NORTHPOINT
Aviation, Travel and Tourism Consultants

DEVOLUTION OF AIR PASSENGER DUTY TO WALES

Llywodraeth Cymru
Welsh Government

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EXECUTIVE SUMMARY

I. This report examines the potential market, competition and economic implications of devolving Air Passenger Duty (APD) to the National Assembly for Wales; and in particular compares the outcomes of different APD regimes[1] on Cardiff International (CIA) and Bristol Airports and on the economies of South Wales and the South West of England.

II. The analysis examines the catchment areas of Cardiff, Bristol, Heathrow and Birmingham airports; uses the most recent CAA data available (2015) and develops high-level forecasts using a simplified methodology based on DfT and IATA growth rates and fare/price elasticities. It presents indicative economic appraisals based on projected passenger performance for different types of route and travel time metrics from urban centres across South and South West Wales and the South West of England. The latter are derived using relevant road journey time software and public transport timetables to Cardiff and Bristol airports.

III. In carrying out the analysis, we have considered the reports[2] authored by York Aviation that were commissioned by Bristol International Airport and submitted to the UK Government in 2015 in response to its consultation on the options for supporting English regional airports from the impacts of air passenger duty devolution[3,4]. Those reports, and their conclusions, are referred to in this document.

IV. The assertion made by York Aviation in its report for Bristol Airport that Cardiff and Bristol airports essentially serve the same aviation market because their catchments overlap substantially is examined in some detail as it is crucial to the subsequent market assessment. It results in the following clear conclusion: Using one single 90-minute catchment metric for all types of service, does not reflect industry conventions in relation to domestic and short haul international services, which in turn significantly affects the validity of the analysis undertaken and the conclusions drawn from it. This report adopts a more finely grained analysis of catchment areas, and associated demand is offered based upon the analysis of different types of traffic and a more in-depth review of travel times. The result is that there are two distinct catchments which are clearly discernable, at least in the case of domestic and international short haul traffic, which currently makes up the bulk of the current passenger traffic at both airports.

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[1] Figure 15

[2] York Aviation: *The Impact Of Devolving Air Passenger Duty To Wales – A Fair Flight*; for British International Airport (2016); and its sister report looking at devolved long haul APD.

[3] HM Treasury: *Discussion paper on options for supporting English regional airports from the impacts of air passenger duty devolution* (2015)

[4] HM Treasury: *Options for supporting English regional airports from the impacts of air passenger duty devolution: summary of responses* (2015)

V. This study captures the current picture of passenger patterns across the two focus regions (i.e. the south and south west of Wales, and the south west of England), and then explores the issues arising through the lens of various policy scenarios for APD, before offering estimates of the number of additional passengers generated at Cardiff under different APD scenarios. By 2025, these outline forecasts predict between a 15% - 30% increase in passenger throughput at CIA and variable impact on the differentiated domestic, short haul and long haul markets under consideration. An additional Scenario (No. 6), wherein a 100% reduction in APD is combined with additional route development incentives, is projected to achieve a near 50% increase in passengers. This translates into 658,000 additional passengers per annum using Cardiff airport by 2025.

VI. The report goes on to offer summary estimates of economic benefits that would arise in 2025 to the Welsh economy under the six APD scenarios modelled. Depending on the discount rate adopted and the period over which they are assumed to arise, in Present Value terms, cumulative benefits are likely to be multiples of 5 to 15 times the size of these figures (i.e. an estimated range between £8m -£135m). These outturn results make no assumptions about the stimulation of demand arising from the associated price discounting — simply providing an estimate of existing economic benefits that might be repatriated to Wales as a result of route networks being enhanced at Cardiff Airport on the back of APD reductions; thereby improving the efficiency with which existing air passengers can access air services and hence their productivity.

VII. Given the greater density of traffic at Bristol of most routes served, or likely to be served from Cardiff (typically the passenger ratio is 4:1), and the higher average fares it generates[5], with the possible exception of Scenario 6, this study does not expect Bristol to lose any routes or any material frequency from its current network. It is worth noting that traffic from the South West of England makes up 0.3% of domestic, and 0.4% of international short haul traffic, using Cardiff Airport. So, even if the removal of APD generated a 25% increase in this east-west moving traffic, the numbers will remain de-minimis (less than 100,000 or 1/80th) of Bristol's forecast traffic in 2025.

VIII. A big part of the assumptions underpinning the economic losses projected by the York Aviation report for Bristol Airport is that the recaptured traffic represents significant percentages of current leakage from Wales to Bristol. The report tabulates this in some detail[6] and finds that it represents only a modest percentage of the total passenger throughput at Bristol.

IX. Hence it seems reasonable to conclude that the 'clawback' of traffic that would be generated by changes to the rate of APD in Wales would have only marginal impacts

[5] Figure 22
[6] Figure 17

on services from Bristol. And even if load factors at Bristol drop by as much as 10-15%, the likelihood is that other lower priced demand from within the south west is likely to come forward to replace it. This analysis casts serious doubt on the scale of traffic, frequency and route reductions predicted by York Aviation and their projections of economic losses likely to arise as a result of them.

X. The answer also does not lie with traffic originated from the South West of England migrating to Cardiff either. South West passengers make up only 0.3% of domestic, and 0.4% of international short haul traffic using Cardiff Airport, even if the removal of APD generated a 25% increase in this East-West moving traffic, the numbers will remain de-minimis (less than 100,000 or 1/80th) in terms of Bristol's forecast traffic in 2025.

XI. As a result, significant questions must be raised about the accuracy of projections presented by York Aviation in their report for Bristol Airport around the economic losses to the South West region of 1,500 jobs and over £800m of GVA. It appears that the basis for the figures are a series of worst case assumptions, which have been compounded together to generate numbers of a completely different order to what we have calculated. For example they have assumed large numbers of existing services will be lost, include long haul services that Bristol *hopes* to attract but doesn't yet exist, and uses very high elasticities in their calculations. This report finds that individually and cumulatively, these assumptions are not credible and that in broad terms the actual figures are more likely to be in the order of 100 jobs and £2.5m a year in GVA in terms of domestic and short haul routes and around 500 jobs and £3m GVA per annum associated with long haul services.

XII. Moreover, it should be noted that this does not represent a net loss to UK plc, but rather a transfer of a small amount of economic activity from the Bristol area, one of the higher performing parts of the UK economically, to South Wales much of which has Assisted Area status. The transfer arises because Welsh originating air passengers currently find it necessary to use services from Bristol (and Birmingham and London Airports) because they do not have the choice of using alternative services from Cardiff. Hence arguably reductions to the level of APD in Wales could be regarded as a means of addressing current market inefficiencies and environmental externalities arising from emissions associated with longer surface travel to other airports, both of which impose material costs on users and the Welsh economy.

XIII. The working assumption, when undertaking analysis to look at the long haul market, is that a 90 minute drive time catchment should be used as a standard basis for assessing existing market demand (connecting or point to point). As an accompanying catchment map illustrates, there is substantial overlap between Cardiff and Bristol airport's long haul catchment, perhaps implying that either

airport could serve long haul routes from the South Wales and much of the South West catchment area of England[7].

XIV. However, when considering the ability of long haul operations based at Bristol or Cardiff airports to capture some of this market locally, nearly a million potential passengers in Dorset, Wiltshire and parts of Gloucestershire can be effectively ruled out because of they have easier access to Heathrow and Gatwick; placing the focus of South West demand in Bristol, Somerset and Devon. The former two and the Cheltenham/Gloucester cluster (being well within the 90 minute drive time to Cardiff as well as Bristol), present a potential market of 1.6m passengers in addition to the 840,000 passengers in Wales; this means that overall around 2.5m passengers could theoretically be served from either airport[8].

XV. Considering the key destination markets and how they might be served (e.g. India, the Far East and Australasia will be served either via a Middle Eastern hub from Wales/South West or from Heathrow/Gatwick - direct or with a stopover en route), and taking into account the agreement already reached with Qatar, the study envisages that New York, Toronto and Doha are the potential prime long haul opportunities in the short to medium term, with possible alternatives including Istanbul (Turkish), Emirates (Dubai), Rouge (Toronto), and Boston (Jet Blue) or Chicago (Norwegian/United)[9].

XVI. Interestingly, with between c40% of projected traffic on the New York and Middle Eastern routes, and with 25% of forecast passengers to Canada, Wales over-performs in terms of projected market share, in both the baseline and APD discounted analyses. But more importantly, it is considered unlikely that the equipment the assumed carriers to New York and Doha will probably wish to use can operate without material payload penalties from Bristol because of its short 2,011m elevated runway. Only the Turkish destination appears to offer a good unalloyed opportunity for Bristol.

XVII. In economic terms, conceptually benefits can be considered to be a function of stimulated demand (i.e. additional 'generated' traffic), and time and travel cost savings from flying out of Cardiff or Bristol vs the next nearest airport (assumed to be Heathrow) offering services to the same destination market. Surface travel to Heathrow would incur an additional 90-180 minutes drive away for most of the catchment. The allocation of economic benefits of a new long haul service from South Wales or the South West between Bristol and its wider city region, and Cardiff and the rest of South Wales, depends in part on the airport chosen, but also the trade off in terms of time and costs that South West passengers incur along the M4/M5 corridor travelling to Cardiff rather than Bristol. These are likely to substantially

[7] Figure 4
[8] Appendix L
[9] Appendix L

exceed similar costs for Welsh passengers driving to Bristol, especially those originating west of Cardiff.

XVIII. Hence although the economic evaluation marginally favours Cardiff over Bristol, this is less important in overall terms than operational considerations that certainly do. But compared to using Heathrow, the economic benefits accruing for long haul passengers of a service provided locally at Cardiff will be substantial. And in this case, the South West will gain nearly as much additional benefit overall as Wales from a regionally based long haul operation, because the passenger volumes using it from the South West will be larger than Wales and the benefits accruing per passenger only slightly smaller.

XIX. This represents very different analysis to that presented by York Aviation's report for Bristol Airport. Ours suggests that the effect of removing long haul APD will be modest in terms of stimulated or redistributed demand, but the effect on airline yields will be material; making it more likely they will be willing to commit to a regional service serving Wales and the South than if such an incentive did not exist; however, we also maintain that such a service, if based out of Cardiff will be of benefit to both parts of the combined long haul catchment area.

1. INTRODUCTION

1.1. The purpose of this report is to examine the potential market, competition and economic implications of devolving Air Passenger Duty (APD)[10] to the National Assembly for Wales; and in particular to compare the outcomes of different APD regimes on Cardiff and Bristol Airports and on the economies of South Wales and the South West of England. Our analysis is based on the fundamental cornerstones of:

- Accurate GIS-based analysis of the catchment areas of Cardiff, Bristol, Heathrow and Birmingham airports;
- 2015 CAA Passenger Survey data, which included material sample sizes from all four airports (and Gatwick, Stansted, Luton and Manchester);
- Forecast modelling using DfT and IATA growth rates and fare/price elasticities; and
- Economic appraisals driven by modelled passenger performance and travel time metrices from urban centres across South and South West Wales and the South West of England derived using relevant road journey software and public transport timetables to Cardiff and Bristol airports.

1.2. In carrying out the analysis, we have considered the reports11 authored by York Aviation that were commissioned by Bristol International Airport and submitted to the UK Government in 2015 in response to its consultation on the options for supporting English regional airports from the impacts of air passenger duty devolution[12,13]. Those reports, and their conclusions, are referred to in this document.

1.3. The report is formed of a further eight chapters following this Introduction and also contains a number of Appendices:

- Catchment Analysis
- Data and Methodology
- An Assessment of the Impacts of Changes to APD on the Welsh Economy
- An Assessment of the Effects of Changes to APD on the Economy of the South West of England
- An Assessment of the effects of APD on the Disposition of Long Haul Services between Cardiff and Bristol Airports
- Potential Catalytic Effects of Changes to APD
- Benchmarking Analysis
- Conclusions

[10] Appendix A sets out current rates and bands
[11] York Aviation: *The Impact Of Devolving Air Passenger Duty To Wales – A Fair Flight*; for British International Airport (2016); and its sister report looking at devolved long haul APD.
[12] HM Treasury: *Discussion paper on options for supporting English regional airports from the impacts of air passenger duty devolution* (2015)
[13] HM Treasury: *Options for supporting English regional airports from the impacts of air passenger duty devolution: summary of responses* (2015)

- Appendices

1.4. Further auxiliary work was undertaken as background to this report, which reviewed the findings of two reports prepared by York Aviation for Bristol Airport. This provided the WG with a detailed analysis of the assumptions and methodologies used by York Aviation. Where appropriate, references to this work have been made throughout this document.

1.5. This report focuses on providing analysis based on more up to date (i.e. 2015) passenger data and on a more sophisticated and fine-grained view of catchment areas associated with different types of air service. It does not rely on a single 'aggregate' drive-time isochrone, nor does it use any of the more speculative methodologies and assumptions presented by York. The findings of the two analyses and consequently their conclusions are materially different as a result.

1.6. Arup, in association with ICF, were commissioned by the Welsh Government to undertake a review of the analysis undertaken by Northpoint Aviation to support the case for the devolution of APD to Wales. Arup and ICF support the principle established by this report that reducing APD on flights from Wales has the potential to deliver substantial economic benefits with limited implications for airport competition. The review concluded that there is sufficient evidence to warrant further evaluation as part of the preparation of the business case for APD devolution. To supplement the work undertaken so far, and strengthen the analysis in this report, Arup and ICF have recommended airport choice modelling is undertaken which takes into account catchment area and the current pattern of demand and price. This work is currently being undertaken and will be published alongside this report as supplementary evidence.

2. CATCHMENT ANALYSIS

Matching Air Travel Markets to Catchment Areas

2.1. The starting point for any objective catchment analysis is an understanding of the standard travel time isochrones that are used by airlines to consider the size of the potential market for different types of air service[14] at each airport, as it is this which will have a major impact on whether and where an airline chooses to deploy its aircraft. The core assumption in the York Aviation report for Bristol Airport was that a single 90 minute drive time isochrone can be adopted for all types of service, and that competing catchments associated with major airports elsewhere (e.g. London's Heathrow and Gatwick and Birmingham International) should not be considered to materially affect the analysis. This report has endeavoured to adopt a more multi-faceted and differentiated analysis. This reflects long established industry experience that disparate market segments typically do not have a common catchment area, but rather divergent ones that reflect the different characteristics of the traffic and the ability of the service to draw from, and be sustained by, the geographical area of the airport.

2.2. There are several categories of air service that can and should be considered; these include:

- Lifeline and thin route domestic services (30-45 minutes flight time)
- Domestic and near European routes (45-90 minutes flight time);
- International short haul to hub airports, major business centres, city break and holiday destinations in the EU (90-180 minute flight time)
- Ex EU short haul and mid haul destinations (120-240 minute flight time)
- Short haul inbound tourism (60-120 minute flight time)
- Long haul (Over 240 minutes flight time)

2.3. In terms of APD distance banding, Band B is commonly associated with the last of these categories, Band A with the remainder. Based on these considerations we have developed a simplified catchment typology in Table 1.

[14] The length of travel passengers will on average be willing to make to access different types of air service

Table 1: Typical Drive Time Isochrones for Different Types of Air Service

Type of Service	Travel Time in Minutes	APD Banding
Domestic and Lifeline Services	30-60	A
Hub Airports and Major Business Centres in EU	45-75	A
Primary Short Haul Outbound Leisure (Sun and City Break) Destinations	60-75	A
Secondary Business Destinations in the EU	60-90	A
Inbound Leisure	60-90	A
Secondary Short Haul and Primary Mid Haul Outbound Leisure Destinations	90-120	A
Long Haul	120-180	B

2.4. The ranges of drive times under each type of service shown above, allows for variability depending on factors such as the size of airport, the scale and density of population and the morphology and topography of the area in which it is located, the quality of surface access links, the proximity of competitor airports and their drawing power. So in the case of South Wales and the South West, substantial urban areas are balanced by low density rural areas that are not easy to access, and whereas Cardiff has no competitor airports west of it, Bristol has Heathrow and Gatwick less than 2 hours away to the East and Birmingham 90 minutes to the North. The other material factor that is relevant to the catchment dynamics between South Wales and the South West of England is the physical barrier represented by the Severn Estuary and the material tolls levied for crossing into Wales[15]. In terms of value of time considerations, this equates to a surface journey length of an extra 30-60 minutes for a leisure passenger and 5-10 minutes for a business flyer, although since the analysis supporting this report was undertaken, the UK government has announced that tolls will be abolished on the Severn Crossing by the end of 2018[16].

2.5. The methodology we adopted, which was designed to facilitate a high level comparative analysis focused on a number of broad market segments[17] and two principal catchment specifications: first - domestic/short haul business and leisure services, and the second - in and outbound long haul services. For the former, we have used an average 60 minute catchment for Bristol and Cardiff

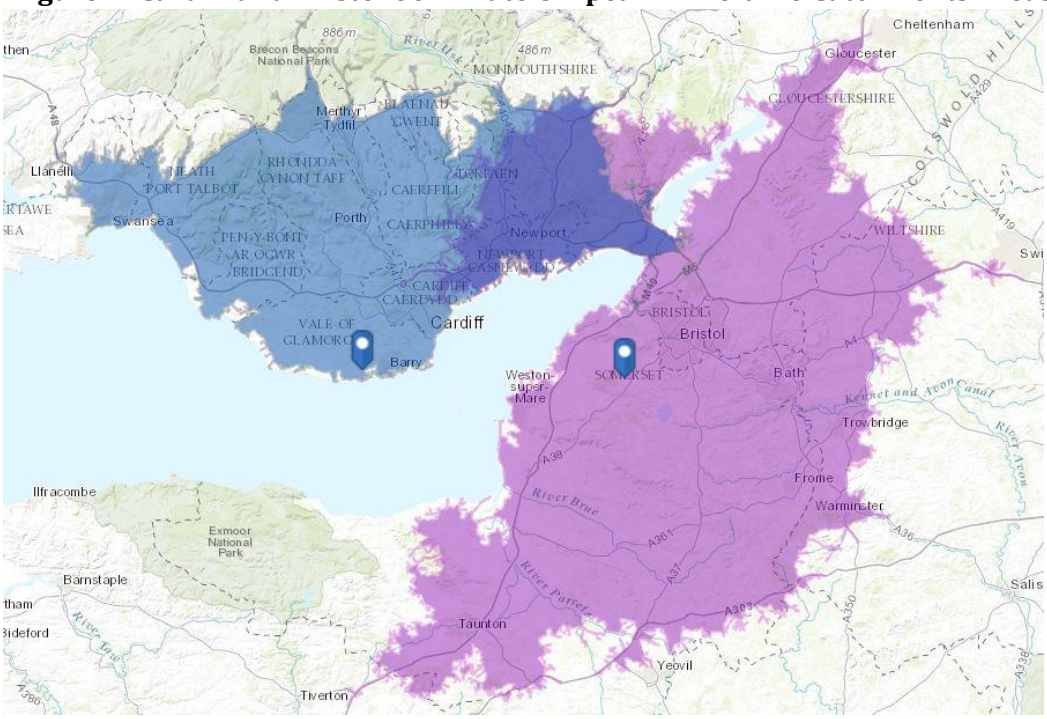
[15] Currently £6.70 for a car, but to become £3 in 2018 (this penned before suspension of Severn Toll announcement)
[16] https://www.gov.uk/government/news/drivers-to-benefit-from-free-severn-crossings-from-2018
[17] Domestic business and leisure; Short haul business and leisure/inbound and outbound; Long haul business and leisure/inbound and outbound

Airports, for the latter a 90 minute catchment. The analysis of long haul catchment areas also encompassed a 90-minute catchment for Birmingham, which still has a relatively modest long haul offering, and 2 hours for Heathrow (and Gatwick) whose long haul networks are far more substantial, with higher frequencies and therefore a greater geographical reach. The series of maps that follow, which have been prepared using recent release GIS mapping software, serve to illustrate the results.

Domestic/Short Haul International Catchments

2.6. Figure 1 illustrates the 60-minute drive-time catchments for the two airports (the public transport equivalents are much more limited18), and shows a small area of potential overlap between the two covering. This extends across Gwent, with the exception on Blaenau Gwent.

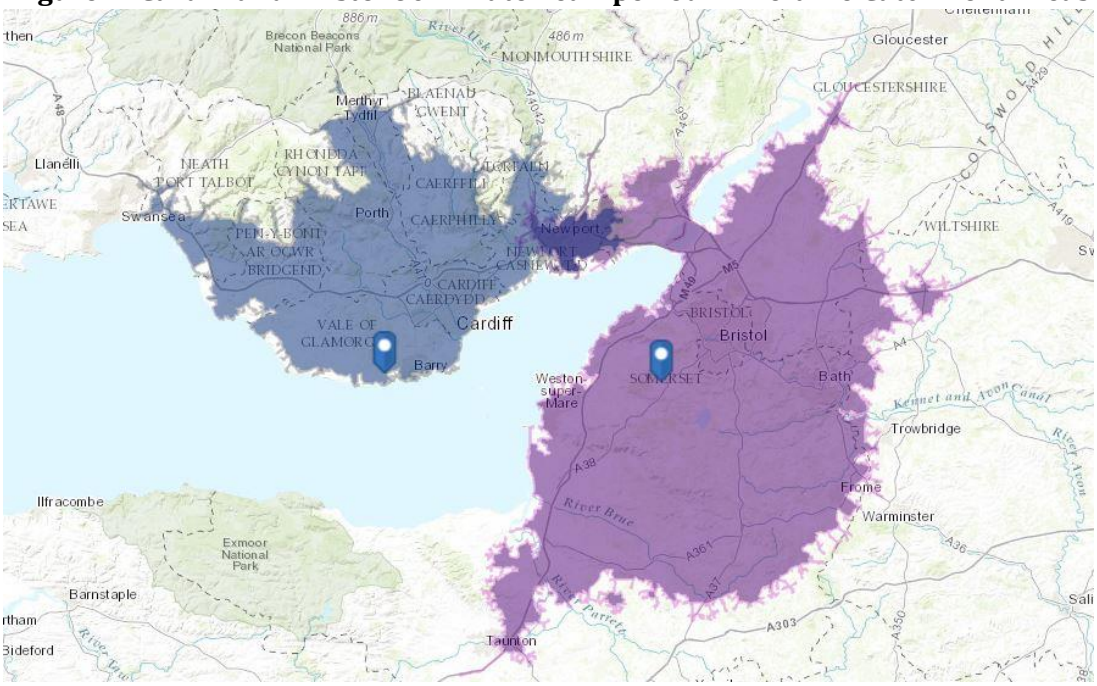
Figure 1: Cardiff and Bristol 60 Minute Off-peak Drive-time Catchments Areas



Source: Consultants

[18] See Appendix E for more detail on this

Figure 2: Cardiff and Bristol 60 Minute Peak-period Drive-time Catchment Areas



2.7. In rush hour conditions, the extent of the catchment overlap predicted is limited to the southern part of the county (see Figure 2), with only Chepstow and its environs falling within Bristol's potential orbit. But given:

- Extent of Cardiff airport's catchment that is not shared with Bristol's; and
- the fact that Cardiff International Airport is 99.4 kms away and between 1 hr 15m and 2 hr 10m drive time (depending on the time of day)[19] from its next nearest competitor (Bristol); then
- given the indicative time and distance thresholds set out in the EU state aid guidelines on regional airports[20];

any question of the two airports sharing a common catchment area is, in our view, mute. And hence there is also no basis for any suggestion that the two airports "share a single aviation market" – at least for short domestic and short haul traffic.

2.8. As we shall go on to discuss, an argument could possibly be made for long haul services essentially sharing the same catchment, but since currently the vast majority of air services (and therefore the journeys by passengers using them) are either domestic or short haul, the only reasonable description is to say that, except for a small area of overlap the size of which depends on the time of travel, Bristol and Cardiff airports have separate and distinctive catchments.

[19] The equivalent figures for a bus in free-flowing traffic is 1 hour 30 minutes and approximately the same by rail.
[20] Guidelines on State aid to airports and airlines 2014/C 99/03

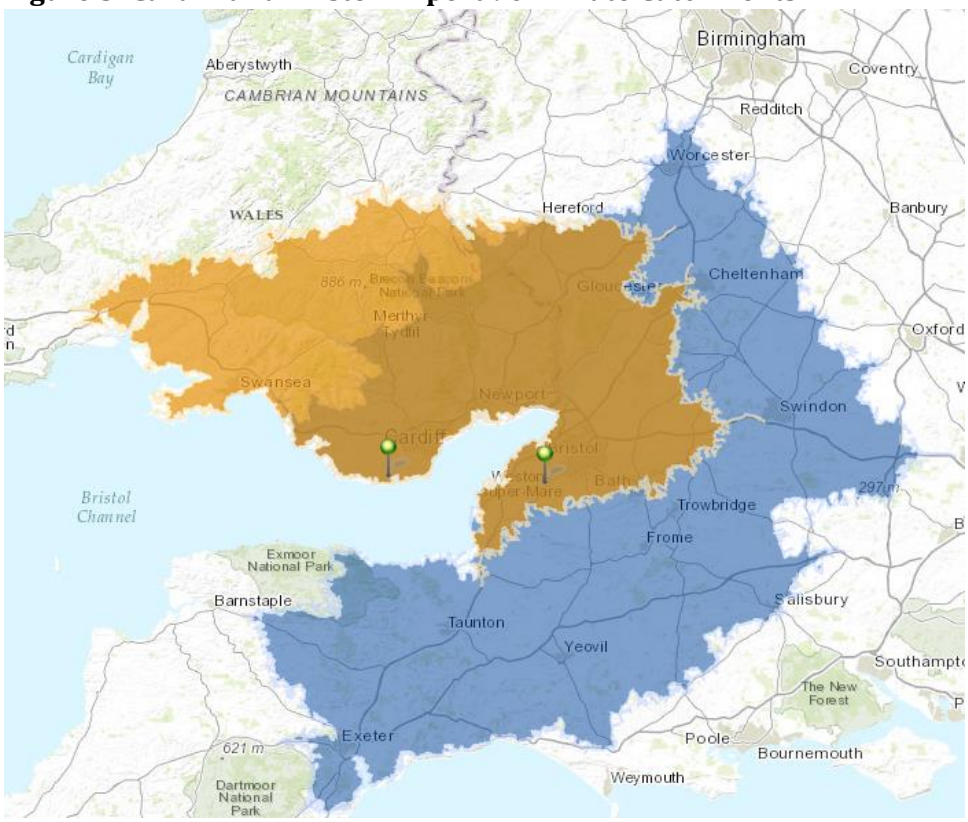
2.9. This view is further reinforced when wider considerations are taken into account such as the access time from long stay car parking, transit times through terminals, the cost of tolls on crossings of the Severn into Wales and passenger sensitivity to the risk of surface access delays en route to one or other the airport; all of which impact on passenger perceptions which make them seem even further apart. For instance there is widespread recognition amongst planners, and the travelling public that the Brynglas Tunnels on the M4 to the north of Newport are an acute pinch-point reducing a six-lane motorway to four lanes, where there is also a lack of a hard shoulder making it particularly susceptible to breakdowns, and that section being also used by local traffic as a local distributor road for short journeys.

2.10. The only reason over a million domestic and short haul passengers from South Wales use Bristol is because there are no suitable alternatives available from Cardiff and most are unwilling to drive 2-3 hours to London or Birmingham. Interestingly the numbers travelling the other way across the Severn – less than 100,000 - are far smaller. If the catchment of the airports were truly shared, this figure could be expected to be much larger.

Long Haul Catchments

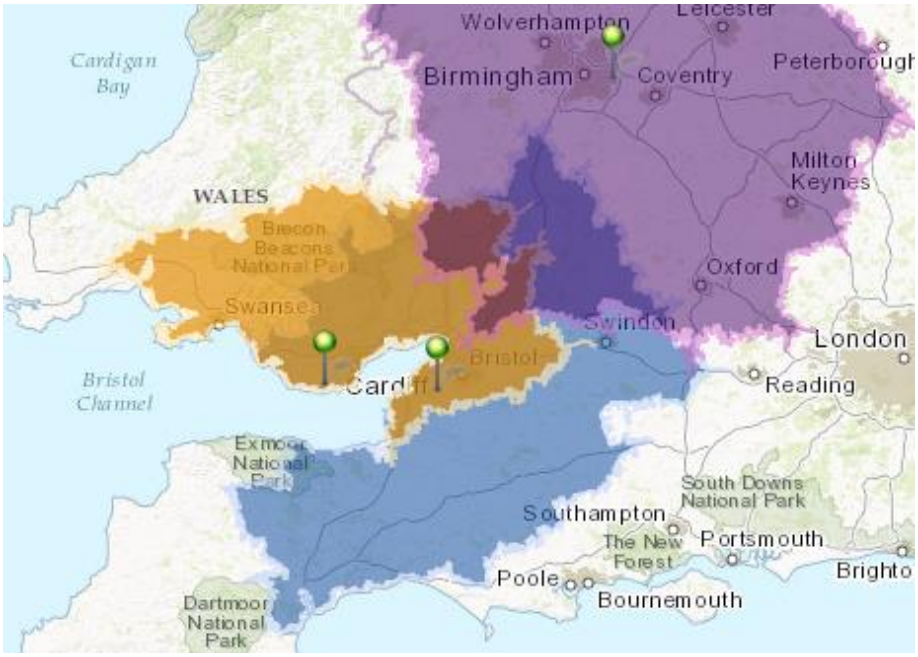
2.11. Using extended 90-minute drive-times isochrones to define the potential catchments from which long haul air services from Cardiff and Bristol airports can draw their traffic, generates the catchment map in Figure 3. This shows much of Gwent, South and Mid-Glamorgan and half of West Glamorgan in overlapping catchments, and similarly Bristol, Bath, North and North East Somerset, and a substantial section of south and west Gloucestershire on the English side of the Severn.

Figure 3: Cardiff and Bristol Airport 90-Minute Catchments



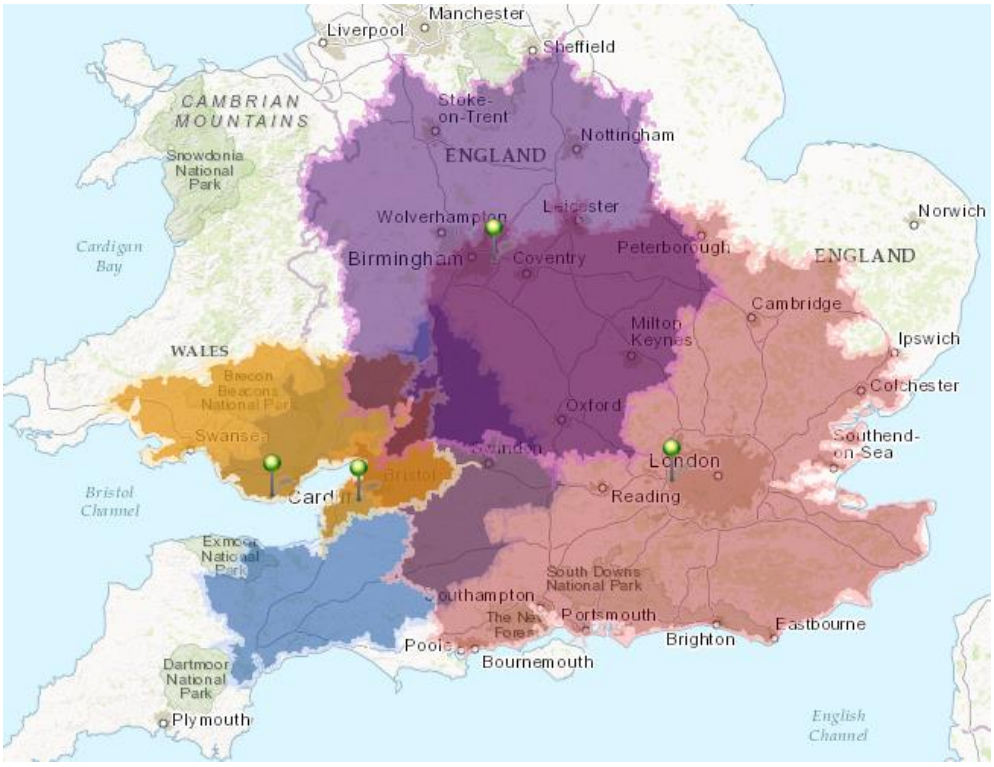
2.12. Since these local government areas coincide with much of the high density urban (and therefore most heavily populated) areas in the combined catchments, it is reasonable to conclude that in the case of long haul, but only long haul, markets for Cardiff and Bristol airports do share a single aviation catchment. This rationale is further reinforced when the 90 minute catchment for long haul services from Birmingham is added to those of Bristol and Cardiff in Figure 3, to Figure 4 below. Worcestershire and the Cotswolds fall comfortably into Birmingham's orbit, leaving Herefordshire, Cheltenham, Gloucester and Tewkesbury as the contestable areas on the catchment boundaries of both airports.

Figure 4: Cardiff, Bristol and Birmingham Airport 90-Minute Catchments



2.13. Finally, in Figure 5 we see the effect of adding Heathrow into the picture. Using a 2 hour drive-time isochrone to reflect the greater size, frequency and drawing power of its international long haul network, Swindon falls within Heathrow's orbit, and Bristol's catchment to the east is heavily circumscribed along a contestable line along the Bath/Somerset and Wiltshire boundaries.

Figure 5: Cardiff, Bristol and Birmingham Airport 90-minute and Heathrow 120 minute Drive-time Catchments



Conclusions

2.14. So what does all this tell us about the extent the extent of catchment competition between Cardiff and Bristol Airports and its implications in terms of the potential impact of APD being devolved to the Welsh Government?

2.15. Well first and foremost using one single 90-minute catchment metric for all types of service (as York Aviation did in their report for Bristol Airport) is inappropriate in terms of industry conventions, and consequently significantly undermines the validity of the conclusions that are dependent upon this important assumption. The result is an overly simplistic view of catchments for different types of traffic, when the reality is somewhat more complex. This is important because our analysis suggests there are likely to be more destinations that could be served from Cardiff than the current offer, resulting in the reduction of current leakage of domestic and short haul international traffic from Wales across the English border, which is both economically and environmentally inefficient.

2.16. For domestic air services at smaller regional airports less than 3mppa like Cardiff, the optimum drive-time isochrone is probably around 45 minutes; whereas for larger ones (like Bristol), with greater traffic volumes and network density and frequency, 60 minutes is more likely to be typical. Using these conservative assumptions, that are also consistent with important thresholds in EU state aid guidance[21], provided a sound analytical underpinning for the adoption of the 60-minute drive-time isochrone as the boundary for domestic and short haul catchments at each airport. The modest catchment overlap that occurs during much of the day, but is almost de-minimis during peak periods, is reduced to no more than a small hinterland in the immediate vicinity of the two Severn Crossings. But in neither case can the airports catchments be said to be 'shared' or 'indistinguishable'.

2.17. For long haul services, the typical catchment reach extends to 90 minutes, resulting in a much larger overlap containing many the most densely populated urban areas in South East Wales, Bristol and Avon. Here the argument for recognition of a single catchment, in terms of both commercial reality and policy, is much stronger although Swansea and extensive areas of Dyfed and Powys lie well beyond Bristol's 90-minute drive-time isochrone.

2.18. Conversely to the East, the fact that Heathrow's 2-hour isochrone runs through the middle of the city of Bristol and encompasses Bath and most of the areas of highest traffic demand in Somerset and South Gloucestershire is

[21] European Commission: Guidelines on State aid to airports and airlines (2014/C 99/03)

important because travellers in these areas are afforded a significant, if slightly remote choice of where they access air services. But, and this is important, Heathrow's 2-hour catchment does not reach Wales, and although many passengers still use Heathrow, if long haul services were to be secured locally, those services would be that much more attractive because of the extra distance required to reach the alternative.

2.19. The effect of this geography on the potential for long haul services can be summarised as follows:

- For all intents and purposes, long haul airlines are likely to see South Wales and the South West region as one catchment served by two airports, not unlike the combined Manchester/Mersey conurbation that is served by Liverpool and Manchester, and the Scottish Lowlands which are served by Edinburgh and Glasgow.

- It is very unlikely, therefore, that a long haul airline will operate from both airports at the same time, and even less so that they would fly to the same long haul destination concurrently from both Cardiff and Bristol.

2.20. To do so would dilute the South Wales and South West regional markets, which combined are potentially large enough to sustain a number of local long haul routes, even in the face of intense competition and passenger leakage to London Airports like Heathrow and Gatwick, and more modestly to Birmingham.

3. DATA AND METHODOLOGY

Introduction

3.1. This Chapter seeks to provide a high level overview of the data used, and the analysis undertaken, to underpin this report, taking into account the schema (and associated train of thinking) set out in the reports Bristol Airport presented to HMT and other Whitehall departments in 2016.

3.2. The work undertaken to deliver this report has included:

3.2.1. Consideration of the reports authored by York Aviation that were commissioned by Bristol International Airport and submitted to the UK Government in 2015 in response to its consultation on the options for supporting English regional airports from the impacts of air passenger duty devolution[22,23]. Those reports, and their conclusions, are referred to in this document;.

3.2.2. An assessment of the economic costs to the Welsh economy arising from current leakage levels to Bristol and the main London Airports, and therefore the economic benefits that might arise from addressing these passenger flows. The findings of that study are largely captured in Chapter 4 of this report; and

3.2.3. Provision of an up to date picture of the demand for, and supply of, air services across not just South Wales, but also across the South West England, including forecasting how the introduction of APD discounts in Wales might impact on domestic and short haul services outside Wales and long haul across the whole area. This work is reported in Chapters 5 and 6 of this document.

3.3. RDC Aviation assisted Northpoint with data analysis and forecasting throughout.

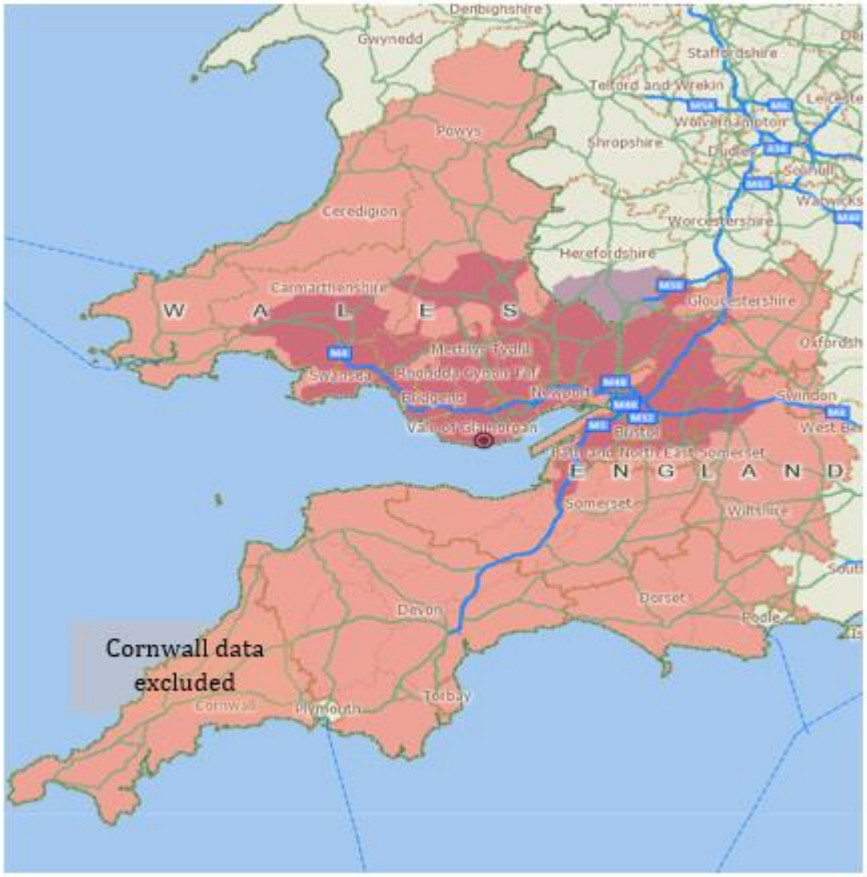
CAA Data Requested

3.4. The use of CAA survey data has been critical to generating the analysis that follows. In order to understand the potential impacts of reducing APD in Wales, not just on the behaviour of domestic and short haul passengers within Cardiff's catchment area but also within Bristol's, data was secured at county level for the whole of the South West region (except Cornwall) and at District level in Wales. The data covered origin/destination, airport used, business/leisure and

[22] HM Treasury: *Discussion paper on options for supporting English regional airports from the impacts of air passenger duty devolution* (2015)
[23] HM Treasury: *Options for supporting English regional airports from the impacts of air passenger duty devolution: summary of responses* (2015)

inbound/ outbound splits. Figure 6 shows the geographical extent of the data requested and the local authority administrative areas used are set out in Appendix B.

Figure 6: The Geographical Scope of CAA Data Acquired



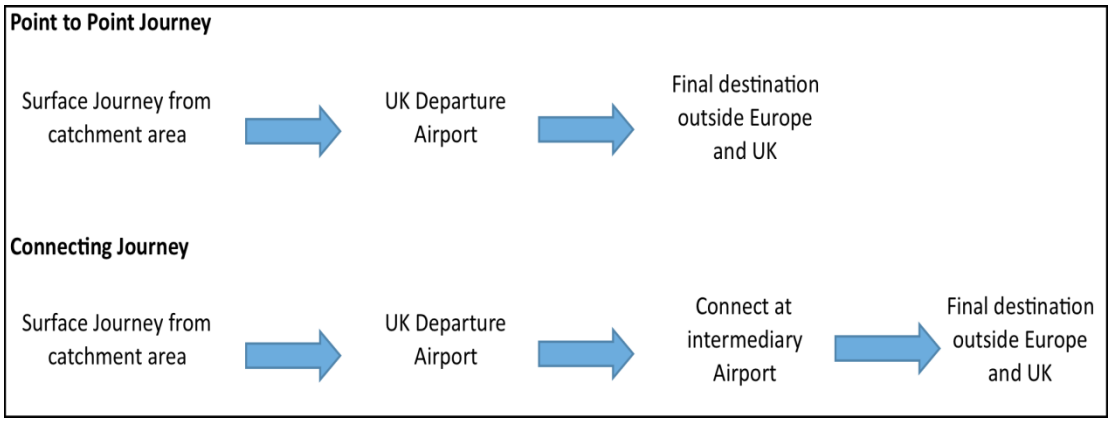
3.5. The approximation of this area, to the GIS derived 90-minute catchments of Cardiff and Bristol combined shown in Figure 6 will immediately be apparent, with the three principal differences being:

- The inclusion of all the districts of Dyfed in south west Wales and of the whole of Powys on the grounds that Cardiff Airport is closer to all parts of both counties than any other airport of significance in England (i.e. Bristol, Birmingham and Manchester).
- The removal of Cornwall from our data set as it was assumed existing (and prospective) London services would be used to access long haul flights direct rather than through Bristol or Cardiff.
- The addition of the southern part of Herefordshire in the Midlands and non-inclusion of Worcestershire - the former because of the access to Cardiff afforded by the A449/A40/M50 corridor; the latter because of the proximity of the much larger Birmingham airport 40-60 minutes away, which limits the scope for market penetration by services operating from Bristol 90

minutes and Cardiff 100 minutes away respectively (each through traffic blackspots).

3.6. Subsequently and separately, data on long haul passengers originating within the same geographical area was acquired, covering both those that travelled by surface mode to their departing airport and then flew direct or via a connecting airport to their long haul destination, and those using their local airports like Cardiff and Bristol to catch a flight to a hub to connect with their long haul service (see Figure 7).

Figure 7: Component Stages of Alternative Pathways for Long Haul Journeys



3.7. There are currently very little by way of direct long haul flights from our focal airports of Cardiff and Bristol; what there is, being mainly charter or tour package flights, but volumes of long haul travellers across the catchment areas of the 'focal' airports are however substantial (see Chapter 6).

Forecast Modelling

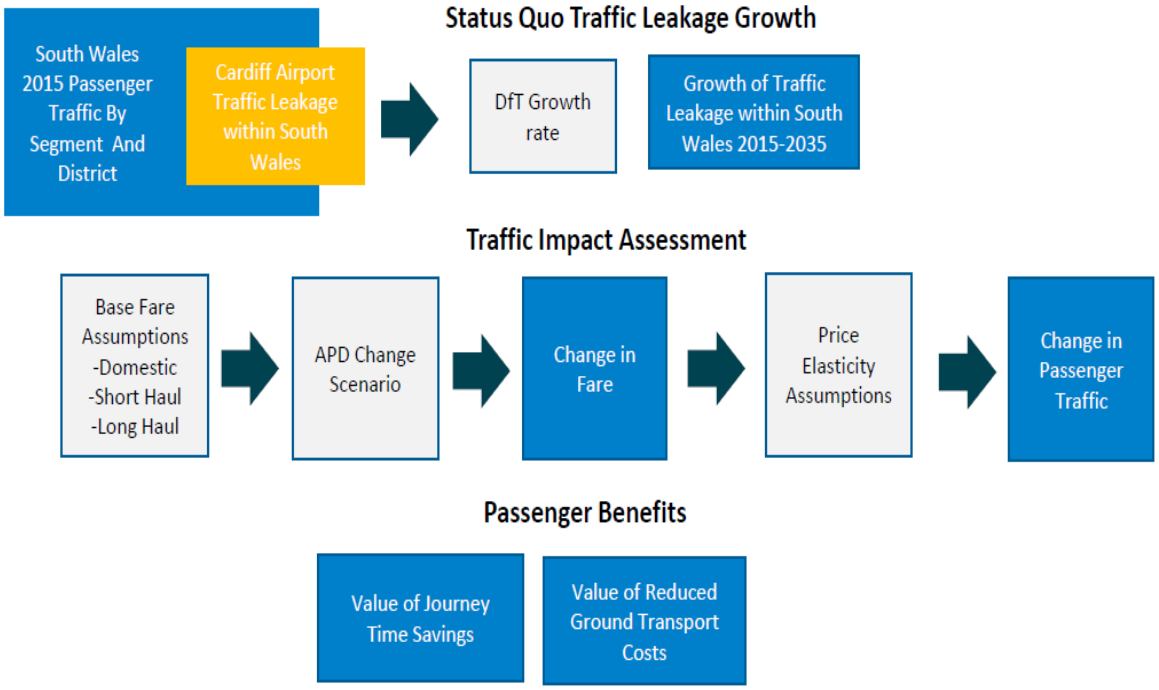
3.8. Based on these two data sets, Northpoint and RDC Aviation agreed a modelling approach based on a 2015 base date and DfT growth rates for different market sectors to develop baseline growth forecasts for domestic and short haul traffic in 5 yearly intervals to 2035 in the earlier Welsh impact study, and separately 10 and 25 years ahead for the South West domestic and short haul and overarching long haul work undertaken as part of this second study in May / June 2017. These forecasts were then available as a baseline against which different scenarios for discounting APD in Wales (i.e. principally Cardiff Airport) could then be tested and compared.

3.9. The key to this scenario modelling was the use of price elasticities for different types of traffic across the area of interest to see whether the lower APD costs would materially change passenger growth and its allocation between our core airports, having regard to average fares and access costs. The detailed assumptions used in each study are set out in the chapters dedicated to each

which follow[24], but the key to the modelling approach in all cases was to the use of the same simple and transparent methodology, appropriate catchment boundaries and conservative assumptions about elasticities and in so doing to offer a helpful contrast with the Black Box modelling single catchment and bring clarity to the exaggerated elasticities used by Bristol Airport's consultants in their work.

3.10. The flow diagram in Figure 8 below sets out the logic plan applied for the modelling and economic appraisal process.

Figure 8



[24] Chapter 4 reviews the findings of the Welsh Economic Impact Study; Chapter 5 impacts on the South West domestic and short haul market, and Chapter 6 on the long haul sector.

4. IMPACTS OF CHANGES TO APD ON WALES AIRPORTS AND ITS ECONOMY

Introduction

4.1. This chapter of the report examines first the potential impact on passenger volumes using air transport services at Welsh Airports, and then the associated economic effects, of reductions in APD. The analysis is deliberately high level, reflecting the incremental nature of the programme of work undertaken for the Welsh Government as it began to consider how it might use devolved powers were they to be granted in line with the recommendations of the Silk Commission.

4.2. As most of the other civilian airfields in Wales principally cater for general and business aviation, and most of that involves the use of aircraft that are below the weight or seat capacity thresholds that qualify for the duty, in reality the primary airport of interest in the report is Cardiff International. Were other smaller airports in Wales like Anglesey, Hawarden or Haverfordwest to attract 'qualifying' public transport services25 eligible to pay APD, then they too would benefit from any changes to the duty the Welsh Government chooses to make. However, since we think it unlikely that any qualifying services will operate from smaller Welsh airports in the foreseeable future, to simplify this assessment and avoid inappropriate speculation, we have assumed that only services from Cardiff are likely to qualify for the tax over the next ten years, the core period of our analysis.

4.3. The indirect impact of APD changes on the aviation market and economy of the South West of England, which was the subject of Bristol Airport's submission to the HMT consultation of English stakeholders that are critiqued in the Addendum accompanying this document, are discussed separately in Chapter 5. The generic long haul analysis found here is revisited in more detail in Chapter 6 in the context of demand from across the combined Wales and South West catchment areas (i.e. not just from Wales)associated with specific route options .

Key Modelling Parameters and Assumptions

4.4. Our initial analysis, focused on 'leaking' Welsh traffic at a broad market sector rather than route-by-route level. This imposes some limitations that are discussed at the end of the chapter, however, since disaggregation to a route level appraisal would introduce the requirement for many additional assumptions, adding greater complexity and uncertainty as a consequence, we took the view that market sectors represented the right scale for the analysis for

[25] The twice-daily scheduled service that operates between Cardiff and Anglesey airports is exempt from APD because it is supported through a PSO (Public Service Obligation) by funding from the Welsh Government, and all PSO routes are exempted from the duty.

the stage of the policy development process that the Welsh Government was then at.

4.5. Again, in the interests of simplicity and transparency, our economic appraisal here also focused on benefits that could be readily quantified rather than embark on a wider evaluation of potential catalytic benefits. These are addressed in generic terms in the concluding chapter.

4.6. The target outputs for this initial phase of our studies were the following metrics associated with each of a number of different scenarios for discounting APD:

a. Additional passenger numbers by market segment using Cardiff International (CWL)
b. Changes in the volume of Wales origin and destination passengers 'leaking' to other airports
c. Quantified net income benefits from 'clawback' of Welsh passengers
d. Employment effects
e. Associated quantum of GVA generated.

4.7. Consideration was also given to the distribution of effects at a sub-regional level so that their interface with South Wales' Assisted Areas in particular, could be understood.

4.8. The scenarios chosen were designed to show the relative outcomes from a range of approaches to the devolution of APD (see Table 2).

Table 2: APD Scenario Assumptions

Assumptions For APD Impact Traffic Scenarios

Scenario	Domestic APD Reduction	Short Haul APD Reduction	Long Haul APD Reduction	Additional Assumptions
1	50%	50%	50%	
2	100%	100%	100%	
3	100%	0%	0%	
4	0%	0%	100%	
5	100%	100%	0%	
6	100%	100%	100%	Double the short haul price elasticity to reflect high growth from combination of strategic positioning making Cardiff a Wales/South West base for an airline, coupled with route incentives

4.9. Average fares derived from RDC's Apex database, were then factored in in terms of industry standard elasticities, to determine the extent to which forecast future growth might increase (or theoretically decrease) using a fixed (rather than dynamic – i.e. changing) geographical pattern of demand to allocate relevant types of traffic (business/leisure, inbound/outbound), by relevant spatial units (local authority districts).

Average Fares

4.10. Given that most of the short haul trips within the geographical study area fly via Cardiff or Bristol (rather than a wider basket of airports), estimates from RDC's in-house fares database were used. In the absence of detailed CAA/MIDT data this database provides a useful starting point as it samples fares for low cost airlines including Flybe, easyjet and Ryanair. These airlines represented 43% of Cardiff's seat capacity and 78% of Bristol's seat capacity in 2015, and this offer a guide to the actual level of fares paid by air travellers within the study's geographical boundaries. Hence the estimated average roundtrip domestic fare has been taken to be £77, and for short haul international £120.

4.11. Long haul passengers within South Wales are currently most likely to travel via the London airports due to lack of availability at Cardiff airport. Given that the study did not have access to detailed fare survey data for long haul markets, as a rule of thumb, it was assumed the long haul air fares are on average 5.5x their short-haul equivalent air fare – this is consistent with the longer distance/cost-curve of long haul operations compared to short haul. This results in an estimated average return fare for long haul of £659 for 2015. In summary, the study assumed average return fares at £77 for domestic, £120 for short haul and £659 for long haul. Further sensitivity testing is being undertaken to supplement this analysis and will be published once completed.

4.12. It should also be noted that there is a certain amount of 'blending' that is included in these assumptions, as some business passengers are interlining and flying long haul, in which case the HMT receives the business rate for long haul and not short haul. It is also recognised that the demand response will be less if for instance average fares are higher in reality[26]. Although not modelled in this report it is also recognised that if APD can be used to stimulate route development at Cardiff Airport then, as route development improves, there is the potential to improve the customer proposition, which in turn will act to attract further share shift.

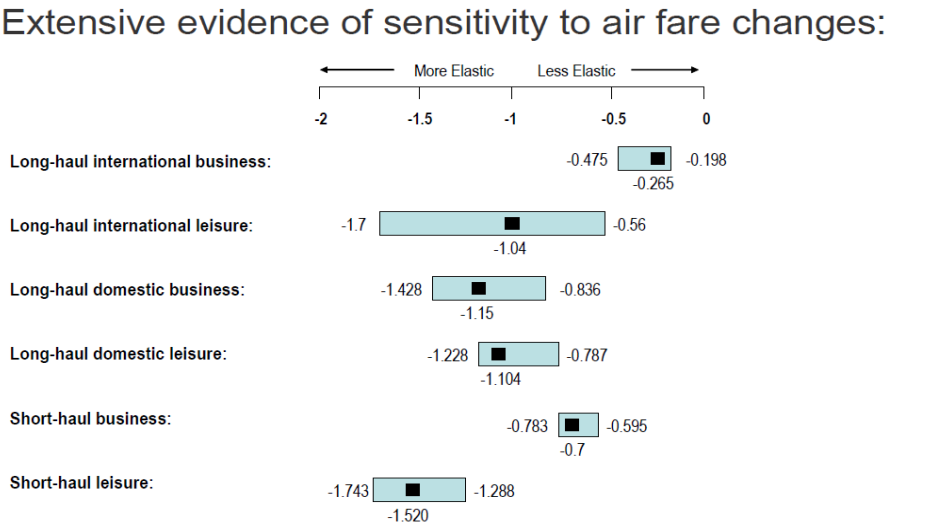
Price Elasticity

4.13. The over-riding assumption under-pinning our work is that a change in fare will result in change in passenger demand – this reaction is measured by price elasticity. The UK DfT 2013 Forecasts divide price elasticity into a number of categories to reflect different combinations of foreign/local and business/ leisure passengers. Overall, the average elasticity is -0.6. By comparison, IATA, the other recognised authority on this issue, put UK Band A (short haul) price elasticity at -1.19 and Band B (long haul) at -0.8427.

[26] In study review the £77 domestic return fare in particular was considered on the low side. This fare assumption could have an overestimating impact on the report's findings as higher average fares would lead to a lower demand response (since the % change in fare would be significantly reduced).
[27] IATA: Economic Briefing, March 2014

4.14. This illustrates an important point, namely that price elasticities can vary substantially, not just by traffic type but by the extent of market maturity (e.g. a route in a developing market such as Africa is likely to experience high levels of demand response as a result of fare changes), whereas for a mature market or business orientated market (e.g. between Bristol/Cardiff and Amsterdam) the elasticities will be much smaller. This is illustrated in Figure 9, which brings together extensive academic research into elasticities in the aviation sector.

Figure 9



Reproduced from *Air Travel Demand Elasticities: Concepts, Issues and Measurement*, D. Gillen, W.G. Morrison and C. Stewart, 2002.

4.15. This study used the mid-point between IATA's price elasticity and DfT's estimate, and proportionately factored the elasticity by segment in line with DfT's assumptions based on the Wales air passenger mix. This results in the price elasticity for the different segments as set out in Table 3 below. The overall elasticity for Wales air passengers is -0.9 compared to UK DFT of -0.6 and IATA of -0.8. While recognising that alternative assumptions are possible, at this stage we have taken this as a reasonable estimate[28] given South Wales' passengers are more leisure oriented and hence price sensitive than higher business proportion airports such as Heathrow, Birmingham, Edinburgh and Manchester.

[28] A distinction is recognised between route elasticities and the DfT's national elasticities, where route elasticities have a tendency to be higher because of the availability of other travel options and substitutes, as opposed to a national 'across the board' reaction to price changes.

Table 3

Assumed Price Elasticity For Wales Air Passengers

Segment	Domestic	SH UK Business	SH UK Leisure	SH Foreign Business	SH Foreign Leisure	LH UK Business	LH UK Leisure	LH Foreign Business	LH Foreign Leisure
DFT Price Elasticity	-0.50	-0.30	-0.70	-0.20	-0.80	0.00	-0.62	-0.09	-0.33
IATA Price Elasticy	-1.19	-1.19	-1.19	-1.19	-1.19	-0.84	-0.84	-0.84	-0.84
Assumed Price Elasticity	-0.70	-0.42	-0.98	-0.28	-1.11	0.00	-0.86	-0.13	-0.46

4.16. For simplicity, fares and APD are assumed to remain at a similar level in real terms. The APD level assumed is that for the lowest class with domestic £26/return, short haul at £13/return and long haul at £75/return – 100% of the APD reduction in each scenario is reflected in the fares that passengers pay. The resultant price elasticity moderated impact is assumed to reflect the extent of Cardiff's capture of leakage passengers.

4.17. Several other considerations are worth mentioning before turning to the modelling results:

- UK APD represents a higher proportion of a typical UK domestic flight than a long haul flight - with 15% of the UK return ticket price for the former versus 6% for the latter.

- Even if APD is removed, partially or fully, most research points to the fact that airlines will retain a share of the reduction to improve yields and therefore route profitability, and moreover are only likely to give up the full amount of any discount once competition forces them to pass the reduction through to passengers. We have taken the view that the presence of Bristol and the access to London airports via the M4, means the air travel market in South Wales is competitive, and therefore our modelling assumes most of any reduction in APD is passed through to passengers from the outset.

- A significant segment of Cardiff's demand today is sold by the charter operators and the price paid by passengers will typically include much more than the air fare (e.g. hotels, excursions, etc.). Many of these passengers will be families travelling together and children who are exempt from APD. Combined, any impact of an APD change could be therefore expected to be proportionally smaller. This effect should not be over emphasised as charter operators (such as Thomas Cook and Thomson Airways) who typically have emerged out of package Tour Operators now also offer scheduled flight only service to augment demand for their scheduled services. The Full Package share of the outbound market has been on a long term downward trend from over 50% in 1992 to about 40% of the holiday market now[29]. Companies have

[29] Who flies the British to the Sun? Anne Graham and Nigel Dennis University of Westminster (2017)

adapted by developing a hybrid package tour or simple seat sales for their aircraft capacity. The study did not model this effect.

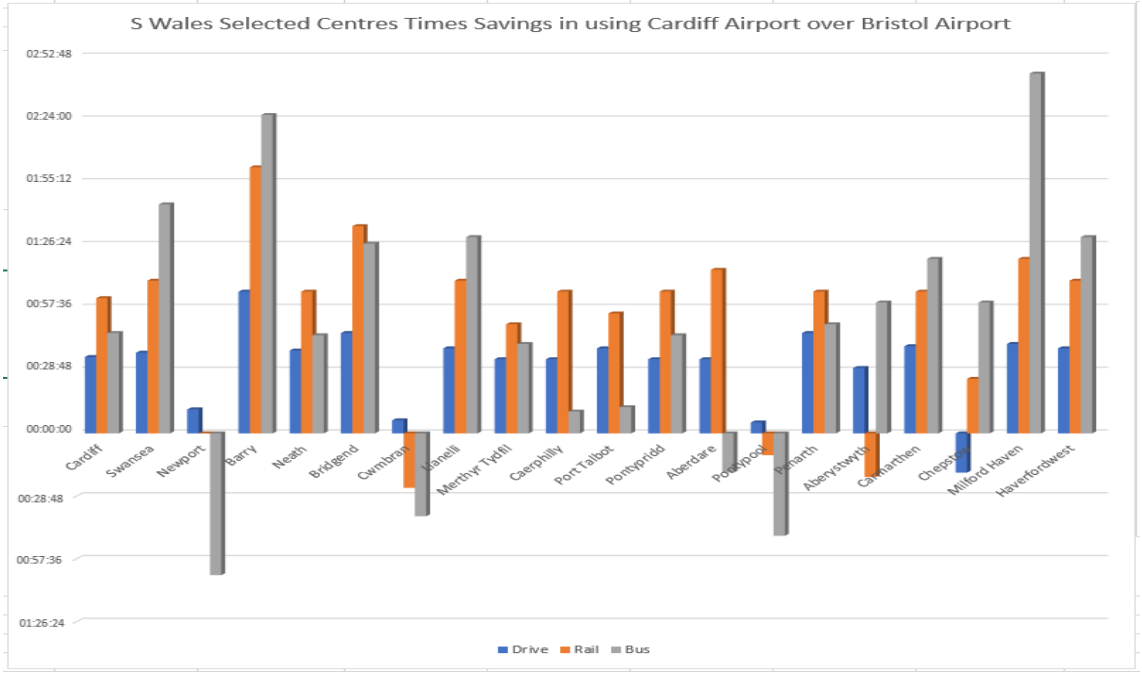
- Assumptions around average fares and elasticities is important in this study. However any modelling changes in assumptions may well cancel each other out in terms of effects. For example assuming a higher average fare whilst assuming a higher elasticity may result in a similar outturn to one where the average fare is considered too low and the elasticity low also.

4.18. In order to examine the scope for clawing back[30] Welsh traffic using other airports, the way in which the results from the modelling in this initial study are presented is framed with this in mind (i.e. the core metric is not total passengers, but passengers recovered from other airports, particularly Bristol). Then, by using centroids (geometric centres) to derive the travel cost and travel time savings/losses associated with driving to Cardiff (rather than Bristol from each Welsh District), it is possible to establish the prospective economic value of passengers from the switch in each district and to use this to calculate potential job creation and changes in GVA. The quantified economic impacts can then be calculated. The exemption of minors from APD was also ignored in this approach, partly because of uncertainties and complexities as to their proportion for different service types, but also because they are a zero draw in the catchment push/pulls considered.

4.19. An analysis of the Cardiff catchment identified that from nearly all of parts of South and South West Wales, there is a time and cost penalty associated with accessing Bristol rather than Cardiff Airport as shown in Figure 11 below.

[30] Clawback is a term used in the industry to refer to traffic from one airports catchment that is using other airports being recaptured by the origin airport as a result of changes in the services, fares and quality of the airport offer.

Figure 11



4.20. The differences in direct travel costs to Cardiff and Bristol Airports from selected parts of Cardiff's catchment are illustrated in Table 4.

Table 4

Population Centre	0.45 / mile	0.45 / mile	Rail	Rail	Bus/Coach	Bus Coach
	Car Mileage Cost to Cardiff Airport	Car Mileage Cost plus £6.70 bridge toll	Cardiff Airport	Bristol Airport	Cardiff Airport	Bristol Airport
Cardiff	£10.80	£53.50	£7.00	£17.90	£10	£24.00
Swansea	£36.00	£74.20	£8.40	£34.50	£17	£30.00
Newport	£25.20	£55.30	£12.90	£14.90	£16	£20.00
Bridgend	£14.40	£50.80	£3.90	£24.40	£15.00	£30
Aberystwyth	£99.90	£126.40	£67.70	£74.40	£55	£75
Carmarthen	£60.30	£104.80	£16.20	£41.80	£18	£45
Chepstow	£40.50	£31.90	£25.10	£10.20	£24	£30
Haverfordwest	£86.40	£130.90	£21.80	£47.90	£36	£48

Current Market Position

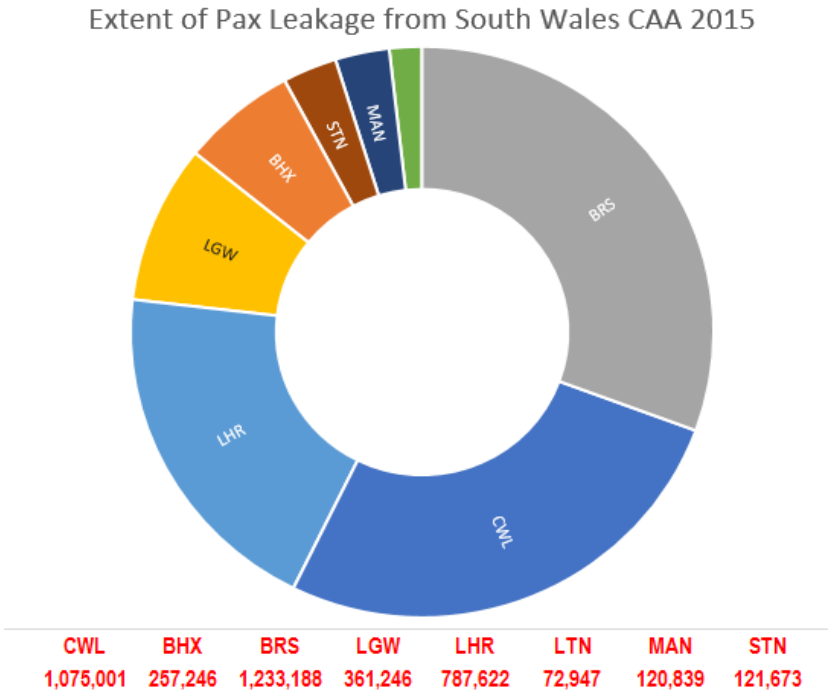
4.21. In 2015, 4m air passenger trips were generated within the 60 minute domestic and short haul catchment of Cardiff Airport, which as discussed in Chapter 3, can be defined as shown in Figure 12 below and the list of local authority districts are shown in Table 5 below.

Table 5:

	Domestic	Short Haul Total	Long Haul Total	Total
Caerdydd - Cardiff	134,511	762,201	310,328	1,207,040
Abertawe - Swansea	32,716	349,531	116,997	499,244
Casnewydd - Newport	40,785	175,446	37,496	253,727
Rhondda, Cynon, Taf - Rhondda, Cynon, Taff	27,441	179,765	28,031	235,237
Sir Ceredigion - Ceredigion	19,256	163,484	39,063	221,803
Bro Morgannwg - the Vale of Glamorgan	32,630	143,462	36,359	212,451
Caerffili - Caerphilly	9,548	166,771	22,197	198,516
Sir Gaerfyrddin - Carmarthenshire	38,374	127,023	24,271	189,668
Castell-nedd Port Talbot - Neath Port Talbot	8,381	131,909	45,517	185,807
Sir Fynwy - Monmouthshire	12,813	120,260	46,848	179,921
Powys - Powys	9,027	96,272	42,511	147,810
Sir Benfro - Pembrokeshire	15,573	94,084	36,604	146,261
Pen-y-bont ar Ogwr - Bridgend	9,987	88,167	10,497	108,651
Blaenau Gwent - Blaenau Gwent	4,011	74,708	22,844	101,563
Tor-faen - Torfaen	8,611	57,457	11,692	77,760
Merthyr Tudful - Merthyr Tydfil	4,382	32,457	27,320	64,158
Grand Total	408,047	2,762,995	858,576	4,029,619

4.22. Out of that 4 million, Cardiff Airport captured 1.16m passengers – just 27% of the total, implying 73% of Welsh originating traffic is leaking across the Border to use airports in England.

Figure 12



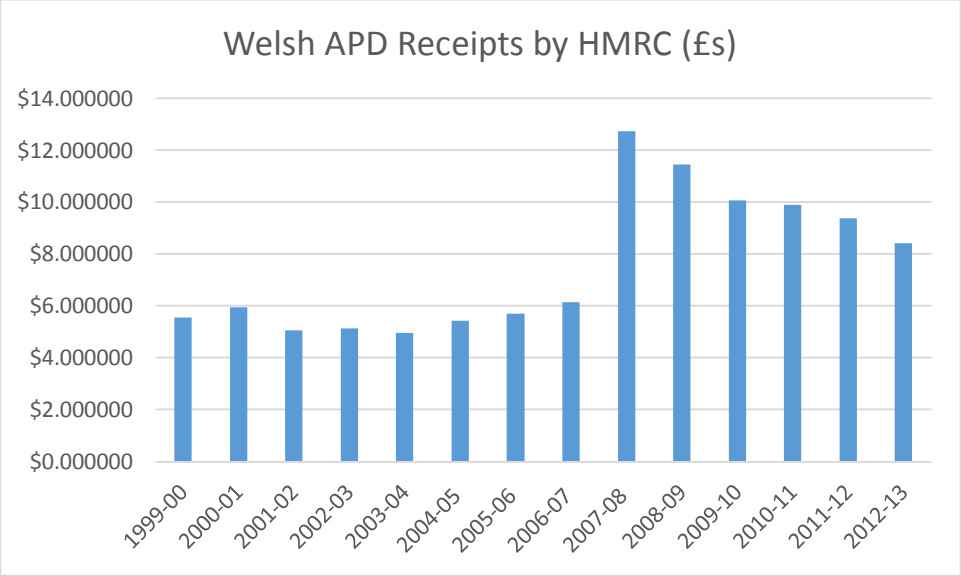
4.23. CAA survey data from 2015 suggests 30% of South Wales' passengers use Bristol Airport - primarily for domestic and short haul flights. A further 19% of passengers use Heathrow (primarily for long haul flights) and 33% use London Airports in general with Gatwick also being material, while Stansted and Luton are less so (see Figure 12).

4.24. Most of the leaking passengers are from Cardiff, Swansea and Newport and their hinterlands, and the majority of air passengers (79%) flying to/from South Wales direct are short haul passengers and those travelling for leisure purposes (84%). Only 19% of passengers are foreign travellers.

APD In Wales Today

4.25. In terms of APD revenues, this traffic pattern generated just over £8m in revenues from passengers using airports in Wales 2012/13 (see Figure 13); recent passenger growth at Cardiff Airport is likely to make the current figure closer to £10m. More than three times this amount will be raised from passengers with a Welsh origin/destination (O/D) using English airports as 75% of Welsh originating passengers use non-Welsh airports.

Figure 13

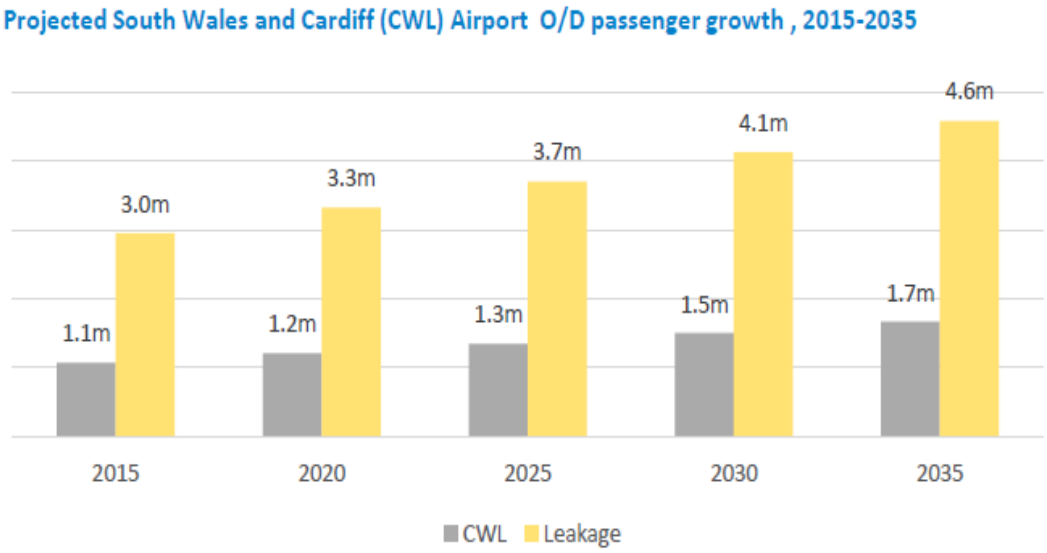


4.26. If HMRC apply the same approach as for the other Devolved Administrations, the cost of reducing APD by 100% is likely to involve reduction of block grant from the UK Government to WG of that order.

Baseline Growth Forecasts

4.27. By applying growth rates from the DfT 2013 Aviation Forecasts in unconstrained conditions, to different traffic segments (foreign/UK and leisure/business), to the different passenger mix within the South Wales catchment at 5 years intervals, the split of current demand between Cardiff and leaking traffic grows as shown in Figure 14. Overall, demand grows by a Compound Annual Growth Rate (CAGR) of 2.2%, and in the absence of any intervention, leaking traffic would increase from 3.0m in 2015 to 4.6m by 2035.

Figure 14



4.28. As indicated earlier, in this study a key assumption is a fixed demand distribution whereby each district and each airport maintains its current market share of South Wales air passengers; by holding this variable constant (as opposed to assuming demand grows more quickly from particular districts and Cardiff increases its market penetration independent of any intervention on APD), it allows us to see clearly the effect changes to APD have. In this baseline forecast, Cardiff Airport's passenger traffic is predicted to grow from 1.1m in 2015 to 1.7m by 2035.

4.29. What the forecasts prepared for this initial study did not attempt to do, was understand whether any South West based traffic would be drawn across the Severn, or seek to add an additional price based stimulation of underlying demand – the effect of which would have been to increase underlying CAGR with an increment of stimulated or generated traffic, associated with the overall cost of air travel to the consumer declining. Now it is arguable whether any such effect would be seen in the domestic and short haul market, which is already much better served than the long haul market (see the further discussion in Chapter 5), but for the sake of clarity, the modelled outputs in this Chapter do not include any such increment, where those in Chapters 5 and 6 do.

Results

4.30. When the modelling applied changes in fares and price elasticities in line with the scenario assumptions set out in Table 2, the result is a reduction to the leakage proportion - therefore resulting in less traffic leaving Wales. In effect, by having lower/no APD, airlines are expected to be able to offer lower fares from

Cardiff Airport, which will enable it to recapture a proportion of the traffic leakage31. Table 6 sets out these calculations.

Table 6

Fare Change vs Leakage Traffic Capture

	Status Quo Fare			APD Discount			Scenario Fare		
	Domestic	Short Haul	Long Haul	Domestic	Short Haul	Long Haul	Domestic	Short Haul	Long Haul
50% Reduced APD	77	120	659	-13	-6.5	-37.5	64	113	622
100% Reduced APD	77	120	659	-26	-13	-75	51	107	584
100% Reduced Domestic APD	77	120	659	-26	0	0	51	120	659
100% Reduced Long Haul APD	77	120	659	0	0	-75	77	120	584
100% Reduced Domestic/Short Haul APD	77	120	659	-26	-13	0	51	107	659
100% Reduced + Airline strategic/incentives	77	120	659	-26	-13	-75	51	107	584

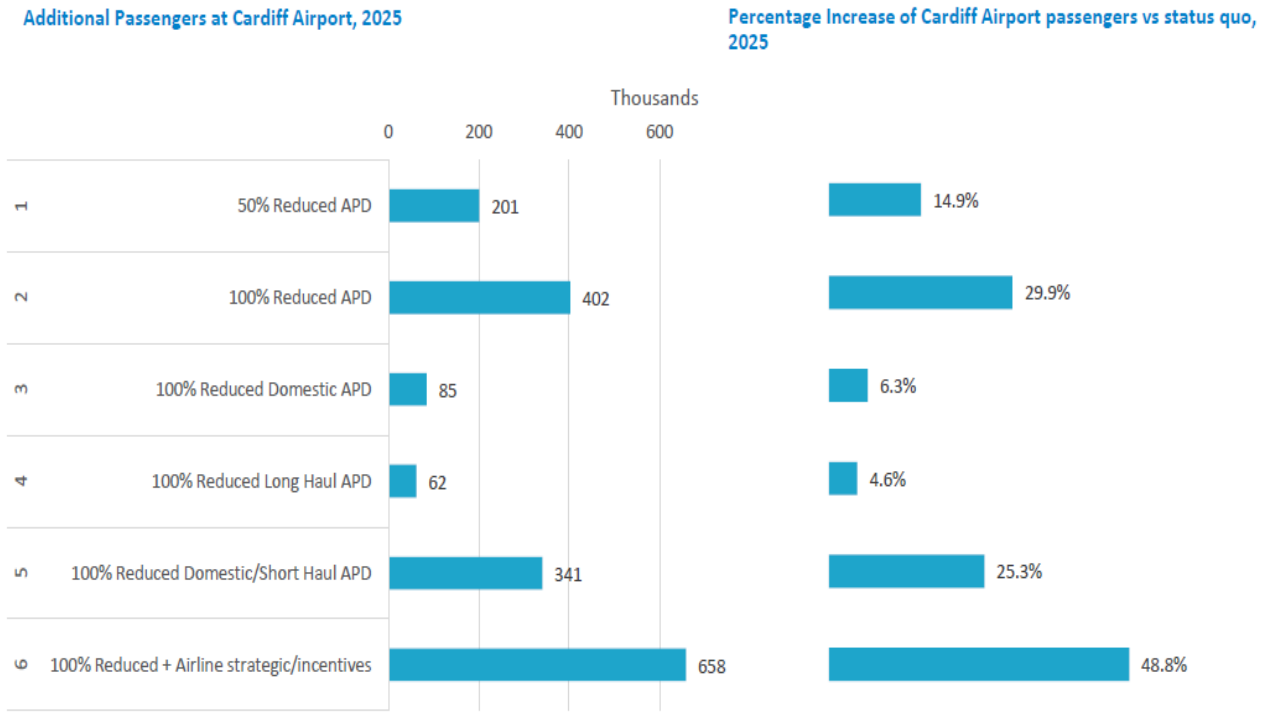
	Fare Change			Price Elasticity (Blended all segment)			Traffic Change (Leakage capture)		
	Domestic	Short Haul	Long Haul	Domestic	Short Haul	Long Haul	Domestic	Short Haul	Long Haul
50% Reduced APD	-17%	-5%	-6%	-0.7	-0.9	-0.7	12%	5%	4%
100% Reduced APD	-34%	-11%	-11%	-0.7	-0.9	-0.7	24%	10%	8%
100% Reduced Domestic APD	-34%	0%	0%	-0.7			24%	0%	0%
100% Reduced Long Haul APD	0%	0%	-11%			-0.7	0%	0%	8%
100% Reduced Domestic/Short Haul APD	-34%	-11%	0%	-0.7	-0.9		24%	10%	0%
100% Reduced + Airline strategic/incentives	-34%	-11%	-11%	-0.7	-1.9	-0.7	24%	20%	8%

Source: Consultants Modelling

4.31. In terms of the studies' key metrics highlighted in paragraph 4.4, the potential increase in Cardiff Airport passengers range from 5% for Scenario 4 (reduction in long haul APD only) to 49% for Scenario 6 (see Figure 15).

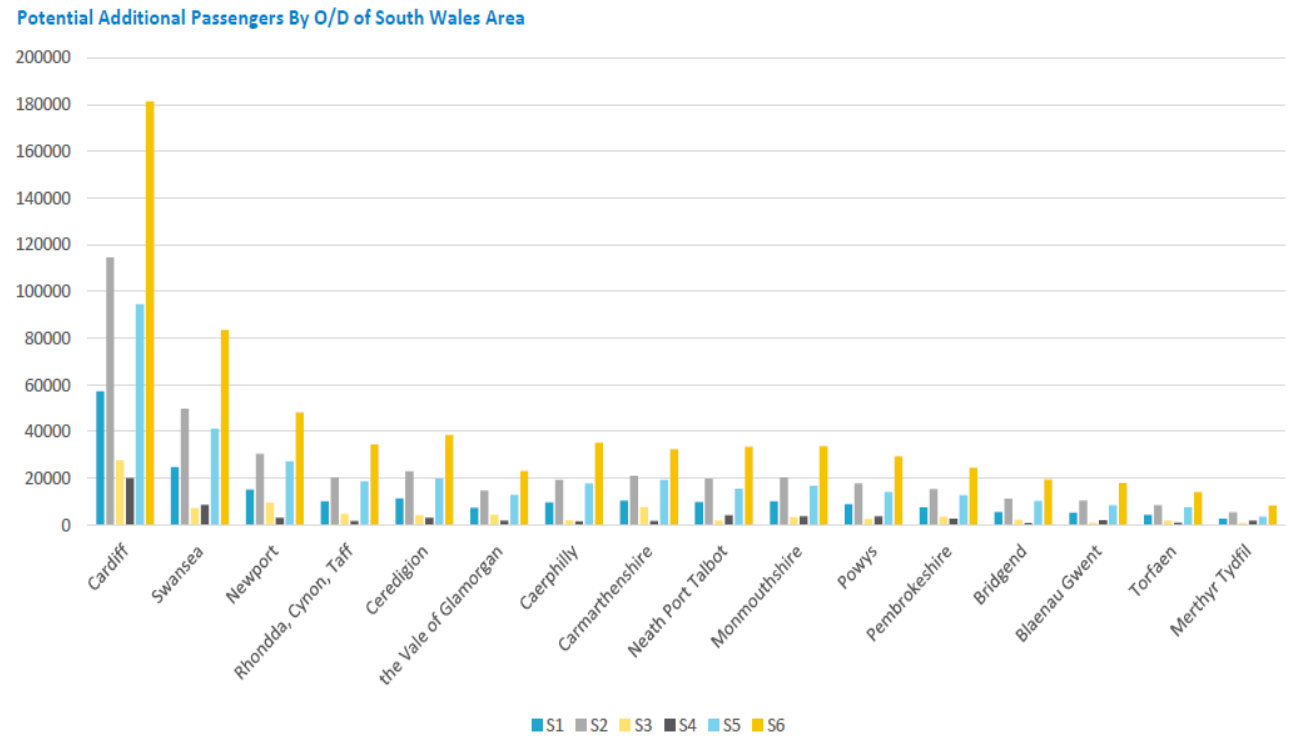
[31] Appendix F - South Wales Traffic Leakage Model – Summary of APD Scenario Runs

Figure 15



4.32. Figure 16 shows that around 50% of the additional traffic captured would come from the main cities of Cardiff, Swansea and Newport.

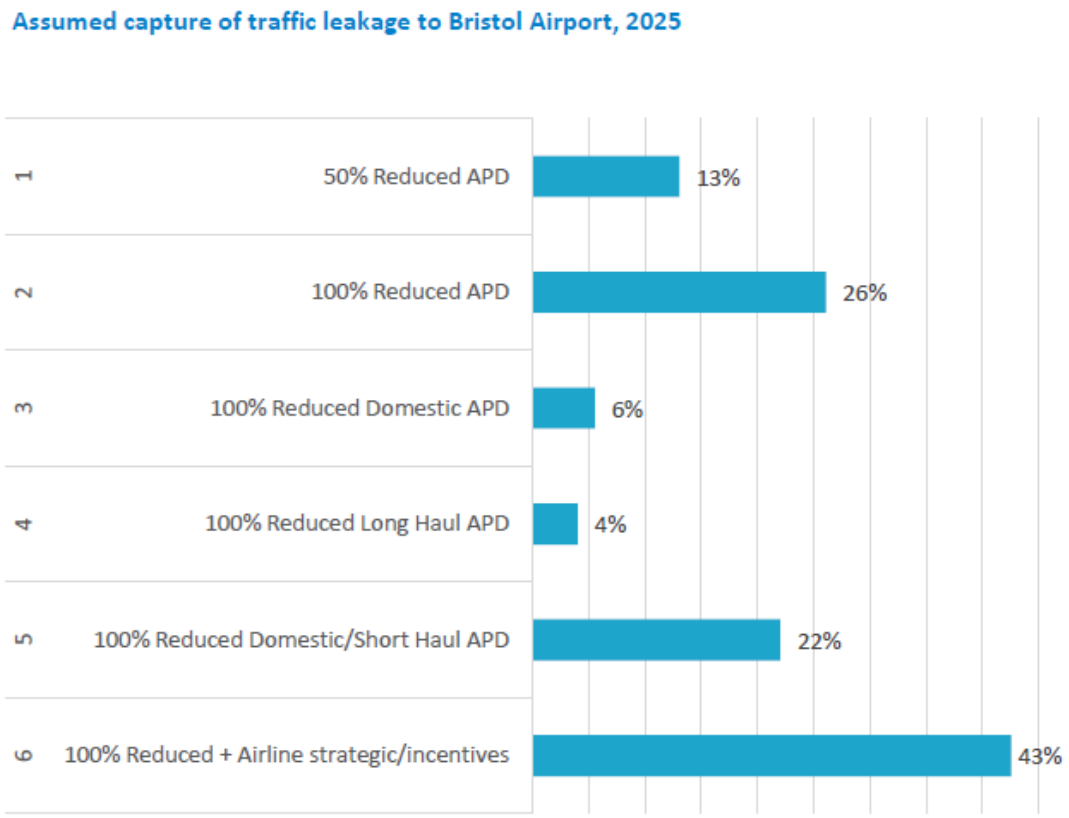
Figure 16



4.33. Assuming that all the additional traffic comprises traffic that previously would have leaked to Bristol, then Cardiff is projected to recapture between 4%

(Scenario 4) and 43% (Scenario 6) of the traffic from its catchment that it is currently losing to Bristol, because of historic under-investment and associated market failures (see Figure 17).

Figure 17



4.34. Scenario 6 is as close as any of our scenarios come to the High Impact scenarios used by York Aviation in their report for Bristol Airport, but the assumptions used are much more conservative, and the resultant traffic change similarly so. Scenarios 1, 2 and 5, which captured between 200-400,000 additional domestic and short haul passengers, feel much more realistic than the 650,000 modelled in Scenario 6. These figures exclude of course any traffic that might be drawn across the Severn from England and any long haul traffic that reduced APD might generate. But even if cumulatively these were to add another 100,000 passengers at Cardiff, the net uplift would remain in a central range between 300,000 and 500,000 and even under the most optimistic of scenarios, less than 1 million.

Economic Impacts

4.35. The economic impact assessment that follows uses a model developed to evaluate the economic impact of recaptured Wales-only air traffic There is no net additional GVA in this evaluation as the analysis was focused on re-distribution of existing demand, not generated or displaced (i.e. south west of England) traffic. Rather, what it was primarily interested in was quantifying the current and projected economic losses that discounting APD would facilitate being recaptured for the benefit of the Welsh economy. For clarity, it also excludes potential catalytic benefits that are dealt with in Chapter 7.

4.36. The direct economic benefits of developing air services can also be expressed as the overall or 'generalised' cost saving enjoyed by passengers, relative to the costs of travelling by other routes and/or transport modes. These savings include the costs faced by passengers who, in the absence of the direct service, might not travel at all. The calculation of 'generalised costs' should take into account all the costs faced by passengers including direct travel costs (e.g. public transport fares, mileage costs for cars, and tolls/congestion charges – see Figure 18), the value of time associated with surface journey time savings and interchange penalties (Figure 19), and airport premiums (e.g. for parking at large busy airports like Heathrow or Gatwick, and hire cars). To simplify matters, we have assumed airport car parking and hire car charges are the same at alternate airports as at Cardiff.

Figure 18:

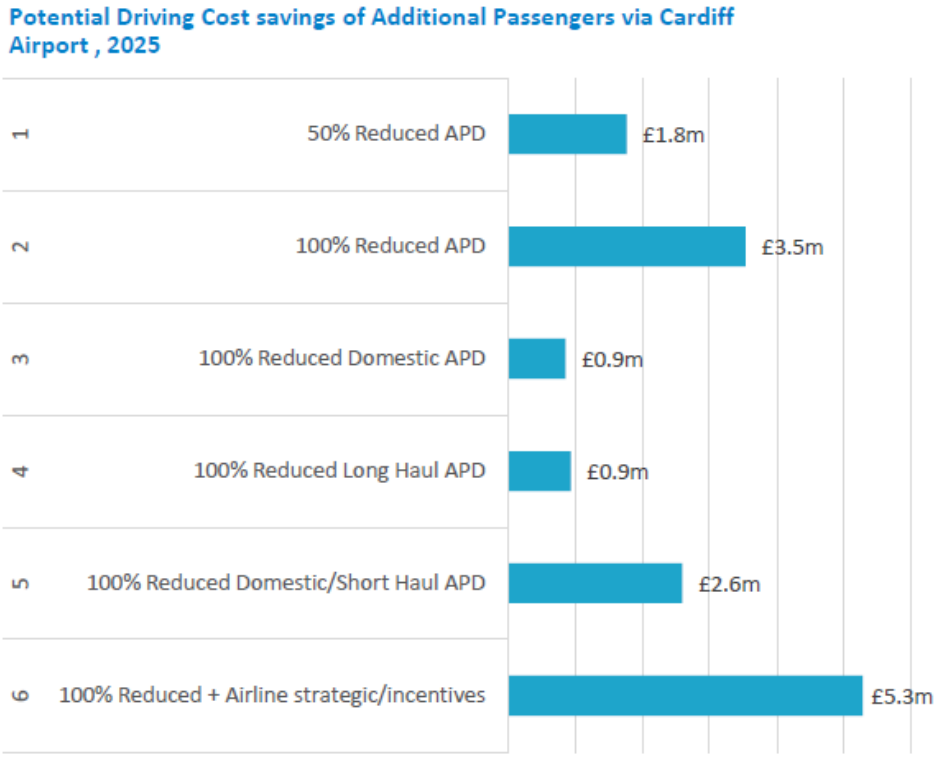
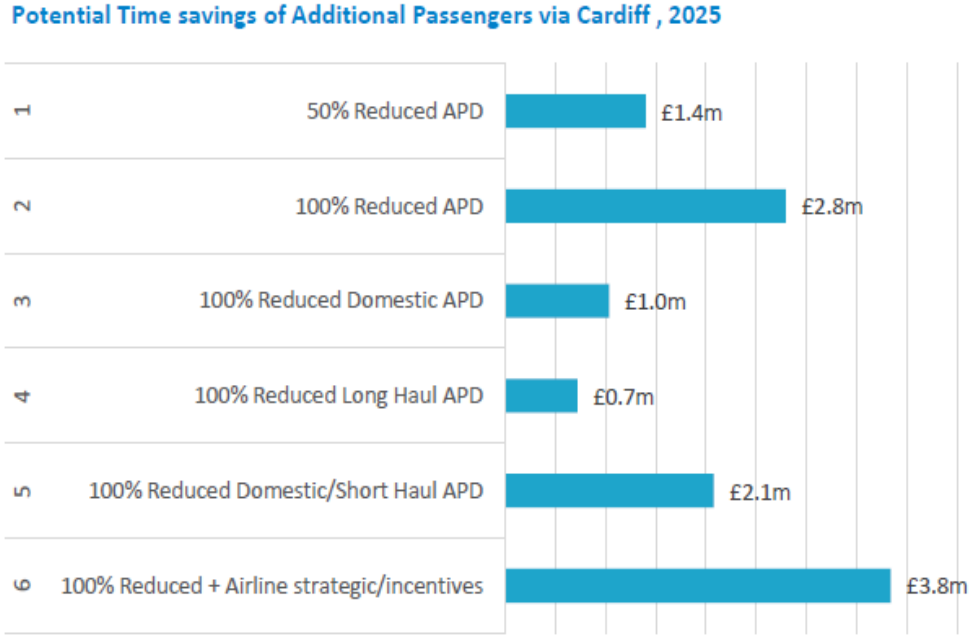


Figure 19

Assumption on Value of Time Per Hour (2015 price)

	UK Business	Foreign Business	Leisure
Bristol Airport (Short Haul)	£ 46.85	£ 42.49	£ 7.12
Heathrow Airport (Short Haul)	£ 64.90	£ 61.04	£ 7.12



4.37. The driving costs were calculated using the UK Government's Webtag transport assumptions. This shows an average of 13p/km cost for business passengers and 11p/km for leisure passengers. It was assumed an average of 1.8 passengers/car for leisure passengers and 1/car for business passengers. For the purpose of this analysis, it was assumed all leakage passengers travel by car to their respective airports. It was assumed all journeys to Bristol and Heathrow go via the tolled Severn Bridges[32]. The analysis therefore estimates driving cost savings in 2025 range between £0.9m - £5m.

4.38. Values of time are commonly applied to a range of different traveller categories. The values we have used are shown in Figure19[33], as are the projected value of potential time savings for passengers using Cardiff instead of travelling to Bristol or Heathrow. The range of scenarios in this case suggests benefits of between £0.7m - £3.8m in 2025.

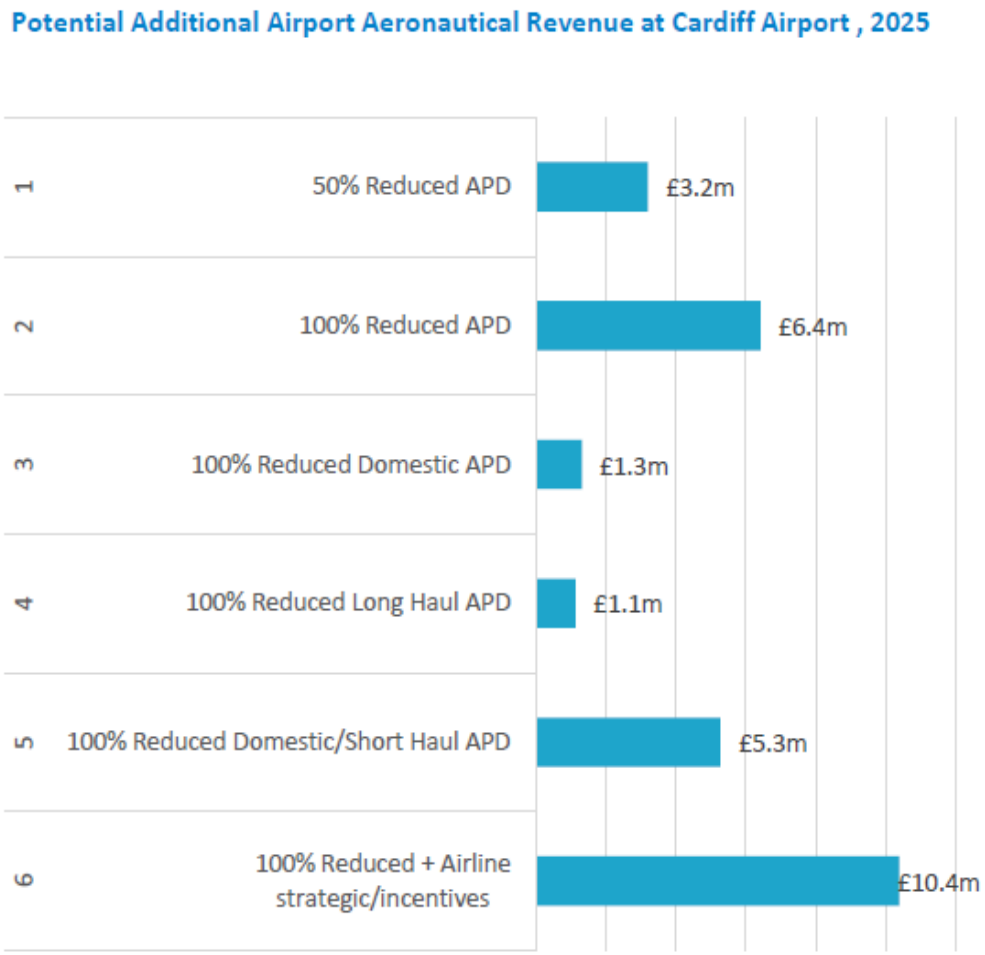
4.39. For the purpose of the analysis, the charges were based on published turnaround charges from Airportcharges.com and were applied on a per passenger basis. It has been assumed that a standard turnaround charge for short haul (737-800) and long haul (787) at 80% load factor[34]. Potential additional aeronautical revenue for Cardiff Airport varied between £1.1m - £10m in 2025 depending on the Scenario considered (see Figure 20). However, in the case of Scenario 6, the revenue excludes any allowance for targeted airline/passenger incentives to support the additional passenger growth and this might result in an outturn closer to £9m than £10.4m.

[32] Before the possibility of Severn Bridge tolls being abolished was announced

[33] The value of time for the leisure and business passengers were based on Airports Commission's assumptions for Bristol (short haul leakage) and Heathrow (long haul leakage)

[34] The per passenger charge was calculated to be £31/departing short haul passengers and £37/departing long haul passengers.

Figure 20



4.40. Table 7 summarises the potential benefits to Wales from different changes to the current APD regime. It is noticeable that benefits increase with the scale and coverage of APD reduction. In the absence of any generated traffic they would amount to c£12.7m in 2025 if the duty were to be completely removed. If some form of incentives were to be included in an overall package, thereby simulating some form of additional price stimulation (not included in the underlying modelling), then the level of potential benefits is forecast to be closer to £20m. This compares to potential lost tax revenues in the baseline of c£10m, but including clawed back traffic of c£13.5m and stimulated traffic of £15m, giving a range of net benefits (i.e. taking into account the potential block grant adjustment) of £5-10m at a discount rate of 3.5%; over 10 years, this represents accumulated net benefits of £35-70m. It is recognised that in reality airports discount on published charges, even on some established routes, and hence caution should be used in assessing aeronautical revenue which may well represent a maximum rather than minimum impact calculation. It has for instance been suggested that airports typically collect something like 50% of their published charges, which would reduce additional aeronautical revenue by

an equivalent amount. Additional car parking charge revenue[35] has also not been modelled, and would counter this dampening effect.

Table 7

APD Scenarios	Journey Time Savings (£m)	Driving Cost Savings (£m)	Additional Aeronautical Revenue (£m)	Total Net Change in Benefits (£m)
50% Reduced APD	1.4	1.8	3.2	6.4
100% Reduced APD	2.8	3.5	6.4	12.7
100% Reduced Domestic APD	1	0.9	1.3	3.2
100% Reduced Long Haul APD	0.7	0.9	1.1	2.7
100% Reduced Domestic/Short Haul APD	2.1	2.6	5.5	10.2
100% Reduced APD plus Strategic Incentives	3.8	5.5	10.4	19.7

4.41. Other metrics for judging the economic value of possible APD intervention strategies are:

- Employment Impacts – Direct, Indirect and Induced
- Changes to General Value Added (GVA) within the South Wales Economy

4.42. Using the traffic forecasts for Scenarios 2 and 6 (i.e. the complete removal of APD and then the addition of other incentives,) allows direct, indirect and induced jobs and GVA to the Welsh economy to be calculated (see Table 8). As elsewhere, the analysis only looks at Welsh O/D traffic in CWL's catchment area.

Table 8

APD Scenario	Estimated Total Clawed Back Demand	Estimate of Generated Traffic		Estimated Direct Jobs	Indirect + Induced Jobs	Total Jobs Created		% Business Pax	Ave Travel Cost Saving per Business Pax (£)	Ave Time Savings per Pax (hrs)	Cost Saving pa - Air vs Road (£)	User Benefits (£)	GVA (£/m)
100% Reduction in APD	402,000	0		362	528	890		16%	30	0.75	1,929,600	2,653,200	4.583
100% Reduction in APD + Stimulation	658,000	248,000		592	865	1457		16%	30	0.75	2,563,200	3,524,400	6.088

[35] A recent study by insurance company Admiral showed large differences in the parking cost of a two-week summer holiday break. The most expensive was Luton Airport, where a fortnight stay at their standard on-site car park came in at £191. The equivalent space at Exeter Airport cost just £65 - a difference of £126. Cardiff Airport was positioned at the lower end of the scale with £72 cited (Bristol £101).

4.43. By comparing Scenario 2, which makes no allowance for traffic (i.e. demand) stimulation arising as a result of the lower fares associated with APD removal vs APD Scenario 6, which does, we can see not only the impact of the clawback (effectively the re-assignment) of Welsh O/D traffic to Wales, but also the potential effects of generated traffic associated with stimulated demand which is a net benefit not only to the Welsh, but also to the UK economy.

4.44. Table 9 below shows the percentage of enhanced traffic associated with each APD scenario that is derived from those parts of South Wales that have Assisted Area status (i.e. between 51-57%). Most of the remaining traffic that is projected to be clawed back from Bristol and Heathrow has an O/D in the built-up areas of Cardiff, Swansea and Newport.

Table 9

Scenario No.	Percentage of Growth in Assisted Areas
S1	56%
S2	56%
S3	52%
S4	51%
S5	57%
S6	57%

Key Findings

4.45. This analysis has been undertaken at a high level but does show, in broad terms, that reductions in the levels of APD at Cardiff Airport could enable the airport to re-capture leaked passengers. The number of re-captured passengers is forecast to be within a range of 5% to 30% of status quo traffic (i.e. 62,000 - 402,000), depending on the changes to APD that are modelled. Of the latter figure, 62,000 is associated with long haul passengers, 85,000 with domestic and 266,000 with short haul international. Around 45% of the growth in traffic would have O/D's in Cardiff, Swansea and Newport, 55% in the hinterlands and the rest of South and South West Wales, which are associated with Assisted Area Status.

4.46. However, the lower/differentiated APD regime would also provide Cardiff Airport with a unique selling point especially for low cost airlines.

4.47. A further potential stimulation in passenger numbers at Cardiff could be expected if we were to consider not only re-capturing leaked passengers, but also new stimulated passenger demand resulting from lower overall air fares, assuming airlines pass on all or part of the reduction in APD. It is forecast that this would result in additional traffic of 658,000 passengers in 2025, representing a growth of c50% against the baseline. This so-called generated traffic allows one to estimate UK-wide GVA associated with the initiative rather than just GVA re-allocated from across the Severn.

4.48. The re-capturing of South Wales originating passengers by Cardiff Airport would result in monetary benefits to passengers through journey-time savings and reduced driving costs, and to Cardiff Airport through increased Aeronautical Revenue.

4.49. Totals vary from £2.7m to £12.7m under the core scenarios (i.e. Scenarios 1-5) and £19.7m in Scenario 6 (which includes assumptions about stimulated traffic).

4.50. The effect on employment is calculated as net positive 360-590 direct jobs under Scenarios 2 and 6 – this takes a mid-point of 900 jobs/million passengers in a typical range of 650-1,250/million shown in ACI and other industry research.

4.51. GVA, which excludes all leisure passengers from consideration under Green Book guidelines, is estimated at £4.6-6.1m in 2025, assuming the proportion of business traffic using Cardiff remains as in 2015. As the network improves, with more long haul and short haul business connections, and especially if a Heathrow Shuttle were added, this might reach a more typical 20-25% for a regional airport, resulting in GVA figures of closer to £7.0-9.5m

4.52. The preceding high level analysis indicates that a reduction or removal of APD would have a materially beneficial impact on the economy of South Wales. It is important to emphasise, however, that these results must be taken as indicative because the exact extent of that impact is difficult to measure without more detailed investigation. Following the review undertaken by Arup, in association with ICF, further airport choice modelling is being undertaken which takes into account catchment area and the current pattern of demand and price. This work is currently being undertaken and will be published alongside this report as supplementary evidence.

5. IMPACT ON DOMESTIC AND SHORT HAUL SERVICES IN THE SOUTH WEST OF ENGLAND

5.1. The purpose of this chapter is to revisit the domestic and short haul international traffic analysis in the preceding chapter and broaden the analysis to take into account demand arising in the same market segments used in the Welsh analysis in chapter 4 in the south west of England. So whereas Chapter 4 concentrated on quantifying and articulating the impacts on Cardiff Airport and the Welsh economy of different APD scenarios, it did not look - other than tangentially - at whether there might be any counter-balancing impacts on the English side of the Severn.

5.2. This was the focus of the York Aviation report for Bristol Airport published in 2016 [36],which in our view rests on the unstated premise that the current level of leakage, that involves large volumes of Welsh originating passengers crossing the Severn to use Bristol Airport (c1.1m in 2015) remains in situ and moreover is an appropriate baseline against which to evaluate future change. It therefore regards any intervention to repatriate some or all of that traffic to its closest local airport (i.e. Cardiff International) is de facto anti-competitive. Adopting this status quo as a null hypothesis, would in effect support the continuation of current 'out of catchment' movement of demand, which is commercially highly remunerative to Bristol but economically inefficient for the Welsh passengers and therefore for the wider economy of Wales.

Factors Constraining South West Leakage to Cardiff

5.3. Even before we examine the relevant modelling outputs that RDC generated to support our analysis, there are a number of pieces of evidence that do not support the notion implicit in York Aviation's report for Bristol Airport, namely that that any Welsh originating traffic that Cardiff Airport is able to clawback from Bristol Airport by discounting APD is effectively capture of 'their' own traffic (even though if originates outside its catchment), and that the use of APD to these ends amounts to anti-competitive behaviour and an abuse of state power.

5.4. Firstly, Figure 21 – which reproduces Table 4.3(a) and (b) from the CAA's published summary of its 2015 passenger survey – shows that whereas Bristol pulls 1.234 million passengers from Wales across the Severn, Cardiff attracted only 35k passengers the other way. In other words, there are a number of extant factors that are already minimising leakage in the domestic and short haul sectors for passengers originating in the south west of England. These include:

- The range and frequency of flights is not as great as from Bristol;

[36] York Aviation: Ibid (2016)

- Bristol Airport is closer to all the major urban areas in its catchment than any other airport (with the exception of Swindon to Heathrow), and it is certainly closer than Cardiff Airport is (see Appendices E (a)-(c)).

- This means that to travel to Cardiff Airport would increase journey times for all South West passengers and in addition they would need to pay the Severn Crossing toll, which they would not if they used to Bristol Airport;

- Average fares are already more expensive at Bristol and yet passengers continue to favour it (see Figure 22)[37]

Figure 21

Table 4.3a
Origin/destination of terminating passengers at the 2015 survey airports.

Region	Gatwick		Heathrow		London City		Luton		Stansted	
	000's	%	000's	%	000's	%	000's	%	000's	%
East Midlands	647	1.7	1,348	2.8	14	0.3	1,097	9.1	773	3.6
East of England	2,864	7.7	4,023	8.4	311	7.4	3,488	29.1	6,370	29.7
North East	103	0.3	130	0.3	1	0.0	25	0.2	61	0.3
North West	192	0.5	287	0.6	2	0.0	106	0.9	143	0.7
Scotland	69	0.2	92	0.2	4	0.1	20	0.2	37	0.2
South East	29,995	81.1	36,290	75.7	3,812	91.4	6,192	51.6	12,891	60.2
South West	1,884	5.1	3,262	6.8	12	0.3	290	2.4	447	2.1
Wales	389	1.1	822	1.7	3	0.1	78	0.7	128	0.6
West Midlands	544	1.5	1,153	2.4	9	0.2	514	4.3	344	1.6
Yorkshire and the Humber	274	0.7	508	1.1	6	0.1	188	1.6	227	1.1
Northern Ireland & Eire	12	0.0	4	0.0	1	0.0	2	0.0	1	0.0
Total	36,973	100.0	47,919	100.0	4,173	100.0	12,001	100.0	21,421	100.0

Note: Excludes interviews where passengers may not have answered all relevant core questions

Table 4.3b
Origin/destination of terminating passengers at the 2015 survey airports.

Region	Birmingham		Bristol		Cardiff		East Midlands		Liverpool		Manchester	
	000's	%	000's	%	000's	%	000's	%	000's	%	000's	%
East Midlands	1,517	15.9	7	0.1	1	0.1	2,766	62.5	41	1.0	910	4.1
East of England	100	1.0	7	0.1	0	0.0	43	1.0	5	0.1	34	0.2
North East	8	0.1	1	0.0	0	0.0	18	0.4	36	0.8	477	2.2
North West	116	1.2	9	0.1	0	0.0	37	0.8	3,334	79.3	13,622	61.9
Scotland	16	0.2	13	0.2	1	0.1	8	0.2	29	0.7	300	1.4
South East	342	3.6	93	1.5	3	0.3	32	0.7	10	0.2	67	0.3
South West	473	5.0	4,843	76.4	35	3.1	28	0.6	3	0.1	62	0.3
Wales	280	2.9	1,234	19.5	1,075	95.9	15	0.3	226	5.4	983	4.5
West Midlands	6,516	68.4	128	2.0	6	0.5	813	18.3	191	4.5	1,238	5.6
Yorkshire and the Humber	152	1.6	6	0.1	0	0.0	668	15.1	278	6.6	4,292	19.5
Northern Ireland & Eire	0	0.0	0	0.0	0	0.0	0	0.0	50	1.2	7	0.0
Total	9,520	100.0	6,343	100.0	1,122	100.0	4,428	100.0	4,203	100.0	21,991	100.0

Note: Excludes interviews where passengers may not have answered all relevant core questions

5.5. Hence it seems unlikely that even modest changes to top-line fares associated with changes to APD may materially change this market dynamic and draw far

[37] Fare Analysis compares observed fares for Cardiff and Bristol in 2015 and 2016 on competing routes. There a few routes where Cardiff is already over £30 cheaper than Bristol – far greater than the potential saving in APD, yet as the CAA survey has shown just 3% of Cardiff's passengers are from the South West. Also view modelled comparison in Appendix C.

more south west England passengers to Cardiff Airport. Of much greater threat to Bristol is the loss of demand from within its catchment to larger airports outside the region. Figure 23 (Table 5.2 from the CAA's 2015 survey report) indicates the principle threats are Heathrow, Gatwick and Birmingham and by comparison Cardiff is (and in our view will remain) a minnow.

Figure 22: Average Fares

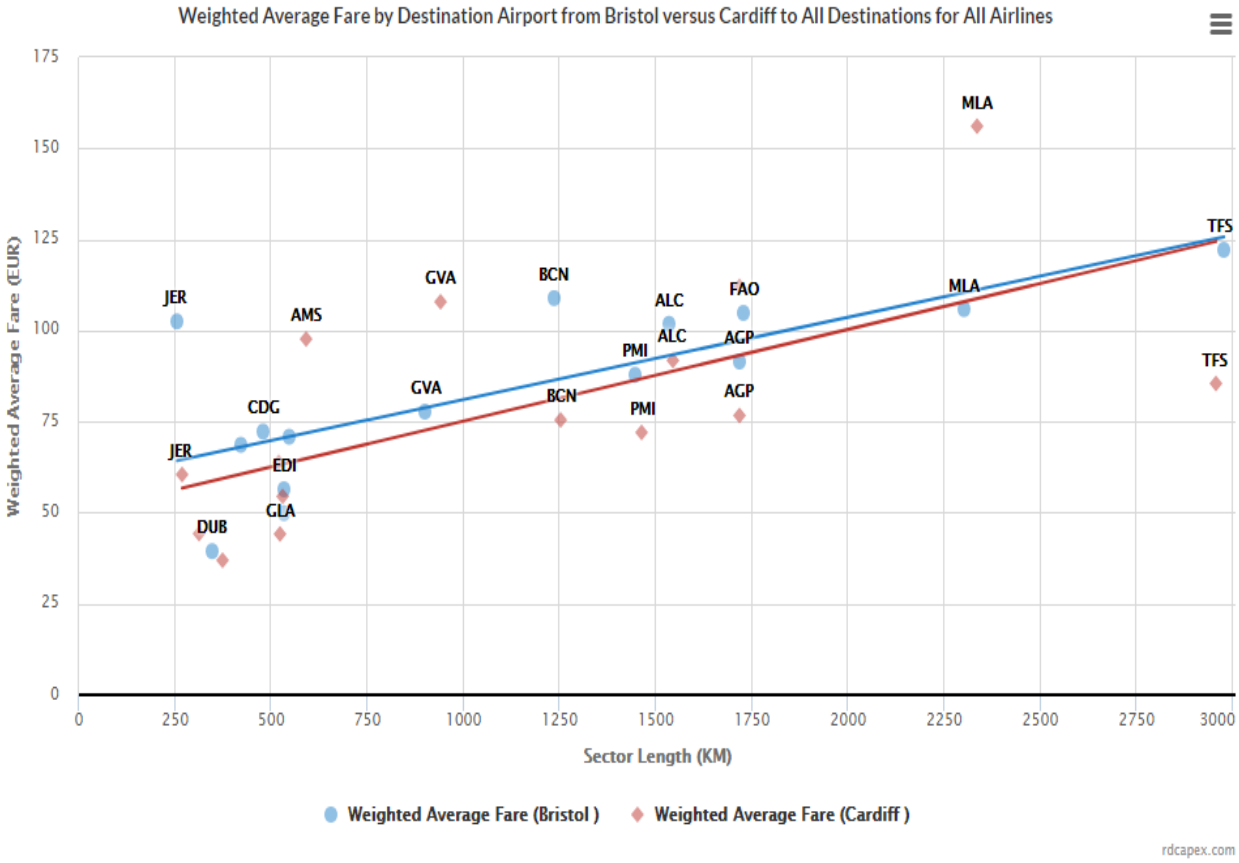


Figure 23

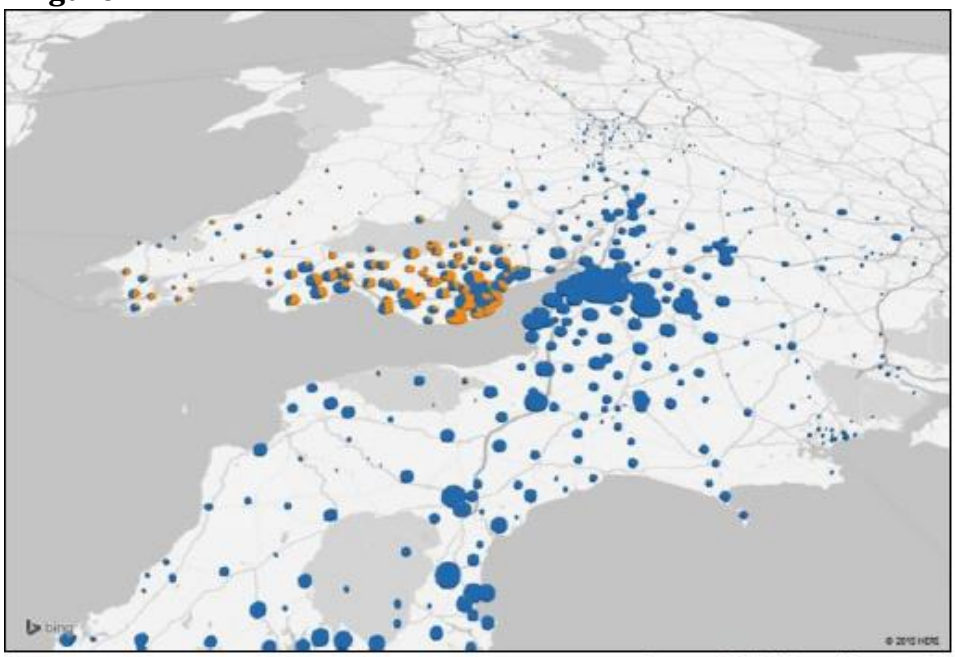
Table 5.2
Origin/destination patterns of terminating passengers at Bristol Airport in 2015 within the South West Planning Region.

Region	County	Scheduled		Charter		Total	
		000's	%	000's	%	000's	%
South West	City of Bristol	1,416	32.7	156	30.6	1,572	32.5
	Cornwall County	255	5.9	36	7.1	291	6.0
	Devon County	724	16.7	94	18.6	818	16.9
	Dorset County	115	2.7	9	1.8	124	2.6
	Gloucestershire County	418	9.6	45	8.9	463	9.6
	Somerset County	1,070	24.7	119	23.3	1,189	24.5
	Wiltshire County	336	7.8	50	9.8	386	8.0
Total		4,334	100.0	509	100.0	4,843	100.0

5.6. In the York Aviation report for Bristol airport, a map was produced (see Figure 24), to show the distribution of current passenger demand for Bristol and

Cardiff airports taken from the CAA Passenger Survey 2012[38]. Although their report claims that this strongly supports the existence of a single market shared by Bristol and Cardiff, Cardiff's catchment area (orange dots) is completely subsumed within Bristol's catchment area (blue dots). We would contend, therefore, that it actually demonstrates the existence of two distinct markets separated by the Severn and that South Wales are using Bristol only because adequate services are not available at Cardiff. To our mind this starkly highlights the distinctiveness of the South West catchment and the difficulty Cardiff would face attracting traffic from east of the Severn, even if that was an objective, which it is not.

Figure24



Source: CAA Airport Survey Data 2012

5.7. But perhaps the most empirical evidence undermining the idea that devolved APD in Wales would threaten Bristol's domestic and short haul market hegemony, is provided by Tables 10 (a)-(d) which break domestic and short haul traffic originating in the South West by county, business and leisure split and airport used.

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Table 10(a): London Airports Used by South West of England Passengers to Access Domestic Air Services 2015

South West	LHR		LGW		LTN		STN	
County	Business	Leisure	Business	Leisure	Business	Leisure	Business	Leisure
City of Bristol		1,275	4,982	2,065				
Somerset County	2,837	4,072		688	749			
Wiltshire County	10,154	7,347	4,079	11,010	973	2,045		876
Gloucestershire County	479	2,726	2,743	1,617		763		696
Devon County	1,187		1,773					
Cornwall County	2,596	7,264	240			1,710		
Dorset County	2,929	8,185		1,431		3,576		295
Total	20,182	30,869	13,817	16,812	1,722	8,093	0	1,867
% Business Leisure Capture	**4.6%**	**4.6%**	**3.2%**	**2.5%**	**0.4%**	**1.2%**	**0.0%**	**0.3%**
% Total Capture	**5%**		**3%**		**1%**		**0%**	

Table 10(b): Non-London Airports Used by South West of England to Access Domestic Air Services 2015

South West	BHX		BRS		CWL		Total	
County	Business	Leisure	Business	Leisure	Business	Leisure	Business	Leisure
City of Bristol			180,058	180,743	112	1,138	185,152	185,222
Somerset County	835	1,119	71,471	193,501		283	75,891	199,664
Wiltshire County		3,321	30,707	60,421	103		46,017	85,020
Gloucestershire County	27,987	19,183	28,767	39,347	51	978	60,027	65,311
Devon County	398		41,494	76,970		207	44,852	77,177
Cornwall County			18,947	21,640			21,782	30,613
Dorset County			1,483	16,518	103		4,516	30,005
Total	29,220	23,624	372,928	589,140	369	2,607	438,237	673,012
% Business Leisure Capture	**6.7%**	**3.5%**	**85.1%**	**87.5%**	**0.1%**	**0.4%**	**100%**	**100%**
% Total Capture	**5%**		**87%**		**0.3%**		**100%**	

Table 10(c): London Airports Used by South West of England to Access International Short Haul Air Services 2015

South West	LGW		LHR		LTN		STN	
County	Business	Leisure	Business	Leisure	Business	Leisure	Business	Leisure
City of Bristol	12,278	97,314	38,493	87,177	13,333	20,843	5,099	49,167
Somerset County	18,660	141,279	48,421	130,892	4,088	34,237	5,849	47,095
Devon County	28,166	173,426	57,351	145,169	4,801	27,058	11,503	73,468
Gloucestershire County	8,132	176,556	68,216	103,761	16,774	28,794	8,353	37,885
Wiltshire County	25,589	226,994	135,218	112,758	2,394	36,698	4,540	72,269
Dorset County	24,300	268,535	52,396	196,920		64,462	14,665	75,324
Cornwall County	1,129	95,392	8,566	41,922	2,291	12,538	1,008	30,845
Total	118,253	1,179,497	408,660	818,598	43,680	224,630	51,018	386,055
% Business Leisure Capture	**10.8%**	**18.6%**	**37.2%**	**12.9%**	**4.0%**	**3.5%**	**4.6%**	**6.1%**
% Total Capture	**17%**		**16%**		**4%**		**6%**	

Table 10(d): Non -London Airports Used by South West of England to Access International Short Haul Air Services 2015

South West	BHX		BRS		CWL		Total	
County	Business	Leisure	Business	Leisure	Business	Leisure	Business	Leisure
City of Bristol	2,097	23,038	185,432	1,012,990	1,050	7,037	257,781	1,297,566
Somerset County	2,408	23,354	98,118	813,961		3,432	177,545	1,194,250
Devon County	513	22,092	65,689	619,552	63	3,847	168,084	1,064,611
Gloucestershire County	22,682	234,594	42,976	347,879	187	4,901	167,320	934,371
Wiltshire County	3,223	19,568	28,710	259,988		8,628	199,674	736,903
Dorset County		5,164	6,483	99,524		288	97,844	710,215
Cornwall County		3,248	17,449	227,301	47	1,962	30,490	413,207
Total	30,922	331,056	444,858	3,381,193	1,347	30,094	1,098,738	6,351,123
% Business Leisure Capture	**2.8%**	**5.2%**	**40.5%**	**53.2%**	**0.1%**	**0.5%**	**100%**	**100%**
% Total Capture	**5%**		**51%**		**0.4%**		**100%**	

5.8. What they show is that only about 0.3% of south west England domestic passengers (some 3,000 in all) use Cardiff Airport (300 times less than uses Bristol), and that the equivalent short haul international figures are 0.4% and 32,000 respectively.

Modelling the Effect of APD Changes on South West England Passengers

5.9. Despite these substantive reservations, we nevertheless modelled the impact of APD changes at Cardiff on south west England originating traffic alongside that from Wales. Passenger volumes in 2015, adjusted to reflect 2016 growth in passenger numbers, were grown in line with long term DfT growth rates out to 2025 and 2040.

5.10. To analyse the impact of APD change we have used a price elasticity approach with following elasticity assumptions:

Domestic	UK Business	UK Leisure	Foreign Business	Foreign Leisure
-0.7	-0.4	-1	-0.3	-1.1

5.11. The average fares are based on low cost airlines from Cardiff and Bristol, estimated at an average roundtrip domestic fare of £77 and £120 for short haul international.

5.12. The results are presented in Figure 25 overleaf, and indicate that the total net impact of the two strongest APD discount scenarios would be between 50,000 and 70,000 additional passengers from the South West crossing the Severn to access Cardiff. This would equate to a potential loss of between 65-90 jobs in the South West, but the loss of economic benefit would be de-minimis because the additional travel costs and journey length they would experience would probably offset any APD savings passed on by the airlines.

5.13. The bottom line for this kind of traffic is the negative effects that APD is likely to have on the south west economy are likely to be small and certainly nothing like the kind of numbers projected by Bristol Airport's consultants, who not only exaggerated the scale of these effects and those arising from clawed-back Welsh originating traffic, but also then suggested domestic and short haul routes would be lost altogether from Bristol as a result. In their High Impact scenarios, they even suggested aircraft would be re-deployed because of APD.

Figure 25

		Scenario 50% APD reduction short haul		Scenario 100% APD reduction short haul	
	Cardiff Airport Status Quo	Passengers (m)		Passengers (m)	
		2025	2040	2025	2040
	South Wales	1.37	1.88	1.37	1.88
	Rest Wales	0.23	0.31	0.23	0.31
	Near Southwest	0.04	0.05	0.04	0.05
	Far Southwest	0.01	0.02	0.01	0.02
	Total	**1.65**	**2.26**	**1.65**	**2.26**
A	Cardiff Airport + APD Impact Stimulation On Existing Trafffic				
		2025	2040	2025	2040
	South Wales	1.46	2.00	1.54	2.12
	Rest Wales	0.24	0.33	0.25	0.35
	Near Southwest	0.04	0.06	0.04	0.06
	Far Southwest	0.01	0.02	0.01	0.02
	Total	**1.75**	**2.40**	**1.85**	**2.54**
	Total Impact A	**0.10**	**0.14**	**0.20**	**0.28**
B	Cardiff Airport + APD Impact Stimulation On Existing Trafffic + Leakage Capture of Wales				
		2025	2040	2025	2040
	South Wales	1.59	2.18	1.80	2.47
	Rest Wales	0.27	0.37	0.32	0.44
	Near Southwest	0.04	0.06	0.04	0.06
	Far Southwest	0.01	0.02	0.01	0.02
	Total	**1.92**	**2.63**	**2.18**	**2.99**
	Total Impact A+B	**0.26**	**0.36**	**0.53**	**0.73**

5.14. However, our analysis suggests that none of the effects are that significant. The traffic ratios in Appendix D point to there being plenty of scope to accommodate modest losses of traffic associated with Welsh originating passengers re-routing via Cardiff or small additional numbers crossing the Severn into Wales, without loss of route or frequency. Quite apart from which, as Table 11 below demonstrates, there are 15-20 important domestic and short haul scheduled (let alone sun or ski charter) destinations, that are currently served by neither airport, and passengers using these routes can be assumed to form part of the traffic that APD can be expected to clawback or generate in this sector - crucially, not all of it will be from Bristol.

Table 11: Domestic and Short Haul Destinations Served by Neither Cardiff or Bristol

Domestic		Short Haul International		
Hub	City	Hub	City	Leisure
London	Manchester Liverpool Leeds-Brad	Zurich Istanbul Helsinki	Stockholm Oslo Athens Moscow Stuttgart Lux'bourg Gothburg Valencia Stavangar Hannover	Shannon Riga
1	3	3	10	2

5.15. Certainly, at the level of analysis we have undertaken, we see no evidence to suggest that there would be material adverse effects on Bristol Airport or the South West economy as a result of APD being devolved to Wales on domestic and short haul routes as the other two UK national administrations have also been allowed to do.

6. DEVOLVED APD AND LONG HAUL SERVICES

Introduction

6.1. Long haul services were one of the areas of concern that York Aviation reports for Bristol Airport highlighted, on the grounds that the devolution of APD to Wales could give rise to discounting that would have a substantial impact on Bristol's long haul ambitions. In the long haul addendum to their core report for Bristol Airport[39], York Aviation appear to be arguing that as Cardiff Airport is likely to be seeking to attract many of the same airlines as Bristol to serve the common long haul destinations (and the recent commitment from Qatar Airways to begin a service to Doha in 2018 indicates Cardiff is already being successful in this area), then Bristol Airport could not compete with heavily discounted APD 'lite' fares. They go on to suggest that this would mean Bristol might never be able to get a foothold in this lucrative market, which would instead gravitate quickly towards Cardiff Airport – not least because the core South West market for long haul services (i.e. Bristol and Bath), would be within its reach (i.e. its 90 minute catchment).

6.2. This rather pessimistic diagnosis in our view oversimplifies what is likely to be a much more complex balance of considerations, including:

- The type of airlines it might be possible to attract to contemplate developing a 'regional' route into the south west of the UK, having regard to their preferred mix of business and leisure traffic – long haul low cost operators or full service carriers feeding a large hub in a high density market (e.g. transatlantic or Middle East) look the most promising.

- The equipment flown by those airlines and their associated performance (e.g. sector length and take-off run required), relative to what Cardiff and Bristol airports can offer – Bristol's runway is both shorter (2,011m) and higher (166m OD), than Cardiff's at 2,394m and 65m respectively;

- The 'shadow-effect' of Heathrow and Birmingham airports and carrier's reluctance to cannibalise existing commercially successful operations – hence long haul low cost carriers and charter carriers based at Gatwick (e.g. Norwegian, West Jet, Pegasus, TUI and Thomas Cook) or full service carriers under-represented at Heathrow and Birmingham (e.g. Qatar, Turkish, Rouge) are least likely to be discouraged, whereas others such as BA, Emirates, or the US big three (but perhaps not a hybrid operator with the right equipment like Jet Blue) may be.

- The package of discounts and marketing support Bristol and Cardiff airports are willing to offer and the quality of the handling services they can provide.

[39] York Aviation: Ibid (2016)

6.3. Just as interestingly, York Aviation's own Long Haul APD reduction scenario (see highlights in Table 12 below, which reproduces Table 2.3 from Bristol's report), only project modest levels of impact from devolution – indeed the levels of impact suggested are well within the margins of error for future route forecasting.

Table 12:

Table 2.3: Traffic Impacts of Devolution of Direct Long Haul APD vs. Base Case (millions)

	2014	2015	2016	2017	2018	2019	2020	2025
Base Case								
Domestic	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.3
International	5.2	5.5	5.6	5.9	6.1	6.2	6.5	7.8
Total	6.3	6.6	6.7	7.0	7.2	7.4	7.7	9.1
100% Reduction in Direct Long Haul APD								
Domestic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
International	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.2	-0.4
Total	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.2	-0.4

Source: Bristol Airport Report

Current Characteristics of Long Haul Traffic

6.4. With this background, the most useful starting point is to consider first the characteristics of the existing long haul demand across the combined catchment area encompassed by both Cardiff and Bristol's long haul (i.e. 90 minute) catchment areas, as outlined in Chapter 2 and shown in Figure 6 in Chapter 3.

6.5. Altogether, over 3.56 million passengers made long haul journeys from within the combined catchments in 2015. Of these:

- 75% of demand originated from the southwest of England, 23% from Wales and 2% from the south Midlands;
- 2.2 million (62%) flew point-point (i.e. direct) to their destination from their departure airport while 1.35 million (or 38%) connected via an intermediate point.
- 72% used Heathrow as their departure airport for their long haul journey and 20% Gatwick or other London airports, but only 3.7% used Bristol while passengers beginning their long haul journey at Cardiff was de-minimis, with most driving to London, Birmingham or Bristol to start their journey;

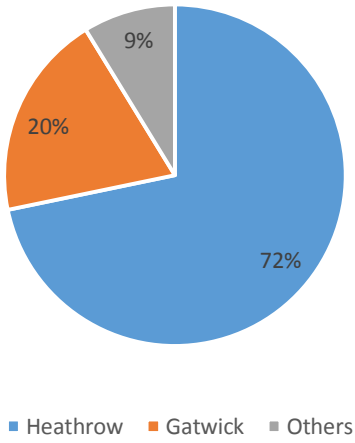
6.6. Table 13 and Figure 26 illustrate these findings, which are broken down in more detail in Appendices G (a)-(d).

Table 13: Composition of Long Haul Traffic

Region	Connecting	Point to Point	Total
South West	**997,734**	**1,662,033**	**2,659,767**

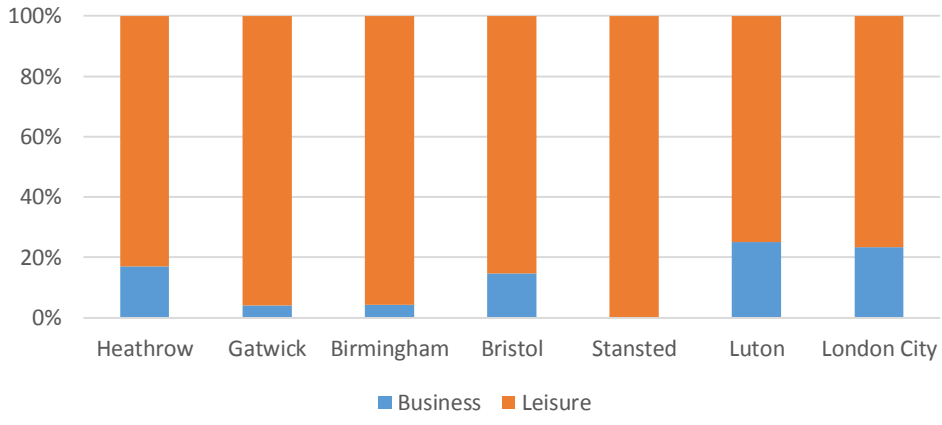
Wales	**328,224**	**508,432**	**836,656**
West Midlands	**28,575**	**32,244**	**60,820**
Total	**1,354,533**	**2,202,709**	**3,557,243**
South West %	**28.0**	**46.7**	**74.8**
Wales %	**9.2**	**14.3**	**23.5**
West Midlands %	**0.8**	**0.9**	**1.7**
Total %	**38.1**	**61.9**	**100.0**

Figure 26: UK Airport Used 2015



6.7. Turning to journey purpose 14% of passengers were travelling on business, 86% for leisure purposes; the departing airports can be seen in Figure 27.

Figure 27: Long Haul Journey Purpose by UK Departure Airport 2015



6.8. In terms of their final destination, Table 14 offers a summary of Appendices H, which indicates that for UK originating passengers (which make up 77% of the total long haul market), North America (26%) is the most popular destination followed by the Far East (18%) and Australasia (11%), then the Middle East, North Africa, the Indian sub-continent and Canada respectively. For passengers

who are overseas residents, the same pattern occurs except the numbers are about a quarter of those travelling outbound and Southern Africa and South America replace North Africa in the pecking order. And while leisure traffic (86%) dominates the market, the USA, Far East and Middle East/Indian sub continent combined each have material business volumes (i.e. over 50,000 passengers a year).

Table 14: Long Haul Destination Markets

	Foreign		UK		Total
Destination Region	**Business**	**Leisure**	**Business**	**Leisure**	
United States of America	43,500	159,516	117,340	606,910	927,266
Far East	14,618	138,930	73,294	428,875	655,716
Australasia	4,482	176,261	7,017	197,428	385,188
Middle East	32,977	35,401	36,228	190,266	294,872
North Africa	1,611	9,016	8,288	248,331	267,246
Indian Sub-Continent	20,028	36,062	10,770	154,822	221,682
Canada	12,302	46,997	9,270	94,052	162,621
Central America		3,595	10,705	124,653	138,953
Caribbean Area	390	5,677	6,525	117,310	129,901
Southern Africa	6,325	35,128	7,029	62,328	110,810
South America	12,830	24,423	12,316	33,998	83,568
West Africa	3,817	1,206	16,464	15,558	37,045
East Africa	685	8,978	9,052	16,057	34,773
Indian Ocean Islands		885	1,702	30,124	32,711
Near East	2,814	3,075	8,541	17,888	32,318
Atlantic Ocean Islands		1,335		23,966	25,301
Central Africa	558	1,339	805	11,678	14,380
Pacific Ocean Islands		871		2,019	2,890
Total	**156,938**	**688,693**	**335,349**	**2,376,263**	**3,557,243**

6.9. Focusing in from global regions to look at individual cities, in terms of final destinations (see Appendix I (a)), demand is well spread with only Dubai and New York attracting 5% or more of the market. The picture is much clearer in relation to connecting points for onward travel (a market of 1.35 million passengers), however, with Dubai and Doha being substantially ahead of their peers followed in order by Singapore, Amsterdam, Abu Dhabi, Hong Kong and New York, which is the top gateway to other parts of the USA (Appendix I (b)).

6.10. Looking ahead, the underlying long haul market suggests the 35 cities in Table 15 as the top long haul target destinations, with key hubs such as Dubai, Doha, Singapore, New York, Abu Dhabi and Toronto topping the list for full service carriers; Hong Kong, Delhi, Boston and Washington leading the way in terms of point to point opportunities for low cost long haul operators and Tel Aviv, Las Vegas, Cairo and Cancun as primary un-served candidates for leisure operators.

Table15

Long Haul International		
Hub	City	Leisure
Dubai	Hong Kong	Tel Aviv
Doha	Delhi	Las Vegas
Singapore	Boston	Cairo
New York	Washington	Cancun
Abu Dhabi	Los Angeles	Bali
Toronto	Jo'burg	
Miami	Mumbai	
Atlanta	Beijing	
Philadelphia	Tokyo	
Dallas	Shanghai	
Houston	Calgary	
Seoul	Jeddah	
Bangkok	Kuwait	
K-Lumpur	Seattle	
	Lagos	
	Vancouver	
14	16	5

Long Haul Forecasts

6.11. To understand the scope for sustaining long haul operations within Bristol and Cardiff's catchment areas, we have undertaken a series of case studies of the most promising routes. These include Doha, which was announced by Qatar Airways during the course of our work on this report.

6.12. The text box overleaf provides a synopsis of the analytical approach adopted to generate pre and post APD route forecasts which are set out in Full in Appendix J, and but summarised in Tables 16(a)-(c) New York, Toronto and Doha respectively.

Long Haul Analysis

1. We filtered the passenger demand to 3 main markets. These markets are the strongest and most likely scheduled long haul service to be developed out of Cardiff Airport:
    a. New York market
    b. Canada market
    c. Middle East hub + onward
2. For each of these main markets, we have assumed target airlines, aircraft, frequency and load factor.

Target Airline Operations	**2018**	**2025**	**2040**	**2018**	**2025**	**2040**	**2018**	**2025**	**2040**
Route Region	**New York (JFK + EWR)**			**Canada**			**Middle East Hub**		
Airline	Norwegian			WestJet			Qatar		
Aircraft Seats	189	189	189	136	136	136	144	144	144
Frequency	3	5	7	3	5	7	5	7	10
Load Factor	80%	80%	80%	80%	80%	80%	75%	75%	75%
Annual ATM	313	521	730	313	521	730	521	730	1043
Annual Seats	59157	98469	137970	42568	70856	99280	75024	105120	150192
Target Passengers	**47326**	**78775**	**110376**	**34054**	**56685**	**79424**	**56268**	**78840**	**112644**

3. The target passengers were then derived from the existing catchment demand, with assumptions of higher market capture weighting for South Wales and Rest of Wales compared to the Southwest.
4. In addition, we assumed direct service passenger stimulation of 125% to reflect the availability of direct services operating out of Cardiff Airport.
5. The resulting passengers and catchment origin was assumed as the baseline passengers for long haul services out of Cardiff Airport.
6. The direct APD impact is based on the price elasticity of demand against the baseline passengers.
7. Price elasticity is based on below, estimated on average of DfT and IATA.

UK Business	UK Leisure	Foreign Business	Foreign Leisure
0.0	-0.87	-0.13	-0.46

8. Fare price assumed for the 3 main markets were estimated based on online spot check of scheduled fares.
9. APD impact was varied between 50% and 100% reduction.

Long Haul Forecasts

Table 16(a): New York

Metric	2018	2025	2040
Route Region	**New York (JFK + EWR)**		
Airline	**Norwegian/Jet Blue**		
Aircraft Seats	189	189	189
Frequency	3	5	7
Load Factor	80%	80%	80%
Annual ATM	313	521	730
Annual Seats	59,157	98,469	137,970
Baseline Pax	47,326	78,775	110,376
APD Stimulated Pax	-	**84,680**	**118,698**
Net Stimulated Impact	-	**5,905**	**8,322**
Growth over Baseline	-	**7.50%**	**7.54%**

Table 16(b): Toronto

Metric	2018	2025	2040
Route Region	**Toronto, Canada**		
Airline	**WestJet**		
Aircraft Seats	136	136	136
Frequency	3	5	7
Load Factor	80%	80%	80%
Annual ATM	313	521	730
Annual Seats	42,568	70,856	99,280
Baseline Pax	34,054	56,685	79,424
APD Stimulated Pax	-	**60,889**	**85,251**
Net Stimulated Impact	-	**4,204**	**5,827**
Growth over Baseline	-	**7.42%**	**7.34%**

Table 16(c): Doha

Metric	2018	2025	2040
Route Region	**Doha, Middle East Hub**		
Airline	**Qatar Airways**		
Aircraft Seats	144	144	144
Frequency	5	7	10
Load Factor	75%	75%	75%
Annual ATM	521	730	1043
Annual Seats	75,024	105,120	150,192
Baseline Pax	56,268	78,840	112,644
APD Stimulated Pax	-	**85,516**	**121,970**
Net Stimulated Impact	-	**6,676**	**9,326**
Growth over Baseline	-	**8.47%**	**8.28%**

6.13. The conclusions that can be drawn from these case studies are as follows:

- All three routes are prospectively viable now as seasonal point to point services, but a five day a week, year round service, to New York and Doha looks more sustainable if it carries connecting traffic and launches after 2020. Although New York superficially looks the stronger of the two, as the earlier market analysis suggests there is a bigger larger onward connecting market over the Middle East (to the Far East and Australasia) than there is into North America and point to point traffic to other MEB3[40] gateways is also substantial and capable of being attracted. It is not surprising, therefore that Qatar came forward before transatlantic carriers, where the market is smaller and more direct, to test the Welsh/southwest of England market.
- New York is a classic East Coast Gateway and with the density of full service carriers at Heathrow and Birmingham, and the history of the Continental service to Newark from Bristol in the background, is the most promising looking option for a transatlantic service into the combined catchment area for low cost long haul carriers with single-aisle equipment. Norwegian is already active in this market using B737,800 as well as B787's on thicker longer routes (e.g. LA, Bangkok, Miami), while Jet Blue is known to be examining it for the Airbus A321 Neo's they have on order to fly. Their hybridised 'Mint' branded service, which they already offer on trans-continental services within the USA, is likely to be a very competitive product for transatlantic operations, and the aircraft size (with around 185 seats) would appear highly suitable if connecting options can be offered by JFK.
- The WestJet's Toronto route looks more marginal and may be better offered as a summer service initially, with winter services added if a connecting market can be developed, but a combination of all three in 2025 points to a baseline long haul market from the South Wales and south west England catchment of between 200,000-250,000 passengers annually.
- Our market analysis earlier, which is set out 'in chapter' and in Appendices G (a)-(d) and H, suggests there may also be other long haul opportunities, particularly for low cost long haul carriers, where connecting passengers can be successfully combined with point to point traffic at a gateway hub: Turkish Airlines or Pegasus to Istanbul would be a good example, but Jet Blue to Boston, Norwegian to Washington or Miami and Air Canada Rouge to Toronto, would also merit further investigation. Emirates and Etihad are unlikely to follow Qatar's move with competing links to their hubs in the short term, but might review that position once the regional market either side of the Severn estuary is proven and they can rationalise the

[40] Middle East Big 3 = Doha, Dubai, Abu Dhabi

cannibalisation of traffic that would be certain to occur from their London and Birmingham services.

6.14. The effect of introducing APD is highlighted in Tables 16(a)-(c) and summarised in Table 17. This indicates positive incremental traffic growth of between 7.5% and 8.25%, with in the case of Doha 50% and New York 45% originating from Wales, helping to make the case for Cardiff being considered as the base airport for the services. The equivalent figure for Toronto is 25% and this may therefore be better pointed towards Bristol as the bulk of the traffic is being generated in the south west of England. The uplift is smaller in percentage terms than for some domestic or short haul routes, but that is because APD discount would represent a small proportion of the average ticket price. It nevertheless represents an important and useful margin that long haul low cost airlines would find helpful, especially if it also generated some yield premium.

Table 17: APD Impact Expected on Core Long Haul Routes

Geographical Region	New York (JFL+EWR) Norwegian/Jet Blue		Toronto, Canada Westjet		Doha, Middle East Hub Qatar Airways	
South Wales	2777	33.4%	1272	21.8%	4218	45.2%
Rest Wales	936	11.2%	203	3.5%	488	5.2%
Near Southwest	3514	42.2%	3150	54.1%	3171	34.0%
Far Southwest	923	11.1%	1075	18.4%	1379	14.8%
Herefordshire	172	2.1%	127	2.2%	69	0.7%
Total	8322	100.0%	5827	100.0%	9326	100.0%
Growth over Baseline	7.54%	-	7.34%	-	8.28%	-

6.15. In total, our three case study routes are forecast to generate an additional c16,765 passengers in 2025 if APD were to be removed from long haul services (23,500 in 2040) and the flights were to be depart from Cardiff – see Table 17. Additionally, the APD discount would make it more likely the services would be attracted and remain viable, hence delivering up to 250,000 passengers in 2025 that might otherwise have continued to use Birmingham and the London airports for their long haul travel. This equates to around 40-50 new jobs directly attributable to reduced APD, but taking the traffic carried on the three routes as a whole into account, then that figure would be closer to 500. The equivalent GVA figures are £4.5m in 2025 (£4.625m in 2040), or capitalised over 10 years £63m (and £56m) respectively.

6.16. If however, six routes were to be attracted carrying 500,000 passengers (600,000 in 2040), a not unreasonable expectation over a 10-15 year period, then the generated (net additional) job total for the UK would be 60-70 and the overall employment upside within Cardiff and Bristol's catchment areas would be 1,100 in 2025 and 1,325 in 2040, whilst the associated GVA upside within the

catchment area would be up to £9.725m (and £11.775m) per annum respectively (see Table 18). At a discount rate of 3.5%, over 20 years, the routes would be worth £97.25m (and £117.5m) respectively to the Welsh economy, although around a quarter of that would be incremental for the UK economy as a whole and it is not clear how that incremental benefit from generated, as opposed to transposed, traffic will be handled in terms of the APD tax regime and its link to block funding of the devolved administration.

Table 18: Economic Impact Assessment

APD Scenario	Estimated Total Clawed Back Demand	Estimate of Generated Traffic		Estimated Direct Jobs	Indirect + Induced Jobs	Total Jobs Created		% Business Pax	Ave Travel Cost Saving per Business Pax (£)	Ave Time Savings per Pax (hrs)	Cost Saving pa - Air vs Road (£)	User Benefits (£)	GVA (£/m)
2025													
100% Reduction in APD - 3 Routes	231,065	16,765		208	304	512		14%	50	1.75	1,558,778	3,000,647	4.559
100% Reduction in APD + 6 Routes	500,000	50,000		450	657	1107		14%	50	1.75	3,325,000	6,400,625	9.726
2040													
100% Reduction in APD - 3 Routes	302,443	23,500		214	312	526		14%	50	1.75	1,582,350	3,046,024	4.628
100% Reduction in APD + 6 Routes	600,000	50,000		540	788	1328		14%	50	1.75	4,025,000	7,748,125	11.773

Which Airport?

6.17. The issue that remains at large, therefore, is would the APD incentive be crucial to securing the new long haul services - and therefore in Bristol Airport's view represent an anti-competitive intervention in the market – or are there other factors which would override an APD offer? We think there are, and they are mostly commercial or operational, rather than financial.

6.18. The shadow effect of the London and Birmingham Airports is stronger on Bristol than Cardiff, because it is closer to them – this will make it more difficult to clawback passengers for whom access to Heathrow is quicker than it is from parts of South Wales.

6.19. Bristol's runway is 2,011m long at an elevation of 190m OD, whereas Cardiff's is 2,392m long at an elevation of 67m OD; Cardiff therefore offers much greater performance flexibility. This is important because as Table 19 shows, Bristol will struggle to meet the required Take Off run for the case study routes at Maximum Take Off Weight and thus is likely to be able to accommodate two of the services operationally and only then with payload penalties.

Table 19:

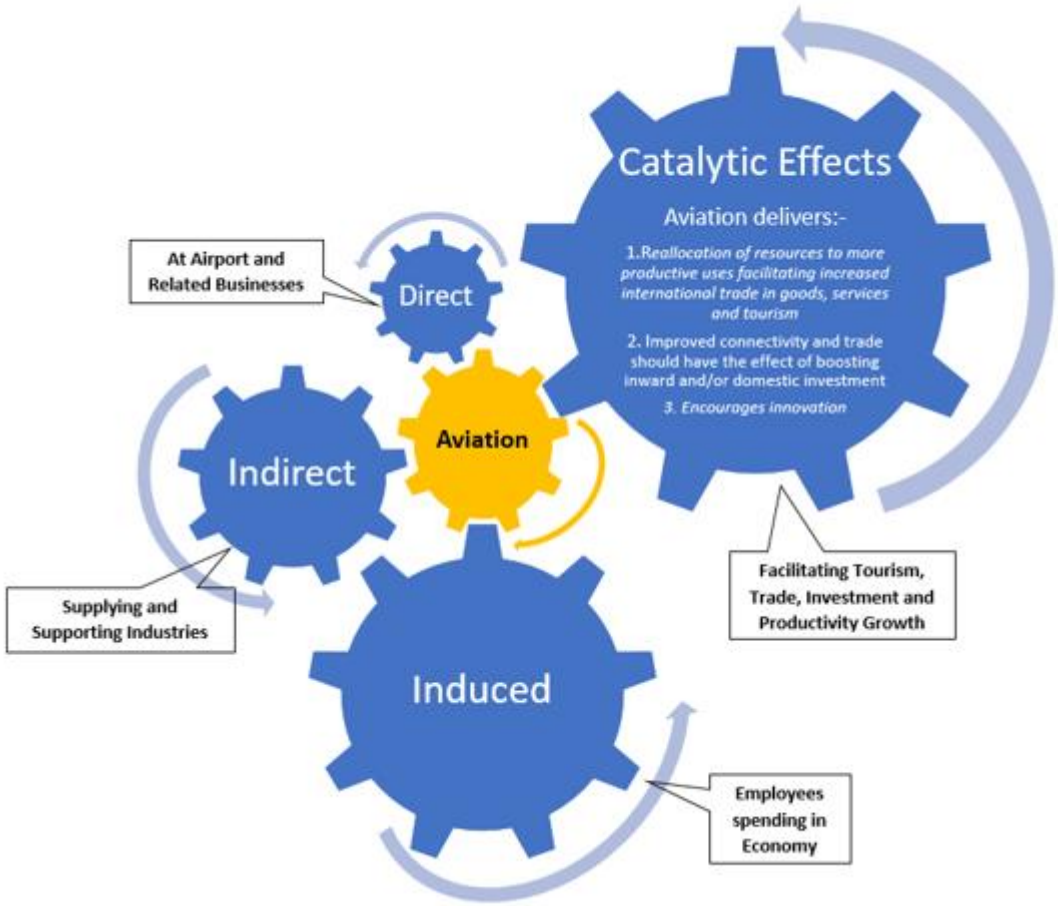
Destination	Airline	Aircraft Type/Seats	Sector Length: Km	Range: Km	Runway @ MTOW (m)	Airport
Doha	Qatar	A320-200 (144)	5,396	5,950	2,180	CWL Only
Toronto	West Jet	B737-700 (130)	5,585	5,570	2,042	CWL, BRS with PP*
Boston	Jet Blue (Mint)	A321 (160)	5,107	5,950	2,180	CWL, BRS with PP*
New York	Jet Blue (Mint)	A321 (160)	5,410	5,950	2,180	CWL Only
New York	Norwegian	B737-800 (189)	5,410	5,435	2,316	CWL Only

6.20. Turkish Airline flights to Istanbul using an A320 and flights to Boston on a B737-800, which both have slightly shorter sectors than the core case study routes, may also be able to be accommodated at Bristol, but again payload penalties are likely (especially in hot weather), and will make operational and commercial performance sub-optimal. Cardiff therefore offers an easier solution, and in terms of apron availability, less congested operating environment.

7. POTENTIAL CATALYTIC EFFECTS OF CHANGES TO APD

7.1. There is recent and increasing interest in the Catalytic Impacts of aviation, which are now reckoned to be as large as the more direct and easily measurable effects. This is reflected in the graphical interpretation in Figure 28.

Figure 28: Quantified impacts as presented by InterVISTAS/ACI in Jan 2015 study in which Catalytic impacts are adjudged to be the most significant.



7.2. Their significance is because they are heavily associated with aviation's role in improving the productivity in firms outside the aviation sector. This facilitation occurs through:

- The effects on domestic firms of increased access to markets in the rest of the UK and overseas, and increased UK and foreign competition in Wales.
- The freer movement of investment capital and workers between Wales, other UK regions and a range of external countries – most notably in the EU.

7.3. Catalytic benefits are primarily associated with enhanced connectivity, which is itself an expression of the range, frequency of service, and number of onward connections available and their economic importance, via a country's or local area's aviation network.

7.4. Interventions to boost air services offer the chance for some of the highest value added sectors of the economy to re-allocate resources to more productive uses capable of taking advantage of the opportunities for enhanced domestic and international trade in goods, services and tourism that enhanced air connectivity offers.

7.5. Although increasingly regarded as significant in the context of overall economic benefits from investment in regional airports, they also remain difficult to quantify with any certainty, especially in a study undertaken over a short time period such as this one. We have therefore not attempted such an assessment, but recognise that a combination of enhanced domestic air services (80% of Welsh trade is with the rest of the UK) and long haul routes opening up new overseas trading markets as the UK leaves the EU, are likely to be important in any aviation route strategy for Wales. These considerations are discussed at much greater length in a Public Policy Institute for Wales report from 2015[41].

[41] Public Policy Institute for Wales: *Optimising the Economic Benefits of Cardiff & St Athan Airports* (2015).

8. BENCHMARKING

Introduction

8.1. This chapter concerns itself with a combination of real world experience and other studies relating to the introduction and withdrawal of air passenger taxes in a number of different countries. This kind of benchmarking can be instructive by helping to sense check the broad assumptions used in this report, the nature and likely scale of impacts and underlying theoretical conceptions and strategic policy outcomes that might be expected.

8.2. There is evidence that different aviation sectors have different levels of price sensitivity. For instance, short haul leisure is the most price sensitive, whilst short haul business is less price sensitive and long haul business is the least price sensitive. The results of a range of studies was summarised with elasticities ranging from -0.17 to –3.41. There seems little doubt, therefore, that:

- UK APD will have a significant impact on UK regional travel;
- APD burdens domestic services more significantly than international services; and
- APD disproportionately impacts low cost operators as their margins are relatively thin resulting in them moving capacity to other more lucrative markets.

8.3. The negative impact can be observed nowhere more acutely than at Glasgow Prestwick (GPA), another privately run airport taken back into public ownership, where pre APD's introduction, Ryanair represented over 95% of the Airport's 2m scheduled passengers. The percentage remains the case but passenger numbers have fallen to around a third of that amount.

8.4. It is instructive to note that Ryanair's profit after tax per its 2014 published financial statements equates to €6.40/£5.04 per passenger. GPA understood that the correlation between an increase in APD and the reduction in a low cost operators yield to be around 90%. Hence in 2014, Michael O'Leary stated that Ryanair would double passenger numbers in Scotland should APD be abolished.

8.5. Also notable is that Dublin Airport is consciously using the existence of APD to tempt Northern Irish passengers to fly from Dublin. The catchment leakage from the north is similar to Wales to Bristol at over 1mppa, with the notable difference that many more are flying to key business destinations thereby undermining current indications that this trend is continuing and may even be accelerating. The deal that the Treasury has offered is that if APD is devolved to Northern Ireland, £100 million will be lost from the block grant to the Northern Irish exchequer. Since most of the stimulative benefits of any reductions in the tax will also be enjoyed by the Treasury through increased tax and VAT receipts,

which are not devolved, the Northern Irish Government has yet to take up this measure, even though it is on offer.

Air passenger taxes in the Netherlands

8.6. The principal source of information on the impact of the introduction and subsequent withdrawal of the Dutch Air Passenger (or Ticket) Tax is an in-depth investigation by the KiM Netherlands Institute for Transport Analysis in 2011 (Kennisinstituut voor Mobiliteitsbeleid (KiM)), although the work also led to the publication of a range of other supporting papers which are detailed in the Bibliography. Given the open Schengen border arrangements between Germany and the Netherlands, the Dutch experience provides a useful model from which to view the potential effects of varying APD levels either side of regional boundaries in the UK.

History of the Dutch Ticket Tax

8.7. The Dutch Ticket Tax was introduced on 1 July 2008 by a new, environmentally minded government, which saw the Ticket Tax as a good way to control what it perceived as the unrestrained growth of the aviation sector, and more importantly to create a new source of tax revenue. A target of €350m was set, but with the agreement that the form in which the tax was introduced should cause the least possible harm to the national economy. The original idea of a €25 fixed duty per ticket was abandoned for that reason and replaced with a distance-related fee that did not apply to transfer passengers or freight-traffic.

8.8. When finally introduced, the Ticket Tax amounted to €11.25 for flights within the EU or for distances no longer than 2,500km; flights beyond that distance incurred a €45 charge. The tax was levied only on passengers departing from the Netherlands. The tax exceeded its target revenue by around 10%, raising €380m in its first year, but at the same time, an 8% decline in passenger numbers was recorded at Amsterdam Schiphol Airport. This was in line with estimates of an 8-10% drop prior to implementation, which was deemed acceptable at the time.

8.9. There was strong resistance to the flight tax by the aviation industry (particularly KLM and Amsterdam Schiphol Airport), and later by travel agencies and the tourist sector across the Netherlands; especially when they began to notice the adverse effects of the tax on their businesses. The concurrent onset of the global banking and economic crisis meant that the fall in passenger volumes was amplified. Speculation arose that the Exchequer was losing around €1bn a year as Dutch originating travellers left the Netherlands to cross land borders with Germany and Belgium to access non-Dutch airports, primarily Düsseldorf, Weeze and both Brussels airports. In the light of this and intensified protests from the aviation and tourism sectors, the Dutch Government responded by reducing the air passenger tax to zero (€0.00) as of 1

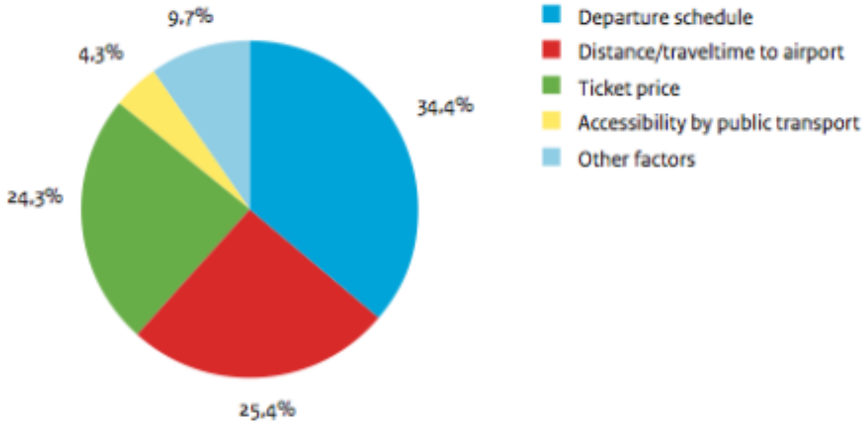
July 2009 and subsequently abolished the tax on 1 January 2010, as part of its 'Economic Crisis and Recovery Plan'.

The KiM Study

8.10. As part of its work to try to model 'airport choice', KiM made use of an airport choice survey conducted in July 2010, in which 3,000 Dutch residents participated via an internet-panel. As Figure A5 indicates, for most of the respondents, the flight schedule (departure and arrival times) seemed to have been the strongest decision-making factor when choosing between airports for the last flight they had taken. But KiM also identified that less rational factors also play a role in how people choose an airport, including:

- habitual behaviour (familiarity with the airport) - unfamiliarity with possible alternatives;
- risk aversion; and
- failure to access all available information regarding alternatives (lack of complete information)

Figure A5: Decisive Factors in the Choice of Airports (Source: KiM)

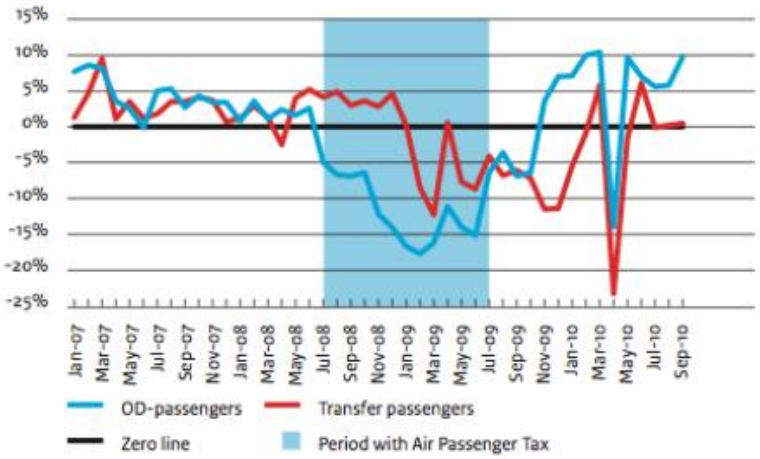


8.11. In addition, KiM highlighted airline companies' strategic decisions as also being important. So when a substantial drop in demand occurs, airlines can modify their existing operations by reducing capacities, frequencies or by switching routes. Airlines that mainly fly point-to-point destinations can move their operational bases to nearby foreign airports that do not have any air passenger taxes relatively easily as they have few sunk costs to tie them into an established airport base.

8.12. KiM points to evidence of this soon after the decision to introduce the air passenger tax was reached, when the low-cost segment of the airline industry in the Netherlands (e.g. Transavia, easyJet and Jet2) responded by reducing frequencies as of the winter season 2007 and cancelling routes.

8.13. The effect on passenger volumes was also immediate. As Figure A6 below illustrates, the number of O&D passengers departing from Amsterdam began to decrease as soon as the tax went live in July 2008.

Figure A6: Year on Year Growth in Number of Monthly O&D and Transfer Passengers (Source: Schiphol Group, KiM)



8.14. KiM suggests that the transfer segment's negative growth was primarily caused by the global economic crisis, which at the time was looking increasingly serious. Note that the sizeable decline in passenger volumes in April 2010 was the result of the Icelandic volcano Eyjafjallajökull's eruption and subsequent ash cloud.

8.15. KiM concludes in their report that:

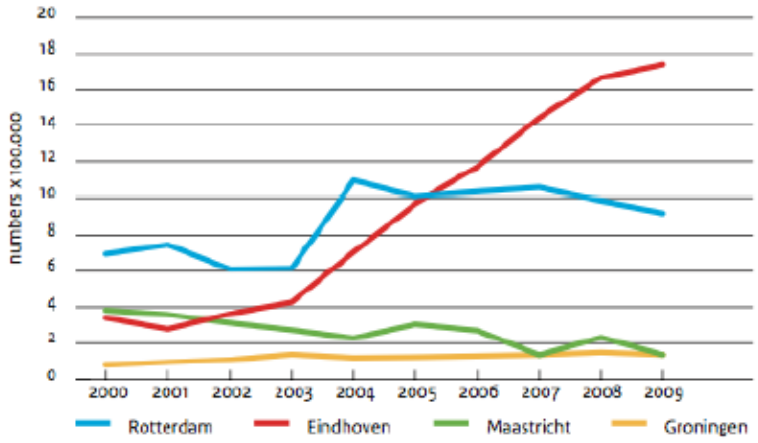
> "*… the decline in passenger volumes from 1 July 2008 to 1 July 2009 cannot be wholly attributed to the air passenger tax. The economic crisis was also an important factor. Moreover, the many developments occurring within the airline industry itself also played a role*."

8.16. The report points to the fact that Schiphol was already experiencing a trend among passengers to make greater use of airports in Germany and Belgium (particularly from the Netherlands' eastern and southern regions). This was a result of new bases and strong growth from low-cost airlines at regional airports in close proximity to the Dutch border, such as Charleroi in Belgium and Weeze in Germany.

Regional Airports in the Netherlands

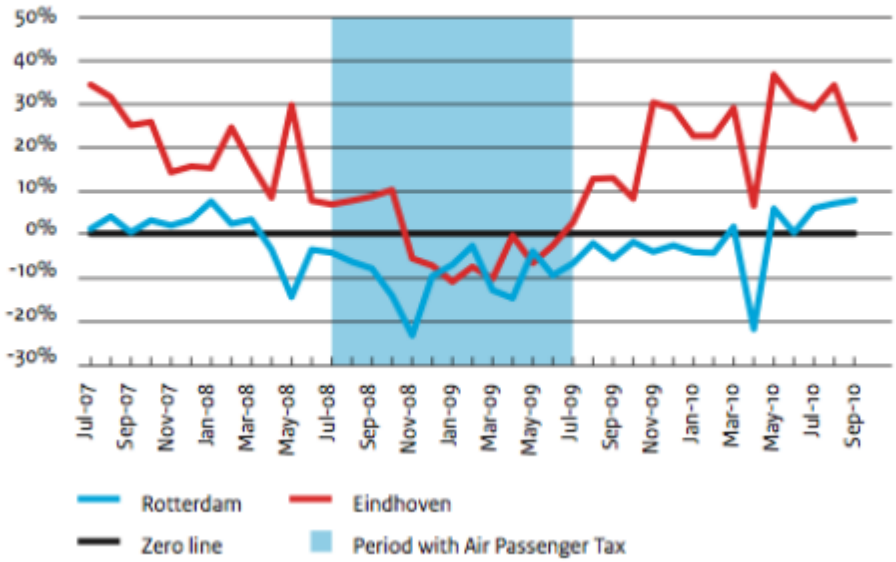
8.17. Figure A7 shows that Maastricht Aachen Airport, situated close to the Belgian and German borders, lost a substantial part of its supply of flights. Groningen was largely unaffected owing to its geographical location.

Figure A7: Passenger Volumes at Regional Airports (Source: KiM, CBS)



8.18. Figure A8 shows that Rotterdam Airport experienced a decline in traffic when the Air Passenger Tax came into force in 2008, but overall the declines were modest. Eindhoven continued to grow although it did experience a slowdown in the rate growth in 2008 as compared with preceding years.

Figure A8: Monthly Growth Rates Compared to the Same Month of the Previous Year for Eindhoven and Rotterdam (Source: KiM, CBS)



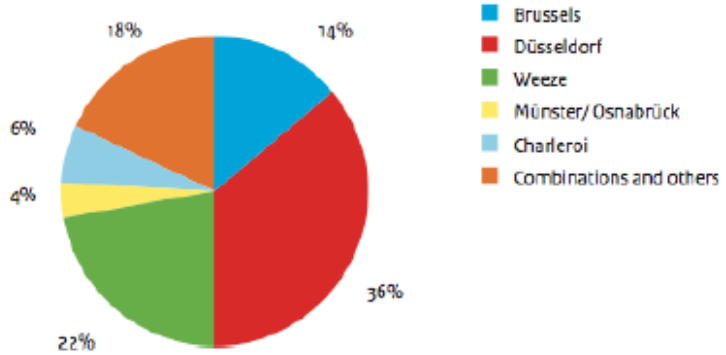
8.19. Based on data from annual reports and interviews with managers of the various airports, KiM concludes that Eindhoven and Maastricht, which have a relatively large supply of low-cost carriers (the most price-sensitive segment of the aviation market) including Ryanair and Wizzair, is where the air passenger tax had the greatest negative impact. Conversely, in Rotterdam and Groningen, where the supply of flights is primarily comprised of price-inelastic business-dominated services or holiday charters, they believe there was little or no impact.

The Effects of the Air Passenger Tax

8.20. It is difficult to isolate the true effects of the air passenger tax, because (as KiM recognises) this time period largely coincides with the beginning of the global economic crisis. Such was the volatility of this period that the impact of the tax was largely swamped by various other trends and developments. However, KiM concludes that the air passenger tax resulted in nearly two million fewer passengers from Amsterdam Schiphol Airport over the period of the tax's implementation, at a conservative estimate.

8.21. The airport choice survey undertaken by KiM as part of the research, revealed that one-fifth of those surveyed said that they were unaware of an air passenger tax. Fourteen percent however confirmed that the tax had influenced their travel behaviour, with half of these saying that they had cancelled a proposed flight or chosen to travel instead by car or train. The remainder confirmed that they had opted to use a foreign airport, with Düsseldorf, Weeze and Brussels airports being the most popular choices. These results are illustrated in Figure A9.

Figure A9: Answers to the Question: 'From which Other Airport did you Depart?' (Source: KiM)



8.22. The report looked at each airport near the border with the Netherlands in Belgium and Germany and the following estimates of defections were made, as summarised in Table A2. The estimates were derived by KiM using ratios and adjustments from the airport-choice survey, but the estimated defection to Brussels in this calculation is in agreement with the defection rate based on MIDT-data examined by Witlox and Derruder.

Table A2: Estimate of the Number of Extra Dutch Passengers at Foreign Airports as a consequence of the Air Passenger Tax (Source: KiM)

Estimated defection as consequence of the air passenger tax (x 1.000)	
Düsseldorf	450
Weeze/NRN	275
Brussels	175
Charleroi	75
FMO	50
Other/Combo	220
Total	**1.245**

8.23. These findings are also in line with information garnered from foreign airports and derived from reservation systems that track the number of Dutch passengers departing from foreign airports. The number of Dutch passengers using Düsseldorf airport has increased every year since 2001, and the increase in 2008 was greater than in any previous year. Brussels airport experienced a similar trend. At Germany's Weeze airport, passenger volumes tripled in two years, and the number of Dutch passengers rose approximately fifty per cent during the period in which the Dutch air passenger tax was in force. KiM estimates the number of additional Dutch passengers flying from foreign airports were one million passengers during this period.

Removal of the Air Passenger Tax

8.24. KiM concluded in 2011 that it is difficult to determine with any statistical accuracy whether Dutch passengers will or will not 'return' to Dutch airports. At the time, the abolishment of the air passenger tax was too recent for an accurate assessment to be made; moreover, the picture was obscured by the many developments occurring both within and outside the aviation sector. But it does appear likely that despite abolishing the air passenger tax, Dutch passengers will continue to use foreign airports more than was previously the case. A trend among Dutch people to use foreign airports already existed prior to implementation of the air passenger tax, and following implementation of the tax, other passengers also discovered the supply of cheaper flights available at foreign airports. If these passengers had a good experience in using these foreign airports, they will continue to use them in the future. The choice of flights increased substantially at the German airports, Weeze and Düsseldorf, and these airports remain more attractive compared to their situation prior to the air passenger tax period. KiM believes that the air passenger tax served to accelerate the trend-driven developments that were already occurring and that the 'stickiness' of passenger behaviour due to familiarity may lead to long-term changes to behaviour.

8.25. However the report also concludes that Dutch passengers can be encouraged to return to the Netherlands' airports through improved choice of flights, lower costs, and improved accessibility. Based on concepts of key

behavioural choice drivers, targeted publicity can serve to better inform target audiences about the improved offers available at Dutch airports. But most importantly, in January 2011 the German Government introduced its own air passenger tax.

German Air Passenger Tax

8.26. Germany's air passenger tax was introduced in Germany in January 2011 by the Federal Government; the motivation was entirely fiscal, with the tax levels set so as to raise 1bn EUR. The tax is levied on passengers departing from German airports. Transfer and transit passengers are exempted and there is no tax on cargo. The tax rate depends on the distance to the final destination (i.e. there is no differentiation according to the class of travel).

8.27. The original tax rates were reduced by approximately 6.25% on 1st January 2012 in order to compensate for the additional financial burden caused by the inclusion of the air transport industry into the EU Trading Scheme for CO2 emissions. The tax rates have remained unchanged since then, and are:

- 7.50 EUR for domestic passengers, passengers to the EU and other European countries, and passengers to Turkey, Russia, Ukraine, Moldova, Belarus, Morocco, Tunisia, Libya, and Algeria.
- 23.43 EUR for passengers to many other countries in Africa (including Egypt but without South Africa), as well as Asian countries like Pakistan, Georgia, Iran, and Kazakhstan.
- 42.18 EUR for passengers on all other (long haul) flights.

8.28. Almost 60% of the taxes are paid by (passengers flying with) German airlines. There are tax exemptions (and significantly reduced tax rates respectively) for passengers travelling to/from some islands in the North Sea. However, the absolute number of passengers on these flights is small. Airlines, as well as German airports, are against the tax and are supported by trade unions from the aviation industry and the German states (Länder) – most of them hold shares in at least one airport and they do not benefit from the tax revenues, which have been slightly below the target value (0.96 bn EUR in 2013). Three studies on the effects of the tax have been published, and they show:

- A strong effect on *domestic flights*; for a domestic return flight, the tax has to be paid twice and it is also subject to the VAT (standard rate 19%). For passengers that cannot deduct the VAT (all private passengers, but also some business travellers), the additional tax burden is 17.85 EUR. Moreover, the German high-speed rail network is a close substitute to air transport on the domestic market. Hence in spite of the significant economic growth in 2011, the number of domestic air passengers declined.

- A significant effect on some airports located in *border regions*, with passengers travelling by rail or by car to a foreign airport. This effect is limited to airports in the western part of Germany, especially North Rhine-Westphalia (Nordrhein Westfalen). The strongest effect can be seen at Weeze airport (Niederrhein), an airport close to the Dutch border and heavily dependent on low cost traffic. This airport lost 16.3% of its traffic in 2011.

- After the introduction of the air transport tax, *low cost carriers*, especially Ryanair reduced the number of frequencies significantly. Not only all domestic flights (e. g. from Hahn to Berlin) but also many international flights have been dropped by this airline.

- Since many *regional airports* rely on low cost traffic and are also characterised by an above average share of domestic O&D passengers, they have experienced the highest percentage loss in the number of passengers. At the *hub airports* (especially Frankfurt), the total number of passengers doesn't seem to be significantly affected. However, an increase in the number of transfer passengers has been reported, indicating that Lufthansa might compensate a decline in the number of O&D passengers by selling more tickets to international rather than German transfer passengers.

8.29. There are different calculations with respect to the total effect on passenger numbers in 2011 compared to 2010: The German air transport association (INTRAPLAN) claims a loss of 5m passengers or 2.6% of demand. The official impact assessment (INFRAS) calculates a passenger loss between 1m and 1.8m or 0.6% and 1.1%. Based on the number of departing O&D passengers (74m), the reduction of demand is at least 1.2m, equivalent to 1.6% of passengers).

Scotland[42]

8.30. The impact of the changes in APD since 2007 has been significant. Each increase or change in structure has resulted in a widening of the gap between actual performance and what Scotland's airports could have achieved without APD.

8.31. In York's analysis from 2012, the initial doubling of APD in 2007 was felt to have had an initial dramatic effect, with a loss of around 1.2m passengers in 2007. The next significant step came with the increase in rates in November 2010. In 2011, the first full year of impact, the gap between the Without APD increases case and the With APD Increases case grew from around 1.4 million in

[42] York Aviation: The impact of Air Passenger Duty on Scotland; for Consortium of Scottish Airports (October 2012)

2010 to over 1.7 million in 2011. By 2016, the total difference in traffic projected reached around 2.1mppa.

8.32. Over time, the impact becomes increasingly concentrated on international traffic, with longer haul passengers particularly affected. This focus of the impact on international traffic is particularly concerning given the policy aims of the Scottish Government to grow the Country's international connectivity.

8.33. In terms of the knock-on impacts to the Scottish economy, APD it was estimated, over the long term, reduced traffic and connectivity from Scotland's airports, impacting on inward investment, trade and competitiveness. It also was estimated to impact Scotland's inbound tourism industry. By 2016 the estimate was that £210 million per annum less would be being spent in Scotland by inbound visitors than if APD had not risen, as it has, since 2007. It should also be remembered that Scotland's airports are major employment centres in their own right and that APD's impact on traffic constrains the role they can play as generators of job opportunities and prosperity. The report estimated that in broad terms the impact of APD on other tax revenues in Scotland could be around £50 million by 2016.

General Lessons from these Case Studies

8.34. These cases studies are useful because they indicate that:-

- The scale of impact on SW England is likely to be far smaller than the Bristol APD study suggested.

- There is a consistent pattern of impact associated with reducing or removing air passenger taxes.

- That the benefits to the local, regional and national economies of doing so are likely to be positive and material.

9. CONCLUSIONS

The Main Findings

9.1. This report provides indicative estimates of the potential scale of additional passengers that might be generated at Cardiff under different APD policy scenarios[43] if APD were to be devolved to the National Assembly for Wales. By 2025, the high level modelling undertaken to facilitate comparisons between these options suggest and increase in traffic at Cardiff Airport of between 15% - 30% under the core five scenarios; impact in each of the key markets examined domestic, short haul and long haul markets - is also expected to vary.

9.2. An additional sixth scenario, wherein a 100% reduction in APD is combined with additional route development incentives, is predicted by the modelling undertaken to date to result in a near 50% increase in passengers, translating in absolute terms to 658,000 additional passengers per annum by 2025. More sophisticated mode choice modelling may produce slightly different detailed figures, but the relative scale of the positive impact that this scenario is likely to have on passenger volumes using Cardiff Airport, is likely to remain broadly similar. Following the review undertaken by Arup, in association with ICF, further evaluation of evidence is being prepared to support the business case for APD devolution. To supplement the work undertaken so far, and strengthen the analysis in this report, Arup and ICF have recommended airport choice modelling is undertaken which takes into account catchment area and the current pattern of demand and price. This work is currently being undertaken and will be published alongside this report as supplementary evidence.

9.3. The modelled projections of passenger throughput in 2025 under each of the six APD scenarios can then be used to calculate user benefits (see Table 20). Depending on the discount rate adopted and the period over which they are assumed to arise, in Present Value terms this suggests cumulative benefits are likely to arise that are between 5 to 15 times these figures (i.e. £8m -£135m with the median some where near the middle of this range).

Table 20: Summary of User Benefits*

Scenario	Driving Cost Savings (£m)	Time Savings Benefits (£m)	Total User Benefits (£m)
1. 50% reduction in APD	1.8	1.4	3.2
2. 100% reduction in APD	3.5	2.8	6.3
3. 100% reduced Domestic	0.9	1.0	1.9
4. 100% reduced LH	0.9	0.7	1.6
5. 100% reduced Dom/SH	2.6	2.1	4.7
6. 100% reduction +	5.3	3.8	9.1

[43] Figure 15

incentives			

Note: * NPV per annum at present day prices in 2025; excludes additional revenues to CIA.

9.4. It is important to note that these figures include no allowance for the stimulation of demand arising from the associated price discounting – this can only be picked through more complicated mode choice modelling. In other words, the economic benefits assessed here probably do not reflect all those likely to accrue to Wales as passenger repatriate their future air travel to Wales in response to the enhanced route networks being developed at Cardiff Airport on the back of APD reductions. 'Generated' benefits that should arise as a result of the improvement in travel efficiency for air passengers 'stimulating new scheduled services' have been dealt with separately. Given the greater density of traffic at Bristol on most routes served, or likely to be served, from Cardiff (typically the ratio of passenger volumes served by the two airports ranges from 2:1 and 4:1), and the higher average fares it generates (which is illustrated[44]), we do not expect Bristol to lose any routes or any material frequency from its current network. Scenario 6 might be the sole possible exception to this rule.

9.5. By comparison with our approach, many of the assumptions underpinning the economic losses projected by the York Aviation in their report for Bristol Airport are in our view artificially high in order to maximise the potential negative impacts. Of the 1.1 million passengers from Wales that currently use Bristol airport we estimate that by 2025 only 4% to 43% (depending on the scenario)[45] will be recaptured by reducing APD.

9.6. To put this in context, it should be remembered, that even if all the leaking traffic from Wales were to be repatriated this would represent no more than one sixth of total passenger throughput at Bristol, and we are projecting only modest percentages of the whole. Hence we are convinced the 'clawback' of traffic that would be generated by changes to the rate of APD in Wales would have only marginal impacts on services from Bristol. And even if load factors drop by as much as 10-15%, it should be remembered that other lower priced demand from within the south west is likely to come forward to replace it – at least in part. Hence we are extremely sceptical about the scale of traffic, frequency and route reductions predicted by York Aviation and their projections of economic benefit losses likely to arise as a result of them.

9.7. And the answer does not lie with traffic originated from the South West of England migrating to Cardiff either. South West passengers make up only 0.3% of domestic, and 0.4% of international short haul traffic using Cardiff Airport, even if the removal of APD generated a 25% increase in this east-west moving traffic, the numbers will remain de-minimis (less than 100,000 or 1/80th) in terms of Bristol's forecast traffic in 2025.

[44] Figure 22

[45] Figure 17

9.8. As a result we do not believe the projections of economic losses to the South West region presented by York Aviation in their report for Bristol Airport (i.e. economic losses of 1,500 jobs and over £800m of GVA) are realistic. It appears that the basis for the figures are a series of worst case assumptions, which have been compounded together to generate numbers of a completely different order than those we have derived. For example they have assumed large numbers of existing services will be lost, include long haul services that Bristol *hopes* to attract but don't yet exist in their calculations, and uses very high elasticities. Our view is that individually and cumulatively these assumptions are not credible and that in broad terms the actual figures are more likely to be in the order of 100 jobs and £2.5m a year in GVA in terms of domestic and short haul routes and around 500 jobs and £3m GVA per annum associated with long haul services.

9.9. Moreover, it should be noted that this does not represent a net loss to UK plc, but rather a transfer of a small amount of economic activity from the Bristol area, one of the higher performing parts of the UK economically, to South Wales much of which has Assisted Area status. The transfer arises because Welsh originating air passengers currently find it necessary to use services from Bristol (and Birmingham and London Airports) because they do not have the choice of using alternative services from Cardiff. Hence arguably changes to the level of APD in Wales could be regarded as a means of addressing current market inefficiencies and environmental externalities arising from emissions associated with longer surface travel to other airports, both of which impose material costs on users and the Welsh economy.

Impacts of Discounting Long Haul APD at Cardiff

9.10. The working assumption, when looking at the long haul market, is a 90 minute drive time catchment from either Cardiff or Bristol Airport is finally appropriate, and can be used as a standard basis for assessing existing market demand (connecting or point to point). As the catchment map in Chapter 2 illustrates, there is substantial overlap of the two airports' long haul catchments; implicitly demonstrating either airport could serve long haul routes from the South Wales and much of the South West catchment area of England[46].

9.11. Around 75% of this demand originates in the South West region: 23% from Wales, and 2% from Herefordshire in the south Midlands[47]. However, when considering the potential for long haul operations based at Bristol or Cardiff airports to capture some of this market locally, nearly a million potential passengers in Dorset, Wiltshire and parts of Gloucestershire can be effectively ruled out because of their easier access to Heathrow and Gatwick; placing the focus of South West demand in Bristol, Somerset and Devon. The former two and the Cheltenham/Gloucester cluster (being well within the 90 minute drive

[46] Figure 4
[47] Appendix K

time to Cardiff as well as Bristol), present a potential market of 1.6m passengers in addition to the 840,000 passengers in Wales The result is around 2.5m passengers overall that could be served from either airport48.

9.12. Considering the key destination markets and how they might be served (e.g. India, the Far East and Australasia will be served either via a Middle Eastern hub from Wales/South West or from Heathrow/Gatwick - direct or with a stopover en-route), and taking into account the agreement already reached with Qatar, the study envisages that New York, Toronto and Doha are the potential prime long haul opportunities in the short to medium term, with possible alternatives including Istanbul (Turkish), Emirates (Dubai), Rouge (Toronto), and Boston (Jet Blue) or Chicago (Norwegian/United)[49].

9.13. Interestingly, with between c40% of projected traffic on the New York and Middle Eastern routes, and with 25% of forecast passengers to Canada, Wales over-performs in terms of projected market share, in both the baseline and APD discounted analyses. But more importantly, it is considered unlikely that the aircraft the assumed carriers to New York and Doha will probably wish to use can operate without material payload penalties from Bristol because of its short 2,011m elevated runway. Only the Turkish destination appears to offer a good unalloyed opportunity for Bristol.

9.14. In economic terms, conceptually benefits can be considered to be a function of stimulated demand (i.e. additional 'generated' traffic), and time and travel cost savings from flying out of Cardiff or Bristol vs the next nearest airport (assumed to be Heathrow) offering services to the same destination market. Surface travel to Heathrow would incur an additional 90-180 minutes drive away for most of the catchment. The allocation of economic benefits of a new long haul service from South Wales or the South West between Bristol and its wider city region, and Cardiff and the rest of South Wales, depends in part on the airport chosen, but also the trade off in terms of time and costs that South West passengers incur along the M4/M5 corridor travelling to Cardiff rather than Bristol. These are likely to substantially exceed similar costs for Welsh passengers driving to Bristol, especially those originating west of Cardiff.

9.15. Hence although the economic evaluation marginally favours Cardiff over Bristol, this is less important in overall terms than operational considerations that certainly do. But compared to using Heathrow, the economic benefits accruing for long haul passenger of a service provided locally at Cardiff will be substantial. And in this case, the South West will gain nearly as much additional benefit overall as Wales from a regionally based long haul operation, because the passenger volumes using it from the South West will be larger than Wales and the benefits accruing per passenger only slightly smaller.

[48] Appendix L
[49] Appendix M

9.16. This is again a represents very different analysis to that presented by York Aviation's report for Bristol Airport. Ours suggests that the effect of removing long haul APD will be modest in terms of stimulated or redistributed demand, but the effect on airline yields will be material; making it more likely they will be willing to commit to a regional service serving Wales and the South than if such an incentive did not exist; however, we also maintain that such a service, if based out of Cardiff will be of benefit to both parts of the combined catchment area.

9.17. Without the incentive, neither area (South West or Wales) is likely to benefit as it is less likely such a service could be attracted to Bristol or Cardiff Airports. The history of Bristol's experience with Continental, and the extensive efforts needed to attract Qatar to Cardiff, demonstrate this. Concluding that any suggestion that the South West would lose jobs as a result of an intervention in a market in which Bristol is not currently represented demonstrably does not hold water.

9.18. The Case Studies reviewed in Chapter 8 provided a benchmarking exercise from which we concluded that the scale of impact on SW England is likely to be far smaller than the Bristol APD study suggested. There is a consistent pattern of impact associated with reducing or removing air passenger taxes. The benefits to the local, regional and national economies of doing so are likely to be positive and material.

APPENDICES

Appendix A: UK Air Passenger Duty (APD) Rates

The tables below show the APD rates for flights originating from UK airports, excluding Northern Ireland and the Scottish Highlands and Islands region since the Duty was first introduced in 2006.

1 November 1994 - 31 Jan 2006

Class of Duty	Pre Feb 2006	1 Feb 07- 31 Oct 09
EU* Destinations - Lowest Class	£5	£10
EU Destinations - Other Classes**	£10	£20
Other Destinations - Lowest Class	£20	£40
Other Destinations - Other Classes**	£40	£80

*Notes: *Includes EFTA and Switzerland **Included Premium Economy*

From 1 November 2009

Band	from 1 Nov 2009	from 1 Nov 2010	from 1 Apr 2012
Band A (0 – 2,000 miles)	£11	£12	£13
Band B (2,001 – 4,000 miles)	£45	£60	£65
Band C (4,001 – 6,000 miles)	£50	£75	£81
Band D (over 6,000 miles)	£55	£85	£92

Notes: *** Standard rate (for classes other than the lowest class of fare were double those shown above)

From 1 April 2013 - 31 March 2014

Band	Reduced Rate – for travel in lowest class available on aircraft*	Standard Rate – for any other class of travel
Band A (0 – 2,000 miles)	£13	£26
Band B (2,001 to 4,000 miles)	£67	£134
Band C (4,001 to 6,000 miles)	£83	£166
Band D (Over 6,000 miles)	£94	£188

Note: If the seating in the lowest class has seats spaced at more than 40 inches then the Standard Rate applies.

From 1 April 2014

Band - From 1 April 2014 - 31 March 2015	Reduced Rate – for travel in lowest class available on aircraft*	Standard Rate – for any other class of travel
Band A (0 – 2,000 miles)	£13	£26
Band B (2,001 to 4,000 miles)	£69	£138
Band C (4,001 to 6,000 miles)	£85	£170
Band D (Over 6,000 miles)	£97	£194

Note also, flights departing from an airport in the Highlands and Islands have been exempt since 1 April 2001

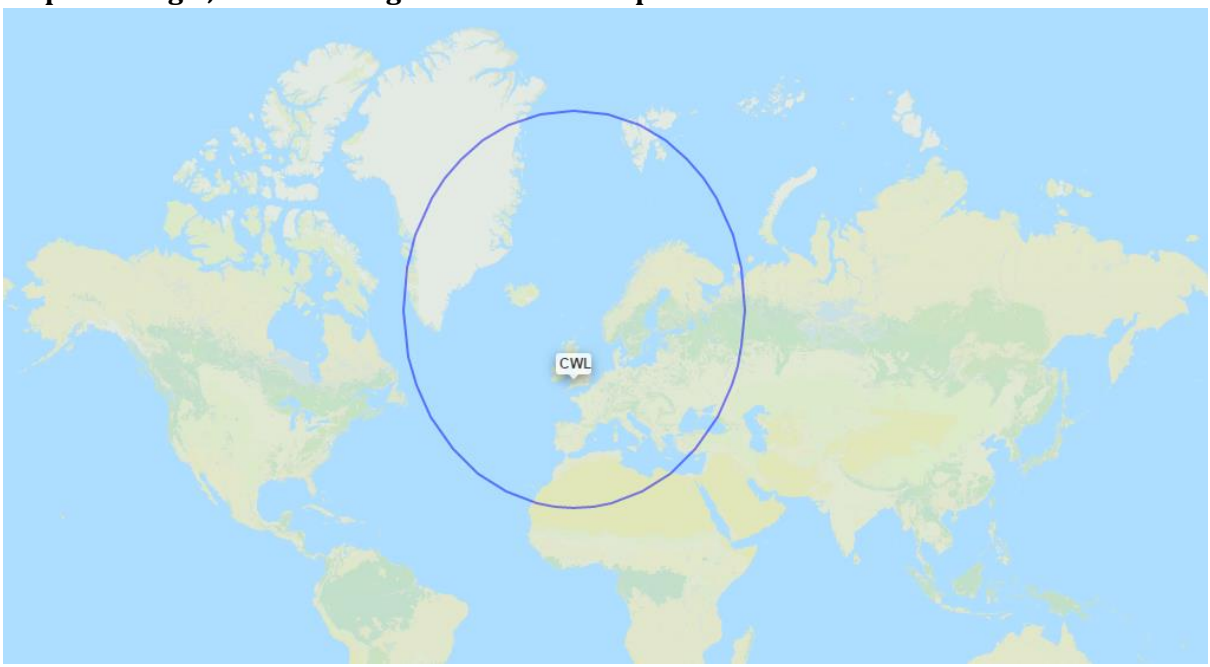
From 1 April 2017

Destination Bands and distance from London (miles)	Reduced rate: (for travel in the lowest class of travel available on the aircraft)	Standard rate: (for travel in any other class of travel)
Band A (0 to 2,000 miles)	£13	£26
Band B (over 2,000 miles)	£75	£150

APD rates from 1 April 2018

Destination Bands and distance from London (miles)	Reduced rate: (for travel in the lowest class of travel available on the aircraft)	Standard rate: (for travel in any other class of travel)
Band A (0 to 2,000 miles)	£13	£26
Band B (over 2,000 miles)	£78	£156

Map Showing 2,000 mile range from Cardiff Airport which marks the limits of Band A



Appendix B: CAA 2015 survey Data Was Taken from these Local Authority Administrative Areas

Local Authority Administrative Area	Sub Region
Caerffili - Caerphilly	South Wales
Caerdydd - Cardiff	South Wales
Sir Fynwy - Monmouthshire	South Wales
Abertawe - Swansea	South Wales
Tor-faen - Torfaen	South Wales
Merthyr Tudful - Merthyr Tydfil	South Wales
Bro Morgannwg - the Vale of Glamorgan	South Wales
Casnewydd - Newport	South Wales
Castell-nedd Port Talbot - Neath Port Talbot	South Wales
Pen-y-bont ar Ogwr - Bridgend	South Wales
Rhondda Cynon Taf - Rhondda Cynon Taff	South Wales
Blaenau Gwent - Blaenau Gwent	South Wales
Sir Ceredigion - Ceredigion	Rest Wales
Sir Benfro - Pembrokeshire	Rest Wales
Sir Gaerfyrddin - Carmarthenshire	Rest Wales
Powys - Powys	Rest Wales
Somerset County	Near Southwest
City of Bristol	Near Southwest
Wiltshire County	Near Southwest
Gloucestershire County	Near Southwest
Dorset County	Far Southwest
Devon County	Far Southwest
County of Herefordshire	Herefordshire

Appendix C: Comparative Rack Rate Charges for Mature Routes from Cardiff and Bristol Airports

Study Tab	CWL/U2319	BRS/U2319	CWL/U2319	BRS/U2319	CWL/WAF70	BRS/WAF70	CWL/BY752	BRS/BY752
Study Name	U2 A319	U2 A319	U2 A319	U2 A319	WA Fokker 70	WA Fokker 70	BY B757-200	BY B757-200
Study Airport	Cardiff Airport	Bristol Airport	Cardiff Airport	Bristol Airport	Cardiff Airport	Bristol Airport	Cardiff Airport	Bristol Airport
Arrival From	Edinburgh Airport	Edinburgh Airport	Palma Mallorca Airport	Palma Mallorca Airport	Amsterdam - Schiphol Airport	Amsterdam - Schiphol Airport	Alicante Airport	Alicante Airport
Departure To	Edinburgh Airport	Edinburgh Airport	Palma Mallorca Airport	Palma Mallorca Airport	Amsterdam - Schiphol Airport	Amsterdam - Schiphol Airport	Alicante Airport	Alicante Airport
Carrier Name	easyJet	easyJet	easyJet	easyJet	KLM Cityhopper	KLM Cityhopper	Thomson Airways	Thomson Airways
Equipment Name	A319	A319	A319	A319	Fokker 70	Fokker 70	B757-200	B757-200
MTOW	64	64	64	64	38.1	38.1	108.86	108.86
Passengers	125	125	125	125	64	64	186	186
Transfer Passengers	0	0	0	0	0	0	0	0
Transit Passengers	0	0	0	0	0	0	0	0
Load Factor	80	80	80	80	80	80	80	80
Capacity	156	156	156	156	80	80	233	233
Arrival Time	31/05/17 12:00	31/05/17 12:00	31/05/17 12:00	31/05/17 12:00	31/05/17 12:00	31/05/17 12:00	31/05/17 12:00	31/05/17 12:00
Departure Time	31/05/17 13:00	31/05/17 13:00	31/05/17 13:00	31/05/17 13:00	31/05/17 13:00	31/05/17 13:00	31/05/17 13:00	31/05/17 13:00
Parking Hours	1	1	1	1	1	1	1	1
Currency	GBP							
Runway Charges	1244.80	1018.15	1244.80	1018.15	758.55	640.65	2120.05	1697.65
Parking Charges	0.00	42.00	0.00	42.00	0.00	42.00	0.00	57.70
Passenger Charges	2233.75	2812.50	2233.75	2812.50	1143.68	1440.00	3323.82	4185.00
Infrastructure Charges	25.00	0.00	25.00	0.00	12.80	0.00	37.20	0.00
Aircraft Security Charges	87.50	0.00	87.50	0.00	44.80	0.00	130.20	0.00
Cargo Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Passenger Security Charges	237.50	0.00	237.50	0.00	121.60	0.00	353.40	0.00
Government Charges	--	--	--	--	--	--	--	--
Air Navigation Charges	0.00	349.05	0.00	349.05	0.00	229.05	0.00	565.05
Noise Charges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CustomCharges	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	3828.55	4221.70	3828.55	4221.70	2081.43	2351.70	5964.67	6505.40
Average Per Passenger	30.63	33.77	30.63	33.77	32.52	36.75	32.07	34.98
Fuel Price	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
Frequencies	1	1	1	1	1	1	1	1
Total	3828.55	4221.70	3828.55	4221.70	2081.43	2351.70	5964.67	6505.40
Currency Rates	GBP to GBP: 1	GBP to GBP: 1	GBP to GBP: 1	GBP to GBP: 1	GBP to GBP: 1	GBP to GBP: 1	GBP to GBP: 1	GBP to GBP: 1

Appendix D: Seat Capacity - Domestic and Short Haul Routes

Departing Seat Capacity – Summer 2017					
Destination	**Total**	**BRS**	**CWL**	**Difference BRS vs CWL**	**Ratio BRS to CWL**
Palma Mallorca	198,116	145,763	52,353	93,410	2.8
Amsterdam - Schiphol	164,432	120,284	44,148	76,136	2.7
Dublin	163,371	127,569	35,802	91,767	3.6
Edinburgh	144,496	107,562	36,934	70,628	2.9
Malaga	143,773	112,201	31,572	80,629	3.6
Alicante	143,146	109,729	33,417	76,312	3.3
Faro	136,559	110,655	25,904	84,751	4.3
Glasgow International	91,212	83,100	8,112	74,988	10.2
Belfast International	77,178	77,178	-	77,178	-
Barcelona	76,134	59,214	16,920	42,294	3.5
Tenerife South	67,897	48,637	19,260	29,377	2.5
Paris - Charles De Gaulle	67,797	46,203	21,594	24,609	2.1
Ibiza	64,230	48,156	16,074	32,082	3.0
Geneva - Cointrin	58,456	58,102	354	57,748	164.1
Lanzarote	56,297	42,509	13,788	28,721	3.1
Newcastle	52,624	45,084	7,540	37,544	6.0
Menorca	46,305	34,569	11,736	22,833	2.9
Venice - Marco Polo	43,701	43,701	-	43,701	-
Nice - Cote D'Azur	40,854	40,854	-	40,854	-
Dalaman	40,496	28,220	12,276	15,944	2.3
Rome - Fiumicino	39,434	33,180	6,254	26,926	5.3
Zakinthos	38,531	27,362	11,169	16,193	2.4
Kerkyra - I. Kapodistrias	36,264	32,106	4,158	27,948	7.7
Madrid - Barajas	35,775	29,448	6,327	23,121	4.7
Toulouse - Blagnac	35,704	35,704	-	35,704	-
Las Palmas - Gran Canaria	32,941	27,838	5,103	22,735	5.5
Inverness	32,418	32,418	-	32,418	-
Krakow - J. Paul II International	31,482	31,482	-	31,482	-
Paphos International	30,216	25,302	4,914	20,388	5.1
Gerona - Costa Brava	28,161	28,161	-	28,161	-
Murcia - San Javier	27,762	27,762	-	27,762	-
Heraklion - N. Kazantzakis	27,081	22,923	4,158	18,765	5.5
Larnaca	26,766	19,017	7,749	11,268	2.5
Munich - Franz Josef Strauss	25,536	16,332	9,204	7,128	1.8
Malta International	24,398	24,398	-	24,398	-
Berlin - Schoenefeld	22,734	22,734	-	22,734	-
Frankfurt International	22,388	22,388	-	22,388	-

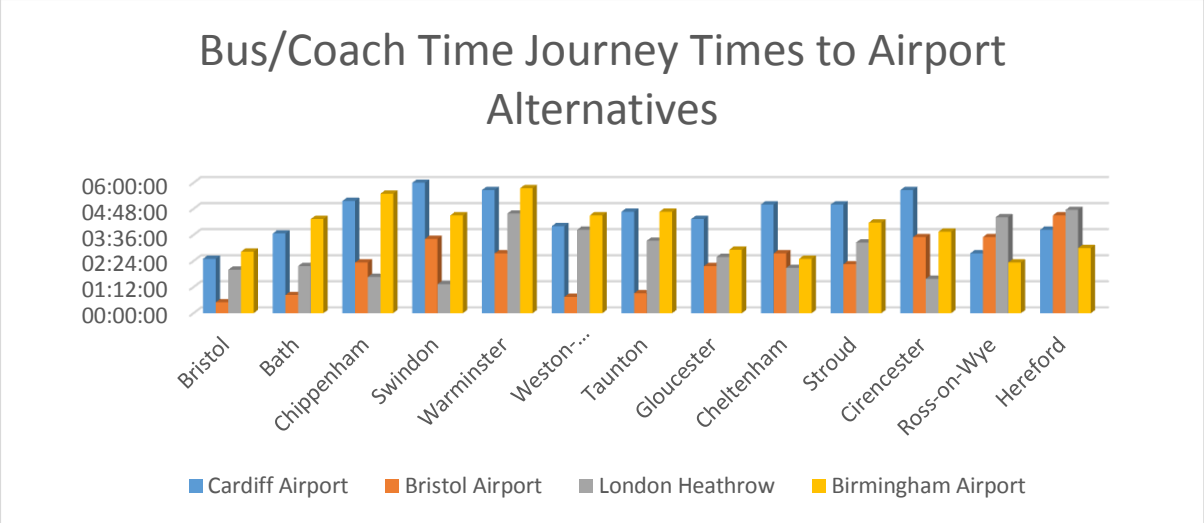
Appendix E: Terrestrial Travel Times

(a) Drive-times (Shortest and Longest Highlighted)

Road	Cardiff Airport	Bristol Airport	London Heathrow Airport	Birmingham Airport
Bristol	01:21:00	00:20:00	01:43:00	01:39:00
Bath	01:34:00	00:46:00	01:48:00	01:58:00
Chippenham	01:26:00	00:55:00	01:23:00	01:50:00
Swindon	01:39:00	01:13:00	01:12:00	01:38:00
Warminster	01:55:00	01:02:00	01:48:00	02:19:00
Weston- super-Mare	01:25:00	00:31:00	02:05:00	01:55:00
Taunton	01:46:00	00:54:00	02:26:00	02:15:00
Gloucester	01:33:00	01:04:00	01:44:00	01:07:00
Cheltenham	01:37:00	01:07:00	01:42:00	01:06:00
Stroud	01:28:00	00:59:00	01:42:00	01:20:00
Cirencester	01:43:00	01:14:00	01:21:00	01:17:00
Ross-on-Wye	01:17:00	01:17:00	02:11:00	01:11:00
Hereford	01:35:00	01:34:00	02:34:00	01:28:00

(b) Rail Journey Times

Rail	Cardiff Airport	Bristol Airport	London Heathrow Airport	Birmingham Airport
Bristol	01:55:00	00:22:00	02:25:00	01:55:00
Bath	02:25:00	00:58:00	02:05:00	02:25:00
Chippenham	02:40:00	01:00:00	01:50:00	02:30:00
Swindon	02:00:00	01:22:00	01:35:00	02:05:00
Warminster	03:00:00	01:30:00	03:00:00	03:00:00
Weston- super-Mare	02:30:00	01:12:00	03:00:00	02:35:00
Taunton	02:55:00	01:20:00	02:45:00	02:35:00
Gloucester	02:25:00	02:00:00	02:35:00	01:25:00
Cheltenham	02:15:00	01:25:00	02:55:00	01:10:00
Stroud	02:50:00	02:12:00	02:10:00	01:55:00
Cirencester	02:14:00	02:00:00	02:14:00	02:20:00
Ross-on-Wye	*No railway station*			
Hereford	01:55:00	02:25:00	03:55:00	02:00:00


Bus/Coach Time Journey Times to Airport Alternatives
06:00:00
04:48:00
03:36:00
02:24:00
01:12:00
00:00:00
Bristol
Bath
Chippenham
Swindon
Warminster
Weston-...
Taunton
Gloucester
Cheltenham
Stroud
Cirencester
Ross-on-Wye
Hereford
Cardiff Airport
Bristol Airport
London Heathrow
Birmingham Airport

Appendix F: South Wales Traffic Leakage Model – Summary of APD Scenario Runs

South Wales Leakage Traffic APD Impact (CWL Recapture)

		DOM	SH UKB	SH UKL	SH FRB	SH FRL	LH UKB	LH UKL	LH FRB	LH FRL	Leakage	CWL	S Wales Total
Status Quo, Leakage	2015	292466	145630	1481005	86068	312291	45277	433900	33197	124313	2954147	1,075,001	4,029,148
	2020	319532	171373	1681651	94522	342116	57314	484559	35851	134246	3321164	1,208,557	4,529,721
	2025	359970	193997	1877940	104472	373067	65105	544648	39520	144263	3702981	1,347,498	5,050,479
	2030	405524	219606	2097140	115470	406817	73956	612188	43564	155028	4129293	1,502,631	5,631,925
	2035	450803	244196	2329238	125745	443015	81900	689192	47180	166917	4578186	1,665,981	6,244,167

			DOM	SH UKB	SH UKL	SH FRB	SH FRL	LH UKB	LH UKL	LH FRB	LH FRL	Additional
1	Scenario 1	2015	0	0	0	0	0	0	0	0	0	0
1		2020	37565	3887	89007	1429	20694	0	23846	256	3519	180204
1		2025	42319	4401	99396	1580	22567	0	26803	282	3782	201129
1		2030	47675	4981	110998	1746	24608	0	30127	311	4064	224510
1		2035	52998	5539	123283	1902	26798	0	33916	337	4375	249148

			DOM	SH UKB	SH UKL	SH FRB	SH FRL	LH UKB	LH UKL	LH FRB	LH FRL	Additional
2	Scenario 2	2015	0	0	0	0	0	0	0	0	0	0
2		2020	75131	7775	178014	2859	41389	0	47692	512	7038	360409
2		2025	84638	8801	198793	3160	45133	0	53606	564	7563	402259
2		2030	95350	9963	221997	3492	49216	0	60254	622	8127	449021
2		2035	105996	11078	246566	3803	53596	0	67833	673	8751	498295

			DOM	SH UKB	SH UKL	SH FRB	SH FRL	LH UKB	LH UKL	LH FRB	LH FRL	Additional
3	Scenario 3	2015	0	0	0	0	0	0	0	0	0	0
3		2020	75131	0	0	0	0	0	0	0	0	75131
3		2025	84638	0	0	0	0	0	0	0	0	84638
3		2030	95350	0	0	0	0	0	0	0	0	95350
3		2035	105996	0	0	0	0	0	0	0	0	105996

			DOM	SH UKB	SH UKL	SH FRB	SH FRL	LH UKB	LH UKL	LH FRB	LH FRL	Additional
4	Scenario 4	2015	0	0	0	0	0	0	0	0	0	0
4		2020	0	0	0	0	0	0	47692	512	7038	55241
4		2025	0	0	0	0	0	0	53606	564	7563	61733
4		2030	0	0	0	0	0	0	60254	622	8127	69003
4		2035	0	0	0	0	0	0	67833	673	8751	77257

			DOM	SH UKB	SH UKL	SH FRB	SH FRL	LH UKB	LH UKL	LH FRB	LH FRL	Additional
5	Scenario 5	2015	0	0	0	0	0	0	0	0	0	0
5		2020	75131	7775	178014	2859	41389	0	0	0	0	305167
5		2025	84638	8801	198793	3160	45133	0	0	0	0	340525
5		2030	95350	9963	221997	3492	49216	0	0	0	0	380018
5		2035	105996	11078	246566	3803	53596	0	0	0	0	421039

			DOM	SH UKB	SH UKL	SH FRB	SH FRL	LH UKB	LH UKL	LH FRB	LH FRL	Additional
6	Scenario 6	2015	0	0	0	0	0	0	0	0	0	0
6		2020	75131	15549	356029	5718	82778	0	47692	512	7038	590446
6		2025	84638	17602	397586	6319	90267	0	53606	564	7563	658146
6		2030	95350	19926	443993	6985	98433	0	60254	622	8127	733689
6		2035	105996	22157	493132	7606	107191	0	67833	673	8751	813338

Appendix G (a): Long Haul Traffic by Region

Region	UK Departu Airport	Business	Leisure	Total	% Split
South West	LHR	346,891	1,589,019	1,935,911	
South West	LGW	22,543	509,065	531,608	
South West	BRS	19,445	94,857	114,302	
South West	BHX	4,414	52,687	57,101	
South West	LTN	1,376	10,395	11,771	
South West	STN	-	8,329	8,329	
South West	LCY	174	571	745	
South West	**Sub Total**	**394,843**	**2,264,925**	**2,659,767**	**74.8**
Wales	LHR	80,102	498,995	579,097	
Wales	LGW	2,500	147,437	149,937	
Wales	BHX	341	65,995	66,337	
Wales	BRS	-	18,738	18,738	
Wales	STN	-	16,077	16,077	
Wales	LTN	3,358	3,112	6,470	
Wales	**Sub Total**	**86,302**	**750,354**	**836,656**	**23.5**
West Midlands	LHR	7,031	30,096	37,126	
West Midlands	LGW	3,231	9,067	12,298	
West Midlands	BHX	881	9,838	10,719	
West Midlands	LTN	-	676	676	
West Midlands	**Sub Total**	**11,142**	**49,677**	**60,820**	**1.7**
Total		**492,287**	**3,064,956**	**3,557,243**	**100.0**

Source: CAA Survey 2015

Appendix G (b): Long Haul Regional Survey Data

Region	UK Departure Airport	Connecting	Point to Point	Total	% Split
South West	LHR	833,898	1,102,012	1,935,911	
South West	LGW	68,725	462,883	531,608	
South West	BRS	68,217	46,086	114,302	
South West	BHX	25,514	31,587	57,101	
South West	LTN	-	11,771	11,771	
South West	STN	636	7,694	8,329	
South West	LCY	745	-	745	
South West	**Sub Total**	**997,734**	**1,662,033**	**2,659,767**	**74.8**
Wales	LHR	274,630	304,467	579,097	
Wales	LGW	23,051	126,886	149,937	
Wales	BHX	25,010	41,326	66,337	
Wales	BRS	2,090	16,647	18,738	
Wales	STN	930	15,146	16,077	
Wales	LTN	2,511	3,959	6,470	
Wales	**Sub Total**	**328,224**	**508,432**	**836,656**	**23.5**
West Midlands	LHR	21,488	15,638	37,126	
West Midlands	LGW	-	12,298	12,298	
West Midlands	BHX	7,087	3,632	10,719	
West Midlands	LTN	-	676	676	
West Midlands	**Sub Total**	**28,575**	**32,244**	**60,820**	**1.7**
Total		**1,354,533**	**2,202,709**	**3,557,243**	**100.0**

Source: CAA Survey 2015

Appendix G (c): Long Haul Business / Leisure Breakdown

Region	UK Departure Airport	Business	Leisure	Total	% Split
South West	**LHR**	346,891	1,589,019	1,935,911	
Wales	**LHR**	80,102	498,995	579,097	
West Midlands	**LHR**	7,031	30,096	37,126	
LHR	**Sub Total**	**434,024**	**2,118,110**	**2,552,134**	**71.7**
South West	**LGW**	22,543	509,065	531,608	
Wales	**LGW**	2,500	147,437	149,937	
West Midlands	**LGW**	3,231	9,067	12,298	
LGW	**Sub Total**	**28,274**	**665,570**	**693,843**	**19.5**
South West	**STN**	-	8,329	8,329	
Wales	**STN**	-	16,077	16,077	
South West	**LTN**	1,376	10,395	11,771	
Wales	**LTN**	3,358	3,112	6,470	
West Midlands	**LTN**	-	676	676	
South West	**LCY**	174	571	745	
Other LDN	**Sub Total**	**4,908**	**39,160**	**44,068**	**1.2**
South West	**BHX**	4,414	52,687	57,101	
Wales	**BHX**	341	65,995	66,337	
West Midlands	**BHX**	881	9,838	10,719	
BHX	**Sub Total**	**5,636**	**128,521**	**134,157**	**3.8**
South West	**BRS**	19,445	94,857	114,302	
Wales	**BRS**	-	18,738	18,738	
BRS	**Sub Total**	**19,445**	**113,595**	**133,040**	**3.7**
Total		**492,287**	**3,064,956**	**3,557,243**	**100.0**
% Split		**13.8**	**86.2**	**100.0**	

Source: CAA Survey 2015

Appendix G (d): Long Haul Connecting & Point to Point

Region	UK Departure APT Airport	Connecting	Point to Point	Total	% Split
South West	LHR	833,898	1,102,012	1,935,911	
Wales	LHR	274,630	304,467	579,097	
West Midlands	LHR	21,488	15,638	37,126	
LHR	**Sub Total**	**1,130,017**	**1,422,117**	**2,552,134**	**71.7**
South West	LGW	68,725	462,883	531,608	
Wales	LGW	23,051	126,886	149,937	
West Midlands	LGW	-	12,298	12,298	
LGW	**Sub Total**	**91,776**	**602,067**	**693,843**	**19.5**
South West	STN	636	7,694	8,329	
Wales	STN	930	15,146	16,077	
South West	LTN	-	11,771	11,771	
Wales	LTN	2,511	3,959	6,470	
West Midlands	LTN	-	676	676	
South West	LCY	745	-	745	
Other LDN	**Sub Total**	**4,822**	**39,247**	**44,068**	**1.2**
South West	BHX	25,514	31,587	57,101	
Wales	BHX	25,010	41,326	66,337	
West Midlands	BHX	7,087	3,632	10,719	
BHX	**Sub Total**	**57,612**	**76,545**	**134,157**	**3.8**
South West	BRS	68,217	46,086	114,302	
Wales	BRS	2,090	16,647	18,738	
BRS	**Sub Total**	**70,307**	**62,733**	**133,040**	**3.7**
Total		**1,354,533**	**2,202,709**	**3,557,243**	**100.0**
% Split		38.1	61.9	100.0	

Source: CAA Survey 2015

Appendix H: Characteristics of Traffic from Combined Cardiff and Bristol Long Haul Catchment

Destination Region	Foreign	UK	Total	%
United States of America	203,016	724,250	927,266	26%
Far East	153,547	502,169	655,716	18%
Australasia	180,743	204,445	385,188	11%
Middle East	68,378	226,494	294,872	8%
North Africa	10,627	256,619	267,246	8%
Indian Sub-Continent	56,090	165,592	221,682	6%
Canada	59,299	103,322	162,621	5%
Central America	3,595	135,358	138,953	4%
Caribbean Area	6,067	123,835	129,901	4%
Southern Africa	41,453	69,357	110,810	3%
South America	37,254	46,314	83,568	2%
West Africa	5,022	32,022	37,045	1%
East Africa	9,663	25,109	34,773	1%
Indian Ocean Islands	885	31,826	32,711	1%
Near East	5,889	26,429	32,318	1%
Atlantic Ocean Islands	1,335	23,966	25,301	1%
Central Africa	1,897	12,483	14,380	0%
Pacific Ocean Islands	871	2,019	2,890	0%
Total	**845,631**	**2,711,611**	**3,557,243**	**100%**

Destination Region	Business	Leisure	Total	%
United States of America	160,841	766,426	927,266	26%
Far East	87,911	567,805	655,716	18%
Australasia	11,499	373,689	385,188	11%
Middle East	69,205	225,667	294,872	8%
North Africa	9,899	257,347	267,246	8%
Indian Sub-Continent	30,798	190,883	221,682	6%
Canada	21,573	141,049	162,621	5%
Central America	10,705	128,248	138,953	4%
Caribbean Area	6,915	122,987	129,901	4%
Southern Africa	13,354	97,456	110,810	3%
South America	25,146	58,421	83,568	2%
West Africa	20,281	16,764	37,045	1%
East Africa	9,738	25,035	34,773	1%
Indian Ocean Islands	1,702	31,010	32,711	1%
Near East	11,355	20,963	32,318	1%
Atlantic Ocean Islands		25,301	25,301	1%
Central Africa	1,364	13,016	14,380	0%
Pacific Ocean Islands		2,890	2,890	0%
Total	**492,287**	**3,064,956**	**3,557,243**	**100%**

Appendix I (a): Top Destinations from the Combined Cardiff and Bristol Long Haul Catchment

IATA	Final Destination	Business	Leisure	Total	%
DXB	Dubai	34,815	145,455	180,270	5%
JFK	New York	28,547	143,024	171,571	5%
HKG	Hong Kong	23,900	90,285	114,185	3%
MCO	Orlando	5,036	98,488	103,525	3%
SSH	Sharm el-Sheikh		95,847	95,847	3%
BKK	Bangkok	3,844	85,980	89,824	3%
SYD	Sydney	1,280	86,545	87,826	2%
RAK	Marrakech	1,370	73,280	74,651	2%
AKL	Auckland	2,253	67,635	69,888	2%
CUN	Cancun		66,030	66,030	2%
PER	Perth	656	65,360	66,017	2%
YYZ	Toronto	5,656	57,896	63,551	2%
MEL	Melbourne	5,411	54,782	60,193	2%
SIN	Singapore	2,814	55,943	58,756	2%
BOS	Boston	13,125	41,026	54,151	2%
LAS	Las Vegas	5,610	45,810	51,420	1%
JNB	Johannesburg	8,385	39,721	48,106	1%
SFO	San Francisco	11,344	33,764	45,108	1%
DEL	Delhi	5,742	38,735	44,477	1%
LAX	Los Angeles	10,339	32,704	43,043	1%
IAD	Washington	6,481	31,275	37,755	1%
ICN	Seoul	8,289	29,171	37,460	1%
BNE	Brisbane		35,596	35,596	1%
EWR	New York	3,540	31,133	34,672	1%
HND	Tokyo	8,740	25,779	34,519	1%
YVR	Vancouver	322	32,891	33,213	1%
TPE	Taipei	1,301	31,318	32,619	1%
ORD	Chicago	4,343	27,907	32,250	1%
CMB	Colombo	1,551	29,182	30,733	1%
PEK	Beijing	8,330	21,749	30,079	1%
MIA	Miami	1,614	28,027	29,641	1%
ADL	Adelaide	477	28,451	28,928	1%
AUH	Abu Dhabi	12,580	16,173	28,753	1%
PVG	Shanghai	7,141	21,005	28,146	1%
DPS	Denpasar-Bali		27,239	27,239	1%
MBJ	Montego Bay		26,037	26,037	1%
CPT	Cape Town		25,619	25,619	1%
BGI	Bridgetown	2,696	22,674	25,370	1%
BLR	Bengaluru	7,491	16,404	23,895	1%

Appendix I (b): Top Connecting Airports Serving the Combined Cardiff and Bristol Long Haul Catchment

IATA	Connecting Airport Used	Total	%
DXB	Dubai	232,639	17%
DOH	Doha	123,199	9%
SIN	Singapore	77,448	6%
AMS	Amsterdam	68,975	5%
AUH	Abu Dhabi	56,558	4%
HKG	Hong Kong	54,967	4%
EWR	New York	47,131	3%
KUL	Kuala Lumpur	37,145	3%
BKK	Bangkok	33,047	2%
JNB	Johannesburg	32,613	2%
CDG	Paris	28,063	2%
DEL	Delhi	26,011	2%
IST	Istanbul	24,780	2%
ICN	Seoul	24,585	2%
JFK	New York	21,126	2%
GRU	Sao Paulo	20,996	2%
MIA	Miami	20,139	1%
YYZ	Toronto	19,957	1%
MAD	Madrid	19,081	1%
IAD	Washington	18,267	1%
BOM	Mumbai	16,483	1%
ADD	Addis Ababa	15,880	1%
DUB	Dublin	15,354	1%
KEF	Reykyavik	14,027	1%
ORD	Chicago	13,582	1%
FRA	Frankfurt	13,538	1%
MNL	Manila	13,326	1%
SYD	Sydney	12,993	1%
PEK	Beijing	12,184	1%
ATL	Atlanta	11,041	1%
DFW	Dallas	10,616	1%
PVG	Shanghai	9,919	1%
MEX	Mexico City	9,385	1%
IAH	Houston	9,212	1%
VIE	Vienna	9,114	1%
PHL	Philadelphia	8,985	1%
LAX	Los Angeles	8,945	1%
NBO	Nairobi	8,929	1%
CLT	Charlotte	8,596	1%

Appendix J: Traffic Forecasts* for Case Studies Long Haul Routes Serve the Combined Bristol and Cardiff Catchment (*Cannibalised and Generated Traffic)

100% APD Reduction

Target Airline	**2018**	**2025**	**2040**		**2018**	**2025**	**2040**		**2018**	**2025**	**2040**	
Route Region	**New York (JFK + EWR)**				**Toronto, Canada**				**Doha, Middle East Hub**			
Airline	**Norwegian/Jet Blue**				**WestJet**				**Qatar Airways**			
Aircraft Seats	189	189	189		136	136	136		144	144	144	
Frequency	3	5	7		3	5	7		5	7	10	
Load Factor	80%	80%	80%		80%	80%	80%		75%	75%	75%	
Annual ATM	313	521	730		313	521	730		521	730	1043	
Annual Seats	59157	98469	137970		42568	70856	99280		75024	105120	150192	
Target Passengers	**47326**	**78775**	**110376**		**34054**	**56685**	**79424**		**56268**	**78840**	**112644**	
Baseline Passengers												
		2025	**2040**	**% of Total**		**2025**	**2040**	**% of Total**		**2025**	**2040**	**% of Total**
South Wales		25812	36554	33.1%		13477	18503	23.3%		34092	49063	43.6%
Rest Wales		7834	11220	10.2%		1686	2482	3.1%		3855	5585	5.0%
Near Southwest		34589	48056	43.5%		29779	41909	52.8%		27983	39700	35.2%
Far Southwest		9120	12505	11.3%		10261	14463	18.2%		12225	17347	15.4%
Herefordshire		1420	2042	1.8%		1481	2068	2.6%		686	949	0.8%
Total		**78775**	**110376**	**100.0%**		**56685**	**79424**	**100.0%**		**78840**	**112644**	**100.0%**
Baseline + APD Stimulated												
		2025	**2040**	**% of Total**		**2025**	**2040**	**% of Total**		**2025**	**2040**	**% of Total**
South Wales		27769	39330	33.1%		14407	19775	23.2%		37104	53281	43.7%
Rest Wales		8493	12156	10.2%		1829	2685	3.1%		4202	6073	5.0%
Near Southwest		37094	51571	43.4%		32046	45059	52.9%		30259	42871	35.1%
Far Southwest		9784	13428	11.3%		11034	15537	18.2%		13216	18726	15.4%
Herefordshire		1541	2213	1.9%		1573	2195	2.6%		736	1018	0.8%
Total		**84680**	**118698**	**100.0%**		**60889**	**85251**	**100.0%**		**85516**	**121970**	**100.0%**
Net Stimulated APD Impact												
		2025	**2040**	**% of Total**		**2025**	**2040**	**% of Total**		**2025**	**2040**	**% of Total**
South Wales		1957	2777	33.4%		930	1272	21.8%		3012	4218	45.2%
Rest Wales		659	936	11.2%		143	203	3.5%		347	488	5.2%
Near Southwest		2505	3514	42.2%		2267	3150	54.1%		2276	3171	34.0%
Far Southwest		664	923	11.1%		773	1075	18.4%		991	1379	14.8%
Herefordshire		121	172	2.1%		92	127	2.2%		50	69	0.7%
Total		**5905**	**8322**	**100.0%**		**4204**	**5827**	**100.0%**		**6676**	**9326**	**100.0%**
APD Growth over Baseline		**7.50%**	**7.54%**	**-**		**7.42%**	**7.34%**	**-**		**8.47%**	**8.28%**	**-**

100% APD Reduction

Appendix K: Key Markets of Interest to Welsh and South West Travellers

	Foreign		UK		Total
Destination Region	**Business**	**Leisure**	**Business**	**Leisure**	
United States of America	43,500	159,516	117,340	606,910	927,266
Far East	14,618	138,930	73,294	428,875	655,716
Australasia	4,482	176,261	7,017	197,428	385,188
Middle East	32,977	35,401	36,228	190,266	294,872
North Africa	1,611	9,016	8,288	248,331	267,246
Indian Sub-Continent	20,028	36,062	10,770	154,822	221,682
Canada	12,302	46,997	9,270	94,052	162,621
Central America		3,595	10,705	124,653	138,953
Caribbean Area	390	5,677	6,525	117,310	129,901
Southern Africa	6,325	35,128	7,029	62,328	110,810
South America	12,830	24,423	12,316	33,998	83,568
West Africa	3,817	1,206	16,464	15,558	37,045
East Africa	685	8,978	9,052	16,057	34,773
Indian Ocean Islands		885	1,702	30,124	32,711
Near East	2,814	3,075	8,541	17,888	32,318
Atlantic Ocean Islands		1,335		23,966	25,301
Central Africa	558	1,339	805	11,678	14,380
Pacific Ocean Islands		871		2,019	2,890
Total	**156,938**	**688,693**	**335,349**	**2,376,263**	**3,557,243**

Appendix L: Key Markets of Interest to Welsh and South West Travellers

Region	Connecting	Point to Point	Total
South West	**997,734**	**1,662,033**	**2,659,767**
Wales	**328,224**	**508,432**	**836,656**
West Midlands	**28,575**	**32,244**	**60,820**
Total	**1,354,533**	**2,202,709**	**3,557,243**
South West %	**28.0**	**46.7**	**74.8**
Wales %	**9.2**	**14.3**	**23.5**
West Midlands %	**0.8**	**0.9**	**1.7**
Total %	**38.1**	**61.9**	**100.0**

Appendix M: Potential Prime Long Haul Opportunities in the Short to Medium Term

	100% APD Reduction								
Target Airline Operations	**2018**	**2025**	**2040**	**2018**	**2025**	**2040**	**2018**	**2025**	**2040**
Route Region	**New York (JFK + EWR)**			**Canada**			**Middle East Hub**		
Airline	Norwegian/Jet Blue			WestJet			Qatar		
Aircraft Seats	189	189	189	136	136	136	144	144	144
Frequency	3	5	7	3	5	7	5	7	10
Load Factor	80%	80%	80%	80%	80%	80%	75%	75%	75%
Annual ATM	313	521	730	313	521	730	521	730	1043
Annual Seats	59157	98469	137970	42568	70856	99280	75024	105120	150192
Target Passengers	**47326**	**78775**	**110376**	**34054**	**56685**	**79424**	**56268**	**78840**	**112644**
Baseline Passengers									
		2025	**2040**		**2025**	**2040**		**2025**	**2040**
South Wales		25812	36554		13477	18503		34092	49063
Rest Wales		7834	11220		1686	2482		3855	5585
Near Southwest		34589	48056		29779	41909		27983	39700
Far Southwest		9120	12505		10261	14463		12225	17347
Herefordshire		1420	2042		1481	2068		686	949
Total		**78775**	**110376**		**56685**	**79424**		**78840**	**112644**
Baseline + APD Stimulated Impact									
		2025	**2040**		**2025**	**2040**		**2025**	**2040**
South Wales		27769	39330		14407	19775		37104	53281
Rest Wales		8493	12156		1829	2685		4202	6073
Near Southwest		37094	51571		32046	45059		30259	42871
Far Southwest		9784	13428		11034	15537		13216	18726
Herefordshire		1541	2213		1573	2195		736	1018
Total		**84680**	**118698**		**60889**	**85251**		**85516**	**121970**
APD Impact Passenger		5905	8322		4204	5827		6676	9326