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date of receipt:	16 January 2012
to:	Mr Uwe CORSEPIUS, Secretary-General of the Council of the European Union
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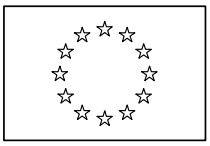
Subject:	Commission Staff Working Paper - Annexes 12-21 to the Impact Assessment Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on common rules for the allocation of slots at European Union airports (Recast)

Delegations will find attached the Commission document SEC(2011) 1443 final - Volume III.

Encl.: SEC(2011) 1443 final - Volume III



EUROPEAN COMMISSION

Brussels, 16.1.2012
SEC(2011) 1443 final

ANNEXE Volume III

Addedum to SEC(2011)1443 final - addition of the third part

COMMISSION STAFF WORKING PAPER

Annexes 12-21 to the Impact Assessment

Accompanying the document

Proposal for Regulation of the European Parliament and of the Council

on common rules for the allocation of slots at European Union airports (recast)

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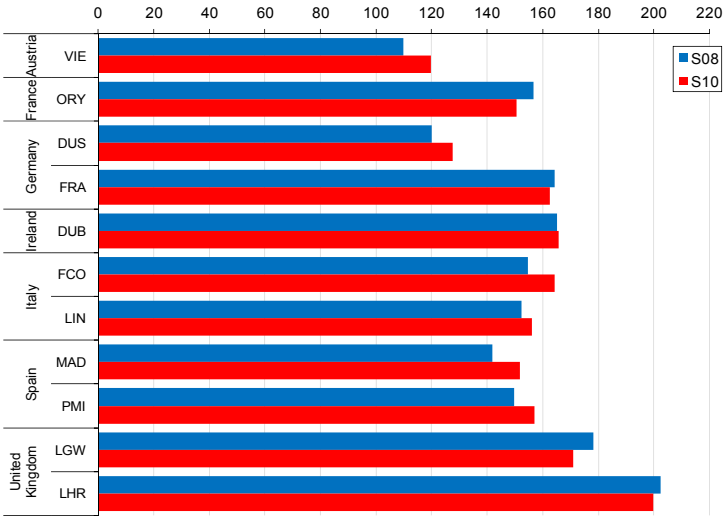
ANNEX

1. AVERAGE AIRCRAFT SIZE AT THE MOST CONGESTED AIRPORTS

FIGURE 1 AVERAGE AIRCRAFT SIZE, MOST CONGESTED AIRPORTS



Source: SDG analysis of coordinator data (OAG data for Orly, Düsseldorf and Frankfurt)

Excludes cargo only flights

2. SLOT MOBILITY

We have defined 'slot mobility' as the extent to which the airlines that held slots at the start of the period for which we have data still held the slots by the end. Table below compares the extent to which the slots held in summer 2010 are equivalent to the slots held in summer 2007, for those airports for which data was obtained. It also shows the total turnover at airports where we only have a shorter data series, although this is not comparable.

TABLE 1 SLOT MOBILITY SUMMER 2007 – SUMMER 2010

Airport	Total allocations S07	Absolute change in total allocations by carrier S07-S10	% change
Airports for which data available S07-S10			
Amsterdam Schiphol	291,913	38,208	13.1%
Dublin	129,405	21,756	16.8%
Düsseldorf	145,938	40,343	27.6%
Frankfurt	312,532	29,816	9.5%
London Gatwick	178,374	69,499	39.0%
London Heathrow	293,530	19,290	6.6%
Madrid Barajas	301,086	58,843	19.5%
Munich	295,853	51,789	17.5%
Palma de Mallorca	162,802	37,061	22.8%
Other airports for which data not available S07-S10			
Milan Linate	59,177 (S08)	8,864 (S08-S10)	14.7%
Paris CDG	375,191 (S09)	32,124 (S09-S10)	8.6%
Paris Orly	143,288 (S08)	15,241 (S08-S10)	10.6%
Rome Fiumicino	218,160 (S08)	45,844 (S08-S10)	21.0%
Stockholm Bromma	19,968 (S08)	10,840 (S08-S10)	54.3%
Vienna	188,360 (S08)	27,176 (S08-S10)	14.4%

Source: SDG analysis of coordinator data

At the most congested airports, there has been limited change in the allocation of slots during this period. The exceptions to this are:

- **Gatwick:** 39% of slots at Gatwick are operated by a different airline to that which operated the slots in 2007. This is a result of the substantial reduction in the number of British Airways flights, the sale of GB Airways and its slots from British Airways to easyJet, US carriers moving to Heathrow after the EU-US Open Skies agreement, and the growth of easyJet and other low cost carriers.

- **Düsseldorf:** 28% of slots at Düsseldorf are operated by a different airline in 2010 to 2007, however this change is mostly due to the acquisition of DBA by Air Berlin.

At the more congested airports, most slots are allocated on the basis of historic preference[1].

TABLE 2 HISTORIC SLOTS

Airport	Historics as % of total allocation	Period covered by data
Dublin	82.5%	S06-W10
Düsseldorf	87.4%	W09-S10
Frankfurt	91.6%	W09-S10
London Gatwick	88.5%	S06-W10
London Heathrow	99.1%	S06-W10
Madrid Barajas	85.5%	W05-S10
Munich	90.9%	W09-S10
Palma de Mallorca	74.1%	W05-S10
Paris CDG	89.7%	W08-S10
Vienna	83.7%	W07-W10

Source: SDG analysis of coordinator data

[1] Note that, at Heathrow and Gatwick, the percentage of slots allocated on the basis of historic preference includes slots transferred due to secondary trading

3. THE PROPORTION OF SLOTS ALLOCATED TO NEW ENTRANTS

The new entrant rule has enabled some carriers to expand and hence to improve competition. For example, of the two main low cost carriers which have expanded in recent years, easyJet has extensively used the rule to obtain slots at congested airports; Ryanair has also used the rule, although less frequently as it tends to serve less congested secondary airports. Several long haul carriers have also used the rule to obtain slots at very congested airports such as Heathrow. For example:

- TAM, the main Brazilian network airline, used the new entrant rule in 2006 to obtain slots for a direct daily flight from Heathrow to Sao Paulo, competing with British Airways. The service still operates, now with a larger aircraft. In 2010 it used the new entrant rule to obtain slots for a direct service from Rio de Janeiro, also competing with British Airways. However, in order to obtain pool slots both slots have to operate with sub-optimal flight timings, with departures from Brazil around midnight, later than any of TAM's other departures to Europe, in order to arrive at Heathrow after 1300.

- Air New Zealand used the new entrant rule in 2006 to obtain slots for a direct daily service to Auckland via Hong Kong, adding competition on the London-Hong Kong route which is dominated by Oneworld alliance carriers (British Airways, Cathay Pacific and Qantas). However, again, to obtain new entrant slots it had to arrive at Heathrow after the peak period: its flight arrives at 1335, whereas most flights from Hong Kong operate overnight and arrive around 0600. The service is still operating although has been reduced to 5 days per week.

The table below shows what proportion of new slots have been allocated under the new entrant rule at those of the sample airports for which we have this data, on average for the period winter 2005/6 – summer 2010 (the period is shorter where we do not have data). The analysis shows that, of the sample airports for which we have data, only at Heathrow and Orly are new entrant allocations approximately 50% of the allocated slots.

TABLE 1 PROPORTION OF POOL SLOTS ALLOCATED THROUGH NEW ENTRANT RULE

Airport	Average % of pool slots allocated through new entrant rule	% of total slots	Period covered by data
Dublin	9.1%	1.5%	S06-W10
Düsseldorf	20.2%	2.6%	W09-S10
Frankfurt	25.7%	2.0%	W09-S10
London Gatwick	18.2%	2.1%	S06-W10
London Heathrow	48.4%	0.4%	S06-W10
Madrid Barajas	12.0%	1.6%	W05-S10
Munich	16.4%	1.5%	W09-S10
Palma de Mallorca	6.3%	1.6%	W05-S10
Paris CDG	7.1%	0.7%	W08-S10
Paris Orly	50.2%	0.6%	S08-S09,S10
Vienna	14.3%	2.4%	W07-W10

Source: SDG analysis of coordinator data

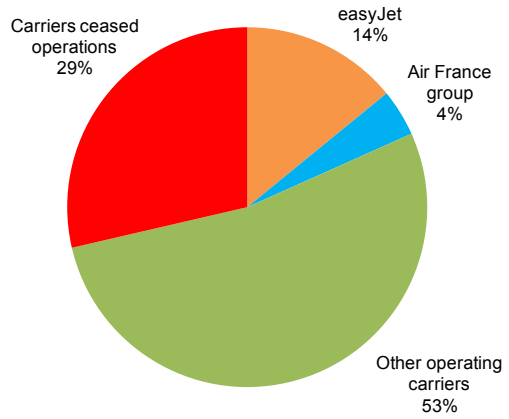
According to the information received from slot coordinators, the low proportion of slots allocated to new entrants was because of a lack of new entrant applications for slots, particularly at less congested airports, as airlines will not invoke the new entrant rule if they can obtain slots without doing so.

However, at Gatwick and (to a lesser extent) Frankfurt there were substantial numbers of new entrant requests that were not granted, despite the fact that new entrant allocations were well below 50%. Coordinators said that this was because some new entrant applications were at times which could not be granted, and because of inter-dependency between slot applications: for example, if a new entrant applies for 3 daily slot pairs for a route, it will not want the afternoon slots which may be available if it is not given the morning slot pair which is not. At Orly, it is possible to achieve an exact 50% allocation because there are no constraints other than the total slot cap – so when slots become available, any request can be granted; similarly, at Heathrow, almost exactly 50% is achieved due to the total movement cap.

4. ALLOCATION OF POOL SLOTS AT PARIS ORLY SINCE 2002

Figure below shows allocations of pool slots at Paris Orly since 2002. This shows that whilst the largest number of slots was awarded to easyJet which was seeking to challenge Air France's dominant position in the Paris market, it was only allocated 14% of the slots which became available, and a greater proportion were allocated to carriers that subsequently ceased operations because they became insolvent or had their licenses revoked.[2] This data also demonstrates the fragmentation of the slot pool that can result from the new entrant rule: the average number of slots allocated to each of the carriers other than easyJet and the Air France group was sufficient for 2.2 flights per day.

FIGURE 1 SLOT ALLOCATIONS AT ORLY 2002-2010



Source: SDG analysis of COHOR data

[2] This analysis includes all new slot allocations at Orly. The data we have been provided by the French coordinator does not separate new entrant from other slots.

5. BASELINE SCENARIO ASSUMPTIONS

Secondary trading

In order to accurately forecast the effect of the proposed options for the two UK airports, we have explicitly modelled the underlying level of secondary trading (referred to as the 'UK baseline' scenario). The UK baseline starts with a scenario with no secondary trading and then makes the following assumptions for the impact of secondary trading at Heathrow and Gatwick:

- **Annual proportion of slots traded:** Up to 3%; this is an estimate of the average percentage of slots secondary traded at Heathrow over the past three years.
- **Ratio of requests to capacity:** we assume that the 3% maximum is only reached during congested periods, and that secondary trading will not occur where the ratio of requests to capacity is less than 90% (although this is not the case for either airport or time period).
- **Aircraft size uplift:** the analysis of historic secondary trades suggests that secondary trading has on average increased aircraft sizes by up to 33%. Part of this uplift derives from trading between short and long haul carriers, but in order to reflect trading within categories we apply an additional aircraft size uplift on all traded slots.

The approach adopted in the UK baseline scenario is discussed in detail in annex 20 on the methodology and assumptions for quantified impact assessment.

Other factors

Assumptions about trends in other factors are shown below.

TABLE 1 OTHER BASELINE ASSUMPTIONS

Factor	Trend
Late handback	Continues as now, but where congestion gets worse, the impact of this increases, as it is more likely to prevent other airlines from acquiring slots.
Slot utilisation	Continues as now, but where congestion gets worse, the impact of low utilisation increases, as it is more likely to prevent other airlines from acquiring slots
Regional accessibility	Where congestion gets worse (e.g. Heathrow) regional services likely to be withdrawn. No impact where congestion does not get worse (e.g. Vienna)
Access for business aircraft	Where congestion gets worse, it will become increasingly difficult for business aviation to obtain access to coordinated airports. No impacts where congestion does not get worse.
CO2 emissions	Increases in line with traffic growth but with 1% per year improved efficiency
Noise	Increases in line with traffic growth
Employment	Increases in line with traffic growth
Economic benefits	Increases in line with traffic growth

In general, where there are issues with the operation of the current Regulation, such as late handback of slots and low utilisation at certain airports, these are likely to continue at the current level. However, the Regulation only has an effect to the extent that demand exceeds capacity: for example, at a congested airport, late handback of slots may lead to some airlines not being able to obtain slots that they could otherwise have used, whereas at an uncongested airport, late handback has no impact because it does not prevent any other airline from obtaining slots. Therefore, where airport congestion is expected to get worse, over time the problems which have been identified with the Regulation will have more impact, and options which address these problems will have greater benefits. In contrast, at airports where capacity is expanded, such as Frankfurt, the impact that these problems have will be reduced.

Outputs

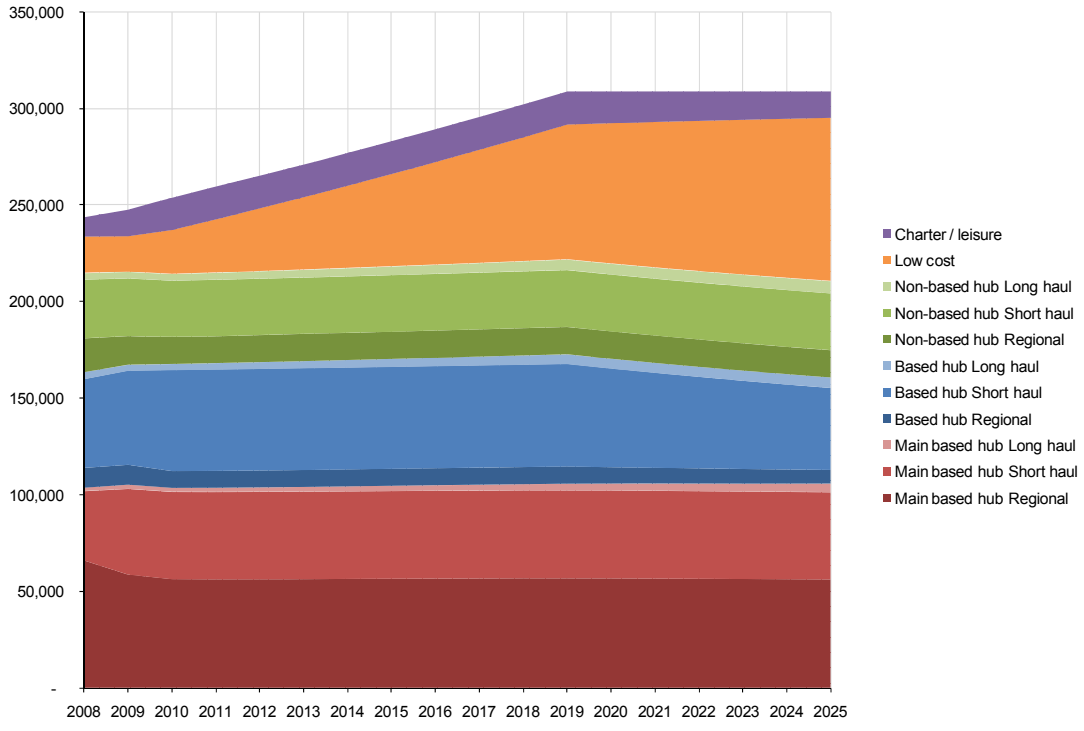
The following pages summarise the outputs of the baseline scenario calculations for each of the six airports modelled. For UK airports the outputs of the UK baseline scenario are presented.

At the end of this section the traffic assumptions for the other airports are summarised. The extrapolation to other airports is based on traffic and level of congestion, and therefore baseline assumptions other than traffic growth are not modelled.

Düsseldorf DUS

Inputs		**2010**	**2012**	**2017**	**2025**
Average hourly daytime capacity		45	45	50	50
Slot transfers through pool		5.0%	5.0%	5.0%	5.0%
Secondary trading		0.0%	0.0%	0.0%	0.0%
Slot utilisation		93.2%	93.2%	93.2%	93.2%
Annual totals		**2010**	**2012**	**2017**	**2025**
Slot requests		271,040	283,097	315,638	375,661
Initial slot allocation		253,664	264,948	295,403	308,596
Operated flights		236,303	246,815	275,186	287,476
Passengers		18,981,000	21,151,537	25,822,247	31,181,361
Passenger-kilometres (millions)		25,617	29,509	38,778	51,230
Rates		**2010**	**2012**	**2017**	**2025**
Capacity utilised		91.3%	95.4%	95.7%	100.0%
Average passengers per flight		80	86	94	108
Average kilometres per flight		1,350	1,395	1,502	1,643
Carrier market share		**2010**	**2012**	**2017**	**2025**
Category	**Main carriers**				
Main based	Lufthansa	41%	39%	36%	34%
Based hub	Air Berlin	25%	24%	22%	18%
Non-based hub	Air France, SAS, Turkish	18%	18%	16%	16%
Low cost	Flybe, TUI Fly, SunExpress	9%	12%	20%	27%
Charter/leisure	Blue Wings, Condor,	7%	6%	6%	4%

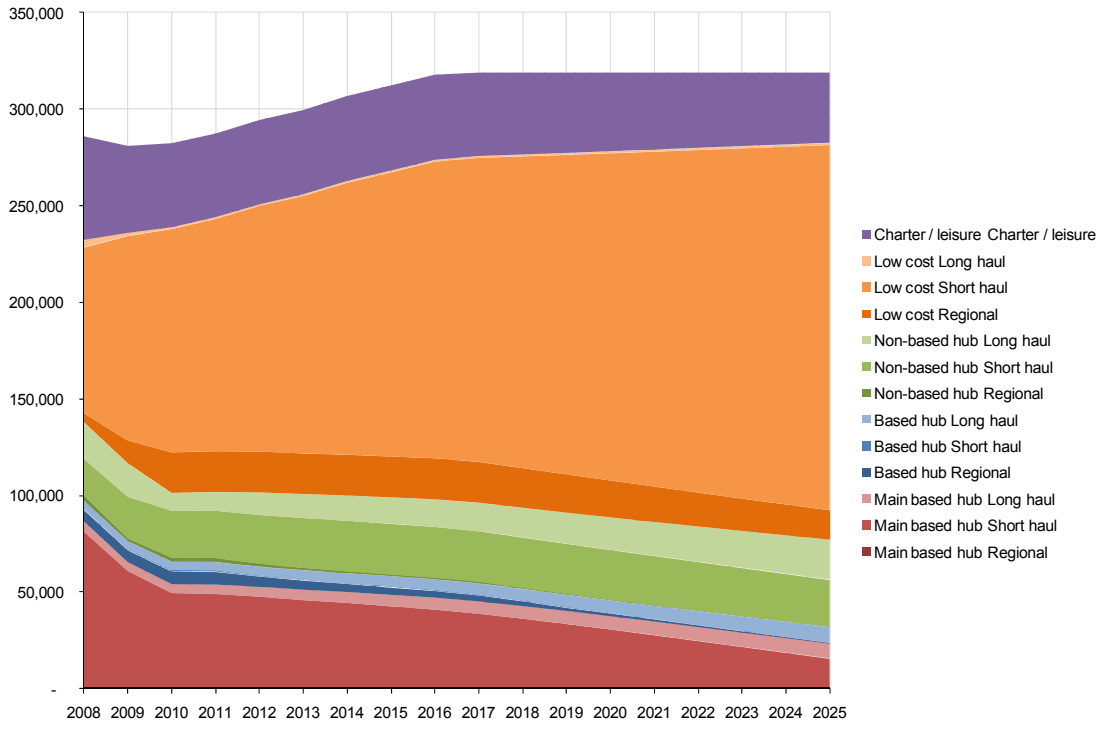
Constrained initial allocation by year, carrier and service type



London Gatwick LGW

Inputs		**2010**	**2012**	**2017**	**2025**
Average hourly daytime capacity		56	58	59	59
Slot transfers through pool		5.4%	5.4%	5.4%	5.4%
Secondary trading		3.0%	3.0%	3.0%	3.0%
Slot utilisation		91.6%	91.6%	91.6%	91.6%
Annual totals		**2010**	**2012**	**2017**	**2025**
Slot requests		310,560	324,375	361,662	430,437
Initial slot allocation		282,200	294,200	318,709	318,709
Operated flights		258,388	269,376	291,817	291,817
Passengers		31,348,100	33,428,401	38,607,789	43,473,437
Passenger-kilometres (millions)		73,163	78,809	92,553	110,734
Rates		**2010**	**2012**	**2017**	**2025**
Capacity utilised	Peak	100.0%	100.0%	100.0%	100.0%
	Off-peak	92.7%	92.8%	100.0%	100.0%
Average passengers per flight		121	124	132	149
Average kilometres per flight		2,334	2,358	2,397	2,547
Carrier market share		**2010**	**2012**	**2017**	**2025**
Category	**Main carriers**				
Main based	British Airways	19%	18%	14%	7%
Based hub	Virgin, Aurigny, Air Southwest	4%	3%	3%	3%
Non-based hub	Aer Lingus, TAP, Emirates	13%	13%	13%	14%
Low cost	easyJet, Flybe, Ryanair	49%	51%	56%	64%
Charter/leisure	Thomson, Thomas Cook,	15%	15%	14%	11%

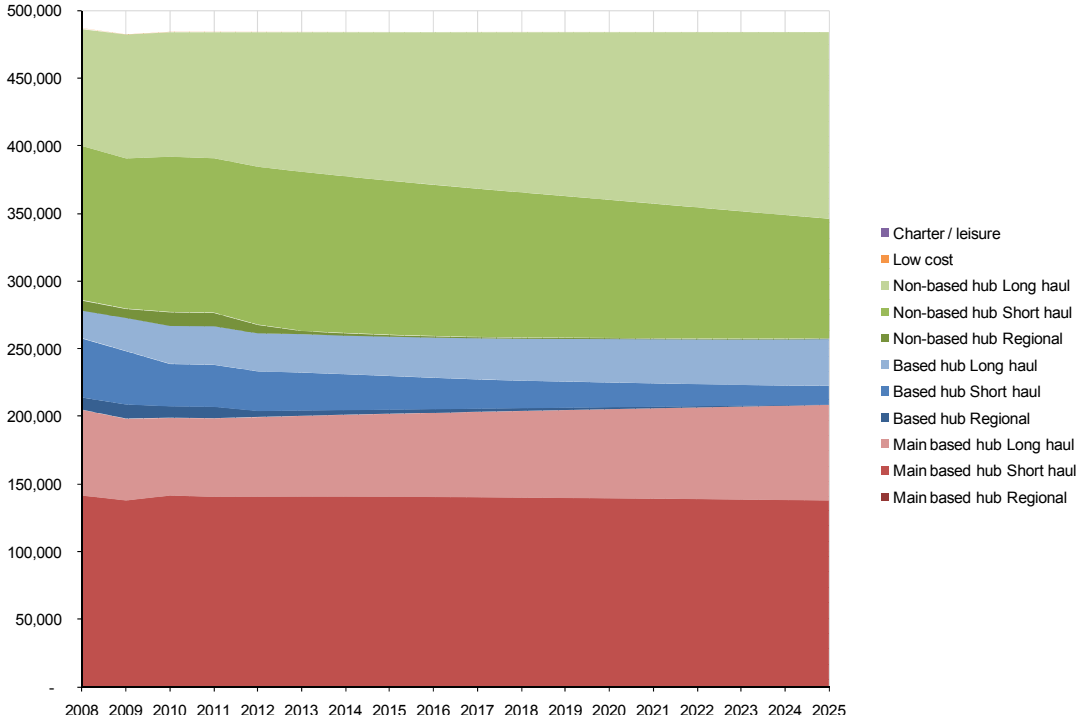
Constrained initial allocation by year, carrier and service type



London Heathrow LHR

Inputs		**2010**	**2012**	**2017**	**2025**
Average hourly daytime capacity		79	79	79	79
Annual movement cap		480,000	480,000	480,000	480,000
Slot transfers through pool		0.3%	0.3%	0.3%	0.3%
Secondary trading		3.0%	3.0%	3.0%	3.0%
Slot utilisation		96.3%	96.3%	96.3%	96.3%
Annual totals		**2010**	**2012**	**2017**	**2025**
Slot requests		523,613	541,567	589,192	674,256
Initial slot allocation		484,251	484,251	484,251	484,251
Operated flights		466,214	466,214	466,214	466,214
Passengers		65,746,910	68,199,954	74,795,002	85,301,445
Passenger-kilometres (millions)		291,939	309,958	361,554	448,418
Rates		**2010**	**2012**	**2017**	**2025**
Capacity utilised	Peak	100.0%	100.0%	100.0%	100.0%
	Shoulder	100.0%	100.0%	100.0%	100.0%
	Off-peak	100.0%	100.0%	100.0%	100.0%
Average passengers per flight		141	146	160	183
Average kilometres per flight		4,440	4,545	4,834	5,257
Carrier market share		**2010**	**2012**	**2017**	**2025**
Category	**Main carriers**				
Main based	British Airways	41%	41%	42%	43%
Based hub	BMI, Virgin	14%	13%	11%	10%
Non-based hub	Lufthansa, Aer Lingus,	45%	46%	47%	47%
Low cost	Air Transat	0%	0%	0%	0%
Charter/leisure	-	0%	0%	0%	0%

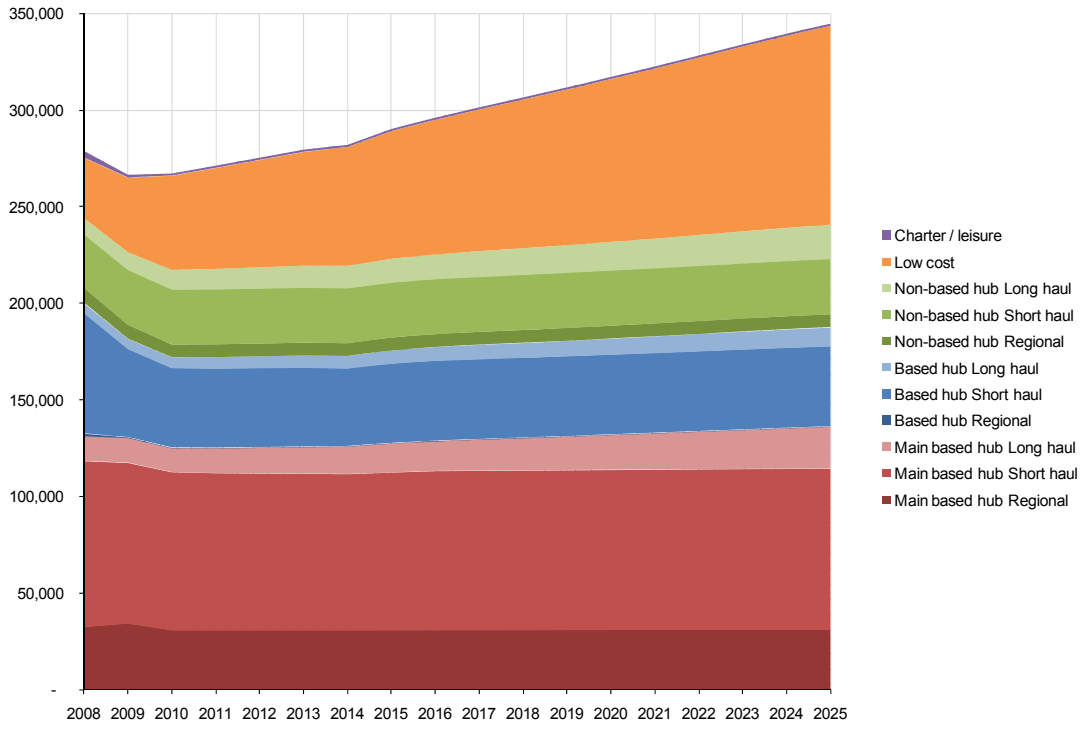
Constrained initial allocation by year, carrier and service type



Madrid Barajas MAD

Inputs		**2010**	**2012**	**2017**	**2025**
Average hourly daytime capacity		96	96	108	118
Slot transfers through pool		6.8%	6.8%	6.8%	6.8%
Secondary trading		0.0%	0.0%	0.0%	0.0%
Slot utilisation		88.3%	88.3%	88.3%	88.3%
Annual totals		**2010**	**2012**	**2017**	**2025**
Slot requests		543,924	562,574	612,047	700,410
Initial slot allocation		534,132	550,396	602,286	689,022
Operated flights		471,600	485,960	531,775	608,356
Passengers					
Passenger-kilometres (millions)		100,463	108,710	134,632	187,970
Rates		**2010**	**2012**	**2017**	**2025**
Capacity utilised	Peak	100.0%	100.0%	96.5%	97.7%
	Shoulder	94.7%	98.2%	95.4%	100.0%
	Off-peak	69.1%	71.8%	72.7%	79.2%
Average passengers per flight		106	109	118	134
Average kilometres per flight		2,015	2,050	2,143	2,304
Carrier market share		**2010**	**2012**	**2017**	**2025**
Category	**Main carriers**				
Main based	Iberia, Air Nostrum	47%	46%	43%	40%
Based hub	Spanair, Air Europa	18%	17%	16%	15%
Non-based	Lufthansa, TAP, Air France	17%	17%	16%	15%
Low cost	Ryanair, easyJet, Vueling	18%	20%	24%	30%
Charter/leisur	Air Pullmantur, AMC Airlines, Air	0%	0%	0%	0%

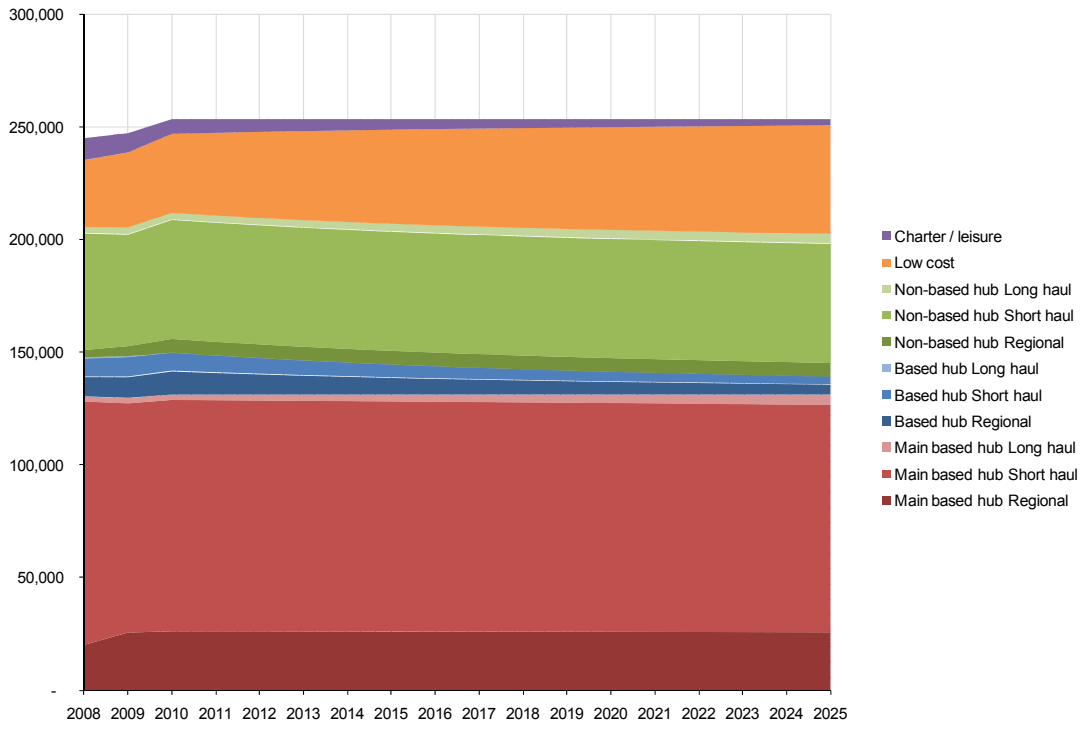
Constrained initial allocation by year, carrier and service type



Paris Orly ORY

Inputs		**2010**	**2012**	**2017**	**2025**
Annual allocation cap		250,000	250,000	250,000	250,000
Slot transfers through pool		1.1%	1.1%	1.1%	1.1%
Secondary trading		0.0%	0.0%	0.0%	0.0%
Slot utilisation		95.9%	95.9%	95.9%	95.9%
Annual totals		**2010**	**2012**	**2017**	**2025**
Slot requests		293,437	306,491	341,721	406,704
Initial slot allocation		253,360	253,360	253,360	253,360
Operated flights		243,016	243,016	243,016	243,016
Passengers					
Passenger-kilometres (millions)		38,249	39,127	42,246	49,512
Rates		**2010**	**2012**	**2017**	**2025**
Capacity utilised		100.0%	100.0%	100.0%	100.0%
Average passengers per flight		104	107	117	135
Average kilometres per flight		1,518	1,499	1,483	1,511
Carrier market share		**2010**	**2012**	**2017**	**2025**
Category	**Main carriers**				
Main based	Air France and subsidiaries	52%	52%	52%	52%
Based hub	Aigle Azur, Airlinair, L'Avion	7%	6%	5%	3%
Non-based	Iberia, Royal Air Maroc, TAP	24%	24%	25%	25%
Low cost	easyJet, Transavia	14%	15%	17%	19%
Charter/leisur	Corsairfly, Air Mediteranee	3%	2%	2%	1%

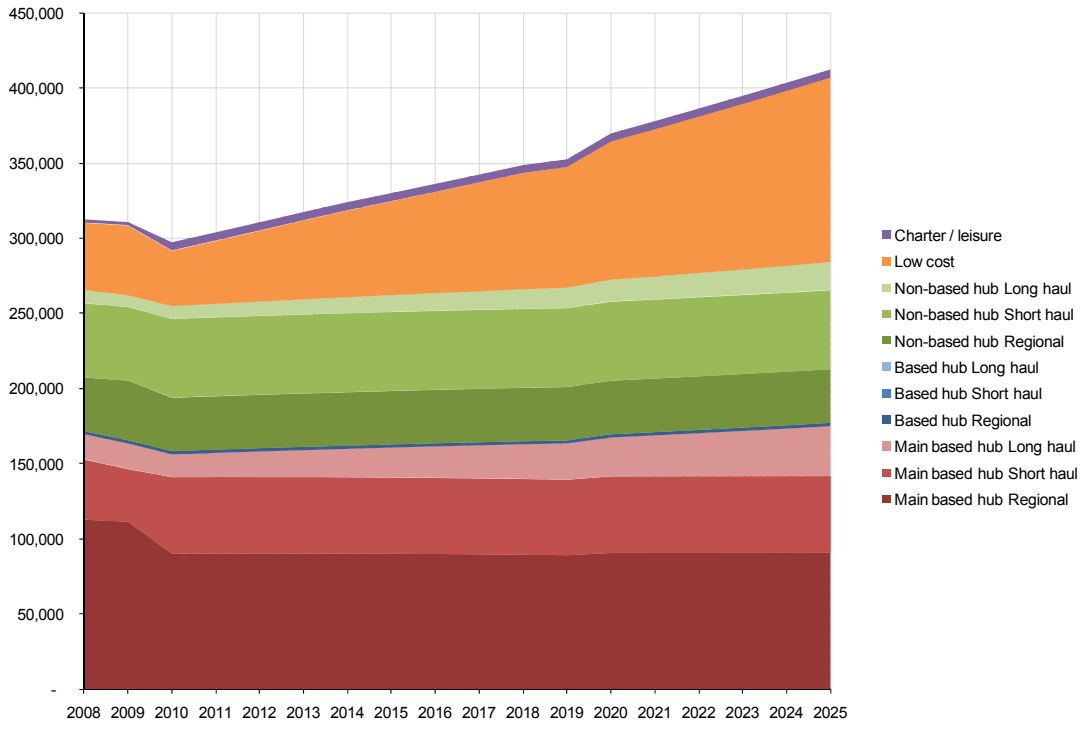
Constrained initial allocation by year, carrier and service type



Vienna VIE

Inputs		**2010**	**2012**	**2017**	**2025**
Average hourly daytime capacity		64	64	64	85
Slot transfers through pool		6.8%	6.8%	6.8%	6.8%
Secondary trading		0.0%	0.0%	0.0%	0.0%
Slot utilisation		90.9%	90.9%	90.9%	90.9%
Annual totals		**2010**	**2012**	**2017**	**2025**
Slot requests		298,018	311,275	347,055	413,053
Initial slot allocation		297,040	310,365	342,335	412,630
Operated flights		269,868	281,974	311,019	374,884
Passengers		19,725,401	21,358,097	25,749,325	35,800,097
Passenger-kilometres (millions)		29,676	33,027	42,614	65,093
Rates		**2010**	**2012**	**2017**	**2025**
Capacity utilised	Peak	94.5%	97.5%	100.0%	91.0%
	Shoulder	83.7%	87.6%	97.9%	88.3%
	Off-peak	59.3%	62.3%	70.5%	64.7%
Average passengers per flight		73	76	83	95
Average kilometres per flight		1,504	1,546	1,655	1,818
Carrier market share		**2010**	**2012**	**2017**	**2025**
Category	**Main carriers**				
Main based	Austrian	53%	51%	47%	42%
Based hub	InterSky	1%	1%	1%	1%
Non-based	Air Berlin, Lufthansa,	33%	31%	29%	26%
Low cost	Niki, Germanwings,	12%	15%	21%	30%
Charter/leisur	MAP, Germania,	2%	2%	2%	1%

Constrained initial allocation by year, carrier and service type



Source: SDG analysis

The table below shows projected traffic at other coordinated airports.

TABLE 2 PASSENGER NUMBERS (MILLIONS) OTHER AIRPORTS

State	Airport	2009	2016	2025
AT	Vienna	18.1	22.9	32.6
BE	Brussels National	17.0	21.5	30.6
CZ	Prague	11.6	14.7	21.0
DK	Copenhagen - Kastrup	19.7	24.9	35.5
DK	Billund	2.3	2.9	4.1
FI	Helsinki-Vantaa	12.6	15.9	22.7
FR	Paris CDG	57.7	70.1	93.9
FR	Paris Orly	25.0	31.6	45.0
FR	Nice Côte d'Azur	9.8	12.4	17.6
FR	Lyon Saint-Exupéry	7.6	9.6	13.6
DE	Frankfurt	50.6	61.5	82.4
DE	Dusseldorf	17.8	22.5	32.0
DE	Munich	32.6	41.3	58.8
DE	Stuttgart	8.9	11.3	16.0
DE	Berlin Tegel	14.2	17.9	25.5
DE	Berlin Schoenefeld	6.8	8.6	12.2
IS	Keflavik International	1.7	2.1	3.0
IE	Dublin	20.5	25.9	36.9
IT	Venice - Marco Polo	6.7	8.4	12.0
IT	Lampedusa	0.2	0.2	0.3
IT	Rome Fiumicino	33.4	42.3	60.2
IT	Bergamo Orio al Serio	7.1	9.0	12.9
IT	Rome Ciampino	4.8	6.0	8.6
IT	Cagliari Elmas	3.3	4.2	6.0
IT	Catania Fontanarossa	5.9	7.5	10.6
IT	Firenze Peretola	1.7	2.1	3.0
IT	Milano Linate	8.3	10.5	14.9
IT	Milano Malpensa	17.3	22.0	31.2
IT	Napoli Capodichino	5.3	6.7	9.5
IT	Palermo	4.4	5.5	7.8
IT	Pantelleria	0.1	0.2	0.2
IT	Torino Caselle	3.2	4.1	5.8
NL	Amsterdam Schiphol	43.5	52.9	70.8
NL	Rotterdam	0.9	1.2	1.7
NL	Eindhoven	1.7	2.2	3.1
NO	Oslo Gardermoen	18.0	22.8	32.4
NO	Bergen Flesland	4.5	5.7	8.1
NO	Stavanger Sola	3.4	4.3	6.1
PT	Lisbon	13.2	16.8	23.9
PT	Oporto	4.5	5.7	8.1
PT	Faro	5.0	6.3	9.0
PT	Madeira	2.3	3.0	4.2
ES	Madrid-Barajas	48.4	58.9	78.8
ES	Almería	0.8	1.0	1.4
ES	Alicante	9.1	11.6	16.5
ES	Barcelona	27.4	34.7	49.4
ES	Bilbao	3.7	4.6	6.6
ES	Fuerteventura	3.7	4.7	6.7
ES	Gran Canaria	9.2	11.6	16.5
ES	Ibiza	4.6	5.8	8.2
ES	Jerez	1.1	1.4	1.9
ES	La Palma	1.0	1.3	1.9
ES	Lanzarote	4.7	5.9	8.5

ES	Málaga	11.6	14.7	20.9
ES	Menorca	2.4	3.1	4.4
ES	Palma de Mallorca	21.2	26.8	38.2
ES	Tenerife Norte	4.1	5.1	7.3
ES	Tenerife Sur	7.1	9.0	12.8
SE	Stockholm-Arlanda	16.1	20.3	28.9
SE	Stockholm-Bromma	2.0	2.5	3.5
CH	Geneva	11.3	14.3	20.4
CH	Zurich	22.0	27.8	39.6
UK	London Heathrow	65.9	80.1	107.3
UK	London City	2.8	3.5	5.0
UK	London Gatwick	32.4	40.9	58.3
UK	London Stansted	19.9	25.2	35.9
UK	Manchester	18.6	23.6	33.6

Source: SDG analysis

6. METHODOLOGY AND ASSUMPTIONS FOR QUANTIFICATION OF THE POLICY OPTIONS

This annex explains how Steer Davies Gleave estimated the quantification of impacts for the policy options. This methodology was discussed with the Commission services and approved.

Options can impact on:

- the percentage of airport capacity for which slots are allocated;
- the percentage of allocated slots which are operated; and/or
- the types of flights to which slots are allocated (airline type, aircraft size, or route length).

Impact of congestion on effects of options

For each airport, year and time period, we calculate the expected ratio between demand for slots and capacity (congestion) in the peak week of the year. This is important because it determines to what extent each option has an impact. Projected levels of congestion are shown in annex 19.

The options have their maximum operational impacts where the number of allocated slots equals capacity. Initially, this applies at all times at Heathrow and Orly, and during peak periods at Gatwick.

Where initial requests for slots are less than capacity, airlines can get the slots that they want within approximately the time that they want. Therefore, the options have no operational impact. For example, late handback of slots should have no operational impact if requests are less than capacity, because it does not impact on the ability of other airlines to gain slots at their preferred times; as a result, introduction of a slot reservation fee may reduce late handbacks but does not increase the number of slots that can be allocated to other airlines, or the amount of traffic that can be handled.

To allow for the fact that there is some variation in demand between times within periods which it is not practical to model, and therefore it is possible that there could be constraints at some times within a period even if overall there are not, the threshold below which options are assumed to have no impact is set where initial requests are 90% of capacity. Initially, during off-peak and shoulder periods at Vienna and Madrid, the number of initial requests is less than 90% of capacity and therefore options have no operational impact.

At some airports at certain times (for example, initially at Dusseldorf; during peak periods at Vienna and Madrid; and off-peak at Gatwick), the number of initial requests for slots exceeds 90% of capacity, but the number of slots ultimately allocated is less than capacity. In these cases the options are assumed to have some, but partial impact, with the impact increasing as demand gets closer to capacity.

Slot reservation fee

Slot reservation fees are assumed to result in a 50% reduction in the net impact on slot allocation of late handback. This results in an increase in the proportion of airport capacity for which slots are actually allocated: where there is currently late handback and this prevents other requests for slots being granted by the coordinator, it is assumed that slots can be allocated to some of these, and therefore some additional flights can be scheduled and operated. It has no impact on slot utilisation or type of flight operated. The impact varies depending on the extent to which the airport is congested.

Penalties for late handback

Penalties for late handback are assumed to result in a 25% reduction in the net impact on slot allocation of late handback. This results in an increase in the proportion of airport capacity for which slots are actually allocated, where the airport is congested: where there is currently late handback and this prevents other requests for slots being granted by the coordinator, it is assumed that slots can be allocated to some of these, and therefore some additional flights can be scheduled and operated. It has no impact on slot utilisation or type of flight operated. The impact varies depending on the extent to which the airport is congested. There is no impact at Dusseldorf or Madrid, as penalties for late handback are already available.

Secondary trading

Secondary trading is modelled twice:

- the underlying level of secondary trading at Heathrow and Gatwick, which is part of the baseline scenario; and

- secondary trading at other airports and a slightly increased level at Heathrow and Gatwick.

The process that is followed to estimate these impacts seeks to replicate actual experience of secondary trading at Heathrow and Gatwick adjusted at the other airports for airport-specific characteristics of the traffic. However, it is not possible to maintain constant assumptions, because airlines' willingness to buy and sell slots depends on a number of factors, including the extent to which they have demand for slots which is unaccommodated, the extent to which they have slots to sell, and the extent to which they can obtain slots in any case through the pool. For example, at Heathrow, the 'based short haul' airline (BMI) has sold slots in the past, but it does not have enough slots left to continue to sell slots at the same rate throughout the impact assessment period. Therefore, the process of estimating the impact of secondary trading is more complex than a simple replication of actual experience – but it is calibrated to have the same effect (at least initially).

The process starts with an assumption for the number of trades which take place each year. This is based on the number that has historically taken place at Heathrow and Gatwick, but is reduced where the airport is less congested and therefore airlines can acquire slots through the pool. At times where the airport is not congested (for example, shoulder and off-peak periods at Vienna and Madrid), secondary trading has no impact.

The next stage is to identify the types of airlines which may buy or sell slots. This is based on the assumptions described in annex 29. However, this may change over time, because some types of airlines may end up with few slots left to sell, or all demand for slots for a particular type of flight may be met. Therefore:

- airlines' willingness to purchase slots is calculated in relation to unaccommodated demand for slots at that time for that type of flight; and

- airlines' willingness to sell slots is calculated in relation to their existing slot holdings.

To reflect the fact that airlines will have more capability to pay for slots for flights which transport more people for greater distances, willingness to purchase slots is based on unaccommodated passenger kilometres. Willingness to sell slots is based on existing slot holdings divided by passenger kilometres transported with these slot holdings.

Weighting factors are then applied to airlines' willingness to buy or sell, so that the initial results are consistent with actual experience. An iterative process is necessary to ensure that the required number

of transactions take place but that airlines cannot purchase more slots than they have unaccommodated demand, or sell more slots than they have.

As a result of this, there are changes in the types of flights that are operated, which in turn lead to changes in passengers and passenger kilometres. However, airlines which buy and sell slots do not necessarily have average characteristics for their category of traffic, and part of the change in passengers and passenger-kilometres results from trading between airlines of the same type. To reflect this, average aircraft sizes are uplifted in relation to the number of trades which occur.

Withdrawal and auction of slots

The calculation of operational impacts follows the same process as the calculation of the operational impacts of secondary trading. However, there are some differences:

- the number of transactions is significantly greater; and
- as all slots are withdrawn and auctioned, there is no calculation of airlines' willingness to give up slots – all slots are eventually sold, in proportion to airlines' holdings of slots.

As the number of transactions is greater, the impact of each individual transaction is less. This is reflected in lower aircraft size increases than for the measure on secondary trading and the UK baseline.

Case study of expansion of capacity at Heathrow

A case study of expansion of capacity at Heathrow is used to assess the revision to the new entrant rule.

Therefore, two scenarios are tested:

- administrative allocation, with the existing new entrant rule; and
- administrative allocation, with the revised new entrant rule.

For the existing new entrant rule, it is assumed that slots are allocated to airlines in proportion to unaccommodated requests for slots. The number of slots allocated to the main based network carrier and other based network carriers is limited, to reflect the fact that 50% of slots have to be allocated to new entrants. The utilisation and load factors for slots allocated to new entrants is reduced, reflecting actual experience.

For the existing new entrant rule, it is also assumed that slots are allocated to airlines in proportion to unaccommodated requests for slots. However, whilst there is a limit on the number of slots allocated to the main based network carrier (British Airways) and also other based network carriers for short haul services (i.e. BMI), there is no limit on the proportion of slots allocated to other based network carriers for long haul services, as Virgin Atlantic would generally be considered a new entrant with the revised rule. In addition, the number of slots that can be allocated to British Airways is slightly increased, as it would account for a higher proportion of new incumbent requests if some of the other airlines otherwise applying for new incumbent slots were able to apply for new entrant slots. The utilisation and load factors for slots allocated to new entrants is reduced, but by half as much as with the existing new entrant rule.

Increase utilisation threshold

These measures increase slot utilisation at the airport, and impacts are calculated by adjusting the slot utilisation data provided by the coordinators to reflect the impact of the new thresholds. The assumptions are:

- For increasing to 85% threshold: Each series with 80-84% utilisation increases utilisation by one flight, and half of the series with 85-89% increase utilisation by one flight.

- For increasing to 90% threshold: Each series with 80-84% utilisation would have two additional flights operated; each series with 85-89% utilisation would have one additional flight operated; and half of the series with 90-94% utilisation have an additional flight operated.

We assume that there will be no impact at Heathrow due to its annual movement and the fact that the coordinator allocates more slots than the capacity of the airport, reflecting expected cancellations. At other airports the impact is dependent on the extent the airport is congested at the time of day concerned; there is no impact where the airport is not congested as the possibility of withdrawal of a series is not an incentive.

For the measure on increasing to 90%, we also consider the impact of increased series withdrawals, modelled as an increase in airline operating costs.

Increase minimum length of a series of slots

The new minimum series length adopted for the summer season is 15 weeks and it is assumed that, where carriers have series shorter than this in the peak summer, these are replaced as follows:

- half are replaced with 15 week series; and

- half are returned to the pool, and replaced with year-round services.

Again, this only happens to the extent that the airport is congested at the time of day concerned. If the airport was not congested carriers would be able to obtain slots for short series in the peak summer from the pool, and this would not prevent operation of other services.

We calculate the additional slot allocations generated, by assuming that the average slots allocated across each of the peak 15 weeks increases by the difference between the number of slots in the peak week, and the average number of slots allocated across the peak 15 weeks. This means that any short series falling within the peak week are extended. For example, if the current number of slots allocated during the peak week is 6,000 and the average across the peak 15 weeks is 5,500 per week; we assume that 6,000 slots are allocated in each of the peak 15 weeks – an average weekly increase of 500 slots. Slots in the remaining 37 weeks of the year are assumed to increase by half this amount (i.e. a weekly increase of 250 slots in the above example).

The numerical increase in slot allocation is expressed as a percentage increase on the current annual total. The percentage increase applied for Düsseldorf is the average across the other five airports, as the data provided by the coordinator does not allow us to calculate allocations on a weekly basis. As for the other options these increases are maxima which are reduced for less congested airports and time periods.

Calculation of economic, environmental and social impacts

Economic, environmental and social impacts are calculated as multiples on the change in passenger numbers and/or passenger kilometres due to the operational results of the options, adjusted to use different values depending the type of service. Changes in air fares are also calculated from the changes in traffic.

Economic impacts

Aviation industry representatives argue that air travel generates significant economic benefits. Economic benefits from increased air travel arise primarily from increased business activity. IATA recently published a report which argued that a 10% rise in connectivity to the international air transport network would increase a country's labour productivity by 0.07%, and hence its GDP.

In principle there could also be economic benefits from increased leisure travel (tourism). However, spending on tourism is likely to displace other types of spending on leisure activities, and spending on air travel for tourism purposes is likely to displace other types of transport (for example domestic road and rail), so there is not necessarily an overall economic gain. The net impact will also vary substantially between Member States: tourism is clearly a net economic benefit to destination countries such as Spain or Greece, but may generate a net economic outflow for origin countries such as the UK or Belgium. As a result many studies on the economic benefits of aviation only attribute economic benefits to business travel.

There is no consensus as to how significant the economic benefits of increased air travel could be. The consultant has not identified any cross-European studies of the economic benefits of air travel but has identified the following figures:

- The US FAA estimates that the value to the US economy in 2007 of air transport was US$1,315 billion, equivalent to €1,210 per passenger journey; most of this is accounted for by induced economic activity, with the direct economic impact being approximately €230 per passenger.3

- A report by Oxford Economics for the aviation industry estimated that the wider economic benefits from expansion of Heathrow airport would be equivalent to €240-267 per additional passenger, and the overall benefits in the UK of airport expansion would equate to €140 per additional passenger.4

- The UK Department for Transport estimated economic benefits of €35 per additional passenger from UK airport expansion; its figure is much lower than OEF's because DfT assumed most incremental passengers travelled for leisure. This value was not specific to expansion of Heathrow and we would expect a higher value than this for measures focussed on expansion of the most congested hub airports: increasing this value consistent with the ratio of Heathrow and UK-wide values from the Oxford Economics study referred to above implies economic benefits of Heathrow expansion of around €60 per passenger.

- The Air Transport Action Group (ATAG), a lobby group funded by the aviation industry, estimated that in 2008 the global air transport industry generated US$408 billion in direct economic activity and total economic activity generated (including induced effects such as trade) was US$3,557 billion; this is equivalent to direct economic benefits of €132 per passenger and total economic benefits of €1,154 per passenger. These figures are also based on analysis undertaken by Oxford Economics.5

- The British Chamber of Commerce estimated in 2009 direct economic benefits from expansion of Heathrow of £400 million per year, and wider economic benefits of £595 million per year (total €1,144 million); this equates to around €68 per incremental passenger, or €61 if improved punctuality and reliability are excluded (as these are related to the additional spare capacity to be

3 FAA (2009): The economic impact of civil aviation on the US economy
4 OEF (2006): The economic contribution of the aviation industry in the UK
5 ATAG (2008): The economic and social benefits of air transport 2008

created at Heathrow, not allocation/use of that capacity, which is what is relevant for this study). This report was also funded by organisations campaigning for the expansion of Heathrow.6

For the study the consultant used a value based on the DfT figure, at the lower end of this range, but adjusted to take into account that economic benefits will be higher at the most congested hub airports such as those to be modelled for the study (applying the ratio of the OEF estimates for Heathrow expansion and for expansion of UK aviation as a whole gives a value of €60 per passenger). The rationale for use of this figure is that this is most likely to be representative of the marginal impact of policy changes. If capacity is less than demand due to slot restrictions, fares should increase, but as business travellers are the least price sensitive, they are most likely still to travel. These are the passengers that generate the most economic benefits. Therefore, we would expect marginal passengers who travel (or do not travel) as a result of policy changes to be disproportionately leisure passengers, who will generate lower economic benefits. In addition, this lower estimate is the only estimate the consultant has found that was not generated by or on behalf of the aviation industry, and therefore it is most likely to be neutral.

We allocate the economic benefits of aviation calculated for Heathrow between long and short haul, on the basis of typical fares and hence revenue for long and short haul flights, to give values for economic benefits of short haul and long haul traffic that can be applied at Heathrow and other airports7. This gives the following values for economic benefits per passenger:

- Short haul: €23/passenger
- Long haul: €92/passenger

Impacts on fares

The options will have different impacts on fares on different routes. For example, if the introduction of secondary trading means capacity and competition on short haul routes are reduced, but capacity and competition on long haul routes are increased, the result will be higher fares on short haul routes and lower fares on long haul. However, overall if more passengers can travel there is likely to be a reduction in air fares.

The overall change in fares will be calculated using a price elasticity of demand: so, if it is estimated that the number of passengers that can travel increases by 1%, the change in fares calculated will be what is necessary to achieve this. The price elasticity of air transport varies by market segment, however, for a study such as this we need to use a total market elasticity8.

IATA estimates a route-level elasticity of -1.4, a national-level elasticity of -0.8 and a supra-national elasticity of -0.69. The higher route-level elasticity partly reflects the switching between routes that would be expected if a prices on one route change relative to another.

To reflect the overall impacts at an airport of changes to slot allocation, we use a value mid-way between the national-level elasticity and the route-level elasticity (i.e. -1.1). The use of an elasticity mid-way between these values is to reflect the fact that under some circumstances, it is possible for passengers to switch between airports. For example, the ability of airlines to increase prices at Orly reflecting the capacity constraint there is limited by the fact that passengers can switch to CDG.

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6 British Chambers of Commerce (2009): Economic impacts of hub airports

7 We assume revenue per passenger of €100 for short haul, based on a sample of short haul airlines, and €400 for long haul, based on Virgin Atlantic (the only major EU long haul only airline)

8 Canada Department of Finance; Air Travel Demand Elasticities, Concepts, Issues and Measurement

9 IATA economic briefing 09

Social impacts

The ATAG report referenced above estimated that 1.5 million people were directly employed in the European air transport industry, of which 748,000 were employed by airlines and 464,000 on site at airports. These equate to:

- 0.70 airport employees per 1000 passengers; and
- 1.13 airline and handling agent employees per 1000 passengers

Changes in airport employment will be calculated in relation to changes in the number of passengers handled. Trends in airline employment will be calculated relative to changes in passenger kilometres rather than passengers, as long haul flights will generate much more airline employment per passenger. Based on ICAO figures for global passengers and passenger kilometres, we estimate that airline employment is around 0.62 employees per million passenger kilometres.

Where a policy results in a significant change in the proportion of slots held by EU and non-EU airlines, we have estimated the employment that moves to (or from) the EU. This is the net result of any change in:

- the number of people employed by the airline type 'non based long haul' (i.e. long haul carriers not based at the airport concerned – which would, by definition, almost always be non-EU carriers); and
- the number of people employed by the other airline types (all based carriers, and almost all short haul/regional carriers, will be EU airlines).

Environmental impacts

For CO2 emissions, we use weighted average emissions for short and long haul flights. We use weighted average emissions calculated from the principles set out in the European Environment Agency CORINAIR emissions inventory guidebook10 by UK DEFRA. Emissions per passenger kilometre are calculated as:

- Domestic (regional): 175.3 gCO2 per passenger km
- Short haul: 98.3 gCO2 per passenger km
- Long haul: 110.6 gCO2 per passenger km11

For short haul, we adapted the CO2 emissions by passenger kilometre to reflect the differences in load factor between network and low cost airlines. The DEFRA figures use a load factor for short haul of 81.2%, but this is based on the UK short haul market which is dominated by low cost carriers. We adapted this to use a higher load factor (84%) for low cost carriers but a lower load factor (72%) for network airlines.12

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10 European Environment Agency (2006): CORINAIR Emissions Inventory Guidebook, Air traffic

11 Department of Environment, Food and Regional Affairs (2008): 2008 Guidelines to Defra's GHG Conversion Factors

12 easyJet full year load factor 2009 86%, Ryanair 82% - compares to British Airways short haul load factor 72%

CO2 emissions from each airport take into account weighted average flight lengths for regional, short haul and long haul flights. This is calculated from slot data where possible, and where not possible given the data we have, from the OAG.

Other assumptions

CO2 emissions will increase more slowly than air traffic, as aircraft become more fuel efficient and through improved operations (for example, more direct routings). The energy intensity of air transport reduced by 60% between 1970 and 200013 and the Advisory Council for Aeronautics Research in Europe (ACARE) set an objective of reducing fuel consumption and hence CO2 emissions per seat KM by 50% relative to 2000 levels in 2020. However, this seems quite optimistic given the time that is taken to replace the aircraft fleet: the typical operating life of an aircraft is 25 years. We have assumed that fuel consumption and hence CO2 emissions reduce by 1% per year14.

We assume that economic impacts and employment increase in line with traffic growth.

For the assessment of the different policy packages, as they represent a combination of policy measures, the result will be obtaining by a multiplicative combination of the different impacts of the measures i.e. (1 + % increase from measure A) x (1 + % increase from measure B) etc. As explained before, the only exceptions are the calculation of impacts for combining extension of the series length with changing the slot utilisation threshold, and slot reservation fees and penalties for late handback.

Extrapolation to other airports

The model produces results for six airports, including four of the airports at which demand exceeds capacity for most or all of the day. In order to make an approximate estimate of the overall impacts of each option, it is necessary to extrapolate these results to other European airports.

This is done as follows:

- European airports are classified first as to whether they are fully coordinated or not, based on the full list of coordinated airports published by EUACA
- These airports are then classified based on whether:
    - demand exceeds capacity throughout most or all of the day;
    - demand exceeds capacity for part of the day (in which case the airport is subdivided into low or high congestion); or
    - demand rarely or never exceeds capacity.
- Taking this into account, we select comparators for each of the airports. For most of the airports two comparators are selected and an average is used, to limit the impact of airport-specific factors. Where demand does not exceed capacity, the options have no impact.
- Impacts are calculated based on the comparator airports. Where impacts are calculated in absolute terms, this is based on the ratio between passenger numbers at the airport and at the comparator modelled airport (for example if an airport had 2 million passengers and the modelled airport had 20 million, the impact would be one tenth of the amount).

For most airports SDG was able to find information on the extent to which demand exceeded capacity from the coordinator websites, the OCS database or from other information which had been provided to us by coordinators in the course of this project. However, for some regional airports in Spain, Norway and Greece, data was not available, and our approach has been as follows:

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13 Source: International Energy Agency (2009)

14 See Committee on Climate Change (2009) Aviation Report, for review of various forecasts for fuel efficiency improvements

- the regional airports in Greece have been excluded, as these airports are generally small airports on islands and SDG was not able to find any information at all (even passenger numbers) upon which to make the extrapolation;
- for regional airports in Spain, we have assumed 50% of the impact at Madrid, pro-rated for the difference in traffic volumes (we are aware that some of these airports are congested, but often in summer only); and
- for Bergen airport we have assumed no impacts.

UK airports are not used as comparators for non-UK airports, because on the information available it appears that secondary trading only takes place to any significant extent in the UK.

The approach to extrapolation is intended to give a reasonable estimate of the EU-wide impact of options; it is not, however, intended to provide an estimate of the impact of options at each individual European airport.

The table below lists the comparators which have been used for each coordinated airport.

TABLE 1 COMPARATORS FOR EXTRAPOLATION

State	Airport	Congestion - future if known otherwise current	Comparators
AT	Vienna	Demand exceeds capacity peak hours (low)	Vienna
BE	Brussels National	Demand exceeds capacity peak hours (low)	Vienna, Madrid
CZ	Prague	Demand exceeds capacity peak hours (low)	Vienna, Madrid
DK	Copenhagen - Kastrup	Demand does not exceed capacity	No impact
DK	Billund	Demand does not exceed capacity	No impact
FI	Helsinki-Vantaa	Demand does not exceed capacity	No impact
FR	Paris CDG	Demand exceeds capacity peak hours (high)	Madrid, Dusseldorf
FR	Paris Orly	Demand exceeds capacity all day	Paris Orly
FR	Nice Côte d'Azur	Demand does not exceed capacity	No impact
FR	Lyon Saint-Exupéry	Demand exceeds capacity peak hours (low)	Vienna, Madrid
DE	Frankfurt	Demand exceeds capacity peak hours (low)	Vienna, Madrid
DE	Dusseldorf	Demand exceeds capacity all day	Dusseldorf
DE	Munich	Demand exceeds capacity peak hours (low)	Madrid, Dusseldorf
DE	Stuttgart	Demand does not exceed capacity	No impact
DE	Berlin Tegel	Demand exceeds capacity peak hours (low)	Vienna, Madrid
DE	Berlin Schoenefeld	Demand does not exceed capacity	No impact
IS	Keflavik International	Demand does not exceed capacity	No impact
IE	Dublin	Demand does not exceed capacity	No impact
IT	Venice - Marco Polo	Demand exceeds capacity peak hours (low)	Madrid, Vienna
IT	Lampedusa	Demand does not exceed capacity	No impact
IT	Rome Fiumicino	Demand exceeds capacity peak hours (high)	Madrid, Dusseldorf
IT	Bergamo Orio al Serio	Demand does not exceed capacity	No impact
IT	Rome Ciampino	Demand exceeds capacity all day	Dusseldorf, Paris Orly
IT	Cagliari Elmas	Demand does not exceed capacity	No impact
IT	Catania Fontanarossa	Demand exceeds capacity peak hours (low)	Madrid, Vienna
IT	Firenze Peretola	Demand does not exceed capacity	No impact
IT	Milano Linate	Demand exceeds capacity all day	Paris Orly
IT	Milano Malpensa	Demand does not exceed capacity	No impact
IT	Napoli Capodichino	Demand exceeds capacity peak hours (low)	Madrid, Vienna
IT	Palermo Falcone-Borsellino	Demand exceeds capacity peak hours (low)	Madrid, Vienna
IT	Pantelleria	Demand does not exceed capacity	No impact
IT	Torino Caselle	Demand does not exceed capacity	No impact
NL	Amsterdam Schiphol	Demand exceeds capacity peak hours (low)	Vienna, Madrid
NL	Rotterdam	Demand exceeds capacity peak hours (low)	Vienna, Madrid
NL	Eindhoven	Demand exceeds capacity peak hours (low)	Vienna, Madrid
NO	Oslo Gardermoen	Demand exceeds capacity peak hours (low)	Vienna, Madrid
NO	Bergen Flesland	No information	No impact

NO	Stavanger Sola	Demand does not exceed capacity	No impact
PT	Lisbon	Demand exceeds capacity peak hours (high)	Madrid, Dusseldorf
PT	Oporto	Demand exceeds capacity peak hours (low)	Vienna, Madrid
PT	Faro	Demand exceeds capacity peak hours (high)	Madrid, Dusseldorf
PT	Madeira	Demand exceeds capacity peak hours (low)	Vienna, Madrid
ES	Madrid-Barajas	Demand exceeds capacity peak hours (high)	Madrid
ES	Almería	No information	50% of Madrid
ES	Alicante	No information	50% of Madrid
ES	Barcelona	Demand exceeds capacity peak hours (low)	Madrid
ES	Bilbao	No information	50% of Madrid
ES	Fuerteventura	No information	50% of Madrid
ES	Gran Canaria	No information	50% of Madrid
ES	Ibiza	No information	50% of Madrid
ES	Jerez	No information	50% of Madrid
ES	La Palma	No information	50% of Madrid
ES	Lanzarote	No information	50% of Madrid
ES	Málaga	No information	50% of Madrid
ES	Menorca	No information	50% of Madrid
ES	Palma de Mallorca	Demand exceeds capacity peak hours (low)	50% of Madrid
ES	Tenerife Norte	No information	50% of Madrid
ES	Tenerife Sur	No information	50% of Madrid
SE	Stockholm-Arlanda	Demand does not exceed capacity	No impact
SE	Stockholm-Bromma	Demand does not exceed capacity	No impact
CH	Geneva	Demand exceeds capacity peak hours (low)	Vienna, Madrid
CH	Zurich	Demand exceeds capacity peak hours (high)	Madrid, Dusseldorf
UK	London Heathrow	Demand exceeds capacity all day	London Heathrow
UK	London City	Demand exceeds capacity peak hours (high)	London Gatwick, Vienna
UK	London Gatwick	Demand exceeds capacity all day	London Gatwick
UK	London Stansted	Demand exceeds capacity peak hours (low)	50% of Gatwick
UK	Manchester	Demand exceeds capacity peak hours (low)	50% of Gatwick

Source: SDG analysis

7. DESCRIPTION OF POLICY MEASURES AND THE FIRST SCREENING

Description of the policy measures

The policy measures as identified at the start of the impact assessment process are included in the following table.

Policy options/measures	
1. Business as usual	
2. Repeal regulation	
3. Guidance on a better implementation	
4. Strengthen the independence of coordinators and the transparency of slot data	
5. Ensure correct use of slots	**5.1 Introduce slot reservation fees** **5.2 Introduce penalties for late hand back** **5.3 Improve and strengthen the role of the coordinator in the application of article 14** **5.4 Clarify obligations to be fulfilled by Member States on the sanctions systems**
6. Fit the slot allocation in the SES	
7. Improve primary allocation	**7.1 Withdrawal of grandfathered rights and auctions** **7.2 Revise new entrant rule**
8. Uniform framework for secondary trading	**8.1 Uniform framework for secondary trading (at all airports)** **8.2 Uniform framework for secondary trading (at all airports) and transparency and competition safeguards**
9. Improve slot utilisation	**9.1 Increase utilisation threshold to 85% or 90%** **9.2 Extend minimum length of series of slot to 15 for the summer season and 10 for the winter season**

Screening of the policy options

With the aim to focus the detailed impact assessment on the most appropriate options, several criteria were used to assess whether the policy options and instruments are suited to achieving the established objectives:

- Effectiveness of the option in relation to the objectives: is the instrument suited to achieve the objective of optimising the allocation and use of airport capacity? To what extent?

- Efficiency of the option in achieving the objectives: the impacts can be obtained at a reasonable cost?

- Feasibility: the option can be legally or operationally feasible?

- Complementary nature: Is it possible to combine two or more instruments without any negative impact on their individual effectiveness?

- Coherence of the option with overarching objectives, strategies and priorities.

On this basis, some of the policy measures will be discarded. On the other hand, given that no policy measure could achieve the specific objectives by itself we have decided to organize them in policy packages as explained in the report.

The stakeholders were invited to submit their observations on the majority of the policy measures shown in the table. Two measures were added to the consultation document under proposal from stakeholders (Extend minimum length of series of slot to 15 for the summer season and 10 for the winter season and Strengthen the independence of the coordinator, by ensuring that it benefits of sufficient funds). The excepted measures from the public consultation were conceived following the results of the study undertaken by Steer Davies Gleave or after discussions in the Impact Assessment Steering Group (Strengthen the transparency of slot data by requiring slot coordinators to retain data for at least 5 years; some of the competition safeguards related to secondary trading).

Stakeholders expressed no clear reject of any of the policy measures included in the consultation document. The market based mechanisms and specially the policy measure on withdrawal and auctions received the strongest negative reaction from airlines. Nevertheless taking into account the results of the several studies undertaken for the Commission and focusing on market based mechanisms we have decided that this policy measure should be further assessed and compared with the other policy measures.

Following we will describe the various policy measures while applying at the same time the screening process and therefore discarding measures when assessing the mentioned criteria. We will also present the arguments of stakeholders for or against options as expressed during the public consultation.

Clarify rules and strengthen enforcement

Under this category, we propose several policy measures.

1. Strengthen the independence of coordinators

We have considered a number of possibilities which could potentially improve the independence of slot coordinators:

1.1. Organisational separation of coordinator

The current Regulation provides in article 4(2)(b) that the Member State shall ensure the independence of the coordinator by separating the coordinator functionally from any single interested party. This measure would consist in providing a higher level of structural independence by requiring an organisational separation instead of merely functional one. This would mean that the coordinator would have to be a separate entity and to keep its own accounts and budget, as any other independent organisation does.

Most stakeholders interviewed for the study expressed strong support for ensuring the independence of coordinators. Many also said that the independence of coordinators had improved in the last 5-10 years as they were now more independent from national flag carriers (nevertheless examples of lack of independence of coordinators were given). Airlines and other stakeholders generally believed that the current system of coordination was performing well, coordinators were now sufficiently independent, and that no changes to this part of the Regulation were required.

In our opinion, this measure would allow to achieve a step further to a higher level of independence of slot coordinators while at the same time easing the implementation of the Regulation.

1.2. Monitor that coordinator is sufficiently funded

This measure consists in amending Article 4(2) to give Member States the ultimate obligation to ensure that coordinators and schedule facilitators have sufficient resources to undertake their activities. Under most circumstances this would not require the State to contribute to the funding of the coordinator, but they would be required to assist in the event of the coordinator or schedule facilitator suffering financial difficulties due to non-payment by airlines or airports.

1.3 Amend funding system

This measure provides for coordinators to be part funded by airlines and part funded by airports, the airline proportion being divided between airlines on the basis of the number of slots used. It would not be possible to specify in the Regulation the proportion of funding for airlines and airports, as the appropriate proportion would vary between States:

- in a State with a concentrated airline market but a number of different airport operators (such as France), it would be appropriate for airports to contribute a relatively high share to avoid excessive dependence on a single airline; whereas

- in a State with only one coordinated airport (such as the Czech Republic), or where all airports are managed by the same company (such as Spain) it would not be appropriate for the airport to contribute such a high proportion.

We have also considered whether the measure should specify a maximum share, for instance 40%, that any one airline or airport should contribute. The constraint on this would be the need to develop a system which could still work in States with only one coordinated airport, or all airports managed by the same company, *and* concentrated airline markets. For example, Finland has only one coordinated airport and Finnair is the dominant carrier at that airport. Under these circumstances it is hard to avoid a situation where one party (Finavia and/or Finnair) contributes at least 40% or more of the funding of the coordinator. Therefore it is not recommended to fix a maximum share.

The measure will finally consists in prescribing that all airlines and airports involved should contribute to the budget of the coordination activities, the ratio being fixed case by case. Nevertheless division between airports should be dependent on cost of coordination and division between airlines should be dependent on number of slots operated.

1.4 Limit the adjacent activities of coordinators

A number of stakeholders expressed concern in principle about UK coordinator's commercial activities and considered that these could raise issues as to its neutrality, particularly if it was providing consultancy services to airlines as well as considering slot allocation requests from them.

The objective of this measure will be to prohibit all adjacent activities of coordinators (such as consultancy activities or developing software or website design to increase transparency of slot data). But if coordinator's commercial activities interfered with the independence of its coordination activity, this would already infringe Article 4(2)(c) of the Slot regulation. Therefore, the only impact of a prohibition of all commercial activities would be to prohibit activities which did **not** interfere with independence – whilst increasing the cost of coordination and reducing the scope to develop adjacent activities which may benefit the industry. This would not answer to the need for an effective and efficient measure and thus the policy option should be discarded.

1.5 Improve transparency of slot and schedule data

This measure would strengthen and/or extend the requirements placed on coordinators regarding data, for example to require them to put data in a consolidated online database available to all stakeholders.

This measure would imply that slot coordinators have to publish online more information on airport capacity. The current Slot regulation already asks coordinators to make available to interested party information on slot allocation, but this measure will represent a step further by extending the requirements and by updating the Regulation in order to take into account the latest technological developments.

Most of airlines were satisfied with the data available and did not see any need for this element of the Regulation to be revised, or any benefits from doing so. Some did however point to ways in which data provision could be improved:

- coordination parameters and local rules are not always transparent;
- overall slot allocations and availability are not always transparent: although allocations can be extracted from the EUACA database, the data in the EUACA database is too disaggregate to enable an airline to review easily when/where slots are available;
- some airlines believed that not all coordinators make slot information available online (although this is not true at least for the sample of States reviewed for this study – all of these coordinators provide information either to the EUACA (www.euaca.org) or OCS databases (www.online-coordination.com), or both); and
- online slot data is not always updated in 'real time', which would be useful during the scheduling and slot allocation process as allocations can change quickly.

Thus the policy measure will aim at amending Article 4(6) of the Slot regulation to require all coordinators to publish certain information online. This should include:

- capacity parameters for each season;
- local guidelines (if any);
- a summary of slot allocation, showing total slot requests and allocations per hour and total slot allocations by airline, for the peak week; and
- a summary of slot utilisation, in total and by airline, for the previous season.

The current Slot regulation requires coordinators to provide annual reports on their activities when requested. EUACA stated that it could be difficult to produce this retrospectively on request and it would be better for this to be mandatory. There are also significant differences in the format and content of these reports between coordinators. Therefore the Slot Regulation should specify that these reports should be produced and published; the content should be agreed between coordinators and the Commission but should include at least the items mentioned above.

Slot coordinators will also be required to retain data for at least 5 years. The EUACA and OCS databases provide data for the current seasons and usually one previous summer and winter season, but not for a longer period. However, national competition authorities and the European Commission can only analyse trends in slot allocation (for example, to test the impacts of secondary trading) if longer term data is available. Most coordinators do keep longer term slot allocation data but not all do. Keeping data for a longer period should be a simple matter of saving and retaining data files and the cost of doing this should be negligible.

Although longer term historical data is not necessary for coordinators' regular activities and is not required by airlines, it is of relevance to regulatory authorities (either national competition authorities or the Commission) in analysing trends in slot allocation and utilisation. Therefore this measure

consists in amending the Slot Regulation by requiring coordinators to keep and make available on request data on slot requests, allocation and utilisation data for at least 5 years.

2. Ensure correct use of slots

This broad policy measure aims at correcting the problem of late hand back of slots as well as the application of the sanctions in case of misuse of slots. It includes the following actions:

2.1 Introduce slot reservation fees

This measure would introduce a new charge which airlines would still have to pay if they did not use the slots that they reserved. The charge would be paid to the airport in the same way as the other charges paid by airlines. The Slot Regulation could be amended to state that nothing in the Slot Regulation should prevent revenue neutral slot reservation fees being introduced by an airport managing body, after consultation with the coordinator and the coordination committee; and that the coordinator shall provide the information to the airport necessary to facilitate collection of these fees.

Many coordinators believed that this would be very effective in encouraging airlines not to ask for more slots than they really need and to hand back slots that they did not intend to use before the deadline. Coordinators also argued that the fee could be set at quite a low level and still be effective, because many airlines hand back slots late through poor organisation and it being a low priority (as it has no cost), rather than an intention to disrupt the operations of competitors. When a slot reservation fee was introduced at Düsseldorf in 2003-2004, there was a substantial reduction in the rate of no-shows: from 20% in summer 2003 to 9% in summer 2004, and from 16% in winter 2002 to 10% in winter 2003. However, some airlines, including Lufthansa, refused to pay the fee and it was rescinded as part of wider negotiations on airport charges.

Several arguments were made against slot reservation fees:

- Many airlines argued that these fees would simply result in higher airport charges and therefore higher operating costs, and give airports a financial incentive to remain capacity constrained. However, there is no reason why this should be the case. A fee could be designed to be revenue neutral if it offset the landing charge, provided the level of the fee was set slightly below the level of the landing charge offset, to ensure that the total amount paid to the airport was equivalent (taking into account that all airlines with reserved slots would pay the fee, whereas only airlines which actually operate pay landing charges). Airlines that operated most of the slots that they reserved would pay lower charges than before.

- Slot reservation fees could cause an issue for airlines' cash flows, as the slot return date is well in advance of when the flight is operated and when the airline would receive ticket revenue. However, this could be addressed by making the airline liable for the fee at the slot return date, but not obliging it to actually pay the fee until it was liable to pay the corresponding landing charge (or the date of the slot, if the flight was not operated).

- Many airlines also argued that the risks inherent in the aviation business, such as downturns in demand, bad weather and other factors leading to cancellations, should be shared between airlines and airports. Some slots are handed back late for reasons that are outside airlines control (for example late delivery of new aircraft). Therefore, they argued that as a matter of principle, airlines should not have to pay for slots for flights that are cancelled.

The Düsseldorf experience demonstrates that slot reservation fees could be very effective in reducing the problem of late handback, and thereby improving capacity utilisation at some of the most congested airports and improving the efficiency of the administrative allocation system.

Capacity reservation fees exist in other sectors in which capacity is constrained: for example, they are specifically permitted in the rail sector by Article 12 of Directive 2001/14/EC, and are applied by many rail infrastructure managers. In addition, airlines regularly impose what are in effect capacity reservation fees on their passengers: most tickets are not refundable if the passenger decides not to travel, even if this is for reasons outside the passenger's control.

Many stakeholders argued that a slot reservation fee, if designed as an airport charge, would be consistent with the current Regulation, and therefore no change to the Regulation is required. However, others considered that an explicit permission in the Regulation for such a charge would make it easier to implement and reduce the risk of legal challenge.

2.2 Introduce penalties for late hand back

The Slot Regulation does not require Member States to have penalties for late handback of slots, but it does not preclude them from doing so. For example, Spain already has such penalties, defined in its Aviation Security Law, and Germany also has penalties, but many other don't have.

Many coordinators believed that penalties for repeated or intentional late handback of slots would be effective in altering airlines' behaviour, but that penalties would be less effective than slot reservation fees, because of the cost and difficulty of imposing penalties and in demonstrating that the late handback was deliberate.

Nonetheless penalties have some advantages over slot reservation fees:

- Penalties may be easier to introduce than slot reservation fees: whilst most airlines strongly opposed slot reservation fees, and some might threaten to move to other airports where these were introduced or refuse to pay them, many airlines supported the possibility of penalties being available for late handback, provided these were not imposed when there were valid reasons for the late handback, such as late delivery of aircraft.

- The slot return date (SRD) is only 11 weeks before the start of the season. A reservation fee would not be paid by airlines handing back slots at this point, but handback on or immediately before the deadline still reduces the chance that slots can be utilised efficiently by another airline. The Regulation could allow for penalties to be imposed on airlines that retained slots at any point, even if before the SRD, if it was clear that it was not going to use them - for example, because they were not marketing any flights. However, this would have to be on a case-by-case basis and might involve high costs of investigation.

- Penalties would only be imposed on airlines that repeatedly or intentionally handed back slots late, and therefore would not cause any issues for cash flow of other airlines.

This measure will be further analyzed as it appears as a potential effective and efficient measure to discourage late hand back. Contrary to the option on slot reservation fee, this measure will aim at introducing an obligation for Member States to sanction late hand back of slots.

2.3 Improve and strengthen the role of the coordinator in the application of article 14

A number of other issues were raised with relation to article 14 by coordinators:

- Article 14(2) requires the coordinator to withdraw slots from an airline if it does not have an operating license. Coordinators suggested that it should be extended to allow withdrawal of slots where an airline does not have traffic rights or other necessary permissions.

- Article 14(5) does not specifically mention no slot operations, or failure to cancel a slot that is not to be used. Some States have interpreted the scope of the article to include operations without a slot and 'no shows', and the Slot regulation does not prevent Member States from having more extensive sanctions for slot misuse. However, it would give more certainty if the article was amended to refer to this.

- Article 14(5) refers only to repeated and intentional abuse of a slot. In some cases of misuse, an individual breach could be so serious that sanctions would be appropriate: for example, a flight that landed at Heathrow without a slot during the Olympics period would cause significant disruption and this should be subject to penalties. This issue could be addressed by amending the Article to refer to *'repeated **or** intentional misuse'*, instead of *'repeated **and** intentional misuse'*.

- Coordinators argued that it should be clarified that the references in article 14(4) and 14(5) to *'cause prejudice to airport or air traffic operations'* should apply only to the *'use of slots in a significantly different way'*, and not to *'operating at a significantly different time'*. In addition, it could be interpreted that failure to comply with emissions or noise limits where these are part of the allocated capacity parameters does not necessarily cause prejudice to airport or air traffic operations. This could be resolved by deleting the reference to 'cause prejudice to airport or air traffic operations' from both article 14(5) and 14(6).

- Coordinators also argued that article 14(6) should be extended to give them the right to withdraw a series before the start of the season if the air carrier concerned cannot demonstrate that it intends to use it. If the series is withdrawn during the season, it is too late to allocate this to anther carrier.

- In most States, the coordinator is not responsible for imposing sanctions under article 14(5) and will not necessarily be informed of the outcome of a case that it refers to the appropriate authorities, including the details of any sanction imposed. The article could require the coordinator to be notified of the outcome of the case.

- Article 7(2) allows the coordinator to not take into account slot requests from airlines where information is missing, misleading or false, but this is of limited benefit as coordinators normally only find out that information was misleading or false after the slots have been allocated. This could be addressed by amending article 14(5) to require that sanctions be available for failing to provide reasonably requested information, or providing misleading or false information. This would be particularly important if coordinators had a role providing data to the Network Manager.

These changes would all be relatively minor but would all improve the operation of the Regulation.

2.4 Clarify obligations to be fulfilled by Member States on the sanctions systems

This option is discarded because the measures retained until now are already fixing the way sanctions should apply in case of misuse of slots or late hand back. This option will not have any added value to the previous options.

3. Integrate the slot allocation in the Single European Sky

The Single European Sky II (SES II) package is an ambitious package of reforms to the European air traffic management system, designed to improve its performance, in terms of cost-efficiency, capacity, environmental performance and safety. The most radical change is that EU-wide performance targets have been set, and States are required to set binding national targets for cost-efficiency and capacity

that are consistent with the EU-wide targets. In addition, a network manager is to be appointed to plan the European ATM network. Airports are a key element of the network and need to be integrated within this if high performance is to be delivered on a gate-to-gate basis.

Slot coordinators collect data on airline schedules which, as part of SES II, could be useful to the Network Manager in planning the European route network. The data collected by coordinators is already provided to Eurocontrol. However, its usefulness is limited by the fact that it does not cover all airports:

- in some Member States (such as the UK and Denmark), the coordinators collect data for some airports that are IATA level 1 (not coordinated or schedules facilitated), i.e. neither coordinated nor schedules facilitated, but there is no obligation on operators to provide data and therefore it is collected late and it is not clear whether it is up-to-date.

- in other Member States coordinators do not collect data for other airports.

In addition, collection of data for level 1 airports could facilitate emergency short-term coordination of these airports, for example when an adjacent airport is closed, or during exceptional circumstances such as the volcanic ash crisis, which resulted in substantially increased traffic at airports on the edge of the no-fly zone, or the snow crisis in December 2010, which also resulted in significant increases in demand at those airports which were still open. Article 3(6) of the Regulation allows for this but application of this is hampered by the fact that coordinators do not generally have data to enable coordination of these airports.

Airlines and airports were not in favour in allowing the Network Manager to influence the slot allocation process and disagreed on the role that slot coordinators might have in the SES II. Some airports agreed nevertheless that coordinators would have to work closely with the Network Manager to make best use of available capacity.

According to this policy option, drafted in cooperation with EUACA representatives, coordinators should only collect data for the airports which the Network Manager determines are of relevance to the planning of the European route network. As the Implementing Rules on the Network Manager have not yet been approved by the Single Sky Committee, it is not clear yet exactly what form this will take or what would be required. Nonetheless it could be amended to:

- require coordinators to collect data for 'Network airports' designated by the Network Manager, even where these are not coordinated or schedules-facilitated;

- require coordinators to provide this data to the Network Manager; and

- require operators to provide this data to the coordinator and allow sanctions to be imposed if the operators fail to provide data, or provide misleading data.

At least initially, these provisions may not be used, but making these amendments as part of a broader revision to the slot Regulation would allow this option to be activated by the Network Manager when this becomes useful.

If the Network Manager designated as Network Airports in States such as Estonia or Latvia which did not already have a coordinator or schedules facilitator, these States would need to designate a body to undertake this task. However, this should not require the creation of any new organisation, as one of the existing coordinators could be designated, in the same way as Ireland has designated ACL as its coordinator and Iceland has designated Airport Coordination Denmark.

The option of clarifying the role of the coordinator in the application of article 14(1) was submitted to the public consultation, but was covering also the possibility to grant the power to reject the flight plan to the central flow management unit or to the airport managing body.

Many stakeholders, including many airports, argued that the airport managing body was not the appropriate body to make operational decisions about whether a flight should land. The coordinator is defined by the Regulation as being the sole body responsible for slot allocation, and only the air traffic management authorities have access to flight plans; there is limited benefit from introducing a third party. Many also argued that it was better to refuse to accept a flight plan than for an aircraft to be refused permission to land, as once an aircraft is in the air, there may be limited alternative available.

Some airports argued that it should be possible to reject flights plans on the basis that they are off slot by more than a few minutes, as well as operations without a slot. However, coordinators considered that this would in effect require the airline to re-clear every slot in the event of operational disruption, which would be impractical for both airlines and coordinators. This would be practical for ad hoc flights but not for scheduled flights and programmed charter flights.

Article 14(1) could be clarified by authorizing the slot coordinator to ask the central flow management unit to suspend the flight plan if there is no slot allocated to the specific air carrier. In this way, article 14(1) will be effectively applied.

Finally, the measure would include the possibility to take into account future performance standards on airports by ensuring the consistency between the performance standards and the slot coordination parameters of the airports. This consistency could be done through the slot coordination committee, involving all stakeholders.

4. Improve primary allocation

We analyze three main possibilities for improving the primary allocation.

4.1 Withdrawal of grandfathered rights and auctions

This policy measure will consist in withdrawing and auctioning 10% of slots held due to grandfather rights each year, to apply at the most congested airports only. To be more precise, the measure aims that at any coordinated airport where:

- the number of slots allocated from the pool was less than 2% of the number of slots allocated on the basis of historic precedence, on average over four scheduling periods; and
- initial requests for slots exceed capacity for at least 8 hours per day; and
- it is not expected within the next 3 years that capacity will be expanded sufficiently to accommodate demand.

Historic preference to be subject to a time limit and 10% of slots shall be withdrawn by the coordinator and auctioned every year. Slots that are allocated in the auction will be allocated for 10 years, and subject to this may be traded without restriction between air carriers.

The State concerned would design the auction mechanism but this would be subject to approval by the Commission. At these airports, Article 10(6) (priority to new entrants) will not apply.

Almost all airlines opposed any policy option aiming at introducing auctions or withdrawal. The main argument invoked by airlines was that it would be very difficult to implement as an airline would need

to simultaneously secure matching slots at each of a route, which would mean that the auction would have to take place in parallel at every European airport and be followed by a separate process to optimise slots. It would also disadvantage the EU-based carriers as they would be forced to be the highest bidder at their home base in order to grow. Slots from the pool would end up with carriers with the deepest pockets (perhaps government-backed non-EU carriers). Only few airports expressed to be in favour of auctions.

Almost all stakeholders, except one Member State, were not in favour of withdrawing slots. The main reason invoked was that the withdrawal will jeopardize the need for stability for the airlines and that it could lead to schedule fragmentation.

By taking into account these inputs, we have analyzed the introduction of auctions and withdrawal only in specific cases.

4.2 Revise new entrant rule

In order to avoid fragmentation of the schedule by allocation of slots to a large number of small carriers, and to increase the likelihood of sustainable competition being created, amend the definition of new entrant so that:

- the number of frequencies that can be operated by a new entrant on an intra-EU route is increased to be equivalent to 4 rotations, to offer more credible competition with incumbent airlines
- new entrant priority can also be obtained for a specific number of frequencies on non-EU routes up to 2 rotations per day
- the reference to regional airports is deleted, as this is never used and in any case is superfluous; and regional airport is not defined
- delete automatic/prioritised classification as a new entrant for carriers with less than 5 slots
- delete reference to airport systems
- apply the new entrant slot limit at the level of airline owning groups, rather than individual air carriers
- prevent airlines from obtaining new entrant slots if they have transferred slots to another carrier, or had slots withdrawn by the coordinator.

The stakeholders, except majority of airlines who did not express any view, supported the general proposal of amending the new entrant rule.

We have analyzed also the possibility of removing the new entrant rule and giving priority to carriers other than the dominant carriers and its partners where these have more than a given number of slots. Most of stakeholders were not in favour of this policy measure.

This measure would in effect be a cap on growth of slot holdings and hence have similar consequences to the option limiting the share of slots that an airline could acquire through secondary trading. This measure should not be pursued for the same key reason discussed with respect to that option (see explanations at page 116): a fixed limit above which priority would be given to carriers other than the dominant carrier would be a blunt instrument and might lead to perverse consequences. The ineffectiveness of the new entrant rule can be addressed more effectively by amending it.

5. Uniform framework for secondary trading

5.1 Uniform framework for secondary trading (at all airports)

This measure would amend the current Regulation to allow secondary trading to take place at all coordinated airports. Slots would be transferred either for a limited period or indefinitely between air carriers, with or without monetary or other considerations.

Stakeholders were divided on the issue of formalizing secondary trading, but the conclusions of the stakeholders' hearing (2011) emphasized that there is no uniform framework in Europe.

5.2 Uniform framework for secondary trading (at all airports) and transparency and competition safeguards

Different measures are analyzed:

a) Caps on market shares of airlines

b) Prohibition of restrictive covenants

c) Pre-trade and post-trade transparency

d) Centralised auctions for slots

d) Increased powers for national competition authorities

a) Caps on market shares of airlines

This measure will consist in allowing secondary trading at all airports but introducing restrictions on the proportion of slots which may be held by an incumbent.

A first screening of this option allowed us to see that the measure is not feasible. It would be very difficult to define a fixed proportion of slots above which an incumbent carrier was dominant and should not be permitted to acquire more slots through secondary trading. The level required to be dominant would depend on a number of different factors, including:

- The extent to which there is competition with other airports: For example, Ryanair has 56% of slots at Stansted[15], but a low share of slots across the five London airports. It is clearly not dominant in the London market.

- The nature and timing of the slots would be relevant to any determination of dominance as well as the proportion held: For example, if a carrier held a high proportion of slots at times appropriate for long haul services, it might be dominant in this market even if did not hold a proportion of slots higher than the threshold in aggregate.

- The extent to which the other carriers provide effective competition: Depending on the nature of the services other carriers provide from the airport, they may be more or less effective competitors. Whilst slot holdings are one factor that may determine this, this is not the only factor.

- The nature of the main carrier's links with other carriers: It would be difficult to define which carriers the cap should apply to - for example, just the dominant carrier; or also other airlines within the same owning group, alliance partners, or airlines with whom it had weaker commercial

[15] ACL (2010): Stansted Summer 2010 Seasonal Report

arrangements. The definition would have to be set quite broadly to avoid the risk that the cap could be circumvented, but there would then be a risk of legal challenge to any decisions that coordinators made in applying the cap - for example, what proportion of ownership would be permitted before an airline was considered to be part of the dominant carrier.

In addition, it could be argued that an administrative limit above which carriers could not obtain more slots through secondary trading would be unfair if it did not require carriers who already have more slots than the threshold to give up these slots. For example, if the limit was set at a level equivalent to British Airways current proportion of slots at Heathrow, it could argue that this would be unfair if there was not also a requirement on Lufthansa to reduce its slot holding at Frankfurt to a similar level.

A defined level above which slot acquisitions were not permitted would be a very blunt instrument that could have significant perverse consequences, including preventing the expansion of services by airlines where there are no real competition concerns, whilst failing to address real competition issues at other airports. Therefore, the option of an administrative limit on total slot holdings was not pursued further.

b) Prohibition of restrictive covenants

This option would introduce a clear prohibition on conditions attached to slot transactions which were anti-competitive, such as requirements not to operate services on particular routes, or to sell the slots on to specific third parties. Prohibition of restrictive covenants was suggested by both the CAA/OFT and European Competition Authorities Air Transport Working Group reports referenced above.

Most airlines and coordinators said that they were not aware of any case in which slot transactions had included anti-competitive restrictive covenants. We would not expect airlines that were selling slots subject to restrictive covenants to inform us of this, particularly given these would already infringe competition law in many cases. However, we would have expected airlines that had been net acquirers of slots to have informed us if these were being subject to these conditions. Indeed, as these covenants would already infringe competition law in many circumstances, these airlines might have already have complained to national competition authorities or the Commission if these covenants had existed: in other cases airlines have been willing to report other airlines to competition authorities.

Any prohibition on restrictive covenants should only cover requirements that have a primarily anti-competitive purpose. However, slot lease contracts do have to be able to limit the ability that the lessee has to change the use of the slot, in order to ensure that an equivalent slot can be returned to the lessor. These restrictions are essential for leases to be able to occur. The lessor needs to be able to ensure that the lessee will:

- comply with the 80/20 rule;
- not lose the slots as a result of penalties for slot abuse;
- not go insolvent (and hence lose slots); or
- not change the slots through retiming or changes to aircraft type or ground facilities used, which would mean that the slots would not be of the same value to the lessor when they were returned.

In order to allow leases to occur, it should be made clear that conditions may be applied to temporary transfers of slots to ensure that an equivalent slot can be returned to the original carrier at the end of the period covered by the transfer.

c) Pre-trade and post-trade transparency

Pre-trade transparency

The UK coordinator, ACL, has established a website (slottrade.aero) on which carriers can advertise that they wish to give up slots, or that they are willing to purchase slots. The website shows details of the slots that carriers wish to obtain or give up, but the name of the carrier does not have to be shown, as airlines might not want this to be known:

- if the airline is considering giving up a route, it might not want to notify their staff or customers of this until it had made a definite decision; and

- if the airline is considering acquiring slots to launch a route or expand services, it might not want to alert potential competitors.

Use of the website is optional. The coordinator has no powers to compel airlines to advertise that they wish to buy or sell slots. This is different to the situation in the US, where the FAA requires airlines to advertise slot sales.

If secondary trading was expanded to other airports, coordinators could be required to ensure that there was a similar website or other forum for advertising slot requirements or availability. We have considered:

- whether use of this website should be compulsory for carriers who wish to undertake slot sales or acquisitions; and

- whether the provision of the website should be required by the Regulation.

There are a number of practical difficulties with use of a website such as this being compulsory. If airlines wished to conclude a trade through a bilateral deal, it is hard to see why they should be prevented from doing so, in the same way that other transactions (such as property purchases) can be concluded bilaterally without any requirement to advertise. Even if use of the website to advertise a potential transaction was compulsory, it would be impossible to prevent airlines from agreeing bilaterally to undertake a transfer, and then advertising it without any intention of accepting proposals from other airlines. In addition, if it was to be useful, a requirement to advertise a potential transfer would have to include a requirement to advertise for a certain period – but this would prevent transfers from taking place urgently where this was necessary (for example if an airline had financial problems, or temporarily could not operate a particular route for a particular reason). Therefore we conclude that use of this website would have to be optional.

Therefore, this measure will consists in that the coordinator should ensure that, at airports where significant number of secondary trades occurs, there is a mechanism available for airlines to publicly advertise their willingness to purchase, lease or give up slots. It would be up to coordinators to decide how best to implement this and the Commission would need to monitor to ensure that they did implement it effectively.

Post-trade transparency

This policy option will aim at amending the Regulation to ensure that:

- All coordinators could be required to ensure that information is publicly available on what transactions have taken place: This could either be achieved by coordinators publishing these themselves, or by contracting another organisation to publish this for them.

- Air carriers could be required to disclose full information, including the price and other commercial details of the transaction, to the coordinator. The coordinator could be required to pass this

information on to the State or the Commission if requested, and the appropriate competition authority would therefore be able to investigate whether trading was having any negative impacts on competition.

- The coordinator could either be required to publish prices or other commercial information relating to individual transactions, or could be required to publish a regular summary of prices and other commercial terms without divulging the commercial details of individual transactions.

The position of stakeholders was concentrated in two poles: airlines against any increase in transparency and airports in favour of full transparency. The position of Member States answering the public consultation questionnaire was rather divided.

d) Centralised auctions for slots

In this scenario, carriers would be able to give up slots and receive the revenue from the sale, but the slots would have to be disposed of through a blind auction. This could either be administered by the coordinator or a third party (it is not material for the purposes of evaluating the option who should implement it).

Almost all stakeholders opposed the introduction of this policy measure. The main benefit of centralised auctions of slots returned to the pool is that this would ensure trades were 'blind'. Carriers might be reluctant to dispose of slots to entrants who would compete directly with them, but would not be able to influence who obtained the slots in this scenario.

However, this needs to be offset against several disadvantages:

- At present, a significant proportion of trades are leases rather than sales. Whilst the nature of each transaction is not transparent, information given to us by airlines indicates that leases account for the majority of transactions[16]. It would not be possible to arrange leases on a blind basis, as the lessor must know the identify of the lessee in order to be confident that the lessee will be able to return the slot to the lessor at the end of the lease (and will not, for example, have lost the slot due to abuse or failure to meet the utilisation criteria, or have changed the timing or use of the slot). In addition the lessor must be confident that it would be able to claim compensation from the lessee.

- Many slot transactions include non-monetary elements, such as codeshare or ground handling agreements, or depend on transactions at other airports. These could not be achieved if there was a blind auction.

- Although a carrier might be reluctant to sell a slot to a competitor, the blind auction may discourage it from selling the slot at all, because of the risk that a competitor would purchase it.

As a result, there is a significant risk that a requirement that slots could only be disposed of through blind auctions would reduce the number of transactions and hence reduce the benefits of secondary trading. Whilst some leases would be replaced by sales of slots, many transactions would not happen at all, and therefore the number of transactions, and hence the benefits of secondary trading, could be reduced significantly. If half of leases were replaced with sales but the other half did not take place at all, this would equate to a 37% reduction in the number of transactions.

By offsetting this measure against the potential benefit in terms of competition, we have considered that it does not represent an efficient and effective measure, thus the measure was discarded.

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[16] Figures from British Airways show 27% of its slot transactions at Heathrow and Gatwick were purchases and the remainder leases (confidential – to be deleted from public version of report)

e) Increased powers for national competition authorities

This measure could take the form of:

- Ex-ante investigations by national competition authorities or the Commission of concentration at EU airports, which could lead to imposition of airport-specific conditions on trading, for example, limitations on further slot acquisitions by the dominant carrier.

- Ex-post investigations by national competition authorities or the Commission of the level of concentration resulting from secondary trading, which could lead to imposition of remedies such as a requirement that a dominant incumbent carrier divest slots.

These investigations could be started on complaint or on the initiative of national competition authorities, perhaps after a request from the Commission. It would be necessary to amend the slot Regulation to state that transfers or exchanges of slots could be made subject to conditions at specific airports which would be determined by national competition authorities or the Commission, where this was necessary to ensure that a level of concentration did not occur which would be incompatible with the common market.

Increasing the powers of competition authorities would not constitute an efficient accompanying measure to a revision of the Slot Regulation allowing for secondary trading at all EU airports. Problems of slot usage should be addressed ex ante, through the Slot Regulation directly. Competition law is by definition an ex post instrument. Experience with respect to other liberalised network industries (such as telecommunications or energy/gas) shows that most market access related competition issues are more effectively addressed by appropriate (and well designed) *ex ante* regulatory measures than by relying predominantly on ex post competition law enforcement. Therefore this measure was discarded.

6. Improve slot utilisation

6.1 Increase utilisation threshold to 85% or 90%

At present, carriers must operate 80% of a series of slots in order to retain historic rights. A series of slots is defined as at least 5 slots, on the same day of the week, at the equivalent or similar time. The slots do not have to be on consecutive weeks but do have to be 'regular'.

This policy measure will aim at increasing this utilisation threshold to 85% or even 90%.

Most of airlines argued that 80-20 rule had been effective and allowed for sufficient flexibility to respond to unforeseen circumstances and to reduce the needless operation of unprofitable services. Therefore airlines considered that increasing the utilisation ratio could result in losing their slots from only two weather- or technical related cancellations. However some airlines were in favour as it will make more difficult for large airlines and alliance to hold unused slots and would therefore increase the return of slots to the pool for the use of new entrants. Most of airports were in favour of an increase in the usage threshold beyond the current 80%.

9.2 Extend minimum length of series of slot to 15 for the summer season and 10 for the winter season

This policy measure has been added following contacts with stakeholders. Coordinators and some airports have suggested that the minimum length of a series of slots should be extended. EUACA

suggested a minimum of 15 for the summer season and 10 for the winter season, equivalent to approximately half the season length.

At some airports, which are dominated by holiday traffic and hence have very seasonal traffic, a shorter series length may be appropriate, for example because coordination is only really necessary during the peak summer. However, this could be addressed by allowing an exception to the minimum series length to be introduced as a local rule, where this is appropriate given the nature of traffic.

In addition, some stakeholders have pointed out that extension of the minimum series length could cause difficulties for flights which only operate at the start or end of seasons, for example charter flights to ski destinations which operate for short periods at the start of the summer season, as well as during the winter. However, these flights would still be able to operate if there were slots available that had not been allocated to carriers wanting to operate longer series of slots, as there would be at these periods (outside the main summer peak) at most airports.

These inputs have led to the modelling of the policy measure as following: the series of slots should be increased to 15 for the summer season and to 10 for the winter season.

18. ESTIMATE OF IMPACTS FOR POLICY PACKAGE I

1. Costs for separation of slot coordination activities

For calculating these costs, we took the example of AENA (Spanish slot coordination) as for the moment it is the only one coordinator (among the sample airports) that would require such a separation.

AENA coordination's budget is currently low (€304,000 per year) compared to other coordinators that also cover a large number of busy airports: for comparison the German coordinator FHKD incurs annual costs of around €3 million, and ACL incurs similar costs for coordination of UK airports (excluding costs associated with its other activities). If AENA coordination were to be established as a separate organisation, its total annual costs would probably be around the same level as FHKD or ACL, and these costs would need to be recovered from airlines and/or airports in Spain.

However, AENA coordination's current budget does not include staff salaries, systems or overheads – these are all covered by AENA from other revenue sources, such as airport charges. If AENA coordination was established as a separate organisation, these costs would be recovered differently, but the level of costs would not change. The only new costs that would be incurred would be costs for services and facilities which are currently shared, such as office costs and other overheads. For other coordinators for which we have data, these costs are 12%-16% of overall costs.

This indicates that the additional costs incurred as a result of separation of AENA coordination might be around €350,000-€500,000 per year. It might be possible to reduce these costs through an agreement on support facilities and services between the coordinator and AENA. Costs would also be incurred to separate any other coordinator that was part of the airport company, although these would be lower as most other coordinators cover fewer airports.

2. Costs to monitor that coordinator sufficiently funded

The costs to monitor that the coordinator was sufficiently funded should be minimal. Under most circumstances, it should be sufficient for a Member State official to:

- review the coordinators' budget for the year
- undertake a brief annual meeting with the coordinator to discuss any financing issues

This might take around 1 day for the Member State official, and 0.5 days for one member of coordinator staff.

We estimate the cost of this would be slightly under €1,000 per State and approximately €21,000 EU-wide. This is on the basis that, according to EUACA, there are currently 22 Member States with either coordinators or schedule facilitators (the other EU Member States do not have any level 2 or level 3 airports).

3. Estimated costs to change funding mechanism

In order to change the funding mechanism where this was required, we estimate that the coordinator would need to:

- draft a proposal

- consult with the coordination committee and other stakeholders
- adapt its financial/invoicing process.

This might take approximately:

- draft proposal: 1 day
- consult coordination committee and other stakeholders: 5 days
- amend proposal if necessary: 1 day
- adapt invoicing data and processes: 3 days.

In addition, an average of 10 airport and 10 airline representatives might need to respond to the consultation, and go through internal processes to agree a response and set up amended payments, taking an average of 2 days per airline or airport. In total this might incur costs of around €19,000 per Member State where the funding mechanism had to be amended. Four of the 10 States whose coordinators were reviewed for this study would have to change the funding mechanism and if the same proportion of other States with coordinators had to change the mechanism, the EU-wide costs would be €133,000.

The ongoing costs of administering the funding mechanism should be no different.

4. Calculation of administrative costs for increasing transparency of slot data

Type of obligation	Required actions (category)	Action	Target groups	Tariff (€ per hour)	Time (hours)	Price	Frequency (per year)	Number of entities	Total number of actions	Equipment and outsourcing costs (€)	Total admin-istrative costs (€)	Business as usual costs (%)	Total admin-istrative burden (€)
Non-labelling information for third parties	Retrieving relevant information from existing data	Prepare demand, capacity and utilisation charts for each airport	Coordinator	39	14	553	2	88	176	0	97,249	70%	29,175
Non-labelling information for third parties	Retrieving relevant information from existing data	Prepare utilisation charts for each airport	Coordinator	39	7	276	2	88	176	0	48,625	20%	38,900
Submission of (recurring) reports	Designing information material	Write text	Coordinator	39	28	1,105	1	18	18	0	19,892	40%	11,935
Submission of (recurring) reports	Designing information material	Review document	Coordinator	39	7	276	1	18	18	0	4,973	40%	2,984
Submission of (recurring) reports	Submitting the information	Upload to website	Coordinator	39	7	276	1	18	18	0	4,973	20%	3,978
Submission of (recurring) reports	Submitting the information	Check and upload local rules, demand and capacity charts, and capacity parameters	Coordinator	39	3.5	138	2	88	176	0	24,312	70%	7,294
Total administrative costs (€)			**200,024**										
% business as usual			53%										
Total administrative burden (€)			**94,265**										
Notes and assumptions:													
Some tasks are per coordinator, others are per airport. The number of States with fully coordinated airports is 18; the current number of fully coordinated airports is 88.													
Hourly pay rate based on average rate for professional staff for States with coordinated airports, and include 25% overhead													

Source: 2011 SDG study

5. Estimate of impacts for introducing slot reservation fees

TABLE 1 QUANTIFIED IMPACTS

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)				Impact on number of passengers (%)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	0.3%	0.3%	0.4%	0.3%	0.3%	0.3%	0.4%	0.3%
London Gatwick	LGW	0.9%	1.4%	1.4%	1.3%	0.9%	1.4%	1.4%	1.3%
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	0.4%	0.2%	0.5%	0.3%	0.4%	0.2%	0.5%	0.3%
Paris Orly	ORY	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
Vienna	VIE	0.3%	0.8%	0.2%	0.4%	0.3%	0.8%	0.2%	0.4%

Economic impacts

		Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	- 18	- 4	- 4	- 5	- 53
London Gatwick	LGW	-	-	-	-	-	- 18	- 4	- 4	- 5	- 53
London Heathrow	LHR	-	-	-	-	-	- 18	- 4	- 4	- 5	- 53
Madrid	MAD	-	-	-	-	-	- 18	- 4	- 4	- 5	- 53
Paris Orly	ORY	-	-	-	-	-	- 18	- 4	- 4	- 5	- 53
Vienna	VIE	-	-	-	-	-	- 18	- 4	- 4	- 5	- 53
		Economic benefits (€ 000s)					**Net economic benefits (€ 000s)**				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	1,345	1,685	2,672	2,053	20,654	1,327	1,681	2,668	2,048	20,601
London Gatwick	LGW	7,107	12,486	13,608	11,754	119,621	7,089	12,482	13,605	11,749	119,568
London Heathrow	LHR	-	-	-	-	-	- 18	- 4	- 4	- 5	- 53
Madrid	MAD	4,443	2,251	8,811	4,333	45,194	4,425	2,247	8,807	4,328	45,141
Paris Orly	ORY	5,328	5,815	6,689	5,985	61,809	5,310	5,812	6,685	5,980	61,756
Vienna	VIE	1,608	4,461	1,574	2,493	26,492	1,590	4,457	1,570	2,488	26,438

Social impacts

		Airport employment (FTEs)				Airline and handling agent employment (FTEs)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	41	51	81	62	50	68	118	85
London Gatwick	LGW	216	379	413	357	426	795	887	748
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	135	68	267	131	253	134	577	266
Paris Orly	ORY	162	176	203	182	214	231	271	239
Vienna	VIE	49	135	48	76	52	172	57	92

Other quantifiable impacts

		Impact on air fares (%)				Impact on CO2 emissions (000s tonnes of CO2)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-0.3%	-0.3%	-0.3%	-0.3%	9.1	11.5	18.2	14.0
London Gatwick	LGW	-0.8%	-1.3%	-1.2%	-1.2%	72.5	128.7	132.1	118.5
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	-0.3%	-0.1%	-0.4%	-0.3%	44.6	22.6	88.3	43.6
Paris Orly	ORY	-0.8%	-0.8%	-0.8%	-0.8%	37.4	38.2	41.2	38.9
Vienna	VIE	-0.3%	-0.7%	-0.2%	-0.4%	10.1	30.5	9.4	16.3

Source: 2011 SDG study

The table below summarises the average results per year for the modelled sample airports, and the extrapolated EU-wide impacts (both to all coordinated airports, and to all airports with over 20 million passengers). The extrapolation to other airports takes into account the relative level of congestion at these airports, and the relative traffic. The modelled airports account for almost one third of the potential EU-wide impact of this option, as the other EU airports are generally less congested, and therefore late handback of slots is less likely to prevent operation of other air services at these airports; the other coordinated airports are also smaller on average. The other airports at which the policy could have relatively significant benefits are Paris CDG, Milan Linate, Rome Fiumicino, and also Frankfurt and Munich particularly before the new runways open at these airports.

TABLE 2 QUANTIFIED IMPACTS SUMMARY

Average impact per year, 2012-25	Modelled airports	Airports >20 million pax	All coordinated airports
Passengers (%)	0.5%	0.3%	0.3%
Flights (%)	0.5%	0.4%	0.2%
Passengers (millions)	1.2	2.3	3.7
Airline operating costs (€ million NPV)	0.0	0.0	0.0
Direct implementation costs (€ million NPV)	0.3	0.7	4.7
Economic benefits (€ million NPV)	273.8	526.3	868.7
Net economic benefits (€ million NPV)	273.5	525.6	864.0
Airport employment (000 FTEs)	0.8	1.5	2.5
Airline employment (000 FTEs)	1.4	2.7	4.4
Fares (%)	-0.5%	-0.3%	-0.2%
CO2 emissions (tonnes, 000s)	231	444	719

Note: Financial values presented as net present value (NPV) of costs/benefits 2012-25. Non-financial values (passengers, emissions etc) presented as annual average values 2012-25.

Source: 2011 SDG study

The qualitative assessment of other impacts is shown below.

TABLE 3 OTHER IMPACTS

Impact category	Impact
Noise	Slight increase, as a result of to slightly more flights from major airports
Frequencies and destinations served	Slight increase, as a result of to slightly more flights from major airports
Punctuality and reliability	Slight reduction in cancellations, as more incentive to operate every flight Slight increase in delays, due to slight increase in number of movements (and hence congestion)

Costs of implementation of slot reservation fee

There would be one-off costs of consultation with airlines, and amending invoicing process/systems, if a slot reservation fee was implemented. We have estimated these as:

10 days per airport

1 day for each of 10 airlines at each airport which might respond to the consultation

Ongoing costs would be minimal as airports would use their existing airport charges systems – therefore, there would be no additional costs for invoicing or collection of the charge. However there would be some limited costs for the coordinator to provide data and for the calculation of the new

charge by the airport:

Coordinator: 1 day per season per airport

Airport: 2 days per season

This indicates that the costs of setting up a slot reservation fee might be €15,000 per airport, and the ongoing costs around €4,000.

If 50% of the fully coordinated airports in the EU implemented a slot reservation fee, this would equate to set-up costs of around €635,000 and annual costs of around €167,000.

Substantially greater costs would be incurred in the event of a legal challenge to the introduction of slot reservation fees.

6. Estimate of impacts for introducing penalties for late hand back

Assumptions for the quantification:

For Gatwick, Vienna and Orly we have used the same approach to estimate the impact penalties might have as for the slot reservation fees. However, it is less clear what impacts penalties could have: it is not clear that late handbacks currently occur less at the German and Spanish airports where there are already penalties available in law. Therefore we have assumed that penalties could, at most, achieve a 25% reduction (half that for slot reservation fees).

There is no clear data available to make an estimate of the costs incurred in imposing a penalty, as (in most cases) these are imposed by national authorities, whose costs and time requirements are not transparent; we have made some assumptions (set out below) in order to make an estimate of potential direct implementation costs. The cost to the airlines concerned of any fine that they might have to pay is not included in this, as this is a transfer payment to the national authorities and should have no economic impact.

TABLE 4 QUANTIFIED IMPACTS

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)				Impact on number of passengers (%)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-
London Gatwick	LGW	0.5%	0.7%	0.7%	0.7%	0.5%	0.7%	0.7%	0.7%
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	-	-	-	-	-	-	-	-
Paris Orly	ORY	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Vienna	VIE	0.2%	0.4%	0.1%	0.2%	0.2%	0.4%	0.1%	0.2%

Economic impacts

		Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	- 32	- 32	- 32	- 32	- 330
London Heathrow	LHR	-	-	-	-	-	- 32	- 32	- 32	- 32	- 330
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-	-	-	-	-	- 32	- 32	- 32	- 32	- 330
Vienna	VIE	-	-	-	-	-	- 32	- 32	- 32	- 32	- 330
		Economic benefits (€ 000s)					**Net economic benefits (€ 000s)**				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	3,553	6,243	6,804	5,877	59,811	3,522	6,212	6,773	5,845	59,480
London Heathrow	LHR	-	-	-	-	-	- 32	- 32	- 32	- 32	- 330
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	2,664	2,908	3,344	2,992	30,905	2,632	2,876	3,313	2,961	30,574
Vienna	VIE	804	2,230	787	1,247	13,246	772	2,199	755	1,215	12,915

Social impacts

		Airport employment (FTEs)				Airline and handling agent employment (FTEs)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-
London Gatwick	LGW	108	189	206	178	213	398	443	374
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	-	-	-	-	-	-	-	-
Paris Orly	ORY	81	88	101	91	107	115	135	120
Vienna	VIE	24	68	24	38	26	86	29	46

Other quantifiable impacts

		Impact on air fares (%)				Impact on CO2 emissions (000s tonnes of CO2)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-
London Gatwick	LGW	-0.4%	-0.6%	-0.6%	-0.6%	36.3	64.4	66.0	59.3
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	-	-	-	-	-	-	-	-
Paris Orly	ORY	-0.4%	-0.4%	-0.4%	-0.4%	18.7	19.1	20.6	19.4
Vienna	VIE	-0.1%	-0.3%	-0.1%	-0.2%	5.1	15.3	4.7	8.2

Source: 2011 SDG study

The table below summarises the average results per year for the modelled sample airports, and the extrapolated EU-wide impacts. The modelled airports account for a significant proportion of the potential impact of this option, as the other EU airports are generally less congested and therefore it has less impact. The other airports at which this could have greater impact are the larger and relatively congested airports in States which do not already have penalties, such as Paris CDG, Rome Fiumicino and Milan Linate. This option would not have any impact at the other airports in Germany or Spain, as there are already penalties for late handback available in German and Spanish national law.

TABLE 5 QUANTIFIED IMPACTS SUMMARY

	Modelled airports	Airports >20 million pax	All coordinated airports
Passengers (%)	0.2%	0.1%	0.1%
Flights (%)	0.2%	0.1%	0.1%
Passengers (millions)	0.4	0.9	1.5
Airline operating costs (€ million NPV)	0.0	0.0	0.0
Direct implementation costs (€ million NPV)	1.3	2.9	19.4
Economic benefits (€ million NPV)	104.0	200.8	352.7
Net economic benefits (€ million NPV)	102.6	198.0	333.3
Airport employment (000 FTEs)	0.3	0.6	1.0
Airline employment (000 FTEs)	0.5	0.9	1.5
Fares (%)	-0.2%	-0.1%	-0.1%
CO2 emissions (tonnes, 000s)	87	146	254

Note: Financial values presented as net present value (NPV) of costs/benefits 2012-25. Non-financial values (passengers, emissions etc) presented as annual average values 2012-25.

Source: 2011 SDG study

The qualitative assessment of other impacts is shown below.

TABLE 6 OTHER IMPACTS

Impact category	Impact assessment
Noise	Slight increase, as a result of to slightly more flights from major airports
Frequencies and destinations served	Slight increase, as a result of to slightly more flights from major airports
Punctuality and reliability	Slight reduction in cancellations, as more incentive to operate every flight Slight increase in delays, due to slight increase in number of movements (and hence congestion)

Costs of imposition of penalties

On the basis of experience with penalties to date, penalties would be imposed quite rarely: it might be expected that there could be a small number (1-3) penalties at each large fully coordinated airport each year. Illustratively, the implementation of a penalty might take:

Member State authorities: 20 days per case

Airline concerned: 10 days per case

In addition, some limited legal advice would be required, which we have estimated as €5,000 for each of Member State and airline.

This indicates that the cost of imposing a penalty might be around €32,000. If one penalty was imposed per year at most fully coordinated airports (excluding those at which penalties are already available) the cost EU-wide might be around €1.9 million per year.

7. Estimate of administrative costs for the measure on collection data on planned traffic

Type of obligation	Required actions (category)	Action	Target groups	Tariff (€ per hour)	Time (hours)	Price	Frequency (per year)	Number of entities	Total number of actions	Equipment and outsourcing costs (€)	Total admin-istrative costs (€)	Business as usual costs (%)	Total admin-istrative burden (€)
Non-labelling information for third parties	Retrieving relevant information from existing data	Collect information from airlines in accordance with IATA processes	Coordinator	39	70	2,763	2	162	324		895,134	20%	716,107
Non-labelling information for third parties	Retrieving relevant information from existing data	Maintain and update database	Coordinator	39	7	276	2	162	324		89,513	20%	71,611
Non-labelling information for third parties	Inspecting and checking	Analyse total capacity implications of demand	Coordinator	39	7	276	2	162	324		89,513	20%	71,611
Non-labelling information for third parties	Inspecting and checking	Check data quality	Coordinator	39	14	553	2	162	324		179,027	20%	143,221
Non-labelling information for third parties	Retrieving relevant information from existing data	Provide data feeds to interested parties	Coordinator	39	7	276	2	162	324		89,513	20%	71,611
Non-labelling information for third parties	Retrieving relevant information from existing data	Other overheads (IT systems etc)	Coordinator					162		5,500	891,000	20%	712,800
Total administrative costs (€)			**2,233,701**										
% business as usual			20%										
Total administrative burden (€)			**1,786,961**										
Notes and assumptions:													
Assumed that the Network Manager designates as Network Airports 162 level 1 airports, of which 20% are in States such as UK or Spain where these tasks are already undertaken by coordinator													
Hourly pay rate based on average rate for professional staff for States with coordinated airports, and include 25% overhead													

Source: 2011 SDG study

8. ESTIMATE OF IMPACTS FOR POLICY PACKAGE II

1. Estimate of impacts of the policy measure introducing a uniform framework for secondary trading

Secondary trading at Heathrow and Gatwick does not appear to have been significantly impacted by any lack of clarity with respect to its legal status. However, in the interviews undertaken for this study, airlines indicated that a small increase in secondary trading might be expected if it was explicitly permitted, as this would increase legal certainty and therefore the willingness of some airlines to participate in the market. Therefore, we have assumed that, at Heathrow and Gatwick, the impact of explicit permission for secondary trading would be to increase the number of trades (and hence the impacts obtained from it) by 10%. The reasons for lower volumes of trades being expected at airport other than Heathrow were:

- Most airports are less congested than Heathrow - although some are equivalently restricted, such as Orly, and congestion may get more severe at a wider range of airports in the future. However, it should be noted that the most congested EU hub airport other than Heathrow (Frankfurt) is likely to be less congested in the period covered by the impact assessment, due to substantial planned capacity increases.

- Most other hub airports have one dominant based carrier and alliance, whereas at Heathrow and Gatwick slot holdings are less concentrated. This means that there is more scope for trading at Heathrow and Gatwick than at other airports.

- The high values of peak (pre 0900) slots at Heathrow arises partly because this is the peak time for long haul services for many competing airlines. At some other airports such as Amsterdam, the hub carrier and its alliance partners operate a 'wave' system of arrivals and departures, to maximise connection opportunities. The banks of arrivals and departures represents peak demand but are not necessarily peak periods for other carriers: indeed, they may actively seek to avoid operations in this period, to avoid providing better connections into the hub carriers' other services. More information on the 'wave' system at Amsterdam is provided in section 3.

Other impacts of secondary trading at Heathrow and Gatwick are estimated as follows:

- At Heathrow, we assume that secondary trading would continue to have similar impacts to that it has had before on aircraft sizes and types of airline (i.e. there would be a change in type of flights towards long haul flights operated by non-EU carriers). However, the impact of secondary trading is likely to reduce over time, as there are already relatively few short haul flights left particularly during the high peak period (early morning arrivals), and therefore relatively few peak slots which can be transferred from short haul to long haul. Therefore the marginal benefits from each trade will reduce over time.

- At Gatwick, the impact secondary trading has had in recent years is partly distorted by the fact that the US carriers have given up slots, and some carriers with quite small aircraft have acquired slots (possibly as a result of babysitting). These effects are unlikely to be repeated. Therefore, in estimating future impacts of secondary trading at Gatwick, we have assumed that secondary trading does lead to increased aircraft size but at a lower rate at Heathrow. We would expect low cost carriers (particularly easyJet) to continue to be the main buyers of Gatwick slots, but some other low cost carriers which operate smaller aircraft to be sellers of slots, particularly in the later years of the period covered by the impact assessment.

The number of trades and the impact on slot mobility (and hence the overall impact of secondary trading) would vary between the airports:

- Trading would appear likely to have the strongest impact at Paris Orly, where demand significantly exceeds capacity, slot mobility is currently very low, and there are no plans to expand capacity. Although there is currently no market in slots, slots appear to have significant value, indicated by the very low proportion of slots returned to the pool, and the high value attributed to slots acquired through airline takeovers. Therefore we would expect secondary trading to result in a significant increase in slot mobility and account for the majority of slot transfers (as at Heathrow). In particular, the fact that there is almost no constraint other than the annual slot cap increases the potential for secondary trading, because any airline that was able to find a seller of a slot would be able to use the slot as it wanted without any other restrictions (at Heathrow and Gatwick, the seller must have an equivalent slot). This situation is unique to Orly and, in our view, means that trading could have very significant impacts on slot mobility at this airport, perhaps equivalent to or even greater than at Heathrow.

- Trading could also have a significant impact on slot mobility at Düsseldorf. However, the impact would be much less than at Heathrow or Orly. Despite the fact that demand exceeds capacity throughout the day, slots can already be obtained through the pool at Düsseldorf; slot mobility is still quite high even without secondary trading. In addition, the fact that there are other airports in the region with spare capacity (Cologne-Bonn, Weeze, Dortmund), and that there is a major hub easily accessible by rail (Frankfurt) which will soon have substantial spare capacity, also act as a constraint on slot values and demand. For modelling purposes, we have assumed that the impacts at Düsseldorf might be closer to those seen at Gatwick.

- As trading would only have an impact where demand exceeded capacity, it would only have an impact at Madrid or Vienna during peak periods, and as it has been possible to obtain pool slots even during peak periods at these airports, the impact would be much less than at Heathrow or Gatwick now. Airlines' willingness to pay for slots would also be significantly limited by the fact that both airports expect to expand capacity during the period covered by the impact assessment.

The impacts on the types of airlines using slots will also differ between the airports:

- At Orly, although the impact on slot mobility might be comparable to Heathrow, unlike at Heathrow there probably would not be significant acquisitions of slots by non-EU airlines. Long haul services are more dependent on connecting traffic and therefore non-EU airlines will tend to prefer to operate to CDG. In addition, the based network carrier (Air France) would probably not be willing to purchase slots, as it mostly operates short haul services from Orly, and short haul network carrier services are rarely very profitable. Therefore, we would expect low cost airlines, particularly easyJet, to be the main buyers of slots, as at Gatwick. The main airlines giving up slots would be the operators of the smaller aircraft, potentially including the based network carrier, as at Gatwick.

- At Düsseldorf, there is quite a wide mix of different types of flights, many of which use quite small aircraft. We would expect secondary trading to mean that any increased demand for long haul flights is accommodated first, as long haul operators would generally have more resources to purchase slots, and long haul services are more profitable; but otherwise the main impact to be that airlines with smaller aircraft will sell slots to those with larger aircraft.

- At Madrid and Vienna, secondary trading would have relatively limited impacts on types of airline serving the airport, as demand for slots only exceeds supply in certain peak periods. Where demand does exceed supply, secondary trading would mean that slots would be more likely to be taken for long haul flights, and the airlines with smaller aircraft would be most likely to give up slots.

The assumed impacts on aircraft size are as follows:

- At Orly, there is significant potential for secondary trading to have an impact given some small aircraft sizes at the moment, and currently low slot mobility. However, the impact on aircraft sizes would be less than at Heathrow because, as discussed above, long haul operators (who would generally have the largest aircraft) would probably not be significant buyers of Orly slots.

- At Düsseldorf, there would also be a significant impact particularly in the later years when demand more significantly exceeds capacity. The potential for increases in aircraft size is quite high at Düsseldorf as flights with small aircraft currently account for a high proportion of movements.

- At Madrid and Vienna, the overall impact on aircraft size is limited, although operators of smaller aircraft might shift into off-peak periods in order to sell peak slots to long haul or other operators.

These assumptions are summarised in the table below:

TABLE 1 ASSUMPTIONS

Airport	**Impact on slot mobility**	**Impact on aircraft size**	**Impact on type of airline/flight**
Düsseldorf	Medium	Medium	Move towards longer distance and larger aircraft types
London Gatwick	Trading already in baseline. 10% increase in number of trades.	Medium	Based on actual experience (low cost airlines main buyers)
London Heathrow	Trading already in baseline. 10% increase in number of trades.	High (but reducing)	Based on actual experience (non-EU airlines main buyers)
Madrid	Low	Low	Where demand exceeds capacity, towards longer distance and larger aircraft types
Paris Orly	High	Medium	Low cost airlines main buyers
Vienna	Low	Low	Where demand exceeds capacity, towards longer distance and larger aircraft types

The table below shows the impacts for the six modelled airports:

TABLE 2 QUANTIFIED IMPACTS

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)				Impact on number of passengers (%)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	0.0%	-0.0%	-0.0%	-0.0%	0.8%	3.6%	8.6%	4.7%
London Gatwick	LGW	-0.0%	0.0%	-0.0%	-0.0%	0.1%	0.1%	0.6%	0.3%
London Heathrow	LHR	-0.0%	0.0%	-0.0%	0.0%	0.2%	0.4%	0.9%	0.5%
Madrid	MAD	0.0%	0.0%	-0.0%	0.0%	0.2%	0.6%	0.7%	0.6%
Paris Orly	ORY	0.0%	0.0%	0.0%	0.0%	1.1%	6.0%	13.3%	7.6%
Vienna	VIE	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.4%	0.4%

Economic impacts

		Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	- 162	- 185	- 254	- 216	- 2,201
London Gatwick	LGW	-	-	-	-	-	2	3	3	2	25
London Heathrow	LHR	-	-	-	-	-	4	4	4	4	42
Madrid	MAD	-	-	-	-	-	- 85	- 84	- 96	- 84	- 881
Paris Orly	ORY	-	-	-	-	-	- 208	- 208	- 208	- 208	- 2,176
Vienna	VIE	-	-	-	-	-	- 51	- 60	- 40	- 49	- 528
		Economic benefits (€ 000s)					**Net economic benefits (€ 000s)**				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	3,869	21,513	61,537	28,872	273,758	3,707	21,328	61,283	28,656	271,558
London Gatwick	LGW	571	993	5,664	2,608	24,663	573	996	5,666	2,611	24,688
London Heathrow	LHR	2,475	7,064	18,073	9,161	87,453	2,479	7,068	18,077	9,165	87,495
Madrid	MAD	3,016	9,022	12,454	9,216	92,095	2,931	8,938	12,358	9,131	91,215
Paris Orly	ORY	6,705	39,369	100,077	51,370	487,386	6,497	39,160	99,868	51,162	485,210
Vienna	VIE	864	2,494	3,466	2,628	25,952	812	2,434	3,425	2,579	25,424

Social impacts

		Airport employment (FTEs)				Airline and handling agent employment (FTEs)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	117	653	1,868	876	199	1,128	3,746	1,600
London Gatwick	LGW	17	30	172	79	30	23	354	149
London Heathrow	LHR	75	214	548	278	321	1,126	3,054	1,457
Madrid	MAD	92	274	378	280	916	2,823	3,813	2,827
Paris Orly	ORY	203	1,195	3,037	1,559	497	2,489	5,860	3,136
Vienna	VIE	26	76	105	80	28	107	150	116

Other quantifiable impacts

		Impact on air fares (%)				Impact on CO2 emissions (000s tonnes of CO2)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-0.7%	-3.3%	-7.8%	-4.0%	30	159	490	218
London Gatwick	LGW	-0.1%	-0.1%	-0.5%	-0.3%	5	3	50	22
London Heathrow	LHR	-0.1%	-0.4%	-0.8%	-0.5%	55	189	472	235
Madrid	MAD	-0.2%	-0.6%	-0.6%	-0.5%	159	466	576	454
Paris Orly	ORY	-1.0%	-5.5%	-12.1%	-6.7%	79	362	766	435
Vienna	VIE	-0.2%	-0.4%	-0.4%	-0.4%	4	11	12	11

Source: 2011 SDG study

TABLE 3 QUANTIFIED IMPACTS SUMMARY: SECONDARY TRADING AT ALL EU AIRPORTS

	Modelled airports	Airports >20 million pax	All coordinated airports
Passengers (%)	2.4%	1.5%	1.2%
Flights (%)	0.0%	0.0%	0.0%
Passengers (millions)	4.5	10.0	14.4
Airline operating costs (€ million NPV)	0.0	0.0	0.0
Direct implementation costs (€ million NPV)	5.7	16.1	24.7
Economic benefits (€ million NPV)	991.3	2,162.3	3,139.7
Net economic benefits (€ million NPV)	985.6	2,146.2	3,115.1
Airport employment (000 FTEs)	3.2	6.8	9.9
Airline employment (000 FTEs)	9.3	23.8	34.3
Fares (%)	-2.1%	-1.4%	-0.6%
CO2 emissions (tonnes, 000s)	1,375	3,574	5,140

Note: Financial values presented as net present value (NPV) of costs/benefits 2012-25. Non-financial values (passengers, emissions etc) presented as annual average values 2012-25.

Source: 2011 SDG study

The changes in the market share of each airline/flight type are shown in the table below. At Düsseldorf and (particularly) at Orly secondary trading results in:

- an increase in the share of low cost carriers – and at Düsseldorf other based network carriers17; and
- a reduction in the share of the based network carriers (Lufthansa and Air France), as these generally operate smaller aircraft.

TABLE 4 IMPACT ON SHARE OF SLOTS

Impact on Carrier Market Share

		Dusseldorf				London Gatwick			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Main based network carrier	Regional	-0.1%	-0.5%	-1.2%	-0.6%	-	-	-	-
	Short haul	-0.3%	-1.3%	-2.9%	-1.4%	-0.6%	-2.9%	-8.2%	-4.0%
	Long haul	-	-	-	-	-	-	-	-
Other based network carriers	Regional	-0.2%	-1.1%	-2.1%	-1.3%	-0.5%	-1.0%	-1.5%	-1.2%
	Short haul	0.7%	2.2%	3.5%	2.3%	-0.1%	-0.0%	-0.1%	-0.1%
	Long haul	-	-	-	-	-0.0%	-0.0%	0.4%	0.1%
Non-based network carriers	Regional	-0.4%	-2.0%	-4.3%	-2.2%	-0.2%	-0.4%	-0.6%	-0.4%
	Short haul	-0.1%	-0.1%	-0.7%	-0.2%	0.3%	0.5%	-0.1%	0.4%
	Long haul	0.0%	0.0%	0.2%	0.0%	0.5%	0.7%	1.8%	1.0%
Low cost carriers		0.4%	2.2%	7.0%	3.1%	0.4%	2.7%	7.7%	3.8%
Charter / leisure carriers		0.1%	0.5%	0.5%	0.4%	0.1%	0.3%	0.5%	0.4%
		London Heathrow				Madrid			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Main based network carrier	Regional	-	-	-	-	-	-	-	-
	Short haul	0.2%	0.9%	1.7%	1.0%	0.1%	0.4%	0.4%	0.3%
	Long haul	0.0%	0.2%	0.5%	0.2%	0.1%	0.3%	0.2%	0.2%
Other based network carriers	Regional	-0.8%	-0.9%	-1.0%	-0.9%	-0.0%	-0.0%	-0.0%	-0.0%
	Short haul	-0.2%	-1.0%	-1.4%	-1.0%	-0.1%	-0.8%	-1.4%	-0.9%
	Long haul	0.0%	0.6%	2.0%	0.9%	0.1%	0.2%	0.3%	0.2%
Non-based network carriers	Regional	-0.9%	-1.9%	-2.0%	-1.8%	-0.1%	-0.3%	-0.2%	-0.2%
	Short haul	0.5%	-1.2%	-5.8%	-2.2%	-0.1%	-0.3%	-0.4%	-0.3%
	Long haul	1.1%	3.3%	6.0%	3.7%	0.1%	0.3%	0.3%	0.3%
Low cost carriers		-0.0%	-0.0%	-0.0%	-0.0%	0.0%	0.2%	0.7%	0.4%
Charter / leisure carriers		-	-	-	-	-0.0%	-0.0%	-0.0%	-0.0%
		Paris Orly				Vienna			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Main based network carrier	Regional	-0.6%	-2.8%	-5.7%	-3.3%	-	-	-	-
	Short haul	-0.5%	-3.1%	-7.5%	-4.0%	-0.0%	-0.1%	-0.1%	-0.1%
	Long haul	-	-	-	-	-0.0%	0.0%	-0.0%	0.0%
Other based network carriers	Regional	-0.2%	-1.0%	-1.7%	-1.1%	-0.1%	-0.1%	-0.1%	-0.1%
	Short haul	-0.1%	-0.1%	-0.3%	-0.1%	-	-	-	-
	Long haul	-	-	-	-	-	-	-	-
Non-based network carriers	Regional	-0.0%	-0.1%	-0.5%	-0.2%	-0.1%	-0.7%	-0.8%	-0.7%
	Short haul	0.3%	0.4%	-0.6%	0.1%	0.1%	0.2%	0.2%	0.2%
	Long haul	0.1%	0.3%	0.5%	0.3%	0.0%	0.0%	0.1%	0.0%
Low cost carriers		1.0%	6.1%	15.1%	7.8%	0.1%	0.6%	0.8%	0.6%
Charter / leisure carriers		0.0%	0.4%	0.7%	0.4%	0.0%	0.0%	0.0%	0.0%

Source: 2011 SDG study

The small increase in secondary trading resulting from this option has a negligible impact on shares, by airline type, at Heathrow and Gatwick; this is because this option only represents a small increase

17 We have classified Air Berlin, the second largest holder of slots at Düsseldorf, as a based network carrier as it is a member of an airline alliance and accommodates transfer passengers; however it has many of the other characteristics of a low cost carrier

in the volume of trades at these airports, and there is limited scope for further change to the market shares of different airline types. Particularly later in the period, most incremental trading would be between airlines of the same category (for example between non-EU airlines at Heathrow, and between low cost airlines at Gatwick). In order to show what effect secondary trading has on market share at Heathrow and Gatwick this table shows the **full** market share impact of secondary trading (i.e. relative to a scenario in which there is no trading at all).

The analysis shows that secondary trading could have a particularly significant impact on overall market share at Orly. Low cost carriers currently have around 13% of slots at Orly, which we estimate might increase to 19% by 2025 without secondary trading, but 34% if secondary trading is introduced.

The qualitative assessment of other impacts is shown below. Secondary trading could have a negative impact on regional accessibility, because, as at Heathrow, airlines operating regional flights may decide to sell these slots to airlines wishing to operate more profitable long haul services.

TABLE 5 OTHER IMPACTS

Impact category	**Impact**
Noise	Slight increase in noise around major airports, as a result of use of larger aircraft
Frequencies and destinations served	No overall impact on number of flights. There may be a reduction in short distance and regional destinations served and frequencies, as regional airlines sell slots to operators of more profitable longer-distance services. There may be an increase in frequencies on long haul routes.
Punctuality and reliability	Little or no impact. There could be a slight improvement in reliability as airlines that purchase slots may be less likely to cancel flights.

2. Administrative costs for pre-trade transparency

Type of obligation	Required actions (category)	Action	Target groups	Tariff (€ per hour)	Time (hours)	Price	Frequency (per year)	Number of entities	Total number of actions	Equipment and outsourcing costs (€)	Total admin-istrative costs (€)	Business as usual costs (%)	Total admin-istrative burden (€)
Submission of (recurring) reports	Designing information material	Check information and manage website	Coordinator	39	7	276	2	48	96		26,522	10%	23,870
Submission of (recurring) reports	Buying (IT) equipment & supplies	External cost of designing and hosting website	Coordinator							12,536	12,536	10%	11,282
Total administrative costs (€)			**39,058**										
% business as usual			10%										
Total administrative burden (€)			**35,152**										
Notes and assumptions:													
Estimated that secondary trading could occur at 48 (of the 88) coordinated airports; websites would need to be set up by 13 coordinators.													
Hourly pay rate based on average rate for professional staff for States with coordinated airports, and include 25% overhead													

Source: 2011 SDG study

3. Administrative costs for post-trade transparency

Type of obligation	Required actions (category)	Action	Target groups	Tariff (€ per hour)	Time (hours)	Price	Frequency (per year)	Number of entities	Total number of actions	Equipment and outsourcing costs (€)	Total admin-istrative costs (€)	Business as usual costs (%)	Total admin-istrative burden (€)
Submission of (recurring) reports	Designing information material	Check trade information notified by carriers	Coordinator	39	7	276	2	48	96		26,522	10%	23,870
Submission of (recurring) reports	Submitting the information	Upload to website	Coordinator	39	7	276	2	48	96		26,522	10%	23,870
Submission of (recurring) reports	Buying (IT) equipment & supplies	External cost of designing and hosting website	Coordinator							11,143	11,143	10%	10,029
Total administrative costs (€)			**64,188**										
% business as usual			10%										
Total administrative burden (€)			**57,769**										
Notes and assumptions:													
Estimated that secondary trading could occur at 48 (of the 88) coordinated airports; websites would need to be set up by 13 coordinators.													
Hourly pay rate based on average rate for professional staff for States with coordinated airports, and include 25% overhead													

Source: 2011 SDG study

4. Estimate of impacts for the policy measure of revising new entrant rule

Estimate of impacts – slots returned to pool

This section sets out the evaluation of the changes to the new entrant rule under normal circumstances, where it is only used to reallocate slots returned to the pool, or unused slots in the pool.

We have evaluated whether changes to the new entrant rule would have a quantifiable impact in terms of the types of flights operated, aircraft sizes, or utilisation at a congested airport. In order to do this, we compared the use of slots that have historically been granted on the basis of new entrant status with other new slots that have been granted (new incumbent) and other allocated slots at the airport. If the rule was changed as suggested, it would be expected that the use of the new entrant slots would be more similar to that of the new incumbent slots (except in terms of the airline that would use them). At the airports analysed:

- average aircraft sizes are similar for new entrant and new incumbent slots; but
- particularly at the London airports, new entrant slots are more likely to be used for long haul services than new incumbent slots;
- utilisation is significantly lower for new entrant slots; and
- load factors are lower for new entrant slots.

We would expect long haul services to continue to obtain a higher share of new entrant slots, as the short haul networks at congested EU airports are disproportionately operated by the main hub carrier. Therefore, the only quantifiable impacts would be the small improvements in utilisation and load factors. The changes we propose, by allowing new entrant slots to be allocated for more viable services, would eliminate part of the difference between new entrant and other slots. For the estimated impacts below, we have assumed 50% of the difference is eliminated (not all would be, as in some cases new entrant slots could be unattractive for other reasons – for example, because they are not available at peak times).

TABLE 6 QUANTIFIED IMPACTS

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)				Impact on number of passengers (%)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	0.03%	0.03%	0.03%	0.03%	0.06%	0.06%	0.06%	0.06%
London Gatwick	LGW	0.05%	0.05%	0.05%	0.05%	0.09%	0.09%	0.09%	0.09%
London Heathrow	LHR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Madrid	MAD	0.01%	0.01%	0.01%	0.01%	0.04%	0.04%	0.04%	0.04%
Paris Orly	ORY	0.02%	0.02%	0.02%	0.02%	0.04%	0.04%	0.04%	0.04%
Vienna	VIE	0.03%	0.03%	0.03%	0.03%	0.10%	0.10%	0.10%	0.10%

Economic impacts

		Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	-	-	-	-	-	-	-	-	-	-
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-	-	-	-	-	-	-	-	-	-
Vienna	VIE	-	-	-	-	-	-	-	-	-	-
		Economic benefits (€ 000s)					Net economic benefits (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	283	346	422	360	3,684	283	346	422	360	3,684
London Gatwick	LGW	685	788	860	790	8,164	685	788	860	790	8,164
London Heathrow	LHR	63	67	75	69	711	63	67	75	69	711
Madrid	MAD	498	590	767	624	6,377	498	590	767	624	6,377
Paris Orly	ORY	252	276	317	284	2,930	252	276	317	284	2,930
Vienna	VIE	508	614	852	663	6,748	508	614	852	663	6,748

Social impacts

		Airport employment (FTEs)				Airline and handling agent employment (FTEs)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	9	10	13	11	11	14	19	15
London Gatwick	LGW	21	24	26	24	43	50	56	50
London Heathrow	LHR	2	2	2	2	8	8	10	9
Madrid	MAD	15	18	23	19	27	33	46	36
Paris Orly	ORY	8	8	10	9	10	11	13	11
Vienna	VIE	15	19	26	20	21	27	41	30

Other quantifiable impacts

		Impact on air fares (%)				Impact on CO2 emissions (000s tonnes of CO2)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-0.1%	-0.1%	-0.1%	-0.1%	1.9	2.4	2.9	2.4
London Gatwick	LGW	-0.1%	-0.1%	-0.1%	-0.1%	7.3	8.1	8.3	8.0
London Heathrow	LHR	-0.0%	-0.0%	-0.0%	-0.0%	1.3	1.4	1.5	1.4
Madrid	MAD	-0.0%	-0.0%	-0.0%	-0.0%	4.7	5.5	7.1	5.8
Paris Orly	ORY	-0.0%	-0.0%	-0.0%	-0.0%	1.7	1.8	1.9	1.8
Vienna	VIE	-0.1%	-0.1%	-0.1%	-0.1%	3.9	4.7	6.5	5.1

Source: 2011 SDG study

The table below summarises the estimated impacts, across both the modelled airports and extrapolated to other EU airports. Again, at all of the other airports, the quantifiable impacts are very small, because few slots are allocated through the new entrant rule, and the characteristics of operations with new entrant slots are not substantially different from the characteristics of operations with other slots.

TABLE 7 QUANTIFIED IMPACTS SUMMARY: OPTION C7.1 (REVISED NEW ENTRANT RULE)

	Modelled airports	Airports >20 million pax	All coordinated airports
Passengers (%)	0.1%	0.0%	0.0%
Flights (%)	0.0%	0.0%	0.0%
Passengers (millions)	0.1	0.3	0.5
Airline operating costs (€ million NPV)	0.0	0.0	0.0
Direct implementation costs (€ million NPV)	0.0	0.0	0.0
Economic benefits (€ million NPV)	28.6	70.9	124.9
Net economic benefits (€ million NPV)	28.6	70.9	124.9
Airport employment (000 FTEs)	0.1	0.2	0.4
Airline employment (000 FTEs)	0.2	0.4	0.6
Fares (%)	-0.1%	0.0%	0.0%
CO2 emissions (tonnes, 000s)	25	59	102

Note: Financial values presented as net present value (NPV) of costs/benefits 2012-25. Non-financial values (passengers, emissions etc) presented as annual average values 2012-25.

Source: 2011 SDG study

The qualitative assessment of other impacts is shown below.

TABLE 8 OTHER IMPACTS

Impact category	Impact
Noise	Increase, but negligible - as a result of slightly more flights from major airports
Frequencies and destinations served	Possible slight reduction in destinations served, as new entrant flights more likely to be on routes which already have at least some flights from the airport However, this would be offset by a slight increase in frequencies on some established routes
Punctuality and reliability	Slight improvement, as current new entrant services more likely to be cancelled

We have also sought to identify whether changes to the new entrant rule would have a quantifiable impact on market concentration (measured in terms of share of slots) at the sample airports. This would be most likely at Düsseldorf and Orly: at Gatwick market concentration is low in any case, and at the other airports the rule has few impacts (at Heathrow because few slots are allocated through the pool, and at Madrid and Vienna because capacity is not constrained at most times). However, we have found that revisions to the new entrant rule probably would not have quantifiable impacts on market concentration, even at Orly or Düsseldorf:

- At Orly, the dominant carrier (Air France) and other carriers in the Air France-KLM owning group or operating on its behalf, have only been allocated 1.8% of all new slots allocated since 2002. Therefore, the weaknesses with the current new entrant rule have not led to Air France being able to increase its slot holding at Orly, and therefore have had a quantifiable impact on market concentration.

- At Düsseldorf, we only have data for two seasons (W09 and S10) and therefore the results are less clear. However, for this period, only 11% of new slots allocated were granted to the most dominant carrier, Lufthansa and its partners such as Swiss and Austrian. It would still be possible for it to have been granted these slots if the rule was revised. Therefore, the weaknesses with the new entrant rule do not appear to have led to Lufthansa gaining a higher slot share at least for the limited period for which we have data.

Nonetheless, although there is no evidence on which to quantify the impact the proposed revisions to the new entrant rule would have on market concentration (measured in terms of share of slots allocated) at the sample airports, it could still have an impact, by allowing more **effective** competitors to gain slots. This could result in reduced concentration if measured in terms of numbers of passengers. The changes we propose would increase the chance that a new entrant carrier obtained enough slots to offer commercially viable and therefore sustainable competitive services at congested airports.

Under normal circumstances, this option should not generate any implementation costs as the allocation of slots to new entrants and other airlines is part of the regular activity of the coordinator – the change would only impact which airlines the slots were allocated to.

Estimate of impacts – expansion of capacity

We have also evaluated whether a change in the new entrant rule would have a significant quantifiable impact in the event that capacity was expanded at an airport.

As discussed above, there is no evidence that new entrant slots are used in a way which is significantly different in terms of flight type or aircraft type from other newly allocated slots. However, at congested airports such as Heathrow, this partly reflects the fact that very few new entrant slots are granted; the results might be different if a large number of slots were allocated through the new entrant rule, as would happen after capacity was expanded, because there would be differences in the airlines to which slots were allocated. In any case, utilisation and load factors should be higher for new entrant slots if the rule is revised to allow more commercially viable services to acquire these slots.

TABLE 9 QUANTIFIED IMPACTS: REVISED NEW ENTRANT RULE – EXPANSION AT HEATHROW

Percentage impact on traffic volumes handled at each airport

	Impact on number of flights operated (%)					Impact on number of passengers (%)				
	2012	2017	2025	Average 2017-2025		2012	2017	2025	Average 2017-2025	
Administrative (existing new entrant rule)	-	9.8%	10.0%	10.0%		-	8.4%	10.3%	8.8%	
Administrative (revised new entrant rule)	-	9.9%	10.0%	10.0%		-	8.7%	10.3%	9.0%	
Difference	-	0.1%	-	0.0%		-	0.4%	-	0.2%	

Economic impacts

	Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
	2012	2017	2025	Average 2017-2025	NPV 2017-2025	2012	2017	2025	Average 2017-2025	NPV 2017-2025
Administrative (existing new entrant rule)	-	-	-	-	-	-	-	-100	-77	-446
Administrative (revised new entrant rule)	-	-	-	-	-	-	-	-50	-39	-223
Difference	-	-	-	-	-	-	-	50	39	223
	Economic benefits (€ 000s)					**Net economic benefits (€ 000s)**				
	2012	2017	2025	Average 2017-2025	NPV 2017-2025	2012	2017	2025	Average 2017-2025	NPV 2017-2025
Administrative (existing new entrant rule)	-	143,975	201,148	161,537	961,198	-	143,975	201,049	161,460	960,752
Administrative (revised new entrant rule)	-	150,129	201,148	165,141	984,082	-	150,129	201,098	165,102	983,859
Difference	-	6,154	-	3,604	22,884	-	6,154	50	3,643	23,107

Social impacts

	Airport employment (FTEs)					Airline and handling agent employment (FTEs)				
	2012	2017	2025	Average 2017-2025		2012	2017	2025	Average 2017-2025	
Administrative (existing new entrant rule)	-	4,369	6,104	4,902		-	14,854	26,807	18,963	
Administrative (revised new entrant rule)	-	4,556	6,104	5,012		-	16,232	26,807	19,813	
Difference	-	187	-	109		-	1,378	-	850	

Other quantifiable impacts

	Impact on air fares (%)					Impact on CO2 emissions (000s tonnes of CO2)				
	2012	2017	2025	Average 2017-2025		2012	2017	2025	Average 2017-2025	
Administrative (existing new entrant rule)	-	-7.6%	-9.3%	-8.0%		-	2,474.8	4,140.4	3,032.3	
Administrative (revised new entrant rule)	-	-7.9%	-9.3%	-8.1%		-	2,705.1	4,140.4	3,170.6	
Difference	-	-0.3%	-	-0.2%		-	230.4	-	138.3	

Source: 2011 SDG study

TABLE 10 IMPACTS ON SHARE OF SLOTS ALLOCATED OF REVISED NEW ENTRANT RULE, IF CAPACITY EXPANDED AT HEATHROW

		Current new entrant rule	Revised new entrant rule	Difference
Main based network carrier	Regional	-	-	-
	Short haul	14.3%	15.3%	1.0%
	Long haul	10.7%	11.5%	0.8%
Other based network carriers	Regional	2.4%	0.9%	-1.5%
	Short haul	3.2%	3.2%	-0.0%
	Long haul	1.3%	5.1%	3.8%
Non-based network carriers	Regional	13.9%	13.1%	-0.8%
	Short haul	37.9%	35.7%	-2.3%
	Long haul	12.6%	11.8%	-0.8%
Low cost carriers		3.6%	3.3%	-0.2%
Charter / leisure carriers		-	-	-

Source: 2011 SDG study

5. Estimate of impacts for the policy measure on increasing the slot utilisation threshold

At present, carriers must operate 80% of a series of slots in order to retain historic rights. A series of slots is defined as at least 5 slots, on the same day of the week, at the equivalent or similar time. The slots do not have to be on consecutive weeks but do have to be 'regular'. The criteria in the Regulation are much more onerous than a requirement that airlines operate 80% of all slots in order to retain them:

- Any **individual** series which falls below 80% should be withdrawn (if the coordinator follows the Regulation properly), even if the airline achieves very high utilisation if measured across all of its slots. It is entirely possible for an airline to have one series withdrawn whilst achieving 95% or higher utilisation.

- As each day of the week is a separate series, a slot on one day can be lost if less than 80% utilisation is achieved on that day. This means that, if the airline cannot acquire an equivalent slot, it can no longer offer a daily flight. In many cases this is necessary in order to meet market demand, and it is also necessary to have daily slots to ensure aircraft and crew are utilised efficiently. Therefore, potentially withdrawal of one series could prompt an airline to withdraw a service altogether.

The analysis of the sample of airports shows that at the most congested airports, such as Heathrow and Frankfurt, utilisation is very high – approximately 95% even in summer 2009, when the 80% utilisation rule was suspended. However, utilisation at other airports is lower. In addition, even a small percentage increase in capacity utilisation at a congested airport could produce significant economic benefits.

The main benefit of increasing the utilisation required is therefore that the number of flights that would be operated at capacity constrained airports would increase, albeit by relatively small numbers, and carriers that did not make full use of their slots would have to give them up so they could be used by other carriers. An exception to this is Heathrow, where there would be no quantifiable impact because the number of slots allocated is higher than the movement limit to allow for some cancellations.

Cancellations of flights due to events outside carriers' control

Flights may be cancelled (or not programmed) and the slots returned after the slot return date due to either:

- a deliberate decision by the carrier not to operate a flight which it considers is not commercially viable, whilst retaining historic rights to the slot either to keep flexibility for future years, or prevent a competitor from obtaining it; or

- for reasons which are partly or wholly outside the carrier's control, such as bad weather, staffing issues, or technical problems with aircraft; as discussed below some of these are covered by Article 10(4) but many would not be.

The purpose of utilisation monitoring and slot withdrawal is to deter the former, but it may also cover the latter. Whilst Article 10(4) of the Regulation does exclude slots which are not operated due to certain specific reasons outside the carrier's control from the utilisation calculation, this does not cover several possible causes which are partly outside airlines' control, such technical problems with an aircraft and other operational issues. In considering whether the threshold should be increased, the benefit of improved slot utilisation would have to be offset against the disruption to airline scheduling and fragmentation caused by withdrawals of series of slots for reasons outside airlines' control.

In order to assess the extent to which withdrawal of slots for reasons outside airlines' control would be a problem at different utilisation thresholds, we have evaluated how many slot series should be impacted by cancellations if these are outside the carriers' control and hence are randomly distributed across all flights. For this analysis, we have assumed that 1.5% of flights are cancelled, based on statistics from the Association of European Airlines and the European Regional Airlines Association[18].

[18] These are assumptions made by Steer Davies Gleave.

For simplicity we also assume that all series are of 22 slots (equivalent to the winter season length). We have then calculated the proportion of series which would be withdrawn as a result of failure to meet the utilisation threshold, at each possible level, and the proportion of daily flights where a slot on at least one day of the week would be withdrawn. **This is based on a purely random distribution of cancellations – which is what would be expected if these were not within airlines' control.**

The results of this analysis are shown in table below. This shows that, with the 80% utilisation threshold as at present, series of slots would almost never be withdrawn due to random cancellations for operational reasons outside the control of the carrier. If the threshold was increased to 90%, the number withdrawn would still be small, but not insignificant: 0.42% of series would be withdrawn for reasons outside carriers' control, and 2.70% of daily flights would be impacted by the withdrawal of a slot on at least one day of the week. Cumulatively over a number of seasons, this would lead to significant fragmentation of the schedule, particularly at airports such as Heathrow where slots are valuable and it would not readily be possible for airlines to gain equivalent new slots to replace slots that were withdrawn.

TABLE 14 SERIES WITHDRAWN DUE TO RANDOM OPERATIONAL CANCELLATIONS IF THESE OCCUR ON 1.5% OF FLIGHTS

Utilisation threshold	Number of flights (out of 22) needing to be cancelled to lead to withdrawal of series	Proportion of series with at least this number of cancellations	Proportion of daily flights with this number of cancellations on at least one day of week
100%	1 or more	28.29%	85.39%
95%	2 or more	4.26%	23.98%
90%	3 or more	0.42%	2.70%
85%	4 or more	0.03%	0.20%
80%	5 or more	0.00%	0.01%

This analysis indicates that an 85% threshold would improve slot utilisation whilst still rarely causing the withdrawal of series of slots for reasons outside airlines' control. In addition, as many airlines actively manage their portfolios of slots at congested airports, to try to ensure that flights for which the slots at risk of withdrawal are not cancelled, with an 85% threshold it should usually be possible for airlines to avoid withdrawal of slots for reasons outside their control.

Impact on short series

A higher threshold might be a particular issue for short series of slots: a threshold of 90% would mean that, in the event of one cancellation in a series of 5-9 slots, the carrier would lose historic rights. This would not be sensible as it would mean that any cancellation for operational reasons would lead to carriers losing historic rights to the series and hence fragmentation of the schedule. Therefore this option should only be implemented in conjunction with an extension to the minimum series length to ensure that it is always possible for one flight not to be operated without historic precedence being lost. At a minimum, this would need to be:

- if the threshold was increase to 85%, the minimum series length would need to be increased to at least 8 slots; and

- if the threshold was increased to 90%, the minimum series length would need to be increased to at least 10 slots.

Holiday periods

A further issue would relate to public holidays and dates around holiday periods, when there may not be sufficient demand for travel. If there is not sufficient demand, airlines should not be forced to operate at these times in order to retain a series of slots – this would have negative economic and environmental impacts. Individual slots can be returned before the slot return date and these are not counted towards the 20% (or possibly 10-15% in the future). However, some carriers do not return these slots before the slot return date and consider that they count towards the 20%, partly because some coordinators consider that the carrier would lose historic rights.

In order to address this, particularly if the utilisation threshold is increased, the Regulation should clarify whether and when coordinators can allow 'fill in' of missing slots in a series. Steer Davies Gleave suggested this should be permitted for up to three slots per series (as public holidays may occur on the same day of the week – for example, 25 December and 1 January); there should be a good reason for why the slot was originally returned, such as a public holiday; and the slots should have been returned to the coordinator before the slot return date.

Estimate of impacts

The impact of this measure would be to increase slot utilisation at congested airports:

- In the scenario where the threshold is increased to 85%, each series with 80-84% utilisation would have at least one additional flight operated by the airline in order to retain the series; we also assume that half of the slot series with 85-89% utilisation have an additional flight operated, as airlines will try to avoid coming close to the threshold and losing slots unintentionally.

- In the scenario where the threshold is increased to 90%, each series with 80-84% utilisation would have two additional flights operated, and each series with 85-89% utilisation would have one additional flight operated; we also assume that half of the slot series with 90-94% utilisation have an additional flight operated to avoid losing slots unintentionally.

However, as for other options, this measure has no impact on the number of flights operated at airports or times of day where initial requests for slots are less than capacity: in these cases, the risk of slot withdrawal is not an incentive for an airline to operate a flight, as it can always obtain a slot for the following season in any case. In addition, as discussed above, the measure has no impact on the number of flights operated at Heathrow, as the coordinator takes into account that there will be some non-operations and hence allocates more slots than the annual number of movements permitted; if utilisation was increased, the number of slots allocated would have to be reduced. There might still be an impact in terms of improved efficiency at Heathrow, as the number of flights actually operated each day would be more predictable (potentially improving operational performance) and there could be some redistribution of slots towards carriers that would use them more efficiently, but this is not possible to quantify and in any case would be small as utilisation at Heathrow is very high.

In the cases where airlines risked losing slots for reasons outside their control, they might seek to contest this on the basis of Article 10(4), and if they were not successful, this might result in fragmentation of the schedule and reduce the aircraft and crew utilisation that they were able to achieve. As discussed above, this would be negligible in the case that the threshold was increased to 85%, but could be significant if the threshold was increased to 90%, and therefore we have tried to quantify this.

To estimate this, we have assumed that where a series was withdrawn for reasons outside the carrier's control, this would in some cases have an impact on the utilisation the airline could achieve with its crews and aircraft, if the airline was not able to obtain an equivalent slot in the next season. This impact is inherently uncertain and therefore the result should be treated as illustrative. We have

assumed that (for the specific aircraft programmed to operate the slot concerned, and only on the days on which the slot was withdrawn) there would be a 10% reduction in the aircraft/crew utilisation achievable on short haul routes and 5% on long haul. As aircraft and crew costs together account for around 40% of operating costs of short haul services and around 30% on long haul services, this reduction in aircraft and crew utilisation equates to a 3.9% increase in operating costs for short haul, and 1.6% for long haul, again, only for the specific aircraft concerned programmed to use the slot that was withdrawn[19]. This impact only applies to the extent that demand exceeds capacity; where it does not there is no impact because the carrier would be able to obtain equivalent slots in the following season.

Estimated impacts for the scenario where the threshold is increased to 85% are shown in the table below. The most significant quantifiable impacts would be at Gatwick, followed by Orly and Düsseldorf[20]. The impact at Gatwick is greater than at Orly because the number of slot series with 80-84% utilisation is greater. However, at all airports, the impacts are small, because a very small proportion of slot series have 80-84% utilisation. As noted above, there is no increase in airline operating costs in the scenario that the threshold is increased to 85%, because there is still almost no case of fragmentation of the schedule to withdrawal of slots for reasons outside airlines' control. Where this change leads to more flights being operated, this leads to increased economic benefits and employment, but also increased emissions; however, these impacts are very small, reflecting the fact that the impact on the number of flights is also very small.

[19] Each aircraft is assumed to operate 3 rotations (short haul) and 0.75 rotations (long haul) daily

[20] Note however that we do not have detailed slot utilisation data for Düsseldorf and therefore this assumes that the pattern of slot utilisation at Düsseldorf is equivalent to the average of the other airports

TABLE 15 QUANTIFIED IMPACTS: 85% UTILISATION

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)				Impact on number of passengers (%)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	0.2%	0.2%
London Gatwick	LGW	0.2%	0.3%	0.3%	0.2%	0.2%	0.3%	0.2%	0.2%
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%
Paris Orly	ORY	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Vienna	VIE	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%

Economic impacts

		Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	-	-	-	-	-	-	-	-	-	-
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-	-	-	-	-	-	-	-	-	-
Vienna	VIE	-	-	-	-	-	-	-	-	-	-
		Economic benefits (€ 000s)					**Net economic benefits (€ 000s)**				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	700	877	1,391	1,069	10,749	700	877	1,391	1,069	10,749
London Gatwick	LGW	1,277	2,243	2,445	2,112	21,490	1,277	2,243	2,445	2,112	21,490
London Heathrow	LHR	-	-	-	-	-	-	-	-	-	-
Madrid	MAD	809	410	1,604	789	8,228	809	410	1,604	789	8,228
Paris Orly	ORY	1,348	1,471	1,692	1,514	15,639	1,348	1,471	1,692	1,514	15,639
Vienna	VIE	119	331	117	185	1,968	119	331	117	185	1,968

Social impacts

		Airport employees				Airline and handling agent employees			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	21	27	42	32	26	35	61	44
London Gatwick	LGW	39	68	74	64	76	143	159	134
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	25	12	49	24	46	24	105	48
Paris Orly	ORY	41	45	51	46	54	58	68	61
Vienna	VIE	4	10	4	6	4	13	4	7

Other quantifiable impacts

		Impact on air fares (%)				Impact on CO2 emissions (000s tonnes of CO2)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-0.1%	-0.1%	-0.2%	-0.2%	4.8	6.0	9.5	7.3
London Gatwick	LGW	-0.2%	-0.2%	-0.2%	-0.2%	13.0	23.1	23.7	21.3
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	-0.1%	-0.0%	-0.1%	-0.0%	8.1	4.1	16.1	7.9
Paris Orly	ORY	-0.2%	-0.2%	-0.2%	-0.2%	9.5	9.7	10.4	9.8
Vienna	VIE	-0.0%	-0.1%	-0.0%	-0.0%	0.8	2.3	0.7	1.2

Source: 2011 SDG study

Estimated impacts for the scenario where the threshold is increased to 90% are shown in table below. In this case, there is a more significant impact on utilisation, because there are more slot series with 80-89% utilisation, which are impacted by the change, and we also assume an increase in utilisation for slot series with 90-94% utilisation, as carriers try to ensure that they do not accidentally fall below the threshold. However, the economic benefits of more flights being operated are partly offset by the increased airline operating costs which result from reduced aircraft/crew utilisation and fragmentation of the schedule.

TABLE 16 QUANTIFIED IMPACTS: 90% UTILISATION

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)				Impact on number of passengers (%)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	0.4%	0.4%	0.6%	0.5%	0.4%	0.4%	0.6%	0.5%
London Gatwick	LGW	0.5%	0.7%	0.7%	0.7%	0.5%	0.7%	0.7%	0.7%
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	0.2%	0.1%	0.2%	0.1%	0.2%	0.1%	0.2%	0.1%
Paris Orly	ORY	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Vienna	VIE	0.1%	0.2%	0.0%	0.1%	0.1%	0.2%	0.0%	0.1%

Economic impacts

		Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	- 898	- 2,755	- 5,254	- 3,757	- 37,154	-	-	-	-	-
London Gatwick	LGW	- 611	- 3,050	- 3,543	- 2,825	- 28,180	-	-	-	-	-
London Heathrow	LHR	- 1,356	- 4,284	- 4,579	- 4,044	- 41,167	-	-	-	-	-
Madrid	MAD	- 574	- 1,628	- 2,627	- 1,447	- 15,113	-	-	-	-	-
Paris Orly	ORY	- 1,535	- 5,008	- 5,714	- 4,813	- 48,775	-	-	-	-	-
Vienna	VIE	- 237	- 1,405	- 560	- 1,037	- 10,723	-	-	-	-	-
		Economic benefits (€ 000s)					**Net economic benefits (€ 000s)**				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	2,045	2,562	4,063	3,122	31,404	1,147	- 193	- 1,191	- 635	- 5,750
London Gatwick	LGW	3,567	6,267	6,830	5,899	60,039	2,956	3,217	3,287	3,074	31,859
London Heathrow	LHR	-	-	-	-	-	- 1,356	- 4,284	- 4,579	- 4,044	- 41,167
Madrid	MAD	2,256	1,143	4,473	2,200	22,944	1,681	- 485	1,846	752	7,831
Paris Orly	ORY	4,170	4,552	5,235	4,684	48,378	2,635	- 457	- 478	- 129	- 396
Vienna	VIE	390	1,082	382	605	6,427	154	- 323	- 178	- 433	- 4,296

Social impacts

		Airport employees				Airline and handling agent employees			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	62	78	123	95	76	103	179	129
London Gatwick	LGW	108	190	207	179	214	399	445	376
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	68	35	136	67	129	68	293	135
Paris Orly	ORY	127	138	159	142	167	181	212	187
Vienna	VIE	12	33	12	18	13	42	14	22

Other quantifiable impacts

		Impact on air fares (%)				Impact on CO2 emissions (000s tonnes of CO2)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-0.4%	-0.4%	-0.5%	-0.5%	13.9	17.5	27.7	21.3
London Gatwick	LGW	-0.4%	-0.6%	-0.6%	-0.6%	36.4	64.6	66.3	59.5
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	-0.2%	-0.1%	-0.2%	-0.1%	22.6	11.5	44.8	22.2
Paris Orly	ORY	-0.6%	-0.6%	-0.6%	-0.6%	29.2	29.9	32.2	30.4
Vienna	VIE	-0.1%	-0.2%	-0.0%	-0.1%	2.5	7.4	2.3	4.0

Source: 2011 SDG study

The table below summarises the results for both options for the modelled airports and the extrapolated EU-wide estimates. Increasing the threshold to 90% has more impact on utilisation but the economic benefits are offset by the increase in airline operating costs, due to the fragmentation of the schedule that results. The other airports at which these options would have relatively significant impacts are the other relatively large, congested airports such as Paris CDG, Rome Fiumicino and Zurich, and also Frankfurt and Munich, particularly before the new runways are opened at these airports. There could also be a significant benefit at Milan Linate. However, the impacts at other coordinated airports are generally less than the impacts at the modelled airports, reflecting the fact that the other coordinated airports are on average smaller and less congested.

TABLE 17 QUANTIFIED IMPACTS SUMMARY: OPTION C8.1 (INCREASE UTILISATION THRESHOLD)

	Threshold 85%			Threshold 90%		
	Modelled airports	Airports >20 million pax	All coordinated airports	Modelled airports	Airports >20 million pax	All coordinated airports
Passengers (%)	0.1%	0.1%	0.1%	0.3%	0.2%	0.2%
Flights (%)	0.1%	0.1%	0.0%	0.4%	0.3%	0.1%
Passengers (millions)	0.2	0.5	0.8	0.7	1.5	2.3
Airline operating costs (€ million NPV)	0.0	0.0	0.0	181.1	359.2	535.8
Direct implementation costs (€ million NPV)	0.0	0.0	0.0	0.0	0.0	0.0
Economic benefits (€ million NPV)	58.1	121.0	184.7	169.2	350.2	536.2
Net economic benefits (€ million NPV)	58.1	121.0	184.7	-11.9	-9.0	0.4
Airport employment (000 FTEs)	0.2	0.4	0.5	0.5	1.0	1.6
Airline employment (000 FTEs)	0.3	0.6	0.9	0.8	1.7	2.6
Fares (%)	-0.1%	-0.1%	0.0%	-0.3%	-0.2%	-0.1%
CO2 emissions (tonnes, 000s)	48	98	150	137	282	431

Note: Financial values presented as net present value (NPV) of costs/benefits 2012-25. Non-financial values (passengers, emissions etc) presented as annual average values 2012-25.

Source: 2011 SDG study

The qualitative assessment of other impacts is shown below.

TABLE 18 OTHER IMPACTS: INCREASE UTILISATION THRESHOLD TO 85% OR 90%

Impact category	Impact
Noise	Slight increase, as a result of slightly more flights from major airports
Frequencies and destinations served	No impact – option impacts the number of flights cancelled not the number of flights programmed
Punctuality and reliability	Slight improvement in reliability, as airlines have a stronger incentive not to cancel flights Slight deterioration in punctuality, due to more flights being operated from busy airports and hence slightly increased congestion.

6. Estimate of impacts of the policy measure on extending minimum series length

The main operational impact that this measure has is to increase the number of flights that could be operated at certain congested airports where the operation of short series of slots in the peak (usually summer) season, by airlines with historical rights to these series, prevents operation of longer series including year-round services. We have assumed that, at these airports, where airlines currently have historical rights to short series in the high peak:

- some airlines cease to operate the service and return the slot to the pool, and it would be allocated by the coordinator to another airline for a year-round service; and
- some airlines retain the series but extend the length to the new minimum (15 weeks).

It should be noted that the result for Düsseldorf is based on an average pattern of traffic across the airports for which data was available, as no breakdown of slot series lengths at this airport was

provided to the consultant; therefore, the result for Düsseldorf is much more uncertain than the results at the other airports.

TABLE 19 QUANTIFIED IMPACTS

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)				Impact on number of passengers (%)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	0.6%	0.6%	0.8%	0.7%	0.6%	0.6%	0.8%	0.8%
London Gatwick	LGW	0.4%	0.7%	0.7%	0.6%	0.4%	0.6%	0.6%	0.6%
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	0.6%	0.3%	0.8%	0.5%	0.6%	0.3%	0.8%	0.5%
Paris Orly	ORY	-	-	-	-	-	-	-	-
Vienna	VIE	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%

Economic impacts

		Airline operating costs (€ 000s)					Other direct costs (€ 000s)				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	-	-	-	-	-	-	-	-	-	-
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-	-	-	-	-	-	-	-	-	-
Vienna	VIE	-	-	-	-	-	-	-	-	-	-
		Economic benefits (€ 000s)					**Net economic benefits (€ 000s)**				
		2012	2017	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	3,024	3,787	6,006	4,615	46,424	3,024	3,787	6,006	4,615	46,424
London Gatwick	LGW	3,232	5,678	6,188	5,345	54,393	3,232	5,678	6,188	5,345	54,393
London Heathrow	LHR	-	-	-	-	-	-	-	-	-	-
Madrid	MAD	7,721	3,911	15,311	7,529	78,535	7,721	3,911	15,311	7,529	78,535
Paris Orly	ORY	-	-	-	-	-	-	-	-	-	-
Vienna	VIE	143	396	140	221	2,352	143	396	140	221	2,352

Social impacts

		Airport employees				Airline and handling agent employees			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	92	115	182	140	113	152	264	191
London Gatwick	LGW	98	172	188	162	194	362	403	340
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	234	119	465	228	440	234	1,002	463
Paris Orly	ORY	-	-	-	-	-	-	-	-
Vienna	VIE	4	12	4	7	5	15	5	8

Other quantifiable impacts

		Impact on air fares (%)				Impact on CO2 emissions (000s tonnes of CO2)			
		2012	2017	2025	Average 2012-2025	2012	2017	2025	Average 2012-2025
Dusseldorf	DUS	-0.6%	-0.6%	-0.8%	-0.7%	20.5	25.9	40.9	31.5
London Gatwick	LGW	-0.4%	-0.6%	-0.6%	-0.5%	33.0	58.5	60.0	53.9
London Heathrow	LHR	-	-	-	-	-	-	-	-
Madrid	MAD	-0.6%	-0.2%	-0.7%	-0.5%	77.4	39.2	153.4	75.8
Paris Orly	ORY	-	-	-	-	-	-	-	-
Vienna	VIE	-0.0%	-0.1%	-0.0%	-0.0%	0.9	2.7	0.8	1.4

Source: 2011 SDG study

The table below summarises the results for the modelled airports and EU-wide. Increasing minimum series length has a significantly greater impact on the number of flights operated, and hence a greater economic impact, than raising the utilisation threshold. The other airports at which this option could have a relatively significant impact are the other larger and more congested airports such as Paris CDG, Rome Fiumicino and Zurich, and also Frankfurt and Munich before the new runways open at these airports.

TABLE 20 QUANTIFIED IMPACTS SUMMARY: OPTION C8.2 (EXTEND MINIMUM SERIES LENGTH)

	Modelled airports	Airports >20 million pax	All coordinated airports
Passengers (%)	0.3%	0.4%	0.3%
Flights (%)	0.3%	0.4%	0.2%
Passengers (millions)	0.8	2.4	3.6
Airline operating costs (€ million NPV)	0.0	0.0	0.0
Direct implementation costs (€ million NPV)	0.0	0.0	0.0
Economic benefits (€ million NPV)	181.7	589.2	876.3
Net economic benefits (€ million NPV)	181.7	589.2	876.3
Airport employment (000 FTEs)	0.5	1.7	2.6
Airline employment (000 FTEs)	1.0	3.1	4.7
Fares (%)	-0.3%	-0.3%	-0.2%
CO2 emissions (tonnes, 000s)	163	515	768

Note: Financial values presented as net present value (NPV) of costs/benefits 2012-25. Non-financial values (passengers, emissions etc) presented as annual average values 2012-25.

Source: 2011 SDG study

The qualitative assessment of other impacts is shown below.

TABLE 21 OTHER IMPACTS

Impact category	Impact
Noise	Slight increase, as a result of slightly more flights from major airports
Frequencies and destinations served	Slight increase, as a result of slightly more flights from major airports outside the high peak season. But possibly a reduction on some very seasonal services, for example high peak services to holiday resorts.
Punctuality and reliability	Slight deterioration in punctuality, due to more flights being operated from busy airports and hence slightly increased congestion.

9. ESTIMATE OF IMPACTS FOR POLICY PACKAGE III

This section focuses on the impacts of the measure of withdrawal and auction of slots.

Practical issues to be addressed regarding the measure of withdrawal and auction of slots

A significant practical problem with withdrawal of slots and auctions is the complexity of the auction process. This complexity is significantly greater than applies in other market sectors such as for radio frequencies, which are discussed further below. This is because:

- A very large number of slot series would need to be auctioned each year, even if a relatively small proportion of slots (10%) were withdrawn from carriers. There would therefore be a large volume of slots to distribute through the auctions. Although a lower proportion of slots could be withdrawn (the FAA's proposal at the New York airports was to withdraw 2% of slots per year for 5 years), this would substantially reduce the potential benefits of the auctions in terms of improved market liquidity.

- Slots are not heterogeneous assets and there may be significant differences in value to carriers of slots that appear very similar. Where a hub carrier operates a 'bank' of departing flights between (for example) 10:00 and 11:00 at its hub, a slot at another airport which allows good connections into the bank may be valuable to the carrier whereas a slot that is a short time later may be valueless to it. This means that auctions would have to be for slots within relatively short time bands (15-30 minutes), or individual slots. This increases the complexity of the auction process. Also, arrival and departure slots would need to be auctioned separately because turnaround times are different for different types of service. If they were auctioned as pairs, it would be difficult to change the use of slots between short and long haul services, or between network and low cost carrier operations – which would be a key potential benefit of an auction.

- Auctions at different airports would be interdependent. For example, a carrier seeking to operate a service between Heathrow and Frankfurt would need to bid for slots at both airports, which would create a problem if it won slots at one airport but not the other. This is further exacerbated by the fact that an aircraft will often be used for several flights between coordinated airports each day: a short haul aircraft would typically operate three rotations (six takeoffs and six landings). This means that, for an aircraft that was programmed to operate three rotations between coordinated airports in a day, even if only 10% of slots were withdrawn each year, on average at least one slot from the programme of the aircraft would be withdrawn and auctioned each year.

- Slots are permissions to use the full range of airport infrastructure, not just the runway. A carrier might win slots at an airport for operations at a particular time, but then find that, due to the identities of the other carriers that had won slots at the same time, there was not sufficient capacity in the terminal that it used, or not sufficient stands available for the aircraft of the type that it operated. This is already an issue with secondary trading, but is addressed by slot exchanges being subject to agreement by the coordinator; this would not be possible for an auction.

- The number of slots available in an hour is dependent on which aircraft are operated. At Heathrow, the capacity in terms of movements per hour is lower in the hours in which there are a greater proportion of very large aircraft operating, because the runway occupancy time of larger aircraft is longer. This would mean that the number of slots available to auction would depend on something that would not be known until the auction was complete.

- In order to allow scheduling of air services between coordinated airports in the EU and coordinated airports in other countries, auctions for slots at EU airports would need to fit into the current worldwide IATA schedule planning system. Airlines might be reluctant to bid for slots at an EU

airport if they were unsure whether they would obtain slots through the normal allocation process at the other airport.

As a result of these factors, it is unlikely that any initial auction would lead to an efficient (or even operationally possible) outcome and there would be substantial reliance on secondary trading in order to address the deficiencies in the initial allocation. Airlines regularly exchange slots in the biannual schedule planning and slot allocation process, but this would be much more complex:

- As schedules would have to be entirely re-planned each year, the volume of exchanges that would be required would be much greater.

- Slots available for exchange would substantially differ in value, both due to differences in timings of the slots but also the number of years remaining until the slots were next to be withdrawn. As a result, most exchanges would require payments between the carriers, whereas exchanges in the current biannual process do not. The process of evaluating potential exchanges would inevitably be more complex as airlines would wish to ensure that each transaction was good value.

Therefore, it might be difficult to complete the number of secondary trades necessary to optimise the slot allocation after the auctions within the limited time available in the biannual schedule planning and slot allocation process.

As a result of all these factors, there is a significant risk that withdrawal of slots and auctions would not lead to an efficient outcome. In particular it could lead to:

- in effect, a reduction in the amount of useable capacity at some congested airports, as airlines would not be able to undertake the number of secondary trades required to ensure that all capacity was allocated to airlines and services that could use it; and

- lower utilisation of aircraft and air-crew, leading to higher operating costs for airlines, as they would not able to optimise deployment of their fleets.

It was also stated by some stakeholders that withdrawal and auction would lead to higher fares for consumers, as airlines would need to recover the price paid in the auction. However, in our view this should not be the case. When setting fares for individual flights, airlines should charge the price that maximises their profit, regardless of what they had previously paid for the slot. Where demand exceeds capacity, airlines that hold slots should be able to charge fares higher than their operating costs, and therefore benefit from a 'scarcity rent'. Paying for slots will reduce the airlines' profit margins, transferring this scarcity rent from the airlines to the government or whichever other body receives the auction revenue. However, if some airlines cannot afford to purchase slots at the auction price because their potential profit margins from use of the slot are too low, the slots are likely to be purchased by other airlines whose potential margins from use of the slots would be higher. This is consistent with the objective of economically efficient use of capacity. At airports at which demand does not exceed capacity, the auction price should be zero, and therefore there is also no impact on fares at these airports.

Similarly, although withdrawal of grandfather rights could make airline operations at the most congested airports less efficient and therefore increase airline operating costs, this should also reduce scarcity rents (i.e. airline margins), rather than increase fares. Again, this might prompt some lower-margin airlines not to bid for slots, because they could not use them profitably, but this would be consistent with the objective of economically efficient use of capacity. At less congested airports where there are no scarcity rents, if withdrawal of grandfather rights caused fragmentation of the schedule and increased operating costs, this might airlines to cut capacity and charge higher fares; however, this probably would not occur because, at these airports, airlines would generally be able to get slots at their preferred times.

Estimate of impacts

This section sets out how we have estimated the impacts of withdrawal and auction of slots at Heathrow and Orly. It should be emphasised that withdrawal and auction of slots has not been tested at any major airport anywhere (the proposal to apply this at the New York airports was never implemented), and therefore this analysis can only be indicative of the impacts which might occur. For some of the potential negative impacts, we have defined both high and low scenarios, due to the inherent uncertainty:

- in the high negative impacts scenario, the negative impacts of withdrawal and auctions are the maximum that we believe to be reasonably feasible; and

- in the low negative impacts scenario, the negative impacts of withdrawal and auctions are the minimum that we believe to be reasonably feasible.

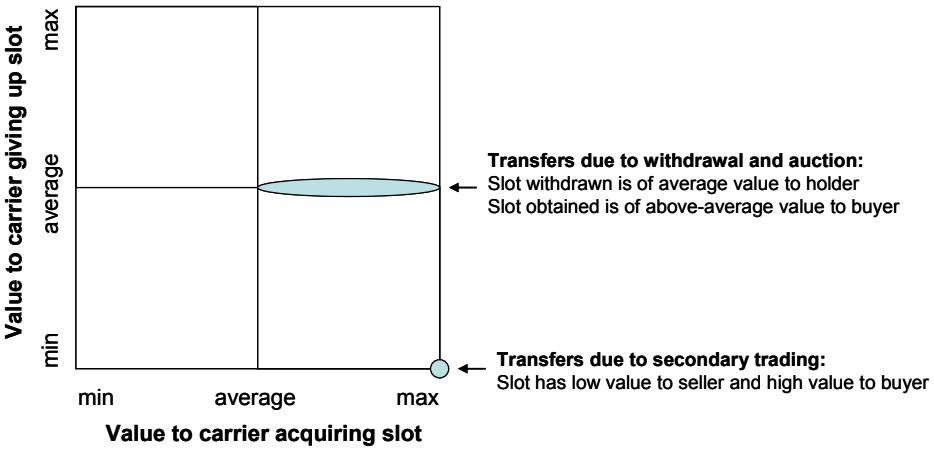
- It is assumed that 10% of slots would be withdrawn and auctioned each year, until all slots had been withdrawn. Therefore, the impacts build up gradually over 10 years; it is assumed that there are no further impacts after 10 years. The main operational impact of slot withdrawal and auctions should be a change in the type of flights operated, and the types of aircraft that would be used. In assessing the impacts of withdrawal and auctions, we always assume that secondary trading would be permitted, as it would be necessary to allow secondary trading to address any deficiencies in the allocation by auction.

- At **Heathrow**, the impacts of withdrawal and auctions can be estimated based on the types of flights for which slots have been bought and sold on the secondary market. Secondary trading has typically led to larger aircraft sizes, and a change in type of flights towards long haul, particularly flights operated by non-EU carriers. If slots were withdrawn and auctioned, these changes would apply to a much larger number of slots (in this scenario, 10% per year instead of an average of 3.3% per year due to secondary trading). However, the change in use in each individual case would be lower:

- Airlines that are the least efficient users of slots would be most likely to give up slots through secondary trading, as these would be making the lowest returns from slots and therefore the slots have the lowest possible value to them; whereas in this scenario all slots would ultimately be withdrawn, including those which are most efficiently used at present. Therefore the slots withdrawn would equate to average slots at the airport. This factor reduces the potential benefit from each individual slot transaction.

- Similarly, only airlines that would be the most efficient users of slots would be likely to purchase slots (either through an auction or on the secondary market). As more slots would be available through the auction than on the secondary market, the marginal value of acquired slots to the buyers should be less. In total, the value of the slots to the buyers would be some way between the value of slots obtained through secondary trading, and the current average slot value across all slots at the airport. Therefore this also reduces the benefit from the transfer, compared to secondary trading.

Therefore, on average, the increase in aircraft size and the change in use in each case that a slot was transferred due to withdrawal and auction would be less than that achieved for each transfer of a slot due to secondary trading. This concept is illustrated (in simplified form) on the figure below. Nonetheless, as the number of slot movements would be greater in the case of slot withdrawal than in the scenario where there was secondary trading only, the overall effect should still be stronger.



At **Orly**, there is no equivalent evidence to suggest which airlines would buy and sell slots. Therefore, we use the same assumptions as set out above for which airlines and types of flight would buy slots as in the case of secondary trading at Orly. As for Heathrow, the net effect of each slot transaction would be less than in the case of secondary trading, but as the number of slot movements would be greater, the effect should be stronger.

At Heathrow (but not Orly), secondary trading would be occurring anyhow, in the baseline scenario. Therefore, the benefits of slot withdrawal and auctions at Heathrow are lower, reflecting the fact that some of these benefits are already obtained from secondary trading in the baseline scenario.

Withdrawal and auctions would also have some negative impacts which we have sought to estimate. As a result of fragmentation of the schedule, withdrawal might lead to **increased airline operating costs**. This is particularly an issue for short haul flights: short haul aircraft are usually planned to do 3 rotations to/from the main hub each day, and therefore the programme for one aircraft would be impacted six years out of ten by slot withdrawal. In most cases, the airline should be able to obtain an appropriate slot (either through the auction or from secondary trading) to carry on achieving the same level of aircraft utilisation, but in some cases this would not be possible. As it is uncertain to what extent this would happen, we have tested a high and a low impact scenario. The methodology and rationale for this is discussed in more detail in the box at the end of this sub-section.

It has previously been argued also that slot withdrawal would lead to an overall **reduction in the number of slots for which flights could be scheduled** at congested airports. This could happen because the fragmentation of the schedule would result in a number of individual slots becoming available at inconsistent times, which airlines would not be able to combine to operate commercially attractive or operationally possible services. For example, if an early morning arrival and departure slot pair at Heathrow currently used for a Lufthansa flight from/to Frankfurt were withdrawn and auctioned, a non-EU airline might purchase the arrival slot for a long haul flight, but it would not want a departure slot at this time, and the departure slot on its own would be of no use to another short haul airline as it would not be able to obtain a corresponding arrival slot; therefore, the departure slot might not be used.

Again, as it is uncertain to what extent this would happen, we have tested a high and a low scenario. At Heathrow, in the low impact scenario, the reduction in the number of slots for which flights can be scheduled is 0.5%, and in the high impact scenario it is 2%. This effect would be much less at Orly than Heathrow, as there are few constraints at Orly other than the annual slot cap. However, it could still occur - for example if, after an auction, an airline found that it did not have sufficient slots to offer a commercially attractive service on the route had previously served, it might not wish to operate the slots it still had, but it could be too late by this point to trade them, or they might be unattractive to buy (if they were due for withdrawal in 1-2 years an airline probably would not buy them, however low the price, because this is not time to launch a viable service). In the low impact scenario we assume no reduction in slots allocated at Orly and in the high impact scenario we assume 0.5%.

There would also be a **cost of management of the auctions**. The best guidance for this is the cost that auctions were expected to incur at the New York airports, as these were at an advanced stage of planning when suspended, and the FAA had already procured an auction design company to design the auctions and another company to design and operate the systems. It expected to incur setup costs of US$1.7 million at each airport and then a further US$0.9 million per year. Auctions at Heathrow and Orly would be more complex to design and manage given the much larger number of daily slots being auctioned: at Heathrow, approximately 10 times as many, and at Orly, approximately 5 times as many, although the costs should not increase in direct proportion to the number of slots being auctioned. Therefore, we have assumed that compared to the New York auctions, the costs would be 50% higher at Orly and 100% higher at Heathrow.

In addition, airlines would incur costs in both preparing for and undertaking the auctions, rearranging their schedules, and in undertaking the secondary trades necessary to address the deficiencies in the initial allocation. In the interviews undertaken for this study, airlines indicated that they would need to significantly increase the size of their scheduling teams. We have assumed that:

- At each of Heathrow and Orly, the main based airline would need to increase their scheduling staff by 3 FTE, and other airlines with significant operations at these airports (more than 3% of slots) would increase their scheduling staff by 1 FTE

- Secondary trades would be necessary for 30% of slots allocated through the auction, and the legal cost per trade is assumed to be equivalent to that outlined under the measure of uniform framework for secondary trading.

- Partly offsetting this, the costs associated with the current level of secondary trading (at Heathrow) would be avoided.

Prices paid for slots in the auction should have no impact on **average fares** as these are a sunk cost. In addition, even though we estimate that airline operating costs would be increased, which impacts all airlines at the airport, this also should also not result in higher fares: if demand is greater than capacity, airlines should currently be benefiting from scarcity rents, which would be eroded by the increase in their operating costs. However, average fares would still be impacted in this scenario: if withdrawal and auctions resulted in more capacity being made available at the airport, this should result in lower fares, as average fares would have to be reduced in order to attract more passengers to use air services from the airport. This would be partly offset by any reduction in the proportion of capacity that could be utilised.

Approach to calculating additional operating costs caused by slot withdrawal

Withdrawal of grandfather rights might make airline schedules less efficient, because airlines might not be able to obtain slots through the auction to enable flights to take off and land at times which maximised utilisation and minimised turnaround times. This would lead to reduced aircraft and crew utilisation, and hence increase costs per flight relating to aircraft (including aircraft leases, and maintenance) and crew costs. Other airline operating costs, such as fuel, landing and navigation charges, and marketing-related costs, are related to the number of flights actually operated and so would not be impacted on a per-flight basis. Aircraft and crew costs together account for approximately 40% of costs on short haul flights and 30% of costs on long haul flights.

Airlines would seek to mitigate the impacts through secondary trading, but this would not always be possible, as a result of the large number of trades that would be required in a limited timescale, and the complexity of arranging these trades, given the very different values slots would have (depending on when they were next due to be withdrawn). The main based network carrier (British Airways at Heathrow and Air France at Orly) could also mitigate the

impacts on its own operations through rearrangement of its other slot holdings, but this would usually not be possible for other airlines whose slot holdings at these airports are much smaller.

The impact of this would be different for short and long haul flights:

- A short haul aircraft is typically used for 3 rotations (6 flights) per day. Therefore, if 10% of takeoff and landing slots were withdrawn each year at the airport at one end of the route, the programme for each short haul aircraft would be impacted 6 years in each 10.

- A long haul aircraft is typically used for 1-2 rotations every 2 days, depending on route length (1.5 flights per day). Therefore, if 10% of slots were withdrawn each year, the programme for each long haul aircraft would be impacted 1.5 years in each 10.

We have assumed that in most cases the airline would be able to find another equivalent slot, either by buying slots in the auction, rearranging other flights, or through secondary trading, so that there was no impact, but in some cases they would not be able to, and so aircraft and crew utilisation would decrease. Indicatively, we have assumed that every time a slot was withdrawn at Heathrow, the number of flights per day that could be achieved with the aircraft programmed to use that slot would be reduced by 0.5% (low impact scenario) and 1.5% (high impact scenario). Over 10 years, the average utilisation of short haul aircraft and crews would be reduced by 3-9%, and long haul by 1-2%.

This would equate to increases in airline operating costs as follows:

High impact scenario: short haul 3.5%, long haul 0.7%

Low impact scenario: short haul 1.2%, long haul 0.2%

At Orly, airlines have much more flexibility to rearrange their slot holdings, as there are in effect no constraints other than the annual cap. Secondary trading would also be easier for this reason. Therefore, we have assumed that every time a slot was withdrawn at Orly, the number of flights per day that could be achieved with the aircraft programmed to use that slot would be reduced by 1% (high impact scenario) but not at all in the low impact scenario. This would equate to increases in airline operating costs at Orly as follows:

High impact scenario: short haul 2.4%, long haul 0.5%

Low impact scenario: zero

The estimated results of withdrawal and auctions at Heathrow and Orly are shown below (scenario with lower negative impacts and scenario with higher negative impacts). The results vary between the airports:

- At Heathrow, although there is an increase in the number of passengers transported and hence some reduction in fares, the net economic impact is negative in both scenarios. This is because secondary trading already delivers much of the improvement in the economically efficient use of slots than auctions deliver (by 2025, we calculate that the average number of passengers per peak arrival slot would be 213 in any case). Therefore the main economic impact is the negative impact on airline operating costs, due to schedule fragmentation and reduced aircraft/crew utilisation. However, as there would be an increase in the number of passengers transported, and on average those passengers would travel much further, significant additional airline employment is created; this is disproportionately for non-EU airlines and therefore would generally not be EU residents, but employment also increases amongst EU airlines.

- At Orly, there are significant economic benefits, and these are greater than we estimate are possible due to secondary trading alone. In the high negative impact scenario these are largely offset by the

increase in airline operating costs and the impact of slightly reduced useable capacity, but as these problems may be avoidable at Orly, there is no such impact in the low scenario. There are also significant increases in airline and airport employment at Orly, reflecting the fact that the volumes of passengers transported would increase.

At both airports, there would be an increase in CO_2 emissions generated, because auctions would usually result in larger aircraft and longer flight lengths.

These tables also show the projected results in 2021, after all slots have been withdrawn and auctioned. The impacts are more limited before this, because not all slots would have been withdrawn, and therefore the option does not have the full effect.

TABLE 1 QUANTIFIED IMPACTS: LOW NEGATIVE IMPACTS SCENARIO

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)					Impact on number of passengers (%)				
		2012	2017	2021	2025	Average 2012-2025	2012	2017	2021	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	-0.0%	-0.3%	-0.5%	-0.5%	-0.3%	-0.1%	1.8%	3.9%	3.5%	2.3%
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	0.0%	-0.0%	-0.0%	-0.0%	-0.0%	1.5%	8.0%	13.0%	16.6%	9.9%
Vienna	VIE	-	-	-	-	-	-	-	-	-	-

Economic impacts

		Airline operating costs (€ 000s)						Other direct costs (€ 000s)					
		2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	- 17,301	- 65,502	- 99,811	- 104,341	- 72,643	- 708,130	- 4,756	- 2,200	- 2,200	- 2,200	- 2,382	- 25,435
Madrid	MAD	-	-	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-	-	-	-	-	-	- 3,693	- 1,776	- 1,713	- 1,713	- 1,890	- 20,200
Vienna	VIE	-	-	-	-	-	-	-	-	-	-	-	-
		Economic benefits (€ 000s)						Net economic benefits (€ 000s)					
		2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	- 1,055	30,541	72,194	69,536	41,350	386,144	- 23,113	- 37,160	- 29,816	- 37,005	- 33,675	- 347,420
Madrid	MAD	-	-	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	9,254	52,091	91,279	125,150	66,934	636,874	5,561	50,316	89,566	123,436	65,044	616,674
Vienna	VIE	-	-	-	-	-	-	-	-	-	-	-	-

Social impacts

		Airport employment (FTEs)					Airline and handling agent employment (FTEs)				
		2012	2017	2021	2025	Average 2012-2025	2012	2017	2021	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	- 32	927	2,191	2,110	1,255	2,134	9,061	17,775	16,680	11,265
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	281	1,581	2,770	3,798	2,031	992	3,771	5,846	7,540	4,465
Vienna	VIE	-	-	-	-	-	-	-	-	-	-

Other quantifiable impacts

		Impact on air fares (%)					Impact on CO2 emissions (000s tonnes of CO2)				
		2012	2017	2021	2025	Average 2012-2025	2012	2017	2021	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	0.1%	-1.6%	-3.6%	-3.2%	-2.0%	384	1,525	2,855	2,574	1,827
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-1.4%	-7.2%	-11.8%	-15.1%	-8.7%	163	554	803	980	624
Vienna	VIE	-	-	-	-	-	-	-	-	-	-

Source: 2011 SDG study

TABLE 2 QUANTIFIED IMPACTS: HIGH NEGATIVE IMPACTS SCENARIO

Percentage impact on traffic volumes handled at each airport

		Impact on number of flights operated (%)					Impact on number of passengers (%)				
		2012	2017	2021	2025	Average 2012-2025	2012	2017	2021	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	-0.2%	-1.2%	-2.0%	-2.0%	-1.4%	-0.2%	1.0%	2.6%	2.2%	1.4%
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-0.0%	-0.3%	-0.5%	-0.5%	-0.3%	1.5%	7.6%	12.4%	16.0%	9.5%
Vienna	VIE	-	-	-	-	-	-	-	-	-	-

Economic impacts

		Airline operating costs (€ 000s)						Other direct costs (€ 000s)					
		2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	- 48,908	- 185,238	- 282,474	- 295,292	- 205,517	- 2,003,299	- 4,756	- 2,200	- 2,200	- 2,200	- 2,382	- 25,435
Madrid	MAD	-	-	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	- 15,329	- 62,125	- 99,520	- 110,038	- 71,818	- 695,442	- 3,693	- 1,775	- 1,713	- 1,713	- 1,936	- 20,811
Vienna	VIE	-	-	-	-	-	-	-	-	-	-	-	-
		Economic benefits (€ 000s)						**Net economic benefits (€ 000s)**					
		2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025	2012	2017	2021	2025	Average 2012-2025	NPV 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	- 3,308	16,661	47,783	43,379	24,843	227,631	- 56,973	- 170,777	- 236,891	- 254,113	- 183,056	- 1,801,102
Madrid	MAD	-	-	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	8,909	49,915	87,420	120,849	64,302	611,661	- 10,112	- 13,986	- 13,814	9,098	- 9,452	- 104,592
Vienna	VIE	-	-	-	-	-	-	-	-	-	-	-	-

Social impacts

		Airport employment (FTEs)					Airline and handling agent employment (FTEs)				
		2012	2017	2021	2025	Average 2012-2025	2012	2017	2021	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	- 100	506	1,450	1,316	754	1,910	7,865	15,647	14,187	9,792
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	270	1,515	2,653	3,668	1,951	979	3,698	5,718	7,397	4,377
Vienna	VIE	-	-	-	-	-	-	-	-	-	-

Other quantifiable impacts

		Impact on air fares (%)					Impact on CO2 emissions (000s tonnes of CO2)				
		2012	2017	2021	2025	Average 2012-2025	2012	2017	2021	2025	Average 2012-2025
Dusseldorf	DUS	-	-	-	-	-	-	-	-	-	-
London Gatwick	LGW	-	-	-	-	-	-	-	-	-	-
London Heathrow	LHR	0.2%	-0.9%	-2.4%	-2.0%	-1.2%	345	1,324	2,512	2,189	1,589
Madrid	MAD	-	-	-	-	-	-	-	-	-	-
Paris Orly	ORY	-1.3%	-6.9%	-11.3%	-14.6%	-8.4%	160	542	784	959	611
Vienna	VIE	-	-	-	-	-	-	-	-	-	-

Source: 2011 SDG study

As discussed above, with the criteria proposed for withdrawal and auctions, initially this would only apply at Heathrow and Orly; however, these criteria might also start to apply at Düsseldorf and Gatwick at some point during the impact assessment period. We have estimated the potential impact at Dusseldorf and Gatwick through extrapolation of the impacts at Heathrow and Orly, taking into account the benefits that secondary trading was calculated as generating at each airport. Overall, although it is possible that withdrawal and auctions might generate net benefits at Dusseldorf, it would not generate net benefits at Gatwick, because secondary trading would be occurring at Gatwick but not Düsseldorf in the baseline scenario. The introduction of secondary trading at Düsseldorf would generate greater net benefits than the introduction of withdrawal and auctions.

TABLE 3 EXTRAPOLATED IMPACT: DUSSELDORF AND GATWICK

	Düsseldorf	**London Gatwick**
Passengers (%)	8.6% - 9.4%	1.4 - 2.3%
Flights (%)	-0.3% - -1.4%	-0.3% - -1.4%
Passengers (millions)	2.3 - 2.6	0.6 - 0.9
Airline operating costs (€ million NPV)	246 - 697	361 - 1,021
Direct implementation costs (€ million NPV)	20 - 21	20 - 21
Economic benefits (€ million NPV)	343 - 357	64 - 109
Net economic benefits (€ million NPV)	-375 - 90	-978 – -272
Airport employment (000 FTEs)	1.1	0.2 - 0.4
Airline employment (000 FTEs)	2.2 - 2.3	1.0 - 1.2
Fares (%)	-7.7% - -8.7%	-1.3% - -2.1%
CO2 emissions (tonnes, 000s)	306 - 312	147 - 169

Note: Financial values presented as net present value (NPV) of costs/benefits 2012-25. Non-financial values (passengers, emissions etc) presented as annual average values 2012-25.

Source: 2011 SDG study

The qualitative assessment of other impacts is shown below.

TABLE 4 OTHER IMPACTS

Impact category	**Impact**
Noise	Slight increase in noise around major airports, as a result of use of larger aircraft
Frequencies and destinations served	Reduction in short distance and regional destinations served and frequencies, as regional airlines would not be able to pay as much for slots as operators of more profitable longer-distance services. There may be an increase in frequencies on long haul routes. Overall there may be a slight reduction in frequencies if the useable capacity of major airports is reduced.
Punctuality and reliability	Little or no impact. There could be a slight improvement in reliability as airlines that purchase slots may be less likely to cancel flights.

Table 5 shows estimated impacts on market share at the two airports in 2021, when all slots have been withdrawn and auctioned, relative to the baseline scenario and the measure on secondary trading. The baseline scenario includes secondary trading at Heathrow but not at Orly; the small difference in the market shares at Heathrow between the baseline and the measure on secondary trading reflects the small increase in the number of trades projected to occur if trading was explicitly permitted.

At Heathrow, the main changes relative to the baseline scenario are that the main incumbent carrier (British Airways) and the non-EU long haul carriers would gain a slightly higher market share. The domestic and short haul services operated by BMI are assumed to be withdrawn altogether by 2021, as it would not be worthwhile purchasing slots for these; in the baseline scenario it is assumed that these services are significantly reduced, particularly during peak hours, but a few are retained. At Orly, the impacts are similar to those from secondary trading, but stronger: low cost carriers would purchase slots (as at Gatwick) and slots would generally not be purchased for operations with smaller regional aircraft, including by the main based carrier (Air France and its subsidiaries).

TABLE 5 IMPACTS ON AIRLINE SHARE OF SLOTS IN 2021

		London Heathrow				
		Market shares in 2021			Impact of the measure of withdrawal and auctions relative to	
		Baseline	Secondary trading	Withdrawal and auctions	Baseline	Secondary trading
Main based network carrier	Regional	-	-	-	-	-
	Short haul	28.7%	28.8%	30.8%	2.1%	2.0%
	Long haul	13.8%	13.8%	14.5%	0.7%	0.7%
Other based network carrier	Regional	0.3%	0.3%	-	-0.3%	-0.3%
	Short haul	3.6%	3.5%	-	-3.6%	-3.5%
	Long haul	6.7%	6.7%	7.6%	0.9%	0.8%
Non-based network carrier	Regional	0.1%	0.1%	-	-0.1%	-0.1%
	Short haul	20.5%	20.4%	18.8%	-1.8%	-1.6%
	Long haul	26.3%	26.3%	28.3%	2.1%	2.0%
Low cost carriers		-	-	-	-	-
Charter/leisure carriers		-	-	-	-	-

Source: 2011 SDG study

		Paris Orly				
		Market shares in 2021			Impact of the measure of withdrawal and auctions relative to	
		Baseline	Secondary trading	Withdrawal and auctions	Baseline	Secondary trading
Main based network carrier	Regional	10.2%	6.0%	5.5%	-4.7%	-0.5%
	Short haul	40.0%	34.8%	31.8%	-8.2%	-2.9%
	Long haul	1.5%	1.5%	1.5%	0.0%	0.0%
Other based network	Regional	2.2%	0.6%	0.7%	-1.5%	0.1%
	Short haul	1.7%	1.5%	1.5%	-0.1%	0.0%

carrier	Long haul	0.0%	-	-	0.0%	-
Non-based network carrier	Regional	2.4%	2.1%	1.6%	-0.8%	-0.5%
	Short haul	20.9%	20.9%	19.4%	-1.4%	-1.4%
	Long haul	1.6%	1.9%	2.1%	0.5%	0.2%
Low cost carriers		18.2%	28.7%	33.3%	15.1%	4.6%
Charter/leisure carriers		1.4%	1.9%	2.3%	1.0%	0.4%

Source: 2011 SDG study

In the same way as the projected impact of secondary trading for Orly depends on the assumption that Air France would be willing to sell slots to competitors if they placed a higher value on the slots than it did, the projected impact of withdrawal and auctions at Orly depends on the assumption that Air France would not buy slots in order to keep competitors out of the airport.

Withdrawal and auction of a smaller proportion of slots

As an alternative, a smaller proportion of slots could be withdrawn and auctioned; this would be similar to the FAA's proposal for the New York airports where 10% of slots were to be auctioned over 5 years (2% per year). In this scenario, negative impacts would be reduced significantly – as it would be easier for carriers to undertake the number of secondary trades required to address any deficiencies in the initial auction allocation. In addition, the marginal gains from each transaction might be higher, as there would be an opportunity for the new entrants who placed the highest value on slots to acquire them – although the total gains would be lower.

However, withdrawal of a smaller proportion of slots would create some difficulties. In particular, where carriers had less than 10 daily slot pairs at an airport, it would not be possible to withdraw 10% of slots without withdrawing slots on certain days only, thereby fragmenting the schedule. The FAA proposed to address this problem at the New York airports by only withdrawing slots from carriers with larger slot holdings. Whilst feasible, this could be considered to be unfair to the based hub carriers (who would probably be the only carriers with a significantly higher number of slots) relative to other carriers operating from the airport.