism marketing*. 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. *Applied Economics, 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. *Journal of Applied Business and Economics, 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. *Tourism Management, 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. *Tourism Management, 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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