



STUDY ON THE IMPACT OF THE INTRODUCTION OF SECONDARY TRADING AT COMMUNITY AIRPORTS

VOLUME I - REPORT

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Study on the Impact of the Introduction of Secondary Trading at Community Airports

Volume I

Report

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Volume I

Report

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List of Contents	Page
Chapters	
1 Executive Summary	1-1
1.1 Synopsis	1-1
1.2 Introduction	1-1
1.3 Objectives of the Commission	1-2
1.4 Definitions and Descriptions	1-2
1.5 Examples of Secondary Slot Trading at Airports	1-2
1.6 Secondary Trading in Other Sectors	1-4
1.7 Recent Trends in Airport Capacity and Slot Demand	1-5
1.8 Industry Expectations of the Impact of Secondary Trading	1-5
1.9 Statistical Assessment of Impact of Secondary Slot Trading	1-6
1.10 Economic and Environmental Impact Assessment	1-6
1.11 Secondary Slot Trading – Analysis of Likely Effects and Impact of Potential Conditions	1-7
1.12 Primary Slot Allocation Issues	1-9
2 Introduction	2-1
2.1 Requirement for Study	2-1
2.2 The Need to Maximise the Efficient Use of Slots	2-4
2.3 The Development of a Grey Market in Airport Slots	2-6
2.4 The Need for a Common System for Regulating Secondary Trading in Airport Slots	2-8
2.5 Consideration of Changes that Might be Made to the Primary Allocation System	2-8
2.6 General Comment on Accuracy of Estimates	2-8
3 Objectives of the Commission	3-1
4 Definitions and Descriptions	4-1
4.1 Definition of a Slot	4-1
4.2 Definition of Secondary Slot Trading	4-1
4.3 Primary Slot Allocation – Description of Current IATA System	4-1

4.4	Primary Slot Allocation – Description of Current EC System	4-2
4.5	Slot Exchanges and Transfers - Description of Current IATA System	4-3
4.6	Slot Exchanges and Transfers – Description of Current EC System	4-3
4.7	Definition of ‘Artificial’ Exchanges	4-5
5	Examples of Secondary Slot Trading at Airports	5-7
5.1	Airport Secondary Slot Trading in the USA	5-7
5.1.1	Introduction & Overview	5-7
5.1.2	US Legislation Applying to Slots and Impact of the Buy/Sell Rule to 2000	5-10
5.1.3	An Assessment of the Buy/Sell Rule	5-13
5.1.4	Modifications to the Buy/Sell Rule and its impact on secondary slot trading	5-14
5.1.5	The Air 21 Act	5-18
5.1.6	New York-La Guardia	5-19
5.1.7	Chicago-O’Hare	5-22
5.1.8	Audit of Slot Holdings and Slot Operations 2000 - 2005	5-24
5.1.9	Conclusions	5-27
5.2	Secondary Slot Trading in the UK	5-34
5.2.1	Background	5-34
5.2.2	Analysis of Trades	5-35
6	Secondary Trading in Other Sectors	6-1
6.1	Introduction	6-1
6.2	Capacity Rights for the UK–Europe Natural Gas Interconnector	6-1
6.3	Capacity Rights for the England–France Electricity Interconnector	6-2
6.4	Gas Entry Capacity Rights for the UK Gas Transmission System	6-3
6.5	EU Emission Trading Scheme	6-4
6.6	Spectrum Trading	6-6
6.6.1	Details of Spectrum Trading	6-6
6.6.2	Issues Arising with the Introduction of Spectrum Trading	6-8
6.7	Water Abstraction Rights in the UK	6-10
6.7.1	Benefits of Introducing Trading	6-10

6.7.2	Market Participation	6-11
6.7.3	Competition Issues	6-11
6.7.4	Access to Information	6-12
6.8	Issues Arising	6-12
6.9	Findings	6-14
6.9.1	The Ability to Trade	6-14
6.9.2	Access to the Market	6-14
6.9.3	Transparency of Information	6-15
6.9.4	Anti-competitive Behaviour	6-16
7	Recent Trends in Airport Capacity and Slot Demand	7-1
7.1	Introduction	7-1
7.2	Airport Selection	7-2
7.3	Airport Slot Usage 1975 and 2005 – All Flights	7-5
7.3.1	Introduction	7-5
7.3.2	Airport Classification	7-6
7.3.3	Comparison of 1993 and 2004 Airport Data	7-6
7.4	Airport Slot Usage 1975 and 2005 – Scheduled Passenger Flights	7-15
7.4.1	Introduction	7-15
7.4.2	Original Data	7-16
7.4.3	Derived Data	7-17
7.4.4	Results of Analysis	7-18
7.4.5	Weekly Scheduled Departures	7-22
7.4.6	Average Seats per Flight	7-23
7.4.7	Average Kilometres per Seat	7-25
7.4.8	Average ASKs per Departure	7-27
7.4.9	Summary	7-29
7.5	Airport Slot Usage 2005 – Coordinator Statistics	7-30
7.5.1	Slot Availability and Slot Allocation	7-32

7.5.2 Slot Demand and Slot Allocations	7-34
7.5.3 Actual Usage of Slots	7-36
7.5.4 ‘Grandfather’ Slots and Pool Slots	7-38
7.5.5 Primary Allocation of Slots	7-39
7.5.6 Slot Exchanges	7-40
7.5.7 Artificial Slot Exchanges	7-41
7.6 Forecast Growth of Slot Demand 2005 – 2025	7-44
7.6.1 From 2004 to 2023 by Airbus	7-45
7.6.2 From 2005 to 2024 by Boeing	7-45
7.6.3 From 2005 to 2024 by Rolls Royce	7-45
7.6.4 From 2005 to 2009 by the International Air Transport Association (IATA)	7-46
7.6.5 From 2004 to 2020 by the Airports Council International (ACI)	7-46
7.6.6 From 2006 to 2012 by Eurocontrol	7-46
7.6.7 From 2005 to 2017 by the U.S Federal Aviation Authority (FAA)	7-47
7.6.8 From 2003 to 2020 by the World Tourism Organisation (WTO)	7-47
7.6.9 Summary	7-47
7.6.10 Forecasts used for This Study	7-47
7.7 Forecast Capacity Growth at European Airports 2005 – 2025	7-48
7.7.1 London-Heathrow	7-50
7.7.2 London-Gatwick	7-51
7.7.3 Paris-Orly	7-51
7.7.4 Paris-Charles de Gaulle	7-52
7.7.5 Amsterdam	7-52
7.7.6 Düsseldorf	7-53
7.7.7 Frankfurt	7-53
7.7.8 Milan-Linate	7-54
7.7.9 Other European Airports	7-54
7.7.10 Summary	7-56

8	Industry Expectations of the Impact of Secondary Trading	8-1
8.1	Introduction	8-1
8.1.1	Views of Airport Operators	8-1
8.1.2	Views of Airport Slot Coordinators	8-2
8.1.3	Views of Airlines	8-3
8.1.4	Views of Governments	8-3
8.1.5	EUACA Seminar	8-3
8.2	Analysis of Views	8-3
8.3	The London Experience	8-4
8.4	The Oslo Experience	8-5
8.5	The Views of Industry Stakeholders	8-6
8.6	Summary	8-11
9	Statistical Assessment of Impact of Secondary Slot Trading	9-1
9.1	Basic Premise Regarding Secondary Slot Trading Regulations	9-1
9.2	General Methodology	9-1
9.3	Impact on the Total Number of Slots Used	9-2
9.4	Impact on Airline Competition	9-3
9.5	Impact on Geographical Destination of Flights	9-6
9.6	Impact on Average Flight Distance in Kilometres	9-7
9.7	Impact on Average Aircraft Size	9-7
9.8	Impact on Average Passengers per Flight	9-8
9.9	Impact on Passenger Revenue per Flight	9-8
9.10	Impact on Airline Cost per Flight	9-9
9.11	Impact on Aircraft Type	9-9
9.12	Impact on Journey Purpose of Passengers	9-10
9.13	Impact on Transfers and Surface Access Requirements	9-11
9.14	Use of Alternative Airports	9-11
9.15	Forecasts for Each of Eight Congested Airports	9-12
9.15.1	Introduction	9-12

9.15.2	Forecasting assumptions	9-13
9.16	Forecast Impact at All EU Airports	9-30
10	Assessment of Economic and Environmental Impacts	10-1
10.1	Introduction	10-1
10.2	Impacts on Welfare	10-1
10.2.1	Background	10-1
10.2.2	Welfare Impacts	10-9
10.2.3	Other Considerations	10-14
10.2.4	Summary of Welfare Impacts	10-15
10.3	Impacts on Competition	10-16
10.4	Impacts on Airport Finances	10-18
10.5	Impacts on the Environment	10-20
10.5.1	Introduction	10-20
10.5.2	Impact of Slot Trading on Atmospheric Emissions	10-21
10.5.3	Local Air Quality Impacts from Aviation	10-21
10.5.4	Carbon Emission Impacts from Aviation	10-27
10.5.5	Surface Access Impacts on Atmospheric Emissions and Local Air Quality	10-31
10.5.6	Impact of Slot Trading on Ambient Noise	10-32
10.6	Impacts on the Local and Wider Economy	10-35
10.6.1	Introduction	10-35
10.6.2	Changes in employment levels in the region	10-36
10.6.3	Catalytic impacts	10-39
10.6.4	Summary	10-42
10.7	Conclusions	10-43
11	Secondary Slot Trading – Analysis of Likely Effects and Impact of Potential Conditions	11-1
11.1	Introduction	11-1
11.2	Definition of Slot Trading Used in Analysis	11-1
11.3	Assessment of the Likely Effects of Secondary Trading	11-2
11.4	Assessment of Impact of Removing Existing Conditions	11-6

11.5	Removal of Restriction on Holders of Slots	11-6
11.6	Removal of Existing New Entrant Restrictions	11-8
11.7	Assessment of Impact of Increasing Conditions	11-9
11.8	Requirement for Pre-Trade Transparency	11-9
11.9	Requirement for Post-Trade Transparency	11-12
11.10	Restrictive Covenants	11-13
11.11	Secondary Trading to be Made Permissible, but not Mandatory	11-14
11.12	Summary of Assessment	11-14
12	Primary Slot Allocation Issues	12-1
12.1	Introduction	12-1
12.2	The New Entrants Provisions	12-1
12.3	Local Guidelines	12-3
12.4	Suggested Amendment to the 80% Rule on Slot Utilisation	12-5
12.4.1	Current Provision	12-5
12.4.2	Possible Variation	12-6
12.4.3	Discussions with Stakeholders	12-6
12.4.4	Analysis of Predicted Impact of Suggested Amendment to the 80% Rule	12-9
12.5	Slot Auctions	12-11
12.5.1	Current Regulations	12-11
12.5.2	Possible Variation	12-12
12.5.3	The Present System of Administrative Slot Allocation	12-13
12.5.4	Discussions Held	12-14
12.5.5	Analysis of Predicted Impact of Slot Auctions	12-19
12.5.6	Assessment of Possible Economic Impact of Suggested Amendment	12-22
12.5.7	Conclusions	12-23
12.6	Suggested Amendment to Allow Slot Withdrawal	12-24
12.6.1	Current Regulations	12-24
12.6.2	Suggested Variation	12-25
12.6.3	Stakeholder Views	12-27

12.6.4	Analysis of Impact	12-29
12.6.5	Optimal Slot Withdrawal and Redistribution Mechanisms	12-30
12.6.6	Analysis of Predicted Impact of Slot Withdrawals	12-31
12.6.7	Assessment of Possible Economic Impact of Suggested Amendment	12-33
13	Glossary	13-1
Figure 6.1:	Volume of Internal and Non-internal Trades of Entry Capacity, Gas Year 2000/01 to 2002/03	6-4
Figure 7.1:	IATA Level Three Coordinated Airports	7-3
Figure 7.2:	IATA Level Two Schedules Facilitated Airports	7-4
Figure 7.3:	Percentage of Scheduled Departures by Seat Kilometre Grouping by Airport Grouping, 2005	7-28
Figure 7.4:	Percentage of Scheduled Departures by Seat Kilometre Grouping by Airport Grouping, 2005	7-29
Figure 10.1:	Definitions of Consumer and Producer Surplus	10-2
Figure 10.2:	Movement Along the Flights Demand Curve	10-3
Figure 10.3:	Additional Shift in the Demand Curve	10-4
Figure 10.4:	Fixed Slot Supply	10-6
Figure 10.5:	Fixed Slot Supply with Higher Demand	10-7
Figure 10.6:	The Impact on Slot Sellers	10-8
Figure 10.7:	Impact of Changes in Slot Costs on Air Fares	10-15
Table 5.1:	Summary of Air Carrier Slot Leases and Sales at US High-density Airports, 1986-92	5-13
Table 5.2:	Percentage of Domestic Air Carrier Slots Held By Selected Groups	5-17
Table 6.1:	Examples of Secondary Trading and Their Characteristics	6-13
Table 7.1:	Total Flights at 30 Airports, 1993 and 2005	7-7
Table 7.2:	Non-Commercial Flights at 30 Airports, 1993 and 2005	7-7
Table 7.3:	Air Transport Movements at 30 Airports, 1993 and 2005	7-8
Table 7.4:	Air Transport Movements at 12 Airports, 1975 or 1986 and 2005	7-9
Table 7.5:	Passenger and Cargo ATMs at 19 Airports, 1993 and 2005	7-10
Table 7.6:	Passenger and Cargo ATMs at 12 Airports, 1975, 1986 or 1991 and 2005	7-11
Table 7.7:	Passenger ATMs at 19 Airports, 1993 and 2005	7-12
Table 7.8:	Charter Passenger ATMs at 7 Airports, 1975 or 1986 and 2005	7-13
Table 7.9:	Passenger Numbers at 30 Airports, 1993 and 2005	7-14
Table 7.10:	Average Passengers per PATM for 19 Airports, 1993 and 2005	7-15
Table 7.11:	ABC Data May 01-07 1975	7-19
Table 7.12:	OAG Data May 01-07 2005	7-20
Table 7.13:	Average Annual Growth Rates 1975 to 2005	7-21
Table 7.14:	Growth Rates by Destination by Airport Category, 1975 to 2005	7-23
Table 7.15:	Average Seats per Flight 1975, by Destination and Airport Category	7-24
Table 7.16:	Average Seats per Flight 2005, by Destination and Airport Category	7-24
Table 7.17:	Average Change in Seats per Flight 1975-2005, by Destination and Airport Category	7-24
Table 7.18:	Average Kilometres Flown 1975, by Destination and Airport Category	7-26
Table 7.19:	Average Kilometres Flown 2005, by Destination and Airport Category	7-26
Table 7.20:	Change in Average Kilometres Flown 1975 to 2005, by Destination and Airport Category	7-26
Table 7.21:	Average ASKs per Departure, 1975 and 2005, by Airport Category	7-27
Table 7.22:	Distribution of Departures by Seat Kilometres Provided in 2005, by Airport Category	7-28
Table 7.23:	Available and Allocated Slots 2005/2006 by Coordinated Airport	7-33

Table 7.24: Slots Requested and Allocated 2005/2006 by Coordinated Airport	7-35
Table 7.25: Slots Allocated and Used 2005/2006 by Coordinated Airport	7-37
Table 7.26: Historical Slots and Total Allocated Slots 2005/2006 by Coordinated Airport	7-38
Table 7.27: Primary Slot Allocation at Brussels, Zürich and Geneva 2005/2006	7-40
Table 7.28: Slot Exchanges at Stockholm-Arlanda, 2005/2006	7-41
Table 7.29: Summary of Relevant Demand Forecasts	7-47
Table 7.30: Historic and Forecast Growth Rates	7-48
Table 7.31: Forecasts of Slot Capacity 2025 by Airport	7-49
Table 7.32: Daily IFR Movements at the 25 Largest European Airports, April-June 2004	7-55
Table 9.1: AEA Revenue per RPK, and Operating Ratios	9-9
Table 9.2: Aircraft Types Selected by Flight Category for 2005 and 2025	9-10
Table 9.3: Slot Capacity and Demand 2005 and 2025 – London-Heathrow	9-15
Table 9.4: Summary of Forecasts for 2025 – London-Heathrow	9-16
Table 9.5: Slot Capacity and Demand 2005 and 2025 – London-Gatwick	9-17
Table 9.6: Summary of Forecasts for 2025 – London-Gatwick	9-17
Table 9.7: Capacity and Demand 2005 and 2025 – Paris-Orly	9-18
Table 9.8: Summary of Forecasts for 2025 – Paris-Orly	9-19
Table 9.9: Capacity and Demand 2005 and 2025 – Paris-Charles de Gaulle	9-20
Table 9.10: Summary of Forecasts for 2025 – Paris-Charles de Gaulle	9-21
Table 9.11: Capacity and Demand 2005 and 2025 – Amsterdam	9-22
Table 9.12: Summary of Forecasts for 2025 – Amsterdam	9-23
Table 9.13: Capacity and Demand 2005 and 2025 – Düsseldorf	9-24
Table 9.14: Summary of Forecasts for 2025 – Düsseldorf	9-24
Table 9.15: Capacity and Demand 2005 and 2025 – Frankfurt	9-25
Table 9.16: Summary of Forecasts for 2025 – Frankfurt	9-26
Table 9.17: Capacity and Demand 2005 and 2025 – Milan-Linate	9-27
Table 9.18: Summary of Forecasts for 2025 – Milan-Linate	9-28
Table 9.19: Capacity and Demand 2005 and 2025 – Eight Congested Airports	9-29
Table 9.20: Summary of Forecasts for 2025 – Eight Congested Airports	9-30
Table 9.21: Summary of Forecasts for 2025 – Estimate of All EU Airports	9-32
Table 10.1: Total Welfare Outcomes Resulting from Introducing Secondary Trading Assuming a Demand Shift (€m)	10-10
Table 10.2: Consumer Welfare Outcomes Resulting from Introducing Secondary Trading (€m)	10-11
Table 10.3: Producer Welfare Outcomes Resulting from Introducing Secondary Trading (€m)	10-12
Table 10.4: Change in Proportion of Flight Types due to Secondary Trading	10-17
Table 10.5: Change in Annual Airport Commercial Revenues due to Secondary Trading	10-19
Table 10.6: Categorisation of aircraft type by flight type and airline type	10-20
Table 10.7: Local NO _x and Hydrocarbon Emissions by Aircraft Type per Landing and Takeoff Cycle (grammes)	10-22
Table 10.8: Indicative Average Emissions by Aircraft Flight Type for Landing and Takeoff	10-23
Table 10.9: Projected Changes in Landing and Takeoff Emissions as a Result of Secondary Trading (tonnes)	10-23
Table 10.10: Indicative Damage Cost of Change in NO _x Emissions as a Result of Secondary Trading	10-26
Table 10.11: Indicative Average Emissions by Flight Type for CO ₂ Emissions (kg CO ₂ /km)	10-28
Table 10.12: Impact of Slot Trading on Carbon Dioxide Emissions (mt CO ₂)	10-29
Table 10.13: Indicative Damage Cost of Change in CO ₂ Emissions as a Result of the Introduction of Slot Trading (€m)	10-30
Table 10.14: Increase in Surface Access CO ₂ Emissions as a Result of Additional Passengers being Carried Following the Introduction of Secondary Trading	10-31
Table 10.15: Value of Impact Caused by Additional Surface Access Emissions for Illustrative Passenger Distance Travelled (€m)	10-32
Table 10.16: Noise from Landing and Takeoff by Aircraft Type (decibels)	10-33
Table 10.17: Noise Classification of Aircraft by Nature of Flight using EPNdB	10-34

Table 10.18: Indicative Change in Average Aircraft EPNdB as a Result of Slot Trading	10-34
Table 10.19: Direct, Indirect and Induced Job Creation at Airports as a Result of Additional Passengers Carried Following Slot Trading	10-38
Table 10.20: Impact of Slot Trading on the Local Economy	10-42
Table 10.21: Summary of Impacts from Slot Trading	10-45

1 Executive Summary

1.1 Synopsis

1. This study was commissioned by the European Commission (DGTREN) to evaluate the implications of the formal introduction and acceptance of secondary trading mechanisms for runway slots at congested community airports.
2. The programme was led by Mott MacDonald's Aviation Group, in association with Oxera, aviation lawyer Hugh O'Donovan, and regulatory specialist Keith Boyfield. The study benefited from the team's active participation in the organization and management of a major seminar on secondary trading led by EUACA (European Union Airport Coordinators Association).
3. The study concentrates on:
 - detailed discussions with senior aviation industry practitioners and regulators concerning their experience of secondary trading in the USA and London
 - considering the relevance of secondary trading in other industries
 - a detailed analysis of available aviation data, characterized by original research, to determine the underlying trends in Europe over the past 30 years
 - discussion with interested stakeholders throughout Europe to allow an analysis of the expected impact of secondary trading
 - preparation of comprehensive forecasts of slot demand to 2025, both with and without secondary trading
 - a series of economic impact assessments based on the slot usage forecasts
 - a set of conclusions regarding the outcome of a range of options regarding the detailed application of secondary trading
4. The study was also asked to give consideration to a range of possible amendments to the current primary allocation mechanisms:
 - the impact of increasing the current 'use-it-or-lose-it' minimum usage requirement above the present level set at 80%.
 - the auctioning of newly created slots
 - the possibility of a continuing programme of withdrawing a proportion of slots from airlines

1.2 Introduction

5. Over the next 20 years, demand for slots is forecast to outstrip any increases in supply at an increasing number of European airports.

6. An earlier study for the Commission by NERA examined several possibilities for the allocation of slots and recommended the adoption of a secondary trading regime accompanied by posted airport prices for slots. The Commission initiated this study to examine secondary trading in more detail, including an assessment of the full economic impacts.
7. The current administrative allocation method is analysed, together with a number of issues such as appropriate measures of economic efficiency associated with slot allocation.
8. The study describes the current grey market in slot trading in Europe and discusses the need for a common approach across the Community.

1.3 Objectives of the Commission

9. The purpose of the study is to assess the likely effects of the introduction of secondary slot trading.
10. The Commission's other primary objectives are:
 - To ensure mobility of slots and 'efficient' transport for passenger and cargo
 - To strengthen competition at Community airports
 - To match secondary trading with the overall EU (air) transport policy
 - To ensure compatibility of secondary slot trading with world-wide procedures

1.4 Definitions and Descriptions

11. In Chapter 4, full definitions and descriptions are given of the key assumptions and terminology regarding: slots, secondary slot trading, primary slot allocation, slot exchanges and transfers, and the current operation of the grey market in Europe.
12. This chapter compares the current EC system of allowing slot exchanges and transfers with the current IATA Worldwide Scheduling Guidelines, and how, in the UK, use has been made of the EC provisions on slot exchanges to achieve unilateral slot transfers, where these are not expressly permitted by the EC Slot Regulation.

1.5 Examples of Secondary Slot Trading at Airports

13. Airport secondary slot trading in the USA
14. In Chapter 5.1, a full analysis of the history of slot trading is given for each of the four congested US airports subject to the High Density Rule and subsequent FAA regulations up to and including the FAA proposals of August 2006. The four affected airports are: New York-La Guardia, New York-JFK, Chicago-O'Hare and Washington-National.
15. The study discusses the main differences between the current law and practice in relation to relieving congestion at US airports and current law and practice in the EC, to determine to what extent the US experience is relevant to the introduction of slot trading in the EC.

-
16. From the long experience of slot trading in the USA, the key themes that emerged are:
- It has led to a liquid and flexible market in slots
 - It has been effective in fostering new entry
 - Secondary trading is supported by the industry, and has proved to be an active market
 - The regime appears to have worked well with minimal regulatory intervention
 - A feature of the liquidity has been the high incidence of slot leasing
 - Direct competitors are prepared to trade slots with each other freely
 - Slots have been used as security in financings
 - The regulatory approach has been adapted to the characteristics of each specific airport
17. There have been political interventions to ring-fence slots for essential services on thinner domestic routes.
18. Airport secondary slot trading in the UK
19. Chapter 5.2 describes the impact of ‘artificial’ slot trades at London-Heathrow and London-Gatwick during the period 2001-2006, and analyses information on trades to assess the impact on slot utilization and competition.
20. This experience largely mirrors the trends observed in the USA, in that:
- It has led to a liquid and flexible market in slots
 - It has been effective in fostering new entry
 - Secondary trading is supported by the industry, and has proved to be an active market
 - The regime has permitted slot leasing
 - Direct competitors are prepared to trade slots with each other freely
 - However, the use of slots as security in financings has not developed, nor has there been the development of different regulations for each congested (UK) airport
21. In general, it is seen that BA have been the largest purchaser of slots, and that short-haul carriers, that have either ceased to trade or have transferred their operations to other London area airports, have been the main sellers of slots at London-Heathrow. New long-haul entrants have also purchased slots. The efficiency in use of slots, as expressed in Available Seat Kilometres [ASKs] per slot, has been greatly improved through small aircraft on short routes generally being replaced by large aircraft on long-haul routes.
22. The London-Heathrow experience has been used in Chapter 9 to help determine the probable impact on other EC congested airports if the EC Slot Regulation were amended to permit secondary slot trading.
-

1.6 Secondary Trading in Other Sectors

23. The majority of the examples of secondary trading in other industries are recent, and assessments of the liquidity of the markets are not always available. Few benefits assessments of the introduction of secondary trading have been undertaken. Chapter 6 focuses on the design characteristics of these markets and related issues that are of relevance to secondary trading of airport slots, notably:

- range of market participants;
- information publication;
- range of transfers allowed;
- competition issues.

24. Six examples are analysed:

- Capacity rights for the UK–Europe natural gas interconnector
- Capacity rights for the England–France electricity interconnector
- Gas entry capacity rights for the UK gas transmission system
- EU Emission Trading Scheme
- Spectrum trading
- Water abstraction rights in the UK

25. The study confirms that the majority of forms of secondary trading are bilateral, with occasional use of brokering or exchanges. Bilateral trades offer continuous trading opportunities, occasionally supplemented by periodic auctions. Defined rights differ according to the nature of the market. Capacity rights for the interconnectors or for gas entry are limited to specific periods - the periods vary in length from a single day to 17 years. In contrast, spectrum rights are held indefinitely, but with revocation clauses. Water rights can either be held indefinitely, or held for shorter terms.

26. Findings from this study of comparative trading are that:

- allowing alternative forms of transfer, such as sub-letting of (capacity) rights, can increase market flexibility and efficiency.
- unrestricted market access may help develop the market for airport slots, potentially helping to overcome knowledge gaps and improve liquidity
- collecting and publishing aggregated data on trades (possibly including price) allays the confidentiality concerns of individual traders, yet satisfies the market's need for information.
- the effectiveness of additional mechanisms to address anti-competitive behaviour should be assessed with regard to the sufficiency of existing competition law

1.7 Recent Trends in Airport Capacity and Slot Demand

27. Chapter 7 examines the trends in the use of airport slots over the thirty year period 1975 to 2005 to enable forecasts to be made of the expected use of slots at congested airports through to 2025, on the expectation of no change in the current EC Slot Regulation.
28. It also examines the current status of slot availability and use at a range of coordinated European airports, so as to enable correlation of current traffic patterns with the degree of congestion.
29. Airports have been categorized as ‘uncongested’, ‘partially congested’ or ‘heavily congested’ in 2005, and these groupings have been used to determine the impact of congestion on trends in slot usage.
30. The figures show conclusively that the trends (independent of any slot trading) have been:
 - commercial flights replace general aviation and other ad hoc flights
 - scheduled passenger flights replace cargo and passenger charter flights
 - aircraft size increases
 - the average distance of flights increases
31. These trends are more obvious at heavily congested airports than at uncongested airports. Thus the efficiency of slot use is already greatly increased at congested airports, even without secondary trading. This is recognised in the subsequent determination of the marginal changes expected to be brought about by such trading.
32. The study examines industry forecasts of expected growth of passengers, passenger kilometres and aircraft movements over the next 20 years. It concludes that – at major European airports – demand for slots is likely to grow at a compound rate of some 3.1% a year between 2005 and 2025. The study also examines any known or expected increases in airport capacity to assess how far such congested airports may be able to meet this forecast demand for slots.

1.8 Industry Expectations of the Impact of Secondary Trading

33. Chapter 8 explores the probable results of introducing secondary trading throughout the EC by detailed surveys and discussion with those stakeholders most likely to be affected. The assumption made was that the legislation would permit secondary trading without conditions as currently practised in the U.K.
34. In general, stakeholders believe that allowing such trading will accentuate the trend towards larger aircraft travelling longer distances. It is generally agreed that:
 - long-haul new entrants and dominant hub carriers will benefit most
 - smaller regional carriers and routes to peripheral destinations will suffer most
 - short-haul competition may diminish

- long-haul competition is expected to increase.

1.9 Statistical Assessment of Impact of Secondary Slot Trading

35. Chapter 9 examines eight airports currently assessed as being heavily congested or expected to be heavily congested by 2025. For London-Heathrow and London-Gatwick, the actual use of the airports in 2005 has been calculated as if the known secondary trades between 2001 and 2006 had not occurred. The figures for all eight airports in 2005 are therefore assessed to a common base, without any allowance for secondary trading.
36. Forecasts are then made for each of the eight airports for 2025 on the assumption of no secondary trading of slots. The forecasts are based on increasing demand of 3.1% a year, and include any expected capacity increases. The trends identified between 1975 and 2025 are used in developing the forecast through to 2025. These include changes in average aircraft size, changes in average flight distance, and changes in airline slot possession.
37. An assessment was then made of the probable distribution of slots in 2025 on the assumption of airlines being able to trade slots. This redistribution acknowledges known experience at London, in-depth discussions with stakeholders, and experience in the USA.
38. The impacts vary considerably between the eight airports. They are affected, for example, by varying levels of surplus demand assumed, characteristics of the airport, the market structure, and the future shape of the airline industry.
39. In addition to the eight individual forecasts, a total figure for the eight is derived, and an assessment made of the impact in 2025 on Community airports as a whole.
40. The base forecast for 2025 (without trading) is compared with the post-trading forecast, to assess its marginal impact on slot use. The variances are described in terms of passengers, revenue passenger kilometres, revenues and airline profitability for each of thirteen categories of airlines, and in total.
41. The assessment is that secondary trading at airports in Europe is expected to lead to these airports recording an increase of 7.2% in passenger numbers, and an increase of 17.1% in terms of revenue passenger kilometres. This would lead to an extra 51.6 million passengers being carried at congested airports in 2025.

1.10 Economic and Environmental Impact Assessment

42. Using the traffic forecasts developed, economic and environmental impact assessments have been produced covering:
 - producer and consumer welfare;
 - the degree of competition, both between airlines and between airport hubs;
 - the effect on thin community routes;
 - airport finances;

- local and wider economic costs and benefits; and
 - CO₂, NO_x and noise emissions.
43. For the major economic impacts, particularly producer and consumer welfare, airport finances and local welfare, detailed assessments of impact have been made. For other impacts, particularly relating to competition, and the impact on peripheral regions, and the environment, the analysis is more descriptive.
44. The improvement in consumer welfare has been assessed at an annual rate of some €1 bn (at current rates) in 2025. Producer welfare is also positive, with an upper bound calculated at €1.2 bn. The impact on routes to peripheral points is expected to be negative unless they are protected, while the impact on airline competition is broadly positive provided appropriate safeguards are identified which address potential monopolistic behaviour. The impact on CO₂ emissions is considerable, at up to €6.7 bn, although it should be recognised that much of this will be a geographical displacement of flights from secondary airports into primary airports, and not an absolute increase for Europe as a whole. The local noise and emission impacts on congested airports are minimal, reflecting the replacement of older short-haul aircraft by more modern long-haul aircraft.

1.11 Secondary Slot Trading – Analysis of Likely Effects and Impact of Potential Conditions

45. Chapter 11 takes the outcomes of the traffic forecasts (Chapter 9) and the impact forecasts (Chapter 10) and assesses the overall impact of secondary slot trading in terms of meeting the Commission's four objectives, on the assumption that such trading has no conditions attached to it other than those which arise under the current EC Slot Regulation.
46. Secondary trading is expected to contribute strongly to the Commission's objective of 'ensuring mobility of slots and efficient transport for passenger and cargo':
- By 2025, the number of passengers handled at congested airports in Europe is expected to be some 7% greater (or an extra 51 million passengers a year) as a direct result of secondary trading
 - In terms of available seat kilometers, the increase is even more substantial at plus 17% as a result of a proportion of small aircraft on short-haul routes being replaced by larger aircraft on long-haul routes.
 - It will greatly increase the mobility of slots in terms of the ability of airlines to trade and to respond to market demand, although (once a new equilibrium is reached) it may not lead to a continuing high turnover of slots.
 - New entrants, especially intercontinental carriers, will find it easier to gain access to congested hubs, while other airlines with small slot shares will have an improved mechanism enabling them to grow. As a result, some airlines will have difficulty in retaining their slots (see next paragraph).
47. In terms of the objective to strengthen competition at Community airports, the conclusions are more mixed:

- Existing dominant carriers with hubs at congested airports are expected to increase their share of slots from an average 47% to around 49% as their network benefits enable them to value slots more highly than their competitors
 - Competition between major European hubs is likely to be increased, as major carriers gain dominance at their own hub.
 - Competition is expected to be stronger for long-haul flights and weaker on intra-EU flights as some carriers sell their slots.
 - Routes to peripheral regional airports and to the more peripheral Member States may be forced out of the congested primary airports to less convenient secondary airports, unless they are protected by Public Service Obligations [PSOs] being applied.
48. The objective to match secondary trading with the overall EU (air) transport policy, secondary slot trading would appear to meet all the requirements:
- It increases consumer welfare by up to some €31 bn in 2025, with producer welfare increasing by up to some €1.2 bn.
 - It improves the finances of major airports by around 7% and strongly benefits economies around such airports, although the overall impact on the economy of the EU is likely to be small
 - Environmental conditions at and close to congested airports will be marginally affected, despite significant increases in throughput
 - The impact on global warming from specific airports may be quite considerable, reflecting the expansion of long-haul services, and the transfer of short-haul services to less congested airports – the net impact across all airports is considerably less
49. Finally, the objective of ensuring compatibility with existing worldwide trading is met, with the conditions relating to secondary slot trading in Europe continuing to meet the IATA Guidelines.
50. The main conclusion of this chapter is that it is not possible for any amendment to the EC Slot Regulation to simultaneously meet all the following objectives:
- Maximising the use of airports (so as to minimise the need for additional infrastructure)
 - Maintaining links to peripheral regions
 - Enhancing airline competition, particularly on intra-EU routes; and
 - Minimising environmental pollution
51. The study then examines the probable impact of making other major changes to the slot exchange and transfer mechanism, to see if these would enhance or detract from such impacts.
52. Some constraints in the existing EC Slot Regulation are then assumed to be relaxed, and measured. The assumptions analysed are:

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- a) slots may only be allocated to air carriers;
 - b) the restriction that slots allocated on the “new entrant” basis cannot be exchanged or transferred for two equivalent seasons
53. Secondly, a range of additional constraints is examined, to see if they might enhance the predicted impact of secondary slot trading. The changed conditions analysed are:
- a) a requirement for pre-trade transparency
 - c) a requirement for post trade transparency
 - d) a ban on restrictive covenants
 - e) secondary trading to be permissible, but not mandatory
54. In summary, secondary slot trading as currently practised is generally beneficial. None of the potential variants, or conditions, examined, except one, provides enhancements which appear to outweigh the disadvantages which would come with them, while many would appear to be unnecessary.
55. The exception is the requirement for coordinators to publish post-trade details of slot transfers. This is considered necessary to help secondary trading achieve the Commission’s objectives.
56. An area recommended for further study is the holding of slots by ‘persons’ other than air carriers. Despite it being contrary to the current IATA Guidelines, it warrants more detailed consideration. The impact on airport utilisation and airline competition is currently not clear, but at this time the downsides seem limited even if the facility may only be used in a limited manner and for very specific purposes, such as in the context of security instruments in airline financing.

1.12 Primary Slot Allocation Issues

57. In addition to examining the likely effects of secondary slot trading in depth, the Commission asked the study team separately to analyse the impact of changing three specific aspects of primary slot allocation. These are analysed in Chapter 12:
- Amendment of the 80/20 rule on slot usage so as to achieve higher slot utilisation, looking at a 90/10 regime
 - The possibility of newly created slots being auctioned (but without assuming that any proceeds would accrue to the airport)
 - The withdrawal of a proportion of slots subject to historical precedence so as to increase mobility
58. Discussion with stakeholders revealed two other areas where there is current concern with aspects of primary slot allocation. They relate to the rules regarding new entrants, and the use of local rules to enhance slot utilisation.

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59. Each of these five topics was discussed widely with stakeholders to determine a full list of advantages and disadvantages, although statistical evidence to support many of the comments was difficult to produce.
- i. Amending the 80/20 ‘use-it-or-lose-it’ provision
60. The evidence is that, although the proposed amendment would increase slot mobility by ensuring that a significantly larger number of slots were returned to the pool each season, the impact on ‘efficient transport’ is likely to be negative. If the threshold were to be raised from the current level of 80% to 85% or 90%, the current stable pattern of year-round daily scheduled services is expected to be much more likely to be disrupted by an apparently random withdrawal of series of slots. This could affect certain days of the week (but not other days), and often for causes outside the control of carriers, such as adverse weather conditions, rather than for true “abuses” of the coordination system. Consideration would probably need to be given to extending the justifications in Article 10 (4) of the EC Slot Regulation to ensure that only true abuses of the system resulted in slot series withdrawals.
- ii. Auctioning newly created slots
61. There is wide acceptance that auctioning scarce resources (particularly what may be regarded as public resources) is a most efficient method of allocating that capacity, when compared with the alternatives. The study starts from this premise before considering whether in the case of slots there are particular reasons for departing from it.
62. The industry does not have a common view on auctions – airports generally favour them and airlines generally argue against them, predominantly for the same reason, the expected transfer of wealth from the one to the other. Generally speaking, none of the stakeholder views appeared to centre on the objective value of auctions as a method of allocating scarce resources: namely, that through auctions assets accrue to those that value them most and are most likely to use them efficiently.
63. In terms of the impacts, the main conclusion drawn from the examination is that the beneficial effect of slot auctions on airport productivity is unlikely to be dramatic in the long run. Secondary slot trading on its own is expected to result in a similar outcome: however it would take longer to have this effect if the current administrative process were used. Auctioning would also avoid the prospect of airlines obtaining slots for free that would immediately have a very high monetary value attached to them and could be traded in the secondary market with the purpose of achieving windfall profits. No significant downsides to auctioning have been identified and therefore nothing apparently to contradict, in the case of slots, the well recognised principle that auctioning is a most efficient method of allocating public assets.
64. The FAA is recommending the use of slot auctions at New York-La Guardia. Their current concern is to determine an effective and efficient auction mechanism. There appears to be no strong resistance from airlines, which have more experience than do European airlines of different allocation mechanisms including the use of lotteries.
65. The key economic impact of auctioning slots will be to bring forward the long run benefits of secondary trading by encouraging the more efficient utilisation of slots from the outset.

66. Where there is only a marginal increase in capacity, such as a small increase in the permitted movement rate per hour, the cost of administering an auction for a small number of slots may not be justified; and where new capacity increase are large, and meet all demand, there may not be a need for auctions, or indeed a need for the airport concerned to continue to be coordinated. The main requirement will be for airports producing significant tranches of additional capacity which are still insufficient to meet all demand for slots going forward.

iii. Slot Withdrawal

67. The proposal studied is the regular withdrawal of a set percentage of slots otherwise entitled to be retained by air carriers based on historical precedence; and for these slots to be re-allocated, either by the current administrative procedures or by auctioning. Although this has happened in the USA for 'domestic' slots, it would be incompatible with the current IATA Guidelines which expressly states that slots should not be withdrawn from carriers for such purposes.

68. The proposal is influenced by a desire to ensure that there is sufficient slot mobility in case secondary slot trading on its own is insufficient to achieve that objective.

69. It is perceived that there would be difficulties in withdrawing slots from non-EU air carriers using them for intercontinental services. The proposal therefore assumes that only slots used for intra-EU routes would be withdrawn and reallocated. However there is under the current EC Slot Regulation no concept of slots being divided into categories (such as "intra-EU" and "intercontinental") and with certain narrow exceptions any slot may be used by a carrier for any type of service and for any route.

70. Apart from this difficulty, by categorising a substantial number of slots as "intra-EU only" the pool of slots available for secondary trading generally would be significantly affected since these slots could not be bought by airlines and converted to use for long-haul operations. Finally, the assessments in this study of the likely effects of the introduction of secondary trading would not be valid where such conditions obtained (especially since conversion of slot usage from short haul services to long haul services is seen as one of the principal outcomes: with the attendant greater efficiencies in slot utilisation from the use of larger aircraft, over longer distances with higher payloads of passengers being seen as one of the positive outcomes). Those assessments assume that all slots can be freely traded and that all airlines, both Community carriers and overseas carriers, would have access to all of them through the secondary trading mechanism.

2 Introduction

2.1 Requirement for Study

1. For some years there has been increasing concern that a number of major European airports have insufficient runway slots to meet all demand by airlines. This insufficiency was already of concern in 1993 when the EC Slot Regulation was introduced to help facilitate market access and competition in the single European aviation market. This shortfall in capacity will continue to increase as environmental pressures grow and airports find it ever more difficult and expensive to add capacity.
2. Over the next twenty years the number of European airports affected will increase, as the demand for capacity outstrips supply. In normal market conditions, where supply does not match demand, the cost of a product can be expected to rise until demand matches supply. This does not apply to airport slots, either in Europe or worldwide (in each case with some exceptions). Generally, slots are allocated on an administrative basis and cannot be bought or sold.
3. Historically, any airline could fly to and from any airport without first being allocated a specific take-off or landing time. But over time, where demand at peak hours and on peak days began to exceed supply, airlines came to be faced with long queues, either on the ground or in the air, in order to land or take off.
4. The industry, through IATA [(the International Air Transport Association)], agreed that airlines should be required to be allocated a slot for each landing or take-off at such congested airports. IATA developed guidelines (which apply worldwide) for the allocation of slots on a worldwide basis. These guidelines are now known as the IATA Worldwide Scheduling Guidelines and cover procedures for both ‘facilitated airports’ (where airlines have to advise in advance their requirements to land and take off) and ‘co-ordinated airports’ (where airlines cannot arrive or depart until they have been allocated specific slots by a coordinator appointed for the airport).
5. At coordinated airports, in accordance with Article 3 of the EC Slot Regulation, the number of slots that are offered in any specific time period have been determined, and are divided into arrival and departure slots, after taking account of the impact of other operational constraints, such as aircraft stand size and capacity, and maximum possible passenger throughput (by airport or by individual terminal).
6. Under the IATA guidelines, once an airline has been allocated a slot (for no payment), and has used that slot sufficiently regularly (generally for a high percentage of the period for which it was allocated) during an IATA season (winter or summer), that airline acquires the right to be allocated that slot in the next equivalent season (known technically as “historical precedence” or, more colloquially, “grandfather right”). This historical precedence continues season by season and therefore, in effect, can continue in perpetuity. In order to meet changing demand patterns, airlines have always been permitted to change the use of a slot, as between aircraft types, routes, or type of service (between scheduled and charter, and between passenger and cargo). They have also been permitted (indeed encouraged) to exchange their slots with those of other airlines to improve schedules or for other operational reasons and, in more recent years (but only where local laws permit) airlines may, according to the IATA guidelines, transfer their slots to other airlines.

7. It is generally asserted that airlines do not have an inalienable right to the slots they are allocated (they do not “own” them) and cannot freely trade in slots by selling them or buying them in a ‘secondary trading’ market unless expressly permitted by law (as has been permitted, to a limited extent, in the USA).
8. The result has been a certain ossification of the networks at major, congested airports, where schedules may still tend to reflect the airline perspective on demand that applied at the time when the slots were originally allocated.
9. Even so, not all slots are always allocated. At off-peak times, it may still be possible for airlines to apply for and be allocated slots. As the level of congestion builds, the number of such available slots reduces dramatically, with the result that – at airports such as London-Heathrow and Paris-Orly – there are effectively no commercially viable slots available for distribution unless some are returned to the slot pool by airlines that no longer require them or have failed to use their slots (and therefore had them withdrawn from them) for one reason or another.
10. When the European single aviation market was established and took full effect on 1 January 1993, the IATA guidelines still applied at all coordinated Community airports. However, soon afterwards, Council Regulation (EEC) 95/93 of 18 January 1993 (“the EC Slot Regulation”) established a set of rules for the allocation of slots at Community airports. The objective of the EC Slot Regulation was to ensure that access to congested airports was organised through a system of fair, non-discriminatory and transparent rules for the allocation of landing and take-off slots so as to improve the utilisation of airport capacity and also to ensure that the purpose of creating one competitive air transport market was not thwarted by the denial of access to the major airports.
11. Although broadly based on the IATA guidelines at that time, the EC Slot Regulation contained some specific provisions designed to encourage non-discriminatory behaviour and to support certain objectives, such as protection for routes which were the subject of Public Service Obligations [PSO] (as defined in the EC Market Access Regulation), and encouragement of new entrant airlines, particularly on intra-Community routes.
12. Following studies undertaken for the Commission by Coopers and Lybrand in 1995 and Price Waterhouse Coopers in 2000 and considerable debate and consultation, the EC Slot Regulation was modified by Council Regulation (EC) 793/2004 of 30 April 2004 (“the 2004 modifications”). Whilst these modifications included (as a “first stage” of development of the EC Slot Regulation) a number of technical improvements, such as provisions with regard to enforcement, clearer definitions, better monitoring tools and stricter sanctions for abuse or non-compliance, they left the basic system of slot allocation unchanged. However, the Commission stated that consideration of the allocation process itself (including the introduction of secondary slot trading) was being reserved for a second stage.
13. There is concern that the detail and application of the EC Slot Regulation, despite the 2004 modifications, has not led to the optimal, or most efficient, use of slots, nor maximised the potential for airline competition at coordinated airports.

14. In particular the anticipated increase in competition, derived from the EC Slot Regulation's provisions favouring new entrants, has not been realised. Although 50% of new slots have to be offered to new entrants (as defined), this has not led to a substantial increase in competition. The number of such slots available at the most congested airports is small, and once the 'new entrant' holds only a few slots it no longer qualifies as a 'new entrant'. Therefore, generally, the "new entrant rule" has not satisfied the need for new entrants to establish a viable network and competitive critical mass of operations.
15. In a different area, the Commission has been disappointed that the severe shortage of available slots has not always led to them being used most efficiently, either in terms of regularity of use or of maximising airline output per slot. This study uses available seat kilometres (ASK) per slot available for allocation as its measure of efficiency. This, when factored for passenger load factor (PLF), provides the other key parameter, revenue passenger kilometres (RPKs) per slot.
16. The Commission has therefore recognised that the current EC Slot Regulation is unlikely to be effective in remedying conditions at the increasing number of Community airports that have reached (or may in future reach) saturation point. The opportunities for new entrants and the efficient utilisation of slots allocated to incumbent carriers might only be improved by way of a more radical structural change to the existing system. The Commission recognises that, under the current EC Slot Regulation, incumbent airlines are not compelled to make the most efficient use of their slots and new entry is hindered by an insufficient turnover of slots, or by the lack of creation of additional slots, in the slot pool. One result of this is that new entrants find it difficult to launch new air services at congested airports: another is that actual and potential competition, even between incumbents, is constrained.
17. In order to give both incumbent carriers and new entrant airlines possibilities to use their slot portfolios with maximum effectiveness, a study was commissioned from NERA in 2003 to develop market oriented slot allocation schemes and to assess their feasibility.
18. The study identified a number of possibilities for commercial slot allocation and described, in general terms, the possible effects of their implementation.
19. In summary, the study examined in some detail the impacts of:
 - Secondary trading
 - Higher posted prices
 - Higher posted prices plus secondary trading
 - Auction of pool slots plus secondary trading
 - Auction of 10% of slots plus secondary trading
20. It concluded that higher posted prices plus secondary trading would have the greatest impact on passenger numbers, although the higher posted prices aspect might be expected to significantly increase the risk of international disputes, challenges and retaliation.

21. As a follow-up to that study, the Commission issued a consultation document in late 2004, inviting comments from Member States and stakeholders. As a result of that consultation, the Commission intends to focus its work on a second revision to the EC Slot Regulation, entailing the introduction of secondary trading of slots.
22. The Commission has now asked for this report to investigate the likely effects of introducing secondary trading at Community airports and to identify what, if any, benefits and disbenefits are likely to flow from its introduction, so as to enable the Commission to have regard to these likely effects in implementing secondary trading.
23. In this Report these impacts are measured against a continuation of the status quo so as to determine their marginal effect.

2.2 The Need to Maximise the Efficient Use of Slots

24. The NERA study contained a significant body of data which demonstrated in detail the excess demand for slots at certain European airports, at particular peak periods of the year, the week or the day, or – in many instances – continuously throughout the year. This information was obtained predominantly from Airports Council International – Europe (ACI-Europe), and supported by further information from specific airports, airport coordinators, airlines and industry bodies.
25. In most industries, such existing levels of excess demand, when also predicted to worsen over time, would be met by both short-term and long-term increases in supply. On that basis, failure to provide sufficient additional capacity would be expected to lead to an increase in the value of slots. However, further increases in runway supply in Europe are likely to be insufficient, owing to several factors:
 - a lack of sufficient suitable land at many existing airports to construct additional runways
 - a lack of alternative locations for new airports that are sufficiently close to the main centres of demand to provide effective competition to existing airports
 - the planning lead times now required for the construction of new runways
 - the political difficulty of justifying additional runways due to the efforts of environmental pressure groups concerned with local noise levels, local air pollution and global climate change issues
 - the substantial capital cost of providing additional capacity
26. Therefore it is accepted that, in order to reduce the increasing mismatch between supply and demand, demand will have to be managed, and maximising slot efficiency will be an increasingly important goal.
27. In this context, two concepts of economic efficiency are important:
 - Allocative efficiency means that slots are used for those destinations which are most highly valued by society. In an optimal allocation, it would be unnecessary to change the allocation of slots to improve social welfare because the allocation would already reflect the destinations that society most valued flying to and from.

- Productive efficiency means that the total number of slots at each airport is maximised, and that each slot is being used to move the maximum amount of passengers possible, or to produce the maximum number of revenue passenger kilometres. In an optimal allocation, it would be impossible to increase load factors further: the largest aircraft possible would already be being used and airlines would maximise the number of passengers being carried on each flight. In addition, in an optimal allocation, at constrained airports slots would always be used and would not be foregone.
28. When a market is both allocatively and productively efficient, in the manner described above, it can be considered economically efficient. In such a situation, society cannot be made better off with the same amount of resources. Clearly if additional resources are added to the market (for example, through more runways and expanded airport capacity), society can be made better off because additional flights can be taken, and more destinations can be served. Economic efficiency concerns using (already allocated) resources to their maximum capacity. Given the constraints faced at many airports across Europe, the efficient use of existing slots is of paramount importance to both the aviation industry and society. However, the current administrative procedures may not be able to deliver economically efficient outcomes.
29. Each of these differing efficiencies is necessary in order to ensure that any given airport is able to maximise its output, whether measured in terms of flights, of seats, of passengers, of revenue passenger kilometres, or of similar air cargo outputs.
30. The introduction of a market for secondary trading of slots has the capacity to increase both productive and allocative efficiency, therefore maximising the value to society from the existing resources dedicated to the aviation industry. Given the various constraints on the development of additional runways and airport capacity, more efficient use of existing resources is particularly important.
31. A market in slots would encourage allocative efficiency by creating price signals relating to the value of slots, which airlines would then take into account when allocating slots to different uses. For example, peak travel slots are more valuable than off-peak slots. Under the current administrative allocation arrangements, a peak slot may be being used for a flight that does not fully benefit from the peak hour characteristic of the slot (e.g. a short-haul European flight may gain some benefit from flying in the peak hour but not as much as an additional flight to New York might benefit).

32. Under the current regime there is little incentive for an airline holding a peak hour slot to trade it for another slot, allowing an airline that values the peak hour slot more highly to utilise it. In contrast, if a market in slots existed, the airline holding the slot would face an incentive to trade because another airline values the slot more highly.¹ A market for secondary trading of slots would allow buyers and sellers with different valuations of slots to trade: low value sellers would sell to high value buyers to the point where no more welfare enhancing trades could be made.² In this way, the market creates incentives for allocative efficiency by providing price signals as to the value of different slots as well as by incentivising sellers with lower valuations to trade their slots with buyers that value them more highly.³
33. A market for slots would also encourage productive efficiency by incentivising airlines to fully utilise their slots, either as a result of paying for a slot directly, or of becoming aware of how valuable a slot is from the market price. This is likely to result in bigger aircraft being flown, passenger numbers being increased, and aircraft flying to more distant destinations.
34. The introduction of a market for slot trading would increase allocative and productive efficiency relative to the current administrative allocation mechanisms. This increase in economic efficiency would result in society accruing greater benefits from the better use of existing resources dedicated to aviation. In addition, the creation of a trading market for slots would provide a price signal as to the benefits of aviation to society – as demand for slots increases and supply remains constrained, the value of slots will increase. This would provide a signal to policymakers and the industry of the value of additional airport capacity. A slot trading market would also therefore contribute to allocating an optimal amount of resources to aviation within the economy, increasing social welfare in the longer run.
35. Secondary trading is not expected, of itself, to increase the number of slots made available in total. This will only be achieved through technological progress, investment in new runways and agreements between the airports and the ANSPs (the air navigation service providers).
36. Slot trading is also likely to affect fare levels. At congested airports, airlines with slots will charge consumers above marginal cost for their seats (owing to excess demand for each seat). As marginal costs increase (as a direct result of airlines buying slots), it is unlikely that airlines will pass this additional cost through to consumers, unless costs rise substantially to a point where price equals marginal cost and there is no excess demand.
37. However, it should be recognised that the utilisation of each slot to maximum efficiency may run counter to the objective of giving precedence to increasing competition (including through new market entry) on intra-Community routes over intercontinental routes, or a policy of reserving slots for routes serving small regional or peripheral cities.

2.3 The Development of a Grey Market in Airport Slots

38. Airports and airlines have a common interest in achieving the various efficiencies discussed above.

¹ Exactly where the price would fall between the seller's valuation and the buyer's valuation will depend on a number of factors which need not be considered here.

² In a theoretical market, trades would occur to this point. In an actual market trades might not reach their optimal point due to a number of factors such as the competitive dynamics of the market.

³ Holders of slots are therefore presented with the 'opportunity cost' of holding their slots. When this cost is higher than the value it places on the slot the seller will enter the market to trade its slot.

39. An airport receives greater revenues per available slot if all slots are used across a season, and if each slot is used by the largest and heaviest aircraft, carrying the greatest possible number of passengers. Most airports charge airlines per tonne for either aircraft arrivals or departures according to the declared maximum take-off weight of the aircraft, plus a charge per passenger; while their non-aeronautical income (such as that from retail concessions) will strongly reflect the total throughput of passengers. However, in these revenue terms, the length of flight made by each aircraft is not of concern to an airport: apart from some short-sector discounts occasionally given to reflect ‘ability to pay’, an aircraft flying 5,000 kms will pay an airport the same as one of equivalent tonnage flying just 500 kms, while there may be no strong relationship between non-aeronautical income per passenger and length of journey.
40. It is generally accepted that airline revenues will normally reflect the number of available seat kilometres produced per flight, generated by multiplying the number of installed seats by the distance flown, times the average yield per ASK. This is not a strict rule, as yield varies significantly by route – for example, a Boeing 747-400 operating with up to 400 seats between Heathrow and Lagos is likely to earn the airline a far greater revenue (and, it is assumed, far greater profit) than a 580 seat Boeing 747-300 flown on the 35% longer sector between Paris and Guadeloupe.
41. Therefore, airlines that have the potential to make significant profits from a given airport slot have an incentive to replace other aviation activities that are using the slot less efficiently.
42. Where the IATA guidelines and EC Slot Regulation allow, such more efficient usage of scarce airport slots (larger aircraft flying longer distances) has tended to replace general aviation, ad hoc, and short-season scheduled and non-scheduled flights, but the obvious substitutions are now exhausted at the more congested airports. For further efficiencies to be made, some long-standing scheduled services occupying peak slots are now the targets of airlines that could use that slot more efficiently. An airline may be able to substitute long-haul services with large aircraft for its own short-haul services by smaller aircraft. To a certain extent, improved slot usage efficiencies can be obtained by exchanging slots between airlines, including airlines using smaller aircraft at peak times exchanging slots with other airlines operating larger aircraft at off-peak times. This would appear to be happening already within larger airline alliances, where a domestic feeder airline might exchange its own peak slots with an inter-continental airline partner operating off-peak, for the good of the alliance overall.
43. However, a few major European airports have become so congested that some airlines are willing to pay other airlines to give up their slots, often for cash, but sometimes in exchange for other, intangible, considerations.
44. Currently, such unilateral slot transfers (often achieved by means of ‘artificial exchanges’, see Section 4.7 below) are not regarded by the Commission as compatible with the EC Regulation, although the English High Court has ruled they were legal under Regulation 95/93 (see *R. v Airport Coordination Limited ex parte States of Guernsey Transport Board*, ‘the Guernsey case’, summarised at Section 4.7 below). Following that case, what is often described as a “grey market” has achieved a greater legitimacy in the United Kingdom, at least so that it can be said that an open market in airport slots now operates at certain of its airports, and there are some indications that such a grey market may have operated elsewhere in the Community. What is very apparent is that many airlines wish to see slot trading at airports in the Community expressly legitimised, and that in that circumstance such trading would become much more prevalent.

2.4 The Need for a Common System for Regulating Secondary Trading in Airport Slots

45. The Commission recognises that the current position is unsatisfactory, whereby the Courts in at least one member state have interpreted the EC Slot Regulation in one way, an ‘enabling’ way, while others may interpret it restrictively.
46. It is therefore considered necessary to lay down specific rules for ‘secondary trading of slots’.
47. This Report seeks to identify the likely economic and other effects of allowing such secondary trading to operate freely, to assess the benefits of this to the Community, and to consider remedies for any potential likely disbenefits.
48. The method adopted is to project the level of slot supply, demand and usage from 2005 to 2025 on the assumption of no secondary trading, and compare it with the probable result in 2025 if secondary slot trading is expressly legalised at an early stage.

2.5 Consideration of Changes that Might be Made to the Primary Allocation System

49. The Commission has also asked the study team to consider (although in less depth than secondary trading) each of three potential changes to the system of primary allocation:
 - the amendment of the 80% ‘use-it-or-lose-it’ provision, which allows coordinators to reclaim from historical precedence slots which have not been operated for at least 80% of the period for which they were allocated, so as to increase the percentage to a level above 80%
 - the introduction of a form of slot auction for newly created slots
 - the withdrawal of a proportion of historical or ‘grandfather’ slots each season, so as to increase the level of slot mobility, and by this means increase competition at Community airports
50. The study was also required to report on any other variations in primary slot allocation that might be indicated as necessitated by the introduction of secondary slot trading.

2.6 General Comment on Accuracy of Estimates

51. Wherever possible, accurate historical data has been used to determine historical trends, and particularly to determine the recent impact of secondary slot trading at London’s airports. These have been used as a guide to the likely outcome of slot usage at a number of heavily congested European airports in 2025, both with and without the ability to trade in such slots. These forecasts – by category of flight and by category of airline – are then used to determine economic impacts.

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52. These forecasts must be treated with caution. Although they represent the best estimates of the study team, and are expressed on occasion to several decimal places, they are reliant on fundamental estimates of the percentage of slots likely to be operated by a variety of airline types in twenty years' time. Many of the calculations follow through from a relatively small number of such fundamental estimates.
 53. However, although the actual numbers forecast should be treated with caution, the study team believes that the ratio of 'with' and 'without' trading estimates is reasonable, and that the resultant differences can be treated with a good degree of confidence.
 54. It should also be noted that – in general – only baseline forecasts have been made, and that 'high' and 'low' sensitivities have not been provided.

3 Objectives of the Commission

1. In its Invitation to Tender [ITT, TREN/F1-33/2005], the Commission stated that it required “*an in-depth analysis of the likely effects of the introduction of secondary slot trading into Community legislation*” taking into account four objectives stated by the Commission. These four objectives are:
 - a) to ensure mobility of slots and efficient transport for passengers and cargo;
 - b) to strengthen competition at Community airports;
 - c) to match secondary trading with overall EU (air) transport policy; and
 - d) to ensure compatibility of secondary slot trading with world-wide procedures
2. Commentary on these four objectives, plus a listing of the relevant secondary objectives attached to EC Regulation EC 93/95 and the subsequent Amending Regulation EC 793/2004, is attached as Appendix 17.
3. The main focus of this study has been to examine the likely effects of secondary trading at coordinated airports. Because secondary trading (of a kind, as discussed at 5.2 below) already takes place at London-Heathrow and London-Gatwick (but not at other Community airports), this provided a significant starting point for the study. The examination has included assessing whether secondary trading will take place if the EC Slot Regulation were expressly to permit its use and to forecast the levels of such trading given the different circumstances at each airport.
4. The study seeks to identify the net outcomes of such trading in terms of:
 - The percentage of airport slots utilised
 - The average number of passengers per movement
 - The average distance flown per movement, thus enabling the number of RPKs and ASKs per slot to be calculated
 - The probable impact on passenger type (for example, leisure or business; or terminating or transfer)
 - The impact on airline competition
 - The impact on airline costs and average fares
 - The subsequent economic impacts on airline efficiency and profitability, airport profitability, and regional economic welfare
 - Any impact on national and Community peripheral areas and their access to congested airports
 - The environmental impacts, particularly on airport noise and pollution
5. Where likely negative outcomes, having regard to the four objectives of the Commission have been identified, the study offers for consideration possible remedies to mitigate them.

4 Definitions and Descriptions

4.1 Definition of a Slot

1. “Slot” is defined in the current EC Regulation (Article 2(a)) as

“the permission given by a coordinator in accordance with this Regulation to use the full range of airport infrastructure necessary to operate an air service at a coordinated airport on a specific date and time for the purpose of landing or take-off as allocated by a coordinator in accordance with this Regulation”

2. The above definition conveys the same understanding as does the definition of “slot” under the IATA Worldwide Scheduling Guidelines (“IATA Guidelines”): that more than just runway capacity is needed for an air service to operate. The IATA Guidelines (12th edition December 2005) state (paragraph 5.3) that a slot is “the scheduled time of arrival or departure available for allocation by, or as allocated by, a coordinator for an aircraft movement on a specified date at a coordinated airport. An allocated slot will take account of all the coordination parameters at the airport, e.g. runways, aprons, terminals, etc.”
3. There appears to be no conflict in any practical sense between the EC and the IATA definition.

4.2 Definition of Secondary Slot Trading

4. In this Report the expression “secondary slot trading” refers to the horizontal transfer of slots between persons allocated, or entitled to hold, slots, by agreement between them (“the parties”), accompanied, if the parties wish, by payment of monetary (or other valuable consideration) from one to the other in respect of such transfer.
5. By “horizontal” is meant without any requirement for such slots first to be returned to the slot pool or otherwise to the coordinator for allocation (or reallocation). By “transfer” is meant without there being necessarily an exchange of slots between the parties. Reference to “persons allocated, or entitled to hold, slots” allows for the possibility that it will be decided that the EC Slot Regulation should permit persons other than air carriers to hold slots.
6. Secondary slot trading is therefore distinguished from the vertical allocation or reallocation of slots by coordinators to applicants for slots or slot holders (“primary allocation”) or the withdrawal of slots from slot holders for any purpose required by or permitted pursuant to the EC Slot Regulation. It is also distinguished from the allocation or reallocation of slots by any Member State or by the Commission or any other competition authority as may be required or permitted pursuant to the EC Slot Regulation.

4.3 Primary Slot Allocation – Description of Current IATA System

7. The general principles of coordination under the IATA system are contained in paragraph 5.8 of the IATA Guidelines (which do not have the force of law) and are, so far as particularly pertinent to primary allocation, summarised below.

8. Under the IATA Guidelines slots can only be allocated to aircraft operators.
9. The forum for the initial allocation of slots is the IATA Schedules Conference held twice yearly and at which all airlines are eligible to participate together with airport coordinators.
10. Slots are allocated by the coordinator to aircraft operations in the following order of priority:
 - a) Regular scheduled services
 - b) Ad-hoc services
 - c) Other operations
11. But the basic principle of allocation, which overrides this, is historical precedence (also known as ‘grandfather rights’) which allows airlines, subject to certain criteria, to retain slots from one season to the next, without restricting their use to particular routes, types of service or aircraft types (paragraph 6.8.1.1).
12. It is expressly provided in the IATA Guidelines (paragraph 5.8) that historical slots must not be withdrawn from one airline as a means of providing for new entrants or any other category of aircraft operator. Slots are only to be confiscated in cases of proven intentional abuse of the coordination system.
13. Changes to an historical slot, for operational or other reasons, have the next priority (subject to local legislation) (paragraph 6.8.1.2).
14. Only after the above criteria have been applied is the slot pool set up (paragraph 6.8.1.3).
15. Of the slots contained within the slot pool at the initial application, 50% must be allocated to new entrants, unless requests by new entrants are less than 50% (paragraph 6.8.1.4). A request to extend an existing operation to a year-round operation has priority over new slot requests (paragraph 6.8.1.5)
16. Subsidiary allocation criteria are: effective period of operation; size and type of market; competition; curfews; requirements of the travelling public and other users; frequency of operation; and local guidelines (paragraph 6.8.2).
17. Slot allocation is independent of bilateral air service agreements.

4.4 Primary Slot Allocation – Description of Current EC System

18. Under the EC Slot Regulation (which has the force of law in each Member State) slots can only be allocated to (and held by) air carriers (see e.g. Article 8.6).
19. Primary allocation is made from the slot pool by the airport coordinator (Articles 8.1 and 8.6) but subject to the recognition of historical precedence in respect of “series” of slots (Articles 8.2 and 8.6).

20. Subject to historical precedence (and retiming of historical slots for operational reasons or improvements in schedules – Article 8.4), priority is to be given to commercial air services (in particular scheduled and programmed non-scheduled air services and, within each such category, to year round operations) (Article 8.3). The coordinator is also required to take into account additional rules or guidelines established by the airline industry world-wide or Community-wide as well as local guidelines proposed by the coordination committee and approved by the Member State (or other responsible body for the airport in question) provided that such rules and guidelines do not affect the independent status of the coordinator, comply with Community law and aim at the efficient use of airport capacity. These rules have to be communicated by the Member State to the Commission (Article 8.5).
21. Subject to historical precedence, 50% of the slots in the pool shall first be allocated (so far as requested by them) to new entrants (Article 8.6).

4.5 Slot Exchanges and Transfers - Description of Current IATA System

22. Under the IATA Guidelines (paragraph 6.10.1), following primary allocation of slots, their exchange is expressly encouraged (provided that, in the case of newly allocated slots, the coordinator is satisfied that the exchange improves the operating position of the airline to whom the slots were allocated). Slots may be freely exchanged on a one for one basis at a coordinated airport by any number of airlines: and indeed, to encourage and facilitate multilateral slot exchanges, the IATA website <http://www.iata.org/ps/services/Skedlink.htm> is available for airlines to advise other airlines of their needs and any current slot holdings available for exchange.
23. Slot transfers (i.e. without an exchange) may only take place where the laws of the relevant country permit and then only to airlines serving or planning to serve the same airport. However, transfers of new slots are not permitted until such slots have been operated for two equivalent scheduling periods in order to prevent airlines taking advantage of an enhanced priority, such as new entrant status, simply to transfer them to another airline (paragraph 6.10.2).
24. This secondary trading probably means that few slots once allocated get returned to the pool for primary allocation. It is to be noted in addition that this effect is enhanced by provisions allowing airlines conducting “shared operations” (“joint, codesharing or any other voluntary cooperation between airlines”) to use each other’s slots (subject to advising the coordinator) (paragraph 6.10.5).
25. There is no bar to monetary consideration being involved in secondary trading.
26. It would therefore not appear to be inconsistent with the IATA system to introduce a system of secondary trading under the EC system.

4.6 Slot Exchanges and Transfers – Description of Current EC System

27. Under the EC Slot Regulation, following primary allocation, slots may be exchanged or transferred between airlines in certain specified circumstances (and then subject also to certain specified exceptions).
28. These circumstances are set out at Article 8a which provides:

“1. Slots may be:

- (a) transferred by an air carrier from one route or type of service to another route or type of service operated by the same air carrier;*
- (b) transferred:*
 - i) between parent and subsidiary companies, and between subsidiaries of the same company,*
 - ii) as part of the acquisition of control over the capital of an air carrier,*
 - iii) in the case of a total or partial take-over when the slots are directly related to the air carrier taken over;*
- (c) exchanged one for one, between air carriers.”*

29. Exchanges and transfers are always subject (Article 8a.2) to the express confirmation of the coordinator. He must not confirm a transfer or exchange unless it is in conformity with the Regulation, and he is satisfied that airport operations would not be prejudiced. The coordinator must also be satisfied that the slots are not ones which have been reserved for a public service obligation route (Article 9) and that slots allocated from the pool to those qualifying for them as “new entrants” may not be exchanged or transferred by them for a period of two equivalent scheduling periods (Article 8a.3).

30. Although the Regulation does not, in its drafting, exclude a degree of interpolation, it is assumed that an exchange of slots ‘one for one’ (see Article 8a.1 (c) above) refers to slots at the same airport.

31. More certainty as to the transfer of slots between air carriers under common ownership was introduced in the 2004 amendments (see Article 8a. 1 (b) (i) above). Also then introduced was the ability in some circumstances of air carriers to use each other’s slots. The EC Slot Regulation now provides that:

“slots allocated to one air carrier may be used by (an)other carrier(s) participating in a joint operation . . .” and “in the case of services operated by a group of air carriers’ such carriers can use each others’ slots” (Article 10.8).

‘Group of air carriers’ is defined (Article 2 (f) (ii)) as “two or more air carriers which together perform joint operations franchise operations or code-sharing for the purpose of operating a specific air service”.

This allows, for example, carriers in the same alliance to use each other’s slots when performing joint operations or code sharing, although any actual exchange or transfer is still subject to Article 8a (see paragraphs 28 and 29 above).

32. The current EC Regulation is silent as to monetary consideration accompanying slot exchanges and transfers and it has been held in the Guernsey case (see Section 4.7 below) that there is no bar to it.

4.7 Definition of 'Artificial' Exchanges

33. As has been seen above, slot transfers (often referred to as “unilateral transfers” to distinguish them from “exchanges” where each airline concerned receives an equivalent number of slots from the other) are allowed under the IATA Guidelines where the laws of the relevant country permit them. However, airlines have not generally understood that the EC Slot Regulation gave such permission.
34. For a long time, including both prior to and since the taking effect in 1993 of the EC Regulation, the ability of airlines to exchange slots has been used at some coordinated airports (particularly at the London airports, but also at Oslo-Fornebu until 1998) to effect a transfer of slots, in substance if not in form, where they are (or it is perceived that they are) otherwise not permitted. It is also understood that certain airlines traded one set of slots at Milan-Linate for another set of slots at Paris.
35. In this form of exchange, Airline A exchanges slots with Airline B (as clearly permitted, both before and since the EC Regulation) but, by way of such exchange, receives from B slots for which it has no requirement, and these are returned to the pool after the exchange.
36. It has been argued (and was the subject of a proposal by the Commission, which was not adopted, in the lead up to the 2004 amendments to the EC Slot Regulation) that exchanges should only be permitted where each party to the exchange intends to use the slots it receives from the other, because otherwise it is possible for Airline B to obtain slots from the coordinator purely for the purpose of effecting such an exchange and for them to be returned to the pool by Airline A following the transaction. At coordinated airports there may be slots at uncommercial times (e.g. late at night) for which there is no demand and which the coordinator can make available to airlines to facilitate such “exchanges” after which they are returned to the coordinator having served this purpose. These are often referred to as ‘junk’ slots.
37. It has been suggested that the reason such “artificial” exchanges (which are believed to be often accompanied by substantial monetary consideration) have not been permitted or practised more often at, and at a greater number of, coordinated Community airports is because of uncertainty as to their legality under the EC Slot Regulation. It was explicitly confirmed to the study team by coordinators that this uncertainty continues, despite the Commission’s specific proposal not being adopted in the current EC Regulation, and notwithstanding the judgement in 1998 of the English High Court in *R v Airport Coordination Limited ex parte States of Guernsey Transport Board* (“the Guernsey case”, see below). The expectation is that if such uncertainty were to be removed through an express provision for secondary trading in slots under the EC Regulation there would be a substantial increase in demand for slot transfers.
38. Prior to the introduction of the EC Regulation in 1993 there was no apparent objection to this practice. When the EC Regulation was introduced, the circumstances in which slots at Community airports could be exchanged and transferred were described at Article 8.4, in a form of words which was generally recognised as highly ambiguous. Article 8.4 stated:

“ Slots may be freely exchanged between air carriers or transferred by an air carrier from one route, or type of route, to another by mutual agreement or as a result of total or partial takeover or unilaterally.”

39. This attempt to encapsulate what air carriers were entitled to do with slots, once allocated to them, all in one sentence, was unclear and led to considerable dispute as to its meaning, particularly as to the association of the word “unilaterally” to the other words in the sentence. Moreover neither in Article 8.4 nor elsewhere in the Regulation was the issue of monetary consideration addressed. Furthermore, assuming Article 8.4 was intended to limit secondary trading to some specific circumstances where slots could be exchanged or transferred between carriers, the Regulation imposed no express duty or power on coordinators to enforce its terms in practice.
40. The issue of the legality of secondary slot trading under the EC 95/93 legislation was the subject of the ‘Guernsey’ case.
41. In brief the case was concerned with two stages of the transfer of slots, year round, between Air UK and British Airways at London Heathrow. First, in December 1997 Air UK announced it would cease to serve the Heathrow – Guernsey route (which it had operated for some 20 years), and indeed cease to serve Heathrow altogether, as from the end of the Winter 1997/98 season. It exchanged its Summer 1998 slots that it had already been allocated and had historically used for that service, with slots from British Airways, which it then returned to the slot pool. It was also anticipated that Air UK would apply, on the basis of historical precedence, for Winter 1998/9 slots even though it would have no use for them itself and would transfer these to British Airways. The Guernsey government brought judicial review proceedings in the English High Court against the Heathrow coordinator. The court held that the exchanges were exchanges in the ordinary meaning of language and this meaning was not qualified by the provisions of the Regulation; and that there was nothing in the Regulation to prevent the application of historical precedence (for which the Regulation expressly provided) to carriers which had no intention of operating at the airport in question. The court also found, incidentally, that there was nothing to prohibit monetary consideration and that the coordinator had no power to enforce the proper application of Article 8.4⁴.
42. This case is only strictly legal precedent in the United Kingdom but it has been said to have further encouraged such “grey market” secondary trading at the London airports.

⁴ It is understood that the Commission, although not a party to the case, thought Guernsey’s arguments correct and that the outcome contributed substantially to its proposals to revise Article 8.4 by means of the 2004 amendments.

5 Examples of Secondary Slot Trading at Airports

5.1 Airport Secondary Slot Trading in the USA

5.1.1 Introduction & Overview

1. The regulatory regime for air traffic movements at congested US airports differs markedly from the one observed in Europe, which hinges on the EC slot regulation. Consequently, the secondary slot trading that takes place via a 'grey' market at congested European hubs, such as Heathrow, has evolved in a wholly different manner from the US model, where slot trading has developed within a noticeably different regulatory context. As a result, both regulators and airlines in the US approach the whole issue of slot trading from a different angle to the one that is familiar in Europe.
2. There are five key differences in the US regulatory regime that pertain to secondary slot trading when compared to the European experience.
3. Firstly, it must be appreciated that most US airports declare the capacity of their runways assuming Visual Meteorological Conditions (VMC) and Visual Flight Rules (VFR). In practice, this means that where weather conditions oblige the airport authorities to switch to Instrument Meteorological Conditions (IMC) and Instrument Flight Rules (IFR), the realisable movement rates and throughputs achieved on specific runways will be significantly reduced. This invariably leads to serious congestion since there is no regulatory authority that allocates specific slots to air carriers, apart from a small clutch of heavily congested airports governed by the High Density Rule (see discussion below).
4. There are a number of very busy airports in the US that would be designated for co-ordination if they were located within the EC, thereby making them subject to the EC Slot Regulation rule. Yet in the US, airlines are not required to apply for slots at these busy airports from an airport coordinator or government established regulatory authority.
5. Instead, airlines schedule their own services into and out of specific airports, accepting there may be a risk of substantial delays if they schedule services at busy times of the day or if weather conditions are adverse. And, in the US, weather conditions can be extremely severe. To help them schedule their services, air carriers consult the Official Airline Guide (OAG) and other sources of information. Hence, the onus is on individual airlines, not airport coordinators, to arrange the daily schedule of services to and from a specific airport such as Dallas or Los Angeles International.

6. The European experience differs noticeably. Air carriers wishing to operate services to and from congested and coordinated airports in the Community must comply with the EC Slot Regulation no 95/93 passed on 18th January 1993, and updated on 21st April 2004 by EC Regulation 793/2004. The number of air transport movements (ATMs) at these airports is specified in detail according to the time of day; furthermore, the Regulation assumes that all air services are operated under Instrument Flight Rules in IMC. When adverse weather conditions are experienced, this enables the achievable flow rates to be maintained and delays minimised. In order to operate services, air carriers need to be allocated appropriate slots. Without them, they cannot offer a service.
7. Accordingly, the allocation of a slot by a coordinator at a European airport confers with it access to a runway at a specified time along with all the other necessary infrastructure services required to facilitate the operation and turnaround of an aircraft at that airport. In the USA, such facilities are subject to separate negotiation.
8. Secondly, and crucially, the US Department of Transportation (DoT), and its sub-department the Federal Aviation Administration (FAA), claim a residual right to deal with airport congestion based on their statutory functions and duties under the 1958 Air Transport Act. They rely on this legal authority to emphasise that slots (at the small handful of US airports where they are required) are theirs to withdraw and reallocate at any time they think fit. The FAA has at times relied on this overriding right to “persuade” air carriers to agree to reduce operations to ease congestion.
9. Under the current EC Slot Regulation Member States have duties to perform, but the Regulation provides no legal basis for them to claim that slots are the property of their governments, although they are permitted to reserve slots for public service obligation routes. Consequently, air carriers holding slots at Community airports do not recognise that any government or regulator has a general right to withdraw slots. However, in certain specific circumstances, airport coordinators are permitted to withdraw slots if they can demonstrate ‘slot abuse’ by an airline; slots may also be withdrawn as part of an explicit remedy solution agreed with regulators responsible for the implementation of competition law.
10. The study team were told that air carriers in the USA tend to amortise the cost of slot acquisition over seven years. In reality, this is only one step away from valuing slots on the basis of their use over a seven year period. Such accounting practices provide a firm context for establishing the financial implications of any slot withdrawals imposed by the FAA.
11. Airlines operating services within the EC adopt an entirely different position with regard to slots since air carriers claim to hold these assets in perpetuity, so long as they satisfy the ‘use it or lose it’ conditions that apply at congested airports. Consequently, slots are not amortised over any fixed period of time, as is the case in the USA.

12. Thirdly, regulatory moves aimed at addressing congestion problems in the US have largely been triggered through political initiatives in the US Congress rather than by the regulators themselves. Where congestion has built up to such a point that it is perceived as intolerable, regulatory intervention has largely been prompted by politicians. Similarly, when regulation has been abandoned, this was usually due to a political initiative in Congress. Indeed, the general impression, gained from a variety of sources, including the FAA and officials of the Senate Aviation Sub-Committee, is that the political climate is generally against, rather than in favour of, airport congestion regulation. This scepticism explains why DoT and FAA measures aimed at the relief of congestion have often, in the past, been overturned by Congress.
13. Fourthly, in those cases where congestion has been regulated, a distinction has been drawn between “domestic” and “international” slots. The USA has taken the view that, in accordance with the “fair and equal opportunity” provisions of bilateral air service agreements, access to airports must always be made available to air carriers designated by the other contracting state. At times, domestic slots have been reduced (usually through negotiation by the FAA with carriers rather than actual enforcement) to make way for international services. In Europe, there is no distinction between domestic and international slots. Designated international carriers, like domestic carriers, only have access if they can obtain the necessary slots in accordance with the EC Slot Regulation⁵.
14. Fifthly and finally, it should be noted that in the USA individuals and entities other than air carriers are permitted to hold slots. As can be seen from the later discussion, this has led to financial institutions, such as First Security Bank and Wells Fargo Bank, holding slots, usually as security on a financial facility agreed with an airline. Significantly, there is no observable trend suggesting that financial institutions, such as hedge funds, have sought to invest in slots as investment assets.
15. In practice, slot allocation at the vast majority of US airports is dealt with by aircraft literally queueing up to land or take-off. The only exceptions to this general rule are a small clutch of congested airports [namely, New York-La Guardia, New York-JFK (John F Kennedy) and Washington-National – or in full Ronald Reagan Washington-National], where the regulatory authorities have intervened to allocate assigned slots. At one of these three airports, New York-JFK, slot regulation only applies at the busiest times of the day. Although the practice of queueing generally works well at uncongested airports, it can cause, and often has led to, severe difficulties at congested hubs such as Chicago-O’Hare.
16. This chapter reviews the experience of secondary slot trading since 1969 when the High Density Rule was first adopted (see below). In doing so it concludes by highlighting the features most relevant to the introduction of secondary slot trading in Europe. But first it explains the US legislation applying to airport slots and the initial experience of secondary slot trading, spanning 30 years between 1970 and 2000.

⁵ This was just as much the case prior to the introduction of the EC Slot Regulation. This is explained through the fact that member state governments have not claimed the legal right to either allocate or withdraw slots in order to make them available to carriers designated by other states.

17. The chapter then turns to an assessment of how the buy/sell rule has been used in practice, and how it has been substantially modified by more recent legislation, notably the Air 21 Act. To help identify how secondary slot trading has operated since 2000, the team undertook a detailed analysis of slot holdings and slot operations at the four US airports subject to the High Density Rule. A more detailed analysis is provided in [Appendix 2](#).
18. The chapter concludes by summarising the main themes to emerge from the US experience of secondary slot trading, which now runs to nearly 40 years. We focus on the lessons to be gained from this experience for the introduction of secondary trading in Europe, paying particular attention to the latest recommendations issued by the FAA on how to address congestion at Chicago-O'Hare and New York-La Guardia.

5.1.2 US Legislation Applying to Slots and Impact of the Buy/Sell Rule to 2000

19. It is important to highlight the fact that there is no legislation in the USA that relates generally to airport runway congestion. This is in marked contrast to the EC, which has a specific EC Slot Regulation dealing with the allocation of slots at congested airports. Historically, in the US, there has been a noticeable lack of legal regulation as it relates to congestion problems, and, where regulation has been introduced, it has tended to be done on an ad hoc basis. It is important to emphasise that different rules have applied at the various airports according to their perceived characteristics. Chicago-O'Hare differs from other slot regulated airports in so far as it is a major domestic hub, dominated by two carriers, while New York-La Guardia is essentially a point of destination airport constrained by relatively short runways, thereby limiting the range of destinations served. In this sense, such legislation may be considered rather more flexible than the EC Slot Regulation, where there remains some uncertainty as to the permissible scope of the "local rules" for which it provides.
20. In 1969, in response to problems associated with congestion and noisy aircraft, new legislation was introduced by Congress. This legislation, known as the High Density Rule, set a limit on the total number of flights into and out of five highly congested airports during specified times of the day (the relevant extract from this legislation can be found in [Appendix 1](#)). The five airports affected by the High Density Rule were Washington-National⁶; Chicago-O'Hare; and New York-JFK, New York-La Guardia and New York-Newark airports in the greater New York area. In the event, the High Density Rule was abandoned within a few years in respect of New York-Newark since it was considered unnecessary.
21. As can be seen from [Appendix 1](#), the enabling legislation set out specific limits on the total number of takeoffs and landings permitted at these airports during specific hours of the day. Three categories of aircraft service were defined: air carrier, commuter and other. The High Density Rule does not apply to international services, but this is only really relevant at Chicago-O'Hare and New York-JFK since New York-La Guardia and Washington-National airports both maintain a "perimeter rule" (maximum flight distance), which means that the vast majority of their services are domestic⁷.

⁶ Subsequently renamed Ronald Reagan Washington National airport.

⁷ The only exceptions being a small handful of flights to Canada, and, in the case of La Guardia, some charter flights to the Caribbean.

22. Commuter flights are defined by the legislation as services operated by turbo-prop powered aircraft with less than 75 passenger seats or by jet aircraft with fewer than 56 passenger seats. In practice, commuter services refer to regional services operating to and from relatively nearby cities to the congested airports earmarked in the High Density Rule legislation.
23. Air carrier flights refer to all other domestic services. Accordingly, scheduled services utilising aircraft with more than 75 seats from New York-La Guardia to cities such as Chicago, Cleveland and Detroit would be defined as air carrier flights. It should be noted, however, that the perimeter rules at New York-La Guardia and Washington-National airport apply to both commuter and air carrier services. At the former, no flight is permitted which is more than 1,500 miles [2,400 kms] in distance; at the latter, a perimeter limit of 1,250 miles [2,000 kms] applies⁸.
24. The High Density Rule, which granted anti-trust immunity to airlines wishing to discuss the allocation and scheduling of slots at the designated airports, acted as a significant hurdle to new entrants wishing to gain access to congested US airports. Prior to the deregulation of domestic services by the Civil Aeronautics Board (CAB) in 1977, the transport economist David Starkie notes that “new entry was ‘virtually non-existent’ for most of the 1970s, the period when slots were allocated by scheduling committees⁹”. Slot holdings hardly changed from season to season, and the CAB’s general regulation of route entry also inhibited new services. Deregulation led to an explosion in domestic airline services and, with it, a reduction in fares. Consequently, demand for air travel increased, particularly at the airports designated under the High Density Rule.
25. By the mid 1980s demand for slots at Chicago-O’Hare, Washington-National, New York-La Guardia and New York-JFK far outstripped available supply. In response, the FAA adopted a buy/sell rule which took effect on 1st April 1986. This allowed for both the trading and leasing of slots at these four airports.
26. Under this buy/sell rule, slots were initially allocated to the carriers that were already using them, thereby maintaining their ‘grandfathering rights’. Airlines did not have to pay for them. However, as soon as the buy/sell rule was adopted, carriers and other holders of slots (notably financial institutions) were allowed to trade them in a secondary market. While this market was legal, it was secretive and the parties concerned jealously guarded the precise details of the sums that changed hands. The Department of Transportation, through the FAA, stressed that it still owned the slots traded under the buy/sell rule, and it was keen to point out that it could always withdraw the slots traded at any time¹⁰.

⁸ Currently exemptions to this perimeter rule apply for certain designated ‘slot exemption’ services, such as air carrier services between Washington-National and Seattle.

⁹ See Slot Trading at United States Airports, by David Starkie, City Publications Ltd, 1992, page 7. Starkie refers to a Department of Transportation study that provides further details on the experience in the 1970s. The report was entitled ‘Secretary’s Task Force on Competition in the US Domestic Airline Industry: Airports, Air Traffic Control and Related Concerns (Impact of Entry)’, Chapter Six, published February 1990.

¹⁰ For further details see Airline Competition – Barriers to Entry Continue in Some Domestic Markets, General Accounting Office, 1999.

27. Under the buy/sell rule, not all slots could be traded or leased at these four airports. To begin with, slots for international services were outside the remit of the buy/sell rule, a factor that was particularly important at New York-JFK, one of the main entry points into the USA. Furthermore, the major carriers were not allowed to acquire commuter slots, i.e., the shorter shuttle routes. In addition, the FAA imposed a ‘use it or lose it’ rule, the terms of which were modified in the early 1990s (see below). New slots, along with slots that were not reclaimed by a carrier, were allocated by lottery after 25 per cent of them had been offered to new entrants.
28. In the early 1990s, the European Commission asked Starkie to review the regulatory environment as it related to secondary slot trading at the four congested US airports referred to above. These research findings were subsequently published in a report entitled, *Slot Trading at United States Airports: A Report for the Director General for Transport of the Commission of the European Communities*¹¹.
29. Drawing on his own original research and a series of interviews with informed parties in the USA, the author concluded:
- The buy-/sell rule facilitated a large number of slot transactions at the four designated airports.
 - The trades fell into two groups: uneven trades, when slots were bought and sold or exchanged in unequal numbers linked to a monetary consideration; and even trades, or one for one exchanges, that were also often accompanied by a monetary amount to facilitate the exchange.
 - Allowing money to pass hands between the parties made it easier for one-to-one trading to be achieved.
 - Following the official authorisation of secondary trading, there was an initial surge of transactions in the last nine months of 1986. Turnover thereafter remained fairly constant at just under 20 per cent in 1987 and 1988. Starkie noted that the number of even trades was approximately double that of uneven trades.
 - Total annual turnover was impressively high. Indeed, it was equivalent to more than 50 per cent of the daily commuter and air carrier slots available during restricted hours at the four airports studied.
 - Secondary trading attracted some criticism on the grounds that it blocked new entry at these four airports. Starkie examined this perceived weakness, and confirmed that only a relatively small proportion of transactions were outright sales. But he pointed out that the “secular decline in sales is exaggerated: a large volume of slot sales in 1986 involved the forced sale to Pan Am of 76 slots used by New York Air in its shuttle operation”. The figures were further affected by the FAA’s initial pool of slots distributed by lottery. Notwithstanding these factors, Starkie acknowledged “there has been a decline in sales”.
 - After 1988, sales significantly increased and surpassed the level recorded in 1986 (see Table 5.1). Lease transactions also increased with the number of trades more than doubling after 1989.

11

Published by City Publications, London, 1992 (ISBN 0 9518919 0 1).

Table 5.1: Summary of Air Carrier Slot Leases and Sales at US High-density Airports, 1986-92

Year	Leases under six months	Leases over six months	Sales	Transactions
1986	163	79	375	617
1987	617	5	152	774
1988	612	58	64	734
1989	1,259	*	290	1,549
1990	1,294	*	403	1,607
1991	1,468	*	477	1,945
1992	1,178	*	310	1,488

Note: * leases not specified as either less than 6 months or over 6 months

Source: **A Market in Airport Slots**, (2003), edited by Keith Boyfield, Institute of Economic Affairs, page 70.

5.1.3 An Assessment of the Buy/Sell Rule

30. In many ways the buy/sell initiative appears to have proved a comparative success, at least until the adoption of the Air 21 Act in 2000 (see below). The initiative offered new entrants an opportunity to acquire slots at congested airports (albeit not many took advantage of this new freedom) and it offered a mechanism to provide greater liquidity for the exchange of slots at popular airports. Starkie reports that, as far as the FAA were concerned, their “general view is that the buy-sell rule has worked well” and, in the process, it had “greatly relieved its administrative burden”. Secondary trading enabled airlines to fine-tune their schedules and generally improve their efficiency.
31. The overall conclusion was that slot trading had proved beneficial in so far as it encouraged the more efficient use of limited airport capacity at the four congested airports designated under the High Density Rule. Nonetheless, Starkie cautions, “slot trading needs to be part of a strong pro-competition policy. It does not, on its own, secure the entry of new airlines into capacity constrained airports¹²”.

¹² Starkie points out that the buy/sell rule had not met with expectations in one respect – “few new entrants had purchased slots or maintained the slots allocated to them at the time of the 1986 lotteries. Their view was that large carriers have tended to add to their slot portfolios”.

32. As mentioned earlier, one of the crucial differences between US airports and airports within the EC is that new entrant airlines in the US must make arrangements for check-in facilities, counter space and handling facilities as well as the use of gates, which have tended to be leased for long periods by individual carriers. In the past this proved to be a significant barrier to entry. In the late 1980s, for example, the US Department of Transportation acknowledged that “there is very little under-utilised terminal and gate capacity at the large airports, consequently, new entry was often achieved through acquiring an existing operation¹³”.
33. To illustrate this point, Donald Trump purchased 92 slots at Washington-National and New York-La Guardia airports along with gates, when he entered the East Coast shuttle market¹⁴. Furthermore, when one analyses the commuter section of the slot market in the late 1980s, there tended to be a higher level of market entry because such services require less sophisticated facilities. Indeed, counter space and handling requirements were minimal.

5.1.4 Modifications to the Buy/Sell Rule and its impact on secondary slot trading

34. In 1993, modest amendments were made to the buy/sell rule. As from January 1993, slots that were traded had to be used for 80 per cent of the time in a two month period (previously it was only 65 per cent). The definition of those entitled to slots from the reserved pool was widened to include incumbent airlines with relatively few slots. In another refinement, restrictions were placed on incumbent carriers with the aim of preventing them acquiring slots intended for new entrants, an acknowledgement that it was felt more needed to be done to attract such carriers in a move to promote competition.
35. Furthermore, there were some amendments made to the distinction drawn between the definition of an air carrier and commuter slot, essentially to allow larger aircraft to serve commuter routes.

¹³ Quoted in Slot Trading at United States Airport: A Report for the Director General for Transport of the Commission of the European Communities¹³ by David Starkie, City Publications, London, 1992, page 15.

¹⁴ Ibid, page 15.

36. In a study published in 2003 by the Institute of Economic Affairs, David Starkie updated the research work he had originally undertaken for the European Commission in 1992. Reviewing the record of secondary slot trading in the US throughout the late 1980s and 1990s, he judged that it had led to a more efficient distribution and use of slots. He argues that, “*given the constraints on correct pricing signals for the use of scarce airport capacity, secondary markets for slots would appear to be an important way of satisfying the dynamics involved in airline markets and an important means for discovering the efficient scale of the network natural monopoly*”¹⁵. In practice this meant that the two main carriers at Chicago-O’Hare – American (AA) and United (UA) - enhanced their grip on slots, while the smaller airlines were often outbid for these assets. The US Department of Justice (DoJ) has highlighted this trend, pointing out “both of these carriers developed hubbing operations out of Chicago O’Hare, and any slot they sold would have almost certainly be used to compete with on some route”. The DoJ claim “neither AA nor UA were willing to sell slots to potential customers, making the bulk of O’Hare slots unavailable to others”. However, Mott MacDonald’s research team has found little evidence to substantiate this claim and while the US Department of Transportation shares some of the DoJ’s concerns, it is pursuing mechanisms that enable new entrants to acquire slots. In the most recent round of secondary slot trading, undertaken in the latter part of 2006, a number of smaller rival carriers were able to obtain significant numbers of slots at Chicago-O’Hare, notably JetBlue Airways.
37. Nevertheless, Starkie cautions that a one-size-fits-all approach is likely to be flawed. The scope for secondary trading is likely to be most beneficial at those congested airports, such as New York-La Guardia, used by a large number of carriers and where no single airline is dominant. The experience at Chicago-O’Hare between 1986 and 2000 suggests that open secondary trading is likely to lead to a consolidation of slots by the two main dominant carriers, United and American, which use this airport as their main hub. Both these airlines have been able to exploit economies of scale and scope stemming from their hub and spoke operations.
38. Throughout the 1990s there was sustained lobbying aimed at securing privileged access for airlines serving smaller communities, such as those in Alaska, and to facilitate entry by new competitors at the four heavily congested airports. In March 1999, the US General Accounting Office [GAO] issued a report on ‘Airline Deregulation: Changes in Airfares, Service Quality & Barriers to Entry’, which observed that the benefits stemming from deregulation had not been evenly distributed across the US domestic market. The study pointed out that at the four slot constrained airports designated under the High Density Rule “established airlines have expanded their slot holdings, while the share held by airlines starting after deregulation remained low”. The report added, unsurprisingly, that air fares continue to be “consistently higher than at airports of comparable size without constraints”. However, given the popularity of these highly congested airports it is understandable that carriers have been able to charge a premium for services operating from these airports. The entry of new carriers would not necessarily make a substantial impact on fare levels if there was buoyant passenger demand for airline services.

¹⁵ ‘A Market in Airport Slots’, edited by Keith Boyfield, Institute of Economic Affairs, 2003, page 77.

39. The GAO report included a table, reproduced as Table 5.2 below, which demonstrates that, between 1986 and 1999, the major incumbents consolidated their grip on slots at the four slot congested airports where secondary slot trading has been employed. The incumbent airlines, along with a bank, almost doubled their holdings of domestic air carrier slots at New York-JFK, while post-deregulation airlines acquired relatively few slots. Three established incumbents, American, Delta and US Airways, more than doubled their slot holdings at New York-La Guardia while other established airlines saw their percentage of slot holdings dwindle. At Washington-National the same three incumbent airlines again more than doubled the percentage of slots held. The exception was Chicago-O'Hare, where the share of slots held by the two dominant carriers – American and United – fell slightly between 1996 and 1999 although the two airlines maintained their market share over the five year time period 1995-2000¹⁶.

¹⁶ When asked to comment on this trend, United Airlines pointed out that both American and United grew their total High Density Rule slot holdings slightly between 1st January 1995 to 1st January 2000, American by 27 and United by 15 slots. The two main incumbents maintained their percentage of total slots at Chicago-O'Hare over this five year time period. Source: E-mail correspondence to the Mott MacDonald team from Michele Boyce, Manager for Airport Co-ordination, United Airlines, 23 August 2006.

Table 5.2: Percentage of Domestic Air Carrier Slots Held By Selected Groups

Airport	Holding entity	1986	1991	1996	1999
Washington-National	American, Delta and US Airways	25	43	59	65
	Other established airlines	58	42	20	18
	Financial institutions	0	7	19	14
	Post-deregulation airlines	17	8	3	3
Chicago-O'Hare	American and United	66	83	87	84
	Other established airlines	28	13	9	10
	Financial institutions	0	3	2	3
	Post-deregulation airlines	6	1	1	3
New York-La Guardia	American, Delta and US Airways	27	43	64	70
	Other established airlines	58	39	14	14
	Financial institutions	0	7	20	10
	Post-deregulation airlines	15	12	2	6
New York-JFK	Shawmut Bank, American and Delta*	43	60	75	84
	Other established airlines	49	18	13	14
	Financial institutions	0	19	6	1
	Post-deregulation airlines	9	3	7	1

*Note: In 1999, First Security National Bank replaced Shawmut Bank as the holding entity. It held these slots by virtue of trust as security for a loan it had extended to TWA, which used some slots and leased others.

Source: Airline Deregulation – Changes in Airfares, Service Quality, and Barriers to Entry, March 1999, GAO/RCED – 99–92, General Accounting office

40. In terms of the underlying economic dynamics such a trend was only to be expected. As Achim Czerny and Henning Tegner of the Berlin University of Technology have argued¹⁷, established airlines find it far more profitable than new entrants to add slots to their portfolio. This is attributable to economies of scale and the remarkably positive network effects triggered by the addition of another destination to an airline's hub and spoke network. Both Czerny & Tegner and Starkie refer to a study by Kleit and Kobayahi, which demonstrates these causal economic effects based on an analysis of traffic data at Chicago-O'Hare in 1990¹⁸. Czerny and Tegner conclude that *"newcomer airlines will not be able to generate such network effects and for this reason their willingness to pay for slots at congested hub airports is bound to be lower compared to the established airlines"*.
41. However, the GAO took a different view. It concluded that regulatory intervention was merited in order to address the consolidated hold achieved by major carriers at the most congested US airports. Consequently, it recommended that the US government should encourage greater competition in the domestic airline market through the redistribution of slots to rival airlines.

5.1.5 The Air 21 Act

42. In 2000, mounting concern among political representatives over the ability of new entrants to acquire slots at congested airports, and to ensure that services were maintained to more isolated, peripheral communities, led Congress to pass the Air 21 Act¹⁹, signed by President Clinton in April 2000. This suggests that while secondary slot trading had provided carriers with the opportunity to acquire slots there was, nevertheless, significant unmet demand for slots at highly congested airports, such as Chicago-O'Hare.
43. The Air 21 Act introduced a number of important changes, most notably a new category of slots, known as Air 21 slots or "exemption slots" (i.e. exempted from the High Density Rule). Through specifying the criteria by which exemptions would be granted, the aim of this amendment was to encourage services to smaller communities (defined as routes serving less than one million passengers a year) as well as services started by new entrants, albeit the definition of new entrant was fairly broad (for example, a carrier that was already flying up to 20 daily landings and takeoffs at New York-La Guardia qualifies as a new entrant under this category). Air 21 also phased out the High Density Rule at Chicago-O'Hare as from 1st July 2002. In addition, the Act provided for the elimination of the High Density Rule at both New York-JFK and New York-La Guardia as from 1st January 2007.

¹⁷ 'Secondary Markets for Runway Capacity', by Achim Czerny & Henning Tegner, Berlin University of Technology, Implementing Reform on Transport Pricing: Identifying Mode-Specific Issues, Imprint Europe, May 2002.

¹⁸ 'Market Failure or Market Efficiency? Evidence on Airport Slot Usage' in B McMullen (ed) Research in Transportation Economics, JAI Press, Connecticut, 1996.

¹⁹ Known officially as the Wendell H Ford Aviation Investment & Reform Act of the Twenty First Century, (codified legally as Title 49 of the United States Code 4111714-41718).

44. The net impact of Air 21 was to make secondary slot trading far more circumscribed. Since this legislation was passed, airlines have sought to exploit the exemption rules by claiming that they are offering a fresh service or one that serves peripheral communities at these congested airports. Consequently, air carriers have been allocated Air 21 slots for free, which, in turn, has reduced their need to acquire slots through secondary trading. Furthermore, since the Air 21 Act specifically states that none of these may be “*bought, sold, leased or otherwise transferred by the carrier to which it is granted*”, the total number of potential slots available for secondary trading has decreased.
45. As discussed later, every new service that was launched at New York-JFK and New York-La Guardia airports since 1995 took advantage of exemption slots. The new low cost carrier, JetBlue, is perhaps the best illustration of this business strategy since it has managed to carve out a significant market share at New York-JFK and now has its own terminal at this international hub. As noted in the detailed analysis of FAA slot data (see *Appendix 2*), in 2005 JetBlue held no less than 58 slots in the time period (2.00 pm to 8.00 pm) when slot restrictions apply at this international gateway.
46. Soon after it was implemented, the Air 21 Act²⁰ created chaos at the most congested airports in the USA, especially at New York-La Guardia and at Chicago-O’Hare. The relaxation of slot regulations triggered much higher demand by airlines wishing to operate services from these airports. Consequently, the deregulation introduced by Air 21 merely led to acute congestion and substantial traffic delays.

5.1.6 New York-La Guardia

47. These repercussions were exemplified at New York-La Guardia where the Air 21 Act enabled many new entrants to request fresh slots. The results speak for themselves: soon after Air 21 was adopted on to the federal statute book, over 300 new flights had been added at New York-La Guardia by carriers taking advantage of the slot exemption process. In November 2000, the number of scheduled flights during the 15 peak hours subject to the High Density Rule far exceeded the maximum capacity of the airport. In total, over 600 new flights were scheduled to operate, which was a 50 per cent increase over the slot limits.
48. This situation was unsustainable: air traffic delays at New York-La Guardia were responsible for 25 per cent of the delays throughout continental USA in November 2000, just six months after Air 21 became federal law²¹. (This compared with a figure of 10 per cent the previous year). In response, the Port Authority of New York and New Jersey intervened to impose a temporary moratorium on new flights at New York-La Guardia; it also asked the FAA to address the congestion problems at the airports, which were spiralling out of control. While the FAA was initially reluctant to tackle the all too apparent repercussions linked to the introduction of Air 21 slot exemptions, it did so on the basis that it had a statutory obligation to intervene in order to maintain safety and the movement of air traffic²².

²⁰ A good example of the overturning of slot rules by Congress, although the Act also dealt with many other aspects of aviation.

²¹ Confirmed by Ms. Lorelei Peter, Senior Attorney, Regulations Division, Office of the Chief Counsel, FAA, 1st March 2006.

²² This obligation on the FAA is codified in US law as 49 U.S.C. 41715(b).

49. Accordingly, in January 2001 the FAA imposed a temporary limit of 75 scheduled operations per hour (plus six unscheduled operations mostly used by general aviation). Henceforth, Air 21 slot exemptions (i.e. those relating to new entrants and carriers serving smaller communities) were to be allocated by a lottery – colloquially referred to as the ‘slottery’²³. The total number of Air 21 slots was restricted to a total of 159 a day between the hours of 7:00 a.m. and 9:59 p.m (just under 11 slots an hour, albeit that at certain times of the day, principally between 6 – 7 am and after 9 pm, not all of the available Air 21 slots allocated by the lottery are taken up, in which case they must be returned to the pool). While Air 21 slots – somewhat confusingly known as slot exemptions - may not be bought, sold or leased, they can under certain conditions be exchanged on a non-permanent, one-for-one basis at the same airport²⁴. It is illegal for money to change hands in respect of such slots.
50. This temporary remedial action alleviated the congestion problems at New York–La Guardia. Within six months of these measures being adopted, the average number of aircraft delays at the airport was transformed: delays fell dramatically from 330 per day in October 2000 to 98 per day in April 2001.
51. The measures introduced by the FAA, which were meant to be temporary, have been extended several times. The latest extension was granted in June 2005 and this is due to run out on 31st December 31, 2006²⁵. These ad hoc extensions have allowed the regulator to explore other options to manage demand at New York–La Guardia, which occupies a physically constrained site on the East River.
52. In August 2006 the FAA announced its proposed rule aimed at maximising the utilisation of New York-La Guardia’s scarce resources. In summary, the proposed rule retains the cap of 75 operations an hour plus six general aviation flights but extends the time period to 6.30 am to 9.59 pm Mondays through Fridays with a limitation placed on flights between noon and 9.59 pm on Sundays. In an important new innovation, aimed at optimising capacity, the FAA is seeking to require carriers to use larger aircraft. Over the last five years, the increasing use of commuter aircraft, defined as planes with fewer than 71 seats, arriving at New York-La Guardia from medium and large hubs has prevented full use being made of the airport’s potential. While the airport handled 25.9 million passengers in 2005, more than any previous year, the Port Authority estimates that the airport could cope with 28.5 million passengers, if larger aircraft were used by carriers²⁶.
53. Accordingly, the FAA is seeking to place a requirement on carriers to meet a specified aircraft size target, in a range from 105 seats to 122 seats, enforced through a use-or-lose provision. In practice, Ms. Nancy LoBue, deputy assistant administrator for policy at the FAA, reckons this would mean that airlines would have to increase the average number of seats on their flights from New York-La Guardia by between five to seven per cent²⁷. It is important to note, however, that this proposed FAA requirement will not be imposed on carriers operating services to small and non-hub communities.

²³ The FAA’s announcement was issued on 15th November 2000, see on 65 FR 69126.

²⁴ E-mail correspondence from Ms Lorelei Peter, Senior Attorney, Regulations Division, Office of the Chief Counsel, FAA, 1st March 2006.

²⁵ This extension was codified by the FAA as 70 FR 36998, dated 27th June 2005.

²⁶ ‘Agency Seeks New Solution to Congestion at La Guardia’, *New York Times*, 26th August 2006.

²⁷ Ibid.

54. The other main element in the FAA's proposed rule is a measure aimed at enhancing competitive entry in the market. This is of particular relevance to the subject of this report since it deals with the issue of how to remove barriers to market entry at congested airports. Under the proposed rule, the FAA would assign 'operating authorisations' to each slot in 2007 with an expiration date ranging from 2010 to 2019. The method adopted by the FAA in assigning these slots would ensure that no carrier would lose a disproportionate number of operating authorisations at any one time.
55. It is proposed that the slots allocated by the FAA in 2007 would have a life of between three to 13 years. In 2010, the plan would be to withdraw ten per cent of these authorisations since they would have expired. This ten per cent tranche would then be reallocated with a renewed ten year life. Accordingly, each year following 2010, ten per cent of the assigned slots would expire and be reallocated for ten years.
56. The FAA believes that "establishing finite lives for Operating Authorizations can improve efficiency at La Guardia over time by encouraging all airlines to maximise the use of a scarce resource and to maximise their investment at the airport. The authorisation's finite life would influence carriers to recognise the present value of operating at La Guardia because an Operating Authorisation ultimately expires, at which point it would be worth nothing to the existing holder"²⁸.
57. As the FAA notes, "if a carrier is not able to use an Operating Authorization profitably, the carrier may sell the authorisation on the secondary market rather than hold the authorisation and operate it at a loss. This incentive, coupled with the use-or-lose provision which enforces usage of Operating Authorisations, would promote efficient use of scarce airport resources because the carriers that value them most will use the Operating Authorisations"²⁹.
58. In summing up its proposed rule for New York-La Guardia, the FAA states that "this reallocation approach should encourage dynamic access to air services". It recognises that "determining the percentage of capacity that should be subject to reallocation annually requires establishing a balance between exposing airport access to market forces, providing access for new entrants, and preserving stability at the airport". The regulator believes that its solution offers such a balance, since all carriers would have at least three years to adjust their strategies to the new slot allocation mechanism. Providing air carriers with ten year franchises on slots should offer them the opportunity to develop services and generate a reasonable profit while also offering other airlines the opportunity to enter this popular market.
59. The FAA emphasises that "if carriers were granted perpetual operating rights they may not have sufficient incentives to sell or lease operating authorisations (i.e. slots) on the secondary market to a competitor placing a higher value on their use"³⁰. Under the approach outlined by the regulator for New York-La Guardia, the finite life assigned to slots should offer clear incentives for carriers to maximise their value over the assigned time period. In short, the proposed rule should meet the Department of Transportation's statutory duty to place maximum reliance on competitive market forces and realise the potential competition to be found in the marketplace.

²⁸ Notice of proposed rulemaking: Congestion Management Rule for La Guardia Airport, Federal Aviation Administration, [Docket No. FAA-2006-25709; Notice No.06-13], 25th August 2006, page 20.

²⁹ Ibid.

³⁰ Ibid., page 25. See proposed rule for the precise details on how the FAA plans to assign expiration dates between grandfathered operating authorisations.

5.1.7 Chicago-O'Hare

60. As noted above the implementation of the Air 21 Act³¹ triggered chaos at Chicago-O'Hare, one of the main hub airports serving the North American continent. With the adoption of the Air 21 Act, after 1st July 2001, slot control restrictions under the High Density Rule at Chicago-O'Hare were limited to a shorter period in the day, namely between 2.45 pm and 8.14 pm. After July 1st 2002 all slot restrictions at the airport were abolished.
61. As in the case of New York-La Guardia, as soon as slot restrictions were relaxed, congestion problems exacerbated. Chicago-O'Hare rapidly became congested with a mass of long haul and commuter carriers clamouring to use its seven runways, particularly in 2003 as the adverse impact of the 9/11 terrorist attacks on the market for domestic air travel began to dissipate. In response to this increased demand, air carriers, most notably the two main incumbents at Chicago-O'Hare - American and United - expanded their range of flights. For example, over the period April 2000 to November 2003 American increased the number of scheduled flights it operated at Chicago-O'Hare between 12.00 p.m. and 8.00 p.m. by almost 10.5 per cent. United added far more services over the same period, equivalent to an increase of 41 per cent³². Coupled with an increase in the use of regional jets shuttling commuter traffic to Chicago-O'Hare, this resulted in far greater congestion problems. By November 2003, Chicago-O'Hare ranked as having the worst on-time performance of any major airport in the US. Indeed, arrivals there were on time only 57 per cent of the time, while departures were only marginally better with flights being on schedule some 67 per cent of the time. (In comparison, other major US airports recorded an average of 85 per cent for on-time performance).
62. Acknowledging that airport congestion was becoming far worse, Congress passed legislation (49 USC 41722) aimed at providing a mechanism to reduce delays. As a result of this initiative, the FAA held a series of meetings with the two main incumbent airlines at Chicago-O'Hare with the express objective of requiring them to trim the number of scheduled services operated at this major hub. In these negotiations, the FAA enjoyed the whip-hand, since it could threaten to withdraw slots based on its legal powers under the 1958 Air Transport Act. Before a formal schedule reduction meeting was held in Spring 2004, American and United offered to reduce the number of flights they operated at Chicago-O'Hare. Clearly, they felt it better to make a voluntary accommodation – amounting to a five per cent cut in scheduled operations - rather than risk the withdrawal of a substantial number of slots.
63. Although the two main incumbents had reduced the number of flights they operated, other carriers continued to add services at the expense of American and United. This led the FAA to intervene once again, this time through agreeing reductions in services with all airlines using Chicago-O'Hare. At the same time, the FAA introduced an Order (commonly referred to as the 'August 2004 Order'), which imposed a maximum limit of 88 scheduled arrivals an hour between 7 a.m. to 8 p.m. as from October 31st 2004. As the FAA explained, "the Order imposed limits previously agreed to by the carriers (but) the order does not include any secondary trading mechanism of operating authority".

³¹ A good example of the overturning of slot rules by Congress, although the Act also dealt with many other aspects of aviation.

³² Figures drawn from Federal Aviation Authority, Federal Register, vol 70, no 57, March 25 2005.

64. This stop-gap measure has been extended several times³³. However, this interim measure gave the FAA the opportunity to consider a range of measures aimed at addressing congestion at this major continental hub. On 25th March 2005 the FAA published its proposed rule and notice on tackling congestion and delay at Chicago-O'Hare. This document led to responses from a wide range of interested parties (27 in all), not least the Department of Justice (DoJ), which expressed a number of areas of concern in a paper published on 24th May 2005.
65. Following lengthy consultation and debate, the FAA published its final proposed rule on congestion management at the end of August 2006, at the same time as its proposed rule for New York-La Guardia. This document, which runs to 97 pages, sets out tailored recommendations on measures to address the congestion problems at Chicago-O'Hare. It is important to stress that this set of recommendations differed in a number of significant ways from those proposed for New York-La Guardia.
66. These differences are threefold. Firstly, the recommendations are only a temporary solution – Chicago-O'Hare is upgrading and reconfiguring its capacity in a \$15 bn expansion programme, thereby enabling it to handle far more operations (by 2008, the airport should be able to accommodate 50,000 extra flights, rising to 90,000 by 2010, and 140,000 by 2013). As a result of this enhanced capacity, beginning on 1st November 2008, the existing cap on flights will be lifted as additional capacity is brought into use. Secondly, slots or 'operating authorisations' as they are known in the FAA's jargon, would not have a finite time limit on them prior to reallocation. Thirdly, unlike New York-La Guardia, no minimum target size aircraft limit would be imposed on carriers operating services at the airport.
67. The FAA states that its preferred approach to reducing delay and congestion is to see airport infrastructure enhanced, so that capacity meets demand. This is an objective to which the City of Chicago is fully committed through its ambitious \$15 bn O'Hare Modernization Programme (known by the acronym OMP) which aims to bring significant additional capacity on-stream over the next seven years. Indeed, the City of Chicago argued that the current cap on flights should be lifted by November 2007. However, the FAA rejected this idea on the basis that there would be no significant increase in overall capacity prior to October 2008.
68. In an initiative aimed at offering new airlines an opportunity to operate at Chicago-O'Hare, the FAA is planning to establish a lottery for the new slots created under the OMP. Under this plan, if the cap is raised to 89 or 90 arrivals per hour as new capacity becomes available from November 2008, the only airlines eligible to apply for such lottery slots would be carriers that do not presently operate at the airport, and those that only offer limited services. Even so, this would only mean an additional 30 arrivals each weekday, compared to the 1,200 scheduled peak hour arrivals that the airport currently handles each weekday. Furthermore, if the cap is lifted marginally higher, namely to 91 or more hourly arrivals, the FAA plans to allow any carriers to apply for lottery slots, including the two major incumbents, American and United.

³³ These extensions tend to be implemented on a six month rolling basis. For example, on 10th February 2005 it was extended once again by the FAA.

5.1.8 Audit of Slot Holdings and Slot Operations 2000 - 2005

69. Given the wide reaching reforms that are currently being debated in the US it is helpful to analyse the ownership and operation of slot holdings at the four most congested airports, namely Chicago-O'Hare, Washington-National, New York-La Guardia and New York-JFK, that have been subject to the High Density Rule in the six years since Air 21 was enacted. The study team has been able to analyse and chart the pattern of commuter and air carrier slots held and operated at all four airports, using raw data supplied by the FAA on slots held and operated at each of the airports concerned (these are divided into commuter slots held and operated, and air carrier slots held and operated). As far as is known, this is the first time such an audit of slots at High Density Rule airports has been undertaken for the period 2000 – 2005. The data is shown diagrammatically in Appendix 2 and this appendix also provides a detailed review of the main points to come out of this analysis.

70. The main themes to emerge from this analysis are as follows:-

- a) Secondary trading is mostly undertaken on an ad hoc basis between carriers. Some of these trades are based on a very short term basis and monetary consideration is not always involved. Sales and leasing deals are arranged at meetings of the Air Transport Association, which holds regular trading sessions throughout the year. It is worth noting that 23 of the 27 airlines holding slots at airports subject to the High Density Rule participate in these sessions. Although carriers may list the fact that they are seeking additional slots at an airport, sales and leases are not a formal part of the ATA trade sessions, since they deal primarily with one-for-one transactions. Most lease and sale transactions are initiated outside these formal trading sessions.
- b) Carriers tend to prefer leasing to outright sales, since they retain ownership of the underlying asset. In recent years the US airline industry has experienced significant financial difficulties and many airlines have sought protection from their creditors by filing under Chapter 11 of the US Bankruptcy Code. However, their slot holdings at congested airports have been used as collateral on loans and other financial arrangements. Accordingly, financial institutions have been recorded as the holders of both commuter and air carrier slots at airports subject to the High Density Rule. Some certified air carriers have even been created with the specific objective of holding slots at these airports on behalf of their parent carrier. CalAir is a good example of this strategy (see below).
- c) A significant amount of secondary trading has been conducted at *Chicago-O'Hare* airport. This is revealed in both the analysis of commuter slots and air carrier slots. The secondary market has provided an opportunity for new carriers to enter the market.
- d) Two airlines dominate Chicago-O'Hare – American and United. These two carriers use the airport as the centre for their hub and spoke operations throughout the North American continent. The economies of scale and scope derived from this model have enabled the two carriers to build up slot holdings equivalent to between 82 to 84 per cent of the airport's total capacity. During the phase out of the High Density Rule at Chicago-O'Hare other carriers managed to increase the number of slots they operated.
- e) Nonetheless, around a fifth of designated slots in the years 2000 and 2001 were held by 19 other entities, including several banks and financial institutions such as Mitsubishi Bank Ltd and First Security Bank, along with carrier affiliated companies such as YX Properties LLC.

- f) The FAA data record that airports have also held air carrier slot exemptions at Chicago-O'Hare. Greenville Spartanburg Airport, located in South Carolina, whose holding declined from three to one between 2000 and 2001; and Savannah Airport Commission, located in Georgia, which held three slot exemptions in 2000, but none in 2001. These allocations were part of a temporary Department of Transportation (DoT) strategy aimed at the direct allocation of slot exemptions to airport operators, with the idea that they would then be able to attract services to their airports. However, the DoT discontinued this policy after a relatively short trial.
- g) A wide number of airlines held commuter slots at *New York-La Guardia* airport. A total of 14 airlines have held commuter slots between 2000 and 2005 as well as one bank, First Security Bank. As a result of secondary trading activity, 21 airlines actually operated commuter slots at the airport. Altogether, 41 airlines have operated air carrier slots at the airport over the period 2000 to 2005. Many of these carriers have obtained slots through the secondary trading market. The New York New Jersey Port Authority claim to have maintained a wide variety of carriers serving customers' needs. Based on our analysis of the FAA data, this claim is demonstrably correct. However, it also important to note that a number of the commuter carriers operating at New York-La Guardia are affiliated to major airlines and tend to negotiate slot transactions with their parent.
- h) The main lessors at New York-La Guardia were American and US Airways. The latter has leased slots to its affiliates, and indeed transferred slots to affiliate carriers, so as to ensure that it retains ownership of these slots while seeking protection from creditors under Chapter 11 of the US Bankruptcy Code.
- i) Five carriers increased their holdings of air carrier slots at New York-La Guardia between 1986 and 2000. However, since 2000, none of these carriers have launched new services by utilising the secondary slot market; these services have been based on government exempted slots, whether categorised as regular or Air 21. On the other hand, a number of other carriers, such as AirTran and Spirit, have increased the number of slots they operate at this airport through utilising the secondary slot market. Most recently, a new entrant, JetBlue, the no frills carrier, has been able to acquire government exempted slots at New York-La Guardia utilising Air 21 slots, thereby by-passing the secondary slot market.
- j) Northwest Airlines sold nearly all its air carrier slots at New York-La Guardia during the period under review, transferring the holder status to financial institutions. In 2000, it held 42 slots but by 2005 it only held two. The need to sell slots was linked to its deteriorating financial position, which led the airline to file for bankruptcy protection under Chapter 11 of the US Bankruptcy Code in September 2005³⁴. Despite selling these slots, it was able to lease slots on the secondary market to maintain its scheduled services. FAA data show that Northwest continued to operate 40 plus slots a day throughout the period 2000 to 2005 (the total climbed from 42 in 2000 to 45 in 2005).

³⁴ As part of the transaction transferring the holder status, presumably to enhance its security interest, the financial institution concurrently transferred the operator status back to Northwest for a period of time. The FAA indicates this is common in transactions involving air carriers and non-air carriers.

- k) Five financial institutions held air carrier slots at New York–La Guardia between 2000 and 2006. At times these entities (First Security Bank, Mitsubishi Bank Ltd, Pension Benefit Guaranty, Wells Fargo Bank and YX Properties LLC³⁵) have held as many as 48 daily slots each. None of these holdings was investment driven. They were held as security on some form of mortgage or credit facility. This reveals the valuable role slot holdings can fulfil in providing much needed funding facilities to airlines, particularly when they are struggling financially.
- l) There is an active secondary slot market in commuter slots at *New York-JFK*. Only three airlines held commuter slots, and these carriers often leased slots to other airlines. AMR Eagle, for example, operated far fewer commuter slots than it held. Similarly, a number of airlines have leased air carrier slots. One of the three main holders of such slots, American, leased a third of its air carrier slots to other carriers in 2005.
- m) Mirroring the experience at New York-La Guardia, new entrants at New York-JFK have sought to pick up government exempted slots under Air 21. Indeed, the majority of new services launched at New York-JFK since 2000, including JetBlue services, have utilised exemption slots, although some new services have been operated using slots obtained from other carriers. JetBlue was operating six services in 2000 when slot restrictions applied, but by 2005 it had built up its slot holdings to 58. In 2005, 28 per cent of all air carrier slots in the restricted time period (3.00 pm to 8.00 pm) were government exempted slots.
- n) Secondary slot trading has been a feature of the market at *Washington-National* airport. The airport authorities judge that the existence of secondary trading has exerted a beneficial influence on services, enabling new carriers to enter the market and allowing the airport to maintain a broad diversity of airlines. However, as Edward Faggen, the Chief Counsel at Washington-National airport confirmed, this influence has lessened following the adoption of Air 21, which has enabled new entrants and carriers serving smaller communities to acquire a modest number of slots for free. As a result, in recent years there has been marginally less secondary trading.
- o) Holders of slots at Washington-National have preferred to lease rather than sell slots since these assets are extremely valuable to the airline (the corollary being that carriers have opted to acquire government exempted slots whenever possible, since these are free).
- p) As in the case of other airports subject to the High Density Rule, banks and financial institutions have held slots at Washington-National airport. Fleet Bank and Wells Fargo Bank both held commuter slots as collateral on specific financial transactions.
- q) The largest holder of commuter slots at Washington-National airport was Piedmont Airlines, a wholly owned subsidiary of US Airways. The vast majority of its slots were leased to other US Airways Express carriers, notably Colgan, Chautauqua and Mid-Atlantic, for services that formed part of the US Airways Express network.

³⁵ YX Properties is an affiliate company under the same corporate holding company that owns Midwest Airlines. YX Properties subsequently transferred the slot operator status to Midwest for a defined period of time. This has been extended several times over the period.

- r) Several airlines took advantage of the secondary market in commuter slots to increase the number of services they operated at Washington-National. These included AMR Eagle and Jetstream International (a wholly owned subsidiary of US Airways). A wide range of carriers (35 in all) operated services utilising air carrier slots. Between them, six certified air carriers have held 88 per cent of air carrier slots, but they have tended to lease a proportion of these slots rather than use them. CalAir was one of these six certified air carriers although it is not an airline as such, but merely a subsidiary of Continental Airlines and was established specifically to hold a sub-set of slots owned by Continental. These slots were often traded on the secondary market. Pursuing this approach, the airline was able to retain its valuable assets at Washington-National, while earning a reasonable income through leasing slots.
- s) As in the case of its slot holdings at New York-La Guardia, Northwest Airlines sold the vast majority of its slots at Washington-National over this six year period. However, it was able to lease a substantial number of slots through the secondary market.
- t) United has leased a significant proportion of the air carrier slots it held at Washington-National. Airline executives explained to the team that doing so “allowed partner carriers to operate our slots during this period on a season-by-season basis, thereby allowing United the flexibility to change our schedule and maintain our historics for future growth”.
- u) Altogether 44 new daily slots at Washington-National have been allocated under the Air 21 initiative³⁶. While Air 21 slots have been useful to new entrants, the total number of such slots has been relatively modest. It is clear that carriers continue to make use of secondary trading at Washington-National, albeit airlines will seek to take advantage of Air 21 slots where they can do so.

5.1.9 Conclusions

71. Having summarised the main themes to emerge from the experience of slot trading over the last six years in the USA, the key conclusions of relevance for secondary slot trading in Europe are as follows:

³⁶ 12 daily Air 21 slot exemptions are for services beyond the 1,250 mile limit for commercial flights at Washington-National. Another 12 daily slot exemptions were granted for services within the 1,250 mile perimeter rule for services to medium hub or smaller airports. The subsequent Vision-100 act directed the Secretary of Transportation to grant a further 12 slot exemptions for beyond perimeter flights and 8 for within perimeter. All 44 slot exemptions were awarded by the Department of Transport based on a competitive process.

- i. Secondary trading of slots in the US differs from secondary trading as currently practised within the EU because the vast majority of slots are traded with reference to the domestic market. The US and Canada is essentially one continent while the EU currently comprises 25, and shortly 27, separate member states. However, as one of the primary purposes of the EU is to complete a single economic market, the freedom to trade airport slots in a secondary market should help facilitate a uniform, single market. Secondary trading should make a significant and noticeable contribution towards enhancing the efficiency of airline services within the EU. In realizing this goal, downward pressure is likely to be applied on transport costs and there should be knock-on benefits for firms and organisations in other sectors, since their spending on air travel should reduce. In this sense, secondary slot trading will help achieve the goals set out in the Lisbon Strategy, which sets out a programme for “a more dynamic, innovative and attractive Europe”³⁷. However, as reflected in paragraph 38 above, even though this should lead to reduced fares at congested airports, the sheer volume of demand may still result in air fares being higher at congested airports than at uncongested airports.
- ii. When reviewing the US experience, it is important to stress that each of these individual airports have their own particular problems – they are not all alike. Chicago-O’Hare is a continental hub dominated by two major incumbents; New York-JFK is essentially an international gateway where congestion is only a problem at certain times of the day; New York-La Guardia is a point of destination airport constrained by the limited length of its runways and support infrastructure; while Washington-National is also physically constrained and, as with New York-La Guardia, is almost entirely used by domestic traffic. In seeking to address the problems manifested at these four different airports, the FAA has adopted expedient ad hoc solutions to the perceived problems linked to congestion. Yet in doing so, it has encountered difficulties in mobilising sufficient political support to ensure these proposals are adopted. This contrasts with the approach by the EU which is to have a consistent rule applying to all airports, but making allowance for some variation through the application of local rules
- iii. In the case of the most congested airports in the USA, secondary slot trading appears to have proved a useful and beneficial tool that has led to increased slot mobility. Most of the secondary trading activity has taken the form of leasing³⁸, as opposed to outright sale. This enables carriers to retain ownership of these valuable assets, while generating a stream of revenue if they choose not to operate the slots themselves.
- iv. Trading has been conducted for monetary consideration, but this is not invariably the case, as United Airlines confirmed in a meeting with the study team. Nonetheless, money is often involved, as well as other forms of commercial benefit.
- v. Both the airlines and the airport authorities judge that secondary trading provides a simple and efficient mechanism to promote slot mobility, and one which is relatively simple to administer at low or indeed no cost³⁹.

³⁷ The Lisbon Strategy was agreed at the Lisbon European Council in March 2000.

³⁸ The Department of Justice notes that slot leasing is “fairly common”, source: Comments of the US Department of Justice, Congestion & Delay Reduction at Chicago-O’Hare International Airport, 24th May 2005, page 4.

³⁹ This was a point highlighted, for example, by United Airlines in discussion with the Mott MacDonald team.

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- vi. Secondary slot trading has been widespread at the US airports subject to the High Density Rule. Since the adoption of the Air 21 Act, carriers have sought to acquire government exempted slots at these airports, since they are free. Certain airlines, notably JetBlue, have been extremely successful in obtaining such government exempted slots. It is striking to note that at New York-La Guardia, at least five carriers have launched new services by utilising government exempted slots.
- vii. As confirmed by managers at the Metropolitan Washington Airports Authority and the Port Authority of New York & New Jersey, the freedom to trade slots has been clearly beneficial: it has maintained more carriers than would have otherwise been the case. However, since the passing of the Air 21 Act new entrants have sought to launch services through applying for government exempted slots, for example, through the lottery in Air 21 slots organised by the FAA at New York-La Guardia. As the management of one major carrier put it to the team, “US government policies and laws that provide free slots to designated categories of carriers eliminate carriers’ incentives to participate in the secondary market”.
- viii. In its response to the FAA’s proposals on how to address congestion and delay at Chicago-O’Hare and New York-La Guardia, the Department of Justice (DoJ) raised a number of concerns with regard to the adoption of a blind buy/sell system for secondary slot trading. The DoJ’s principal concern related to the liquidity of the market if slot trading was made transparent, both before and after the trading occurred. Essentially, the DoJ argued that making such trading transparent would inhibit the level of secondary trading because:
- transparency in the secondary slot market encourages incumbents to make strategic purchases in order to deter new entry;
 - an incumbent carrier would probably “never knowingly sell to an entrant that was likely to compete against it, given that such a sale would likely decrease the slot holder’s profitability”;
 - potential new entrants would probably find it difficult to acquire slots from slot holders since if this was done on a transparent basis, the holder “would have every incentive at that point to seek out the threatened incumbent and solicit a better offer”. The DoJ argued that the holder would most likely negotiate a higher price with the incumbent because the economic rent derived from limiting competition is likely to be greater.
- ix. However, these arguments of the DoJ have been difficult to substantiate. Our audit of secondary slot trading at Chicago-O’Hare and New York-La Guardia does not appear to bear out its scepticism relating to the lack of liquidity in the market. Great Lakes Aviation, for example, held two dozen daily slots at Chicago-O’Hare in 2000 but appears to have leased all of them. Given this actual experience, the DoJ’s misgivings about adopting a blind buy/sell system for arrival allocations at Chicago-O’Hare, with the FAA acting as an intermediary, may need to be considered with caution.

- x. In considering the economic effects of establishing a system of secondary slot trading within the EU the issue of transparency is crucial. Based on the US experience, there would appear to be a strong argument in favour of introducing a slot trading system that reports sales and leasing deals once they have been negotiated. However, if the European Commission made it mandatory for such sales or lease deals to be made transparent ex ante, one might expect liquidity to fall significantly for the reasons set out above in point viii.
- xi. As explained in detail in *Appendix 2*, secondary trading is undertaken on an ad hoc basis between airlines, as well as through the Air Transport Association, an airline trade body,⁴⁰ which has held regular trading sessions for its members. Currently, no less than 23 of the 27 airlines holding slots at High Density Rule airports attend and participate at these sessions⁴¹. There are also some brokers who co-ordinate the trading of slots at congested airports in the US, but such intermediaries appear to play only a relatively minor role in the secondary trading market. The FAA reserves the right to give final approval for all slot transactions, and the carrier must receive FAA approval of slot transfers prior to operation. However, the terms of transactions are not subject to FAA review or approval.
- xii. If secondary slot trading is adopted within the EU, we are likely to see a similar market develop across Europe with secondary slot trading focusing on the most congested airports, such as London-Heathrow and Frankfurt. Slot trading would need to be registered with airport coordinators and a decision will need to be made as to whether transparency shall be on an ex ante or ex post facto basis.
- xiii. As noted by David Starkie and other transport economists, secondary slot trading has reinforced the duopoly dominance by two carriers – American and United – at Chicago-O’Hare. It would appear that they have been able to acquire slots by outbidding other carriers on the basis that the economies of scale and scope generated from their hub and spoke model at Chicago-O’Hare should generate greater profits than their rivals could hope to make. Nonetheless, as demonstrated in the analysis of slot holdings and operations in the period 2000 - 2005, other carriers have been able to acquire slots (through the regulatory process, secondary trading or slot exemptions) along with two airport authorities wishing to secure air services to their regions.

⁴⁰ For further information see www.ata@airlines.org

⁴¹ Source: United Airlines.

- xiv. The evidence we have collected is less positive on the impact secondary trading has exerted on slot efficiency in terms of aircraft size and markets served. This problem is particularly pronounced at Chicago-O'Hare. As referred to earlier, the DoJ points out that some of the congestion at the airport stems from the airlines' move to regional jets, which make inefficient use of Chicago-O'Hare's limited capacity. Indeed, the FAA notes that "in November 2003, more than 40 per cent of American's and United's O'Hare flights were operated with regional jets, many to large and medium hubs"⁴². A year later the picture had not improved from the viewpoint of capacity efficiency. Reviewing the Official Airline Guide for domestic US flights arriving at Chicago-O'Hare, the DoJ notes that an examination from a representative day in December 2004 reveals that regional jets accounted for 44 per cent of operations, but only 24 per cent of seating capacity⁴³.
- xv. This trend was thought to have developed because airlines pay weight-based fees for landing at most US airports, including Chicago-O'Hare, which does not discourage carriers from utilizing smaller regional jets on certain routes and at certain times of day, but it possibly results in carriers making poor use of the limited number of slots at the airport.
- xvi. If secondary trading is adopted in Europe the issue of how to encourage the most efficient use of aircraft at congested airports may need to be addressed. In the US, the FAA is seeking to place a requirement on carriers to fly aircraft of a minimum size in and out of the severely congested New York-La Guardia airport. It has suggested a target in a range from 105 seats to 122 seats, enforced through a use-or-lose provision. Some similar minimum limit might be placed by the regulatory authorities at individual airports in the EU if secondary trading is not seen to lead to a more efficient use of scarce resources, the precise limit being determined by the characteristics of the specific airport.
- xvii. The ability to participate in the secondary slot market has greatly benefited airlines in so far as they can use their slot holdings as collateral for loans, mortgages and other financial facilities. This proved particularly helpful to US carriers following the collapse in airline traffic following the attacks of 9/11.
- xviii. As discussed earlier and in *Appendix 2*, carriers have sought to retain their slot holdings at congested airports while leasing them on a season by season basis, thereby generating much needed revenue. This strategy was exemplified by United Airlines, which leased slots at Washington-National to partner carriers, "thereby allowing United the flexibility to change our schedule and maintain our historic for future growth"⁴⁴.
- xix. As noted above, certain airlines have even established subsidiaries with the specific aim of holding slots at congested airports. CalAir is a good example of this strategy. Meanwhile, US Airways has leased slots to its affiliates, and indeed transferred slots to affiliate carriers, so as to ensure that it retains ownership of these slots while seeking protection from creditors under Chapter 11 of the US Bankruptcy Code.

⁴² FAA's Final Rule & Notice on Congestion, Delay Reduction and Operating Limitations at Chicago-O'Hare International Airport, issued on 26th August 2006. Docket no FAA 2005-20704; amendment no 93-85.

⁴³ See Comments of the US Department of Justice on the FAA's Proposed Rule and notice on Congestion, Delay Reduction and Operating Limitations at Chicago-O'Hare International Airport, issued on 24th May 2005.

⁴⁴ E-mail correspondence with Michele Boyce, Manager for Airport Co-ordination, United Airlines, Washington DC.

- xx. Allowing airlines to trade and lease their slots at Community airports will greatly improve their available financial options. In certain cases, carriers' slot holdings will often be worth more than all their other assets combined; providing them with the ability to securitise these assets may prove to be their route out of bankruptcy. Allowing them to trade slots will also pass these assets on to carriers that should be able to make more efficient use of them.
- xxi. In the US, financial institutions such as Wells Fargo Bank and Mitsubishi Bank Ltd have held slots as collateral on loans or when airlines have run into financial difficulties. As yet, there have been no instances of banks, hedge funds, private equity firms or other financial agents acquiring slots at congested airports as investments, or of acting as brokers between willing buyers and willing sellers.
- xxii. Measures aimed at deregulating slots at Chicago-O'Hare and New York-La Guardia appear to have been self-defeating. Within six months the FAA was obliged to cap the number of Air 21 slots made available by the Air 21 Act in April 2000, while at Chicago-O'Hare, the discontinuation of the High Density Rule led to excessive and damaging air traffic delays. Demand simply outstripped available supply. Consequently, the FAA was forced to introduce an hourly slot limit in November 2004, only two years after the High Density Rule was lifted.
- xxiii. In its latest proposals relating to the allocation of slots at New York-La Guardia, the FAA has outlined an approach aimed at enhancing competitive entry in the market. This initiative follows a model first set out in *A Market in Airport Slots*, published by the Institute of Economic Affairs in 2003. The IEA study advocated auctioning off a random batch of ten per cent of the available slots at London's three main airports on a ten to 15 year cycle. This would ensure that "over ten years all the available slots will come up for auction to the carriers who find them most valuable". However, the IEA study also pointed out that "by phasing in this radical new approach, airlines' past investment and value added through the development of new routes would be recognised"⁴⁵.
- xxiv. The FAA proposes to assign slots or 'operating authorisations' as it refers to them technically, as from 2007. Each current slot at New York-La Guardia would have expiration dates ranging from 2010 to 2019 and therefore have a maximum life-span of 13 years. The FAA would seek to ensure that no carrier would lose a disproportionate number of operating authorisations at any one time.
- xxv. Although not yet endorsing a specific reallocation mechanism, the FAA has announced its intention to seek legislative authority to then auction these slots off for a further ten years. From 2010 onwards, the FAA proposes to withdraw ten per cent of such authorisations each year. By 2020 this would mean that every slot at New York-La Guardia, apart from government exempted slots, would have come up for auction to the highest bidder. Meanwhile, the Air 21 and other exempted slots would be merged into a single category of 'Operating Authorisation' with the regulatory High Density Rule slots. No special treatment is proposed for the operations conducted with slot exemptions under the High Density Rule.

⁴⁵ 'Who owns airport slots?' in *A Market in Airport Slots*, edited by Keith Boyfield, Institute of Economic Affairs, 2003, page 42.

xxvi. This would appear to be a fair and equitable way of allocating slots to those who most value them. Such an approach could be considered at the more congested airports within the EU. The proceeds from such slot sales could be used in a variety of ways, including:-

- compensation or partial compensation for the original holders of the slots.
- funding for airport capacity development and improvements to airport infrastructure.
- funding for measures aimed at tackling environmental externalities caused by airport operations (for example, double glazing of nearby homes and offices; woodland plantation programmes to curb noise pollution and combat damage to the landscape).
- tax revenues to the local, regional and member state governments.

5.2 Secondary Slot Trading in the UK

5.2.1 Background

72. Slot transfers (as distinguished from slot exchanges) are permitted under the current EC Slot Regulation only to the extent provided for in Article 8a – Slot Mobility.
73. Under Article 8a.1 (b) slots can be transferred: between parent and subsidiary airlines, or between subsidiary airlines of the same parent; as part of the acquisition of control over the capital of an air carrier; and in the case of a total or partial takeover when the slots are directly related to the air carrier taken over.
74. Otherwise, under 8a.1 (c), slots can be exchanged ‘one for one, between air carriers’.
75. The practice of effecting ‘artificial’ exchanges (including the use of “junk” slots), often involving monetary consideration, and the approach of the English High Court to it has been described at 4.7 above. ACL (Airport Coordination Limited), as the appointed coordinator for the major UK airports, ensures that all such exchanges meet all the procedural requirements of the EC Slot Regulation.
76. The net effect of such ‘artificial’ exchanges, including those involving the use of junk slots, is that airlines, at London-Heathrow in particular, have been able to engage in a form of secondary trading.
77. Such secondary trading is a matter only for the air carriers concerned, although the coordinator has to give approval for each trade once it is confirmed that the trade does not infringe any operational parameters of the airport. The trades are not transparent in advance, as the airlines are not required to publish their willingness to trade. However, the coordinator may be consulted at an early stage, and recommendations may be made which bring sellers and buyers into discussion. Individual sellers may elect not to deal with certain particular potential buyers, and they are not required to invite bids. There is, however, a certain transparency afterwards, in that ACL publishes details of the sellers and purchasers of such slots. It does not disclose the amount of monetary consideration (if any), even if it has knowledge of this.
78. By this method, airlines may sell slots or they may make them available for an agreed period by arranging for a re-exchange in the future (in effect, achieving a ‘leasing’ of the slot). Transparency is therefore limited to what the parties may themselves be prepared to disclose (or may be required to disclose in their accounts) and what is disclosed in the records kept by coordinators. Save for any accounting requirements, there is no requirement at all to disclose the amount of any monetary consideration involved or any other conditions of the trade.
79. Such slot trading is often documented in formal written agreements (confidential to the parties). As stated above, these may provide for a re-exchange of slots in the future. It is therefore not always possible for the coordinator and others to know whether such transfers are permanent (slot sales) or for a limited period (slot leasing or slot lending).

5.2.2 Analysis of Trades

80. ACL has provided the European Commission and the study team with details of trades at London-Heathrow and London-Gatwick from Summer 2001 to Summer 2006 by season, and have made their summary analysis as follows:

i. Types of Trades

Slot transactions take a number of forms and fulfil various purposes:

- *An outright sale of slots on commercial terms*
- *A lease of slots on commercial terms*
- *As part of the transfer of a route from one carrier to another*
- *As part of the restructuring of a bankrupt air carrier (eg Sabena or Swissair)*
- *To redeploy slots within an airline alliance or other group of carriers*
- *To temporarily babysit surplus slots*

ii. Benefits of Slot Trading

Generally slot trades result in the substitution of short-haul services operated by small aircraft with long-haul, large aircraft services. Analysing only those slot transfers that were commercial transactions, and excluding intra-Alliance transfers, it would appear that the average aircraft size increased some 81% from 139 to some 250 seats per slot. Actual seat numbers are used wherever possible, but when a slot is purchased by an airline with a wide range of aircraft sizes, the average fleet size has been used – thus 196 seats for British Airways and 326 for Virgin.

If slot productivity is measured in terms of the number of ASKs produced, then the increase in productivity will be much greater still. For example, when the Heathrow-Lyons route of the Air France BAe 146 was replaced by a B747-400 of Qantas to Sydney, the ASKs per slot rose 89-fold from 76,000 to 6,767,000. Similarly, the Air France Canadair to Paris being replaced by the Jet Airways B777-200 to Bombay resulted in a 115-fold increase in productivity, from 17,500 ASKs to 2,020,000.

81. The Mott MacDonald study team has made its own analysis of 499 slots traded at London-Heathrow between 2001 and 2006 and generally agrees with this analysis, but has made additional studies of the data. It has calculated that, during this period, approximately:

- 73% of the outright acquisitions of slots were by British Airways
- 13% by Virgin Atlantic
- 11% by two other long-haul airlines, Emirates and Qantas
- and 3% by a new entrant, Jet Airways

82. The foreign long-haul carriers (including the new entrant airline) and Virgin Atlantic will have used these slots entirely for additional intercontinental services, and not for enhancing intra-Community services. Because British Airways will have shuffled around its new purchases of slots within its own substantial slot portfolio, it is not possible to say how many of its purchases led to an increase in intra-Community routes that would otherwise have been sacrificed to make way for additional long-haul flights.
83. The ACL figures show that – at least during the period 2001 to 2006 – British Airways, the dominant carrier at London-Heathrow, has been enabled to increase its slot portfolio by secondary trading.
84. Figures also provided by ACL to the EUACA Seminar show that Virgin Atlantic Airways first moved to London-Heathrow in 1991, and first obtained slots through secondary slot trading in 1993. ACL have calculated that of the 312 weekly slots now operated by Virgin Atlantic, some 168, or 54%, were obtained by secondary slot trading, with the greatest number of purchases being in 2003 and 2004 from FlyBe and SN Brussels.
85. A second set of figures was provided in respect of the booming UK – India market, where a sudden relaxation of the bilateral allowed a substantial increase in the number of airlines that can operate in the market and the number of frequencies that can be flown.
86. The liberalisation of the bilateral has enabled additional direct flights to replace some of the existing sixth-freedom services which can be expected to have lost significant amounts of traffic back to the direct routes.
87. In Summer 2004, the direct market to India was restricted to 70 slots or 35 round trips a week. By Summer 2006, this had risen to 230 slots. Of the additional 160 slots required by the airlines concerned:
 - 60 slots were operated by the airlines incumbent at London-Heathrow (British Airways, bmi and Virgin Atlantic) by using slots previously used for other services, expected to be predominantly short and medium-haul
 - 46 were allocated by ACL from the slot pool (from slots which were either returned from airlines that failed to achieve an 80% usage, or that no longer required them, or were still remaining unused in the slot pool). A second new entrant, Air Sahara of New Delhi, acquired its slots from this source, while Jet Airways also acquired a proportion of its slots this way.
 - the remaining 54 weekly slots were obtained through artificial slot exchanges, which, amongst other changes, allowed Jet Airways to acquire peak time slots for its new London-India services.
88. Further analysis has shown that, over the five year period, of the 499 slots a week which have been traded, some have been traded more than once. For example, on the demise of Sabena some of its slots were transferred to SN Brussels; some of these were then transferred to Virgin Atlantic, which then leased a proportion of these to other airlines until such time as it would require them to be transferred back for its own use. With the total number of Heathrow slots being some 8,700 a week, it would thus appear that almost 6% of slots have changed hands in that five year period. There are no records to show the percentage of trades in previous years.

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89. In addition, during the period 2001 to 2006, the number of slots allocated from the pool by ACL at London-Heathrow has declined significantly, from some 220 a week in 2001 to around 120 by 2006.
90. ACL expressed the view that trading would be even greater at both London-Heathrow and London-Gatwick if secondary trading were to be expressly approved in the EC Slot Regulation, as some airlines, which are not yet comfortable that such trading is lawful, would then feel confident of the status of the slots that they purchased. ACL suggest that British Airways was more active at an early stage, because of its confidence in the approach to such trading in the UK (understood to be favoured by the UK Government), and that its share of trades is likely to decrease in the future, as other airlines begin to engage in secondary trading.
91. This view is disputed by the leading trader, British Airways, which is confident that most, if not all, airlines are aware of the potential for trading and that there is little reticence amongst the airline community today. British Airways still trades in slots, but is wary of some of the new entrants from the Middle East who can afford to pay aggressive prices for slots.
92. Whilst there is therefore evidence that secondary trading has facilitated new entry and increased competition at London-Heathrow, evidence of the impact on fares of secondary slot trading at London's airports is inconclusive. Indirectly, however, such an impact may be seen in the lower fares on the London – India routes, resulting from additional competition on these routes enabled, in part, by such new entry.

6 Secondary Trading in Other Sectors

6.1 Introduction

1. This section considers examples of secondary trading from sectors other than aviation. This is intended to inform discussion of whether any (small) amendments might be made to the current proposed approach for airport slot trading, or whether additional issues should be considered.
2. The main examples of the introduction of secondary trading discussed here relate to:
 - capacity rights for the UK–EU gas interconnector;
 - capacity rights for the England–France electricity interconnector;
 - capacity rights for gas entry to the national transmission system in the UK;
 - the EU Emissions Trading Scheme (EU ETS);
 - spectrum trading in the EU;
 - water abstraction licensing in the UK (to be implemented).
3. Since the majority of these examples of secondary trading are relatively recent, assessments of the liquidity of the markets are generally not yet available. In addition, in many instances, benefits assessments of the introduction of secondary trading have not been undertaken. This discussion therefore focuses on the design characteristics of these markets and related issues that are of relevance to secondary trading of airport slots. These include:
 - range of market participants;
 - information publication;
 - range of transfers allowed;
 - competition issues.

6.2 Capacity Rights for the UK–Europe Natural Gas Interconnector

4. There are four ways in which shippers can gain access to capacity rights for the natural gas interconnector between Continental Europe and the UK:
 - assignment of rights (sale of capacity rights);
 - sub-letting;
 - third-party shipping service (the shipper gains access by contracting out operational processes);

- pooling (not a capacity pool: small tranches of remnant capacity are aggregated for sale by Interconnector UK Ltd on behalf of UK shippers).
5. Interconnector UK's website offers a bulletin board for capacity to be traded, showing the following information for capacity being offered for sale or requested for purchase:
 - flow direction;
 - quantity (Nm³/h);
 - offer dates;
 - date posted;
 - UK shipper;
 - other details such as contact and other offers.
 6. The bulletin board includes an entry for indicative price but examples on the website show that sellers do not post this information: 'price to be determined' is the standard entry for this information field. Information on trades that have taken place is not published.
 7. As the trading of capacity rights arose from the requirement to liberalise energy markets, its introduction was not based on specific estimates of the benefits of trading. Consequently, assessments of the benefits of such trading have not been published as part of the adoption of trading.

6.3 Capacity Rights for the England–France Electricity Interconnector

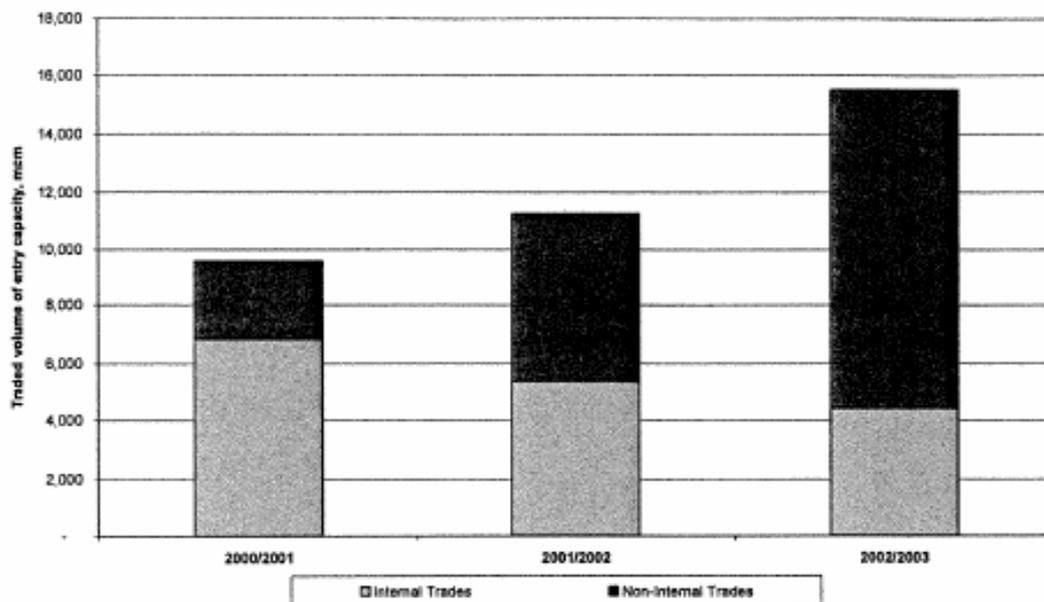
8. The England–France electricity interconnector is jointly owned by National Grid Company plc (now known as National Grid) and Réseau de Transport d'Electricité (RTE). Prior to 2001, the interconnector was used exclusively by the French energy company EDF. From April 1st 2001, trading of capacity rights to the interconnector was introduced, with the initial allocation seeing a capacity of 1,500MW being tendered in 50MW blocks for three years. Since then, 350MW is auctioned annually in 1MW blocks, and 150MW is auctioned daily in 1MW blocks.
9. Since capacity is allocated on the basis of auctions, information relating to trades is available. National Grid publishes the results of daily, monthly, quarterly and annual auctions on its website, showing the capacity auctioned and the price in euros per MW. This is presented for capacity from France to England and from England to France. The identity of bidders is not published on the grounds of commercial confidentiality, but the number of market participants taking up capacity is published. Archived information is also available.
10. As with the gas interconnector, trading of capacity rights for the electricity interconnector was introduced as part of the broader liberalisation of energy markets and, as such, estimates of the benefits of trading have not been published as part of the adoption of trading.

6.4 Gas Entry Capacity Rights for the UK Gas Transmission System

11. Secondary trading of gas entry capacity began following the October 1999 auction of short-term capacity rights. The market was expanded in late 2002 / early 2003 when long-term capacity auctions began. Prior to 1999, an administrative booking system was used by shippers to gain access to the national transmission system. Capacity could be booked at any time and there was no restriction on the amount that could be sold at each terminal. This system was broadly regarded as inefficient.
12. Under the new arrangements, ranges of periods of capacity rights are available, from daily capacity through to capacity for the next 17 years. These rights are auctioned on a variety of frequencies, from daily auctions for daily capacity through to less frequent auctions for longer-term capacity. Secondary trading of the auctioned capacity rights is bilateral and continuous.
13. Data is published on the National Grid website relating to capacity trading. Each (secondary) trade is recorded and the highest, lowest and average bid price relating to this trade is published, along with the average number of bids. The data also shows the number of units of capacity sold at this price. This data is updated around eight times per day. In addition to this daily information, monthly capacity trading analysis is published by entry point, showing the minimum, maximum, average and total trades.
14. Although the question of whether market participation could be broadened to non-shippers was discussed, legislative restrictions following from the Gas Act 1995 have limited participation in the capacity rights market to shippers.
15. In response to the risk of capacity rights being hoarded to the detriment of the rest of the market, the former gas regulator, Ofgas, introduced a 'use-it-or-lose-it' anti-hoarding mechanism, whereby booked capacity which does not have gas flows nominated against it is available to other shippers on an interruptible basis (with the capacity being interrupted if the original holder of the capacity chooses to use it). This limits the ability of any one market participant to block access to capacity.
16. In its review of the long-term system entry capacity auctions, Ofgem mooted the possibility of replacing the requirement for baseline capacity being allocated by short-term auctions with a liquid bilateral trading market. Consequently, Ofgem reviewed the development of liquidity in this market. Over the period 2000/01 to 2002/03, it found that:
 - liquidity in the market developed, with noticeable growth in traded volumes towards the end of the period;
 - participation levels also grew, although by a smaller proportion than traded volumes;
 - the ratio of traded volumes to physical flows was smaller than in other comparable markets.

17. For example, the number of shippers participating in the secondary trading market rose from 40 to 45 over the period. The number of companies trading at each terminal in each gas year rose from 77 in 2000/01 to 96 in 2002/03. Total traded gas capacity increased from 9,500mcm in 2000/01 to 15,000mcm in 2002 (at terminal level, some terminals showed steady growth, whereas others showed year-on-year fluctuations)⁴⁶.
18. In addition to trades between companies, Ofgem observed that there were ‘internal trades’ between shippers owned by the same company. The regulator argued that, while these trades did not increase the liquidity of the market, they should be taken into account when considering the scale of secondary trading. Figure 6.1 shows the relative proportions of internal trades and non-internal trades and their growth over the period 2000/01 to 2002/03. This shows that, as the market matured, the proportion of external trades has risen as a proportion of total trades.

Figure 6.1: Volume of Internal and Non-internal Trades of Entry Capacity, Gas Year 2000/01 to 2002/03



Source: Ofgem (2003), ‘The January 2003 Long-term System Entry Capacity Auctions: A Review Document’, August.

6.5 EU Emission Trading Scheme

19. The EU ETS was launched in January 2005. Businesses falling under its remit are issued with carbon emission allowances, which can then be traded, subject to a requirement for each business to meet its emission target through abatement or the holding of emission allowances.

⁴⁶ Ofgem (2003), ‘The January 2003 Long-term System Entry Capacity Auctions: A Review Document’, August.

20. Following the primary allocation of emissions rights, the trading of these rights between emitters provides an example of Europe-wide secondary trading. A study undertaken before the introduction of the EU ETS suggested that such a trading scheme could reduce abatement costs by an estimated 10%⁴⁷. Trading achieves greater cost efficiencies (and thus economic efficiencies) by increasing the effectiveness of price signals to producers.
21. Emitters can trade in various ways, including:
 - bilateral trades;
 - buying or selling from intermediaries;
 - brokered trades; and
 - exchange-based trades.
22. Sub-letting of allowances is not applicable in the EU ETS, given that the emissions right is non-repeatable - that is, emissions rights for a particular year can only be expended once, and sub-letting of rights is therefore not possible. This is due to the commodity nature of trading under the EU ETS, which is the main difference between this market and that of capacity trading markets, such as spectrum trading or energy interconnectors.
23. Emission allowances are limited to specific compliance periods - for example, 2005-2007 or 2008-2012. It is anticipated that compliance periods (and thus the period of emission allowances) will be five years in the future, as with the compliance period 2008-2012. The right to hold an emissions licence is not limited to emitters – for example, allowances can be owned by banks, specialist traders and environmental organisations such as Greenpeace.
24. Regarding the provision of information, national governments are required to keep electronic registries, which track the changing ownership of allowances. When a trade occurs, the following information is required for the registry:
 - total units;
 - country of origin;
 - unit type;
 - unit commitment period;
 - account ID (of acquirer).
25. The information held in national registries feeds into the community transaction log. This community log shows when a national registry has gone live, when accounts have been opened, the contact details for these accounts, and when allowances have been allocated in line with national allocation plans. Information will be made available each May (from 2006) on the compliance position of individual installations across the EU-25. After a five-year time lag, information on other types of transaction will be made publicly available.

⁴⁷ Foundation for International Environmental Law and Development (2000), 'Design Options for Implementing an Emissions Trading Regime for Greenhouse Gases in the EU', February.

26. The information made available through the national registries and community transaction log does not provide details on price or the parties between which trading has occurred (although the provision of information on ‘other types of transaction’ after five years might relate to the identity of traders). However, this information can be gained from various trading exchanges, which provide information on, for example, indicative prices of allowances, volumes of trade and specific trades. Access to this data is limited to members of the exchange and more detailed data may require the payment of an access fee. Consequently, the information is not ‘publicly available’ as such.
27. An assessment of the impact of the EU ETS is ongoing, with McKinsey’s 2005 analysis currently under consideration by the European Commission⁴⁸. Interim findings from McKinsey about whether the market is functioning suggested that:
- liquidity of the market is increasing but is not sufficient. Long players are especially difficult to identify, making identification of natural sellers more challenging;
 - participation in the market is increasing, but active players are limited to energy companies;
 - recognition of allowances as economic assets with associated opportunity costs is still developing, with allocations often being perceived as a licence to produce rather than as an asset.

6.6 Spectrum Trading

28. Radio spectrum is a limited and valuable resource for electronic communication services and networks, and is used to transmit information over the airwaves. The introduction of market mechanisms in the U.K. to allocate spectrum provides an interesting case study when considering the introduction of market mechanisms to allocate airport slots: parallel issues arise, such as the treatment of public service providers within the market. The sub-section below provides details of how spectrum trading is set up, and the following sub-section discusses some of the issues arising from this that may provide insight for policymakers when considering the creation of a market for airport slots.

6.6.1 Details of Spectrum Trading

29. Prior to the introduction of secondary trading, spectrum was allocated on an administrative basis. In 2005, Ofcom launched a review of spectrum allocation and management in its ‘Spectrum Framework Review’. As part of this review, the regulator stated its position on the use of market forces to allocate this limited resource:

Ofcom’s vision for spectrum management . . . is for market forces to play an increasingly important role in determining how spectrum is used. Ofcom believes that this will encourage efficiency in spectrum use, by increasing the likelihood that spectrum will be held by those who can make the best use of it, and by creating more freedom for spectrum to be used for more valuable applications⁴⁹.

⁴⁸ McKinsey & Company (2005), ‘EU-ETS: Changing Competitive Dynamics for the Industry’, conference presentation, Madrid, October.

⁴⁹ Ofcom (2005), ‘Spectrum Framework Review: Implementation Plan—Interim Statement’, July, p. 3.

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30. Prior to the introduction of secondary trading, Ofcom's primary allocation mechanism was to auction off spectrum in tranches, based on frequency and usage and allowing owners of spectrum to trade their spectrum rights henceforth. These auctions and provisions for secondary trading form part of a broader liberalisation package; other elements include the introduction of pricing mechanisms and reductions in restrictions on the technologies that can be used with particular bands of spectrum.
31. While spectrum licences acquired through the auction have an indefinite period, they do contain provisions for Ofcom to revoke them, based on spectrum management factors. The ability of Ofcom to revoke licences does not apply for a certain period (as yet unspecified) and revocation is subject to five years' notice. Participation in the market is unrestricted: speculators and other interested parties are entitled to hold spectrum alongside users of spectrum. Indeed, Ofcom has highlighted that a range of market intermediaries could result from trades including:
- brokers who link buyers and sellers wishing to trade spectrum but do not actually own spectrum themselves during the trade;
 - market-makers who hold inventories of licences, taking positions with a view to trading out to a long-term buyer, or another trader;
 - spectrum management organisations which undertake the management of certain blocks of spectrum.
32. While some stakeholders have not been supportive of the development of such market intermediaries, Ofcom's position is that intermediaries could bring benefits to the trading market by overcoming information asymmetries that result from bilateral trades.
33. Regarding the release of information relating to spectrum trades, Ofcom has taken the position that, while the publication of information relating to trades is important for the development of the market, protecting commercial interests and security is also significant. It has consequently proposed the publication of a range of information relating to licences, transfers, variations and Ofcom's future plans, as well as occasional aggregated statistics on trading. These statistics will be sourced from the voluntary provision of information to Ofcom, and could include details of the underlying commercial transactions (e.g. price). Ofcom has stated that the details of individual transactions will not be made public.
34. Ofcom has allowed for four types of transfer:
- outright transfers - where the original holder no longer has any right to use the transferred spectrum;
 - concurrent transfers - these enable licensees to share the spectrum rights as they deem appropriate without having to undertake further transfers;
 - total transfers - all rights and obligations associated with the spectrum;
 - partial transfers - these allow a licence to be split by frequency or geography.

35. Sub-letting (or ‘concurrent licensing’ as it is termed by Ofcom) of spectrum has been allowed by Ofcom, with the recommendation that, where transfers are made for a limited period, such periods be clearly specified in contracts.
36. A quantitative assessment of the benefits and costs of the introduction of secondary trading was carried out for the European Commission by a consortium led by Analysys⁵⁰. The study analysed a range of issues associated with spectrum trading and spectrum liberalisation. The report concluded that the benefits to Europe of spectrum trading (without liberalisation) are worth €897m per annum, while the costs amount to €4m per annum. Therefore, the assessed net benefits of introducing secondary trading of radio spectrum are €893m per annum. Ofcom’s spectrum trading statement estimated the net present value of (net) benefits to the UK at £164m - £228m.

6.6.2 Issues Arising with the Introduction of Spectrum Trading

(i) Competition issues

37. When Ofcom first consulted on the competition effects of introducing spectrum trading, it suggested applying a set of rules to assess proposed trades, in order to assess the competition effects. However, following consultation, Ofcom decided that existing competition law would be sufficient to deal with any distortions of competition that might arise⁵¹. Ofcom has powers under primary legislation to address anti-competitive behaviour; its most significant power comes from the Communications Act 2003, which gives it concurrent powers with the OFT [Office of Fair Trading] to apply the provisions of the Competition Act 1998 to communications matters.
38. In May 2004, these powers were extended beyond the UK to cover anti-competitive behaviour that has an effect on trade between Member States. In addition, under the Enterprise Act 2002, the OFT has powers to regulate mergers which have or may result in a significant lessening of competition. The Analysys-led consortium’s work for the European Commission concluded that, at a European level, existing competition law and merger regulation should be sufficient to prevent competition abuses.
39. When considering additional competition provisions, Ofcom put forward mechanisms such as:
- spectrum caps - setting limits to the amount of spectrum that can be held by an operator;
 - ‘use-it-or-lose-it’ licence conditions - monitoring holders’ usage of spectrum and revoking rights if spectrum is not being used (as assessed over a certain time period and against a utilisation level); and
 - significant market power obligations - ex ante regulation to allow Ofcom to prevent trades that it considers might result in a substantial lessening of competition in relevant markets.
40. Ofcom’s decision not to apply these types of assessment was based on the following reasons:

⁵⁰ Analysys (2004), ‘Final Report to the European Commission: Study on Conditions and Options in Introducing Secondary Trading of Radio Spectrum in the European Community’, May, p. 223.

⁵¹ Ofcom (2004), ‘Ensuring Effective Competition Following the Introduction of Spectrum Trading’, June.

- additional mechanisms would significantly complicate the spectrum trading process, lengthening the time required to complete trades and increasing costs;
- the reliance on Ofcom to predict how markets develop and the prospects for future distortions of competition in relevant markets (the need for Ofcom to do this would depend on the precise form of the test chosen);
- such assessments would increase regulatory uncertainty;
- the proposed mechanisms adding minimal or no value above that which can be achieved through existing competition law, and the additional burden being disproportionate to these benefits.

41. Given the possibility of imposing ‘use-it-or-lose-it’ conditions on airport slots, Ofcom’s opinion on this issue is of particular interest:

There is a different issue often termed speculation or hoarding, whereby someone buys spectrum for the express purposes of holding it while its value increases. We believe such behaviour to be acceptable within a functioning market. It may even facilitate operation of the market by providing a degree of liquidity. Accordingly, we would not seek to intervene to prevent it⁵².

42. In its consultation paper on protecting competition once spectrum trading is introduced, Ofcom makes the following additional points relating to the use of a ‘use-it-or-lose-it’ condition:

- such provisions can be difficult to monitor;
- it does not avoid issues of identifying hoarding and whether this is having an anti-competitive effect, thereby adding little to existing competition law;
- if applied to all trades, the approach might be overly cautious, restricting innovation if users want to purchase spectrum in preparation for using it for a future service;
- applying the condition only to certain trades would generate more bureaucracy since criteria for selection would need to be determined; uncertainty would increase and longer timescales would be the result.

43. As a result, Ofcom is not in favour of ‘use-it-or-lose-it’ conditions.

(ii) Control of interference

44. The use of spectrum generates a negative externality for other users of spectrum by causing interference on other frequencies. Ofcom has therefore allocated different frequencies of spectrum for different uses.

⁵² Ofcom (2005), ‘Spectrum Framework Review’, June.

(iii) Restrictions on usage from international agreements

45. Spectrum trading is subject to various international agreements via the International Telecommunication Union, European Conference of Postal and Telecommunications Administrations, NATO, EU and bilateral agreements.

6.7 Water Abstraction Rights in the UK

46. The Water Act 2003 provides for the trading of water abstraction rights. While this has not yet been implemented, the Environment Agency has consulted on the relevant issues. Like airport slots, water rights trading involves different users of water. The main users are agricultural users and water companies. Given the varying structures of demand, the Environment Agency does not anticipate much trading between these different types of user. Water rights trading differs from airport slots trading in that it is subject to environmental constraints, with the Environment Agency being required to assess the reasonableness of an application for a new or varied abstraction licence. The following issues are relevant to slot trading:

- benefits of introducing trading;
- market participation;
- competition issues;
- access to information.

47. Each of these is discussed in turn below.

6.7.1 Benefits of Introducing Trading

48. The Environment Agency has defined water rights trading as ‘the transfer of licensable water rights from one party to another, for benefit’⁵³. Trading of water rights is expected to bring benefits such as:

- providing water efficiency incentives for abstractors;
- enabling licence holders to manage water needs more flexibly when there are temporary changes (e.g. seasonal demand);
- potentially allowing abstractors access to water which would not otherwise be possible given environmental restrictions and other abstraction licences;
- enabling licence holders to manage land rights separately from water rights.

49. The regulatory impact assessment carried out by the Environment Agency did not include a quantification of the net benefits of water rights trading.

⁵³ Environment Agency (2003), ‘Trading Water Rights: A Consultation Document’, June.

6.7.2 Market Participation

50. The Environment Agency has stated that, under current arrangements, brokers will be able to acquire water rights, presenting opportunities for speculation. While this was generally opposed at a previous stakeholder workshop, the Agency does not have the power to prevent this type of trade. Brokers might act to increase the value of their water rights by changing the terms of a licence (such as the purpose of the abstraction) or by separating water rights from land rights. The Agency has raised the possibility that the role of brokers may therefore be important in ensuring that markets respond flexibly to supply and demand changes. If applications from brokers cannot be rejected out of hand, the Agency can suggest the possibility of introducing a 'condition on the licence that it will expire within a set period if the rights are not traded or used' - i.e., a 'use-it-or-lose-it' condition. In relation to this issue, the Agency posed the following question in its consultation.

- Should brokers be able to change the conditions of an abstraction licence to sell water rights on and, if so, should any particular constraints be placed on such licences?

51. A report prepared for the Agency on water rights trading identified a positive role for brokers, arguing that the availability of brokers as market participants was one of the main factors which would encourage trading⁵⁴. The following advantages of brokers were cited:

- developing the market for water rights;
- identifying potential traders;
- bringing together potential buyers and sellers of water rights;
- liaising with the Agency to take applications through the necessary processes.

6.7.3 Competition Issues

52. The consultation document discusses the risk of abuse of a dominant position by dominant licence holders in a catchment buying up water rights to prevent competitors entering the market. The Environment Agency has proposed dealing with this risk by:

- assessing all trading applications for consistency with competition principles;
- relying on an assessment of reasonable need and water efficiency to discourage abstractors from abusing any dominance they may have;
- using market signals and competition legislation to discourage abuse, and engaging Ofwat and OFT powers to address this.

⁵⁴ Risk & Policy Analysts (2000), 'Economic Instruments in Relation to Water Abstraction'.

6.7.4 Access to Information

53. The Environment Agency anticipates market information being provided in part by brokers, but largely by Agency sources. A large amount of information relating to abstraction licences is already available from public registers:
- terms of every licence;
 - name of licence holder;
 - location of abstraction;
 - quantity of abstraction authorised;
 - actual volumes of water abstracted each year; information on specific licences is subject to legal constraints relating to commercially confidential information.
54. This information can be obtained from the Agency, subject to possible charges for complex data requests; however, the information is currently stored manually. The Agency has plans to make the registers more accessible by converting the information into electronic format, with a view to making this available online.
55. The Agency recognises that information on price is also potentially valuable and would benefit the market, encouraging liquidity. However, stakeholders have opposed the idea of making information from private transactions publicly available. Consequently, the Agency has proposed that it will place such information in the public domain, but in a form that does not enable the identification of the parties involved in the trade. The Agency proposes to monitor prices and make information available on general market trends, showing the development of the market, as well as principal factors affecting price.

6.8 Issues Arising

56. Having considered the specific details of secondary trading arrangements in different industries, this section assesses the range of regulatory positions on key characteristics of these trading markets, drawing out issues that might need to be taken into account when establishing a market for airport slots. Table 6.1 summarises some of the key characteristics of the different cases of secondary trading: form of trade, frequency of exchange, market participation, allowance for sub-letting, duration of ownership, and information publication. The final column of the table notes the key issues raised from the case.

Table 6.1: Examples of Secondary Trading and Their Characteristics

Example	Form of trade	Frequency of exchange	Market participation	Sub-letting allowed	Duration of ownership	Information published	Issues relevant to slot trading
UK–Europe natural gas interconnector	Bilateral with some pooling of remnant capacity	Continuous	Shippers only	Yes	For specified periods	Ex ante, identity of shipper, details of trade, offer price (although the option to reveal this is not usually exercised). No ex post data	Information publication (ex ante)
England – France electricity interconnector	Bilateral trades and auctions	Continuous (bilateral) and periodic (daily, monthly, quarterly, seasonal, annual auctions)	Eligible capacity users only	Yes	For specified periods: daily, monthly, quarterly, seasonal, annual - depending on capacity acquired	Ex post, price and volumes, number of market participants taking up capacity, trader identity confidential	Information publication (ex post)
UK gas transmission entry capacity	Bilateral	Continuous	Shippers only	n/a	For specified periods: daily though to 17 years - depending on capacity acquired	Ex post, highest/lowest/average bid price, volumes	Information publication, development of a liquid market, competition issues
EU ETS	Various: bilateral, via intermediaries, brokered, exchange-based	Continuous	Unrestricted (emitters, banks, specialist traders, environmental groups)	n/a	For specified compliance period	Ex post, companies' emission allowance balances (not possible to identify trades). Value of carbon observable from carbon markets	Range of market participants, development of a liquid market
Spectrum trading	Bilateral trades	Continuous	Unrestricted (users of spectrum, speculators)	Yes	Indefinite, with a minimum term after which Ofcom can revoke licences for spectrum management reasons	Ex post, anonymised data on trading: price, etc	Range of market participants, treatment of public service providers, information publication, range of transfers, competition issues, restrictions from international agreements
Water abstraction licensing (to be implemented)	Bilateral	Continuous	Unrestricted (water companies, agricultural users, fisheries, brokers)	Yes	Indefinite, with provisions for the Environment Agency to revoke on environmental or water resource grounds	Public registers of licence-holders and licences, ex post anonymised data on trading: price, etc	Competition issues, market participation, information provision

Sources: UK–France interconnector: EC (2001), ‘UK–French Electricity Interconnector Opens Up, Increasing Scope for Competition’, March. National Grid website: http://www.nationalgrid.com/uk/activities/other/mn_interconnectors_france.html. Natural gas interconnector: website: <http://www.interconnector.com>. UK gas national transmission system entry capacity: Ofgas (1999), ‘The New Gas Trading Arrangements’, May; Ofgem (2003), ‘The January 2003 Long-term System Entry Capacity Auctions: A Review Document’, August. Spectrum Trading: Ofcom (2004), ‘A Statement on Spectrum Trading: Implementation in 2004 and Beyond’, August. EU ETS: Defra (2006), ‘An Operator’s Guide to the EU Emissions Trading Scheme: The Steps to Compliance’, February. Water abstraction licensing: Environment Agency (2003), ‘Trading Water Rights: A Consultation Document’, June.

57. As would be expected, the majority of forms of secondary trade are bilateral, with other forms such as brokering or exchanges in some markets. Bilateral trades offer continuous trading opportunities, interspersed in some instances with additional periodic auctions.
58. Defined rights differ according to the nature of the market. Capacity rights for the interconnectors or for gas entry appear to be limited to specified periods rather than being indefinite. These periods vary in length from daily capacity through to 17 years. In contrast, emission allowances are expendable and therefore cannot be held for an indefinite period - they are held for the compliance period to which they relate. In contrast, spectrum rights are held indefinitely (with Ofcom able revoke them with five years’ notice under certain conditions). Water rights are similar in that they can be held indefinitely, but can also be held for shorter terms. Given these general characteristics, the remaining discussion considers the findings arising from the review of secondary trading in other sectors.

6.9 Findings

6.9.1 The Ability to Trade

59. Sub-letting has generally been allowed to occur where it is possible, given the nature of the right to be traded. For example, spectrum rights, water rights and gas and electricity interconnector rights can be sub-let. Alternative forms of transfer, such as sub-letting, increase flexibility in the market, maximising the efficient use of resources. Ofcom has recognised this, allowing for a large degree of flexibility with outright, concurrent, total and partial transfers.
60. **Finding 1: allowing alternative forms of transfer, such as sub-letting of (capacity) rights, can increase market flexibility and efficiency.**

6.9.2 Access to the Market

61. Regarding the breadth of market participation allowed, energy capacity markets have restricted market participation to eligible capacity users only, usually on the grounds of safety. In contrast, other markets, such as emission allowances, spectrum trading and water rights, have allowed unrestricted market participation.

62. Ofcom and the Environment Agency have actively supported the participation of others (non-users) in the spectrum and water rights markets. Ofcom has argued that financial intermediaries would help to combat information asymmetries that result from bilateral trades. It has also argued that the involvement of speculators could facilitate the development of the market by providing a degree of liquidity. While the Environment Agency has recognised stakeholder resistance to broker involvement in the market, it has also recognised the various benefits that the involvement of brokers could bring, including identifying potential traders, bringing buyers and sellers together, helping markets respond flexibly to changes in demand and supply, and increasing the value of water rights. The Agency did raise the possibility of placing restrictions on brokers, such as limiting their ability to change the conditions of abstraction or imposing a 'use-it-or-lost-it' clause.
63. While economic theory supports the argument that financial intermediaries can benefit the market, it is difficult to assess the extent to which the views of Ofcom and the Environment Agency have been borne out in practice since both of these markets are still in their infancy. Experience from other markets suggests that the existence of financial intermediaries does help market development. Consequently, when considering the scope of the market for airport slots, the European Commission should consider allowing unrestricted access to the market, especially given the asymmetries of information that are likely to result from bilateral trading, and the advantages of broader participation in overcoming this.
64. **Finding 2: unrestricted market access may help develop the market for airport slots, potentially helping to overcome informational asymmetries and provide liquidity.**

6.9.3 Transparency of Information

65. The existence of informational asymmetries is a key issue for market development. Information provision is generally considered beneficial to a market, leading to more efficient price signals and thus enabling the market to operate more efficiently. Oxera has estimated that the value of the provision of more information to UK gas markets could be worth £174m per annum⁵⁵. In the examples of secondary trading considered here, various levels of information provision exist. Generic price information is published for the electricity interconnector; and Ofcom and the Environment Agency plan to publish this for spectrum and water rights markets respectively. For emission allowances, while generic price information is not published through national registries or the community transaction log, the carbon market is relatively well developed and provides a good indication of the value of emission allowances. Indicative price information is not available for the gas interconnector capacity market.

⁵⁵ Oxera (2005), 'What are the Costs and Benefits of Near Real-time Gas Information?', report prepared for UKOOA, May.

66. Regulators' discussions on the issue of information have been instructive, with Ofcom and the Environment Agency taking a similar position. While recognising the importance of commercial confidentiality, regulators have also recognised the value of information to the market. Consequently, they have suggested a compromise by sharing anonymised, periodic information with the market based on actual information about individual trades. The market for airport slots also faces the limitations of commercial confidentiality of parties involved in trades. Equally, the market as a whole would benefit from information sharing. Consequently, the Commission should consider ways in which these competing interests can be reconciled. The route proposed by Ofcom and the Environment appears to provide a sensible approach.
67. **Finding 3: the competing interests of individual traders' commercial confidentiality, and the importance to the market of information provision, could potentially be balanced by collecting information on individual transactions (including price) and periodically providing this to the market in generic form.**

6.9.4 Anti-competitive Behaviour

68. When creating new markets and allowing trading among market participants, regulators have naturally been concerned about anti-competitive effects that might follow from this. This issue has been considered particularly with regard to spectrum trading, gas entry capacity and water rights. To mitigate the risks of such effects, Ofgas, the former gas regulator, introduced a 'use-it-or-lose-it' anti-hoarding mechanism, limiting the ability of any one player to block access to capacity. Ofgem has not removed this mechanism. In contrast, Ofcom has argued that such behaviour is acceptable in a well-functioning market, potentially benefiting it by providing a degree of liquidity. Ofcom opposes 'use-it-or-lose-it' conditions on the basis that they are difficult to monitor and add little benefit over and above existing competition law. While having initially held a position that additional mechanisms might be required to mitigate the effects of anti-competitive behaviour in spectrum trading markets, Ofcom now considers existing competition law sufficient to address the threat of anti-competitive behaviour in spectrum markets. A similar position has also been taken by advisers to the European Commission regarding the introduction of a Europe-wide spectrum market. With regard to the water rights market, the Environment Agency has argued that existing competition law should discourage abuse and that Ofwat and the OFT have powers to address any such abuse. It has also added an additional hurdle, stating that it will test all trading applications for consistency with competition principles and draw on its assessment of 'reasonable need' of requests for abstractions to discourage abuse.
69. **Finding 4: the effectiveness of additional mechanisms to address anti-competitive behaviour should be assessed with regard to the sufficiency of existing competition law.**

7 Recent Trends in Airport Capacity and Slot Demand

7.1 Introduction

1. This part of the study seeks to determine how the lack of runway slots at congested airports in Europe has affected their use, in terms of destinations served, average aircraft size and the level of competition. It enables a forecast to be made in Chapter 9 of the probable future shape of airports if secondary slot trading is not legalised, and forms a base upon which the impact of such secondary slot trading can be superimposed.
2. European airports have become increasingly congested, as increases in demand have outstripped supply, whether in terms of allowable or usable slots per runway per hour, or in terms of absolute numbers of runways.
3. The shortage of slots has existed for a considerable time such that it is now difficult to determine what would be the expected demand were there sufficient slots at congested airports. By analyzing growth patterns at those airports where there is still sufficient capacity to handle all demand, it is possible to draw valuable conclusions. It is generally accepted that once an airport reaches 70% of its notional slot capacity it will begin to experience turnaway, initially in the peak periods. For example, in its report on 'Capacity of Aviation Systems in Europe – Scenario on Airport Congestion' [1987], the AEA [Association of European Airlines] stated that it would not be possible to meet the commercial demand of airlines if more than 70% of available slots were used.
4. The study has compared the supply of and demand for slots at a range of European airports in 2005 with what was happening in 1975, when a few major airports were first beginning to experience peak congestion. **Section 7.2** selects 35 airports throughout Europe for more detailed examination.
5. Historical data for these airports is then examined in two different ways
6. Firstly, in **Section 7.3**, an analysis has been made of the changes in overall runway movements in terms of passenger flights, all-cargo flights, and all other flights, including military and general aviation.
7. The study examines the differences in development between airports that are now congested and those that still have spare capacity.
8. The data confirms that, generally, scheduled passenger flights have retained their position at the top of the pecking order, and have been able to increase their share of slots at congested airports at the expense first of non air transport movements (such as business and general aviation flights), then of cargo and passenger charter flights. This is to be expected, given the preference of IATA guidelines regarding the allocation of slots which favour passenger flights over cargo, and full-season operations against part-season operations.

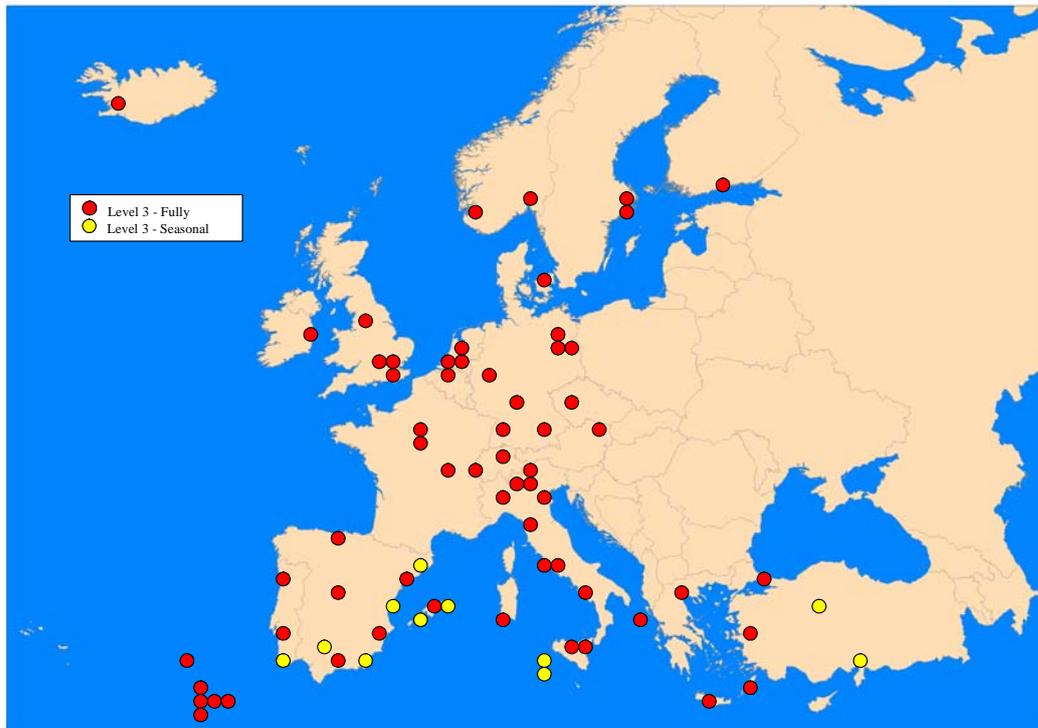
9. The second study, in **Section 7.4**, provides a more detailed analysis of the scheduled passenger services operated in each of the two selected years of 1975 and 2005, based on the advertised operations shown for the first week of May 1975 in the then ABC timetable and the first week of May 2005 from the OAG World Airways Guide. Detailed flight-by-flight analysis has been made of the destinations of flights, aggregated into five major world zones, and observing changes in flight numbers, average seats per flight and the average kilometres flown per flight – the last two being multiplied to give Available Seat Kilometres [ASKs].
10. The study then compares heavily congested, partially congested and uncongested airports in 2005 in terms of the number of ASKs per scheduled departure. This measures the extent to which the lack of available slots is reflected in the distribution of flights at each airport in terms of both the average aircraft size and the distance to the final destination.
11. In **Section 7.5**, the third element of this demand part of the study is an analysis of current statistics provided by airport coordinators for a number of major European airports, to determine the level of congestion at each airport in 2005, and to assess the current level of slot mobility. The statistics have been analysed to determine the level of slots available in the pool, the number of slot exchanges recorded and – where permitted – the number of slot transfers.
12. In **Section 7.6**, the study looks forward twenty years and brings together the forecast growths of passengers, passenger kilometres and movements at European airports from a broad range of forecasters, including aircraft manufacturers, Eurocontrol and international bodies such as ICAO [International Civil Aviation Organization].
13. In **Section 7.7**, similar forecasts have been made for airport slot capacity, as provided by the airports themselves, which relate to expected runway and slot provision in both 2015 and 2025. Comparison of these two sections provides an indication of whether airport congestion is likely to improve or worsen over the next twenty years.
14. When considered alongside the views of the various stakeholders, as described in Chapter 8, the data from this section is used – in Chapter 9 – to forecast the probable levels of slot usage in 2025 at a selection of major congested airports by category of service on the assumption that secondary slot trading is not permitted; and to make a second forecast as to how the slot usage will vary if secondary slot trading is permitted.
15. This enables the marginal impact of secondary slot trading to be measured in terms of air transport outputs – for example, available seat kilometres, revenue passenger kilometres, average passengers per aircraft and average length of flight. In Chapter 10, this data is measured in terms of overall economic impact.

7.2 Airport Selection

16. The two maps at Figures 7.1 and 7.2 show the distribution of coordinated and schedules facilitated airports in Europe, based on information provided by IATA and listed at [Appendix 3](#).
17. There are currently 73 Level 3 or coordinated airports in the Community, and a further 55 Level 2 or schedules facilitated airports, of which 10 are coordinated in the peak.

18. Of these 128 airports considered by their Governments to require some level of coordination, only one coordinated airport (Prague) and thirteen schedules facilitated airports (Larnaca, Budapest, Malta, Ljubljana, Bratislava and eight in Poland) are in the ten accession states. In addition, Sofia is the only schedules facilitated airport in those states seeking admission to the Community.

Figure 7.1: IATA Level Three Coordinated Airports



Note: for reasons of clarity 18 additional airports situated in the Greek islands have been left off the above map, but are listed in [Appendix 3](#).

Figure 7.2: IATA Level Two Schedules Facilitated Airports



19. The study includes all heavily congested airports, a large proportion of all the reasonably congested airports, a small proportion of the wider number of lightly congested, but still coordinated airports, and a small number of ‘control’ airports taken from the list of schedules facilitated airports. Where congested airports form part of an airport system, all the significant airports in that system have been included in the study. Those airports shown in italics are not currently classified as ‘coordinated’.

20. Thirty five airports were selected for study as follows:

- London – London-Heathrow, London-Gatwick, London-Stansted, *London-Luton, London-City*
- Frankfurt – Frankfurt, *Frankfurt-Hahn*
- Paris – Paris-Orly, Paris-Charles de Gaulle, *Paris-Le Bourget*
- Amsterdam
- Brussels – Brussels, *Brussels-Charleroi*
- Stockholm – Stockholm-Arlanda, Stockholm-Bromma
- Copenhagen
- Düsseldorf – Düsseldorf, *Düsseldorf-Niederrhein*
- Munich

- Prague
- Vienna
- Zürich
- Geneva
- Milan – Milan-Linate, Milan-Malpensa, Milan-Bergamo
- Rome [ROM] – Fiumicino [FCO], Ciampino [CIA]
- Madrid [MAD]
- Barcelona [BCN]
- Palma [PMI]
- Malaga [AGP]
- Lisbon [LIS]
- *Birmingham* – (control)
- *Nice* – (control)

21. Although the study is designed to cover the current 25 members of the EU, the current lack of coordinated airports in the ten accession countries means they are less well represented. Prague, as the only coordinated airport, has been included in the study.

7.3 Airport Slot Usage 1975 and 2005 – All Flights

7.3.1 Introduction

22. Consistent data has been provided for all selected airports from 1993 to 2005 by ACI.
23. In addition, detailed data for 1975 has been provided for ten airports [London-Heathrow, London-Gatwick, London-Stansted, Brussels, Amsterdam, Düsseldorf, Frankfurt, Zürich, Milan-Linate and Milan-Malpensa], and for 1986 for Paris-Orly and Paris-Charles de Gaulle. This extra information is therefore provided for all the eight most heavily congested airports studied in more detail in Chapter 9. This additional data has been used to confirm the conclusions drawn from the 1993 – 2005 comparisons.

24. The data analysis for 1993 and 2005 shows the growth of total movements at the two control airports and other less congested airports, to determine what has been the change in flights operated in terms of passenger air transport movements [PATMs], cargo ATMs [CATMs], and non-commercial flights, predominantly general aviation [GA]; and then to compare the situation with both partially and heavily congested airports to see how far the 'less valuable' flights such as those for general aviation have been reduced, and to assess how far any 'less valuable' air transport movements – assumed for the moment to include charter flights and all-cargo flights – have been replaced by scheduled passenger services.
25. This will act as the background for Section 7.4 which analyses solely the changes within the 'scheduled air passenger flights' sector.

7.3.2 Airport Classification

26. The thirty five airports selected have been classified as 'uncongested', 'partially congested', or 'heavily congested' in 2005 as follows, based on the ratio of slots used to available slots as determined from elsewhere in Section 7.3 and also from Section 7.5 of this report. The use of the term 'uncongested' is relative: by definition, all coordinated airports will experience a degree of congestion, but this category is generally far less congested than the other two categories.

27. *Uncongested* (19)

Barcelona, Birmingham, Brussels, Brussels-Charleroi, Düsseldorf-Niederrhein, Frankfurt-Hahn, Geneva, Lisbon, London-Luton, Milan-Bergamo, Milan-Malpensa, München, Nice, Paris-Le Bourget, Prague, Rome-Ciampino, Stockholm-Arlanda, Stockholm-Bromma, and Vienna.

28. *Partially Congested* (10)

Amsterdam, Copenhagen, London-City, London-Stansted, Madrid, Malaga, Palma, Paris-CDG, Rome-Fiumicino and Zürich,

29. *Heavily Congested* (6)

Düsseldorf, Frankfurt, London-Gatwick, London-Heathrow, Milan-Linate and Paris-Orly

30. Three of these airports are known to permit secondary slot trading - London-Heathrow, London-Gatwick, London-Stansted

31. Two airports are known to be active in secondary slot trading - London-Heathrow, London-Gatwick.

7.3.3 Comparison of 1993 and 2004 Airport Data

(i) Total Flights – Air Transport Movements and Other Flights

32. This section analyses comparable data for 30 of the 35 airports studied. Five of the airports reported no flights for 1993: Paris-Le Bourget; Brussels-Charleroi; Düsseldorf-Niederrhein; Frankfurt-Hahn; and Milan-Bergamo. These five are all classified as 'uncongested' in 2005.

33. Growth in total flights for each of the three categories of airports between 1993 and 2004 is shown in Table 7.1. (In this, and all subsequent tables, AAGR% represents ‘Average Annual Growth Rate’).

Table 7.1: Total Flights at 30 Airports, 1993 and 2005

Airport category Year	Uncongested 14	Partially congested 10	Heavily congested 6	Total 30
1993	1,582,026	1,681,929	1,460,502	4,724,457
2005	2,801,333	2,773,710	1,779,217	7,354,260
Total Growth	77.1%	64.9%	21.8%	55.7%
AAGR %	4.9%	4.3%	1.7%	3.8%

34. The figures confirm that airports which are currently thought to be heavily congested have achieved a significantly lower average growth rate in movements over the past thirty years than those that still have significant levels of spare capacity. With a total growth of movements of some 70% over eleven years, the less congested airports have recorded continuous growth more than three times as large as that of the six heavily congested airports, suggesting that there has been pressure to make the best use of the restricted number of slots at the more congested airports. It also strongly suggests that demand for the heavily congested airports has outstripped slot supply, and that many flights will either have been diverted to secondary airports serving the same city, diverted elsewhere, substituted, or not flown at all.

(ii) Non-Commercial Flights

35. The following Table 7.2 takes the same thirty airports but concentrates solely on the non-commercial flights – all those not categorised as Air Transport Movements [ATMs]:

Table 7.2: Non-Commercial Flights at 30 Airports, 1993 and 2005

Airport category Year	Uncongested 14	Partially congested 10	Heavily congested 6	Total 30
1993	260,729 (16.5%)	127,411 (7.6%)	79,738 (5.5%)	467,878 (9.9%)
2005	307,605 (11.0%)	97,992 (3.5%)	70,078 (3.9%)	475,675 (6.5%)
Total Growth	18.0%	- 23.1%	-12.1%	1.7%
AAGR %	1.4%	- 2.2%	- 1.1%	0.1%

36. This table confirms that in 1993, General Aviation and other non-commercial flights represented only 5.5% of all flights at what are now considered to be heavily congested airports, rising to 16.5% at the fourteen uncongested airports analysed.

37. The six heavily congested airports have had widely varying experiences since 1993. GA movements at London-Heathrow declined by 65% in the eleven year period, while those at Paris-Orly declined by 43%. However GA flights at Milan-Linate grew by 44% as these flights are not covered by the stringent government cuts in ATMs for environmental reasons.
38. Overall, GA and other non-commercial flights at these 30 airports grew by less than 2% between 1993 and 2005, with significant growths at the uncongested airports just outweighing the decreases at the partially congested airports, and most of the heavily congested airports. Even so, non-commercial flights continued to lose ground even at the uncongested airports, reducing in twelve years from 16.5% of all movements to just 11.0%.
39. It should be remembered that such non-commercial flights are not normally allocated slots for a season or more, which will mean that they do not become ‘grandfather’ slots. They can therefore not be considered as candidates for losing out further as a result of secondary trading, where only ‘grandfather’ slots are capable of being traded. However, the loss of these flights confirms that, at most of the congested airports, capacity for such flights has been reducing sharply as every valuable slot becomes used by ATMs.

(iii) Total Air Transport Movements [ATMs]

40. The growth in total ATMs over the twelve year period from 1993 to 2005 can be seen in Table 7.3.

Table 7.3: Air Transport Movements at 30 Airports, 1993 and 2005

Airport category Year	Uncongested 14	Partially congested 10	Heavily congested 6	Total 30
1993	1,321,297	1,554,518	1,380,764	4,256,579
2005	2,493,728	2,675,718	1,709,139	6,878,585
Total Growth	88.7%	72.1%	23.8%	61.6%
AAGR %	5.4%	4.6%	1.8%	4.1%

41. There is a significant difference in the growth rates achieved at both the uncongested and partially congested airports, averaging some 5.0% a year, compared to the six heavily congested airports at 1.8% a year, almost some two thirds less. This is to be expected – unless the heavily congested airports had only just become congested, the lack of slots will have constrained a free market growth in ATMs. Instead, secondary airports and other more distant airports will have taken much of the growth which would otherwise have been accommodated at the more heavily congested airports.
42. Data for the twelve airports providing longer traffic histories is summarised in Table 7.4.

Table 7.4: Air Transport Movements at 12 Airports, 1975 or 1986 and 2005

Airport	Data for	ATMs in start year	ATMs in 2005	AAGR %
<i>Heavily congested:</i>				
London-Heathrow	1975	276,121	471,986	1.8%
London-Gatwick	1975	105,050	252,227	3.0%
Frankfurt	1975	209,202	482,125	2.8%
Düsseldorf	1975	113,064	185,981	1.7%
Paris-Orly	1986	169,684	222,878	1.4%
Milan-Linate	1975	91,366	93,942	0.1%
<i>Partially congested:</i>				
London-Stansted	1975	33,265	178,414	5.8%
Amsterdam	1975	173,267	404,594	2.9%
Paris-Charles De G.	1986	148,061	513,674	6.8%
Zürich	1975	142,090	229,980	1.6%
<i>Uncongested:</i>				
Brussels	1975	98,291	231,088	2.9%
Milan-Malpensa	1975	22,845	227,718	8.0%

43. These figures corroborate those in the preceding table, and confirm that the trends seen since 1991 have been evident since at least 1975, with airports that are today heavily congested showing noticeably slower growth rates over the whole 30 year period since 1975.

(iv) Passenger and Cargo Air Transport Movements [PATMs and CATMs]

44. The data examined in Tables 7.3 and 7.4 cover all types of air transport movements, whether passenger or cargo movements, whether scheduled or charter, or whether domestic or international.

45. There is some expectation that the shortage of slot capacity to meet all demand at heavily congested airports will affect certain categories of ATM more acutely than others, with those flights making the most profitable use of scarce slots replacing others that have a lower value.

46. Because cargo generally is less time-conscious than the passenger market, alternative less-well-located airports are more easily substitutable for cargo than for passenger flights. As a result, cargo flights which occupy peak slots at congested airports are more easily transferable to secondary airports than equivalent passenger flights.

47. It should be recognised that there are two types of airlines providing all-cargo services. Firstly, there are those airlines for which all-cargo services form only a part of their total operation at an airport. As an airport becomes more congested, such airlines have the option under current slot regulations of relocating an all-cargo service to a secondary airport and replacing it with an alternative passenger service that offers more network benefits.
48. The second category are those airlines which only operate all-cargo services, and are therefore unable to ‘upgrade’ the service to a passenger service under the existing slot regulations. However strong the demand for those slots by passenger services, the all-cargo airline has just the two options – retain the slots, or voluntarily hand the slots back. If secondary slot trading were to allow such all-cargo airlines to sell those slots to another airline for passenger flights, this would be expected to prove a much-used alternative.
49. The extent to which passenger flights [PATMs] have grown at the expense of all-cargo flights [CATMs] is shown in Table 7.5.
50. Nineteen of the thirty airports provided ACI with details of cargo flights in 1993 and 2005. Comparable data was not provided for either year for the four Spanish airports studied or for Prague; while, in addition, 1993 data was not provided for Stockholm-Arlanda, Stockholm-Bromma, Rome-Catania, Milan-Bergamo, Lisbon or London-Luton.

Table 7.5: Passenger and Cargo ATMs at 19 Airports, 1993 and 2005

Airport category Destination	Uncongested 7	Partially congested 6	Heavily congested 6	Total 19
1993 – Total ATMs	799,772	1,035,975	1,380,764	3,216,531
Passenger ATMs	773,622	986,510	1,347,640	3,107,772
Cargo ATMs	26,170	49,465	33,124	108,759
Cargo ATM %	3.3%	4.8%	2.4%	3.4%
2005 – Total ATMs	1,448,276	1,662,486	1,709,139	4,819,901
Passenger ATMs	1,404,894	1,585,666	1,679,342	4,669,902
Cargo ATMs	43,382	76,820	29,797	149,999
Cargo ATM %	3.0%	4.6%	1.7%	3.1%
AAGR% 1993-2005				
Total ATMs	5.1%	4.0%	1.8%	3.4%
Passenger ATMs	5.1%	4.0%	1.9%	3.5%
Cargo ATMs	4.3%	3.7%	-0.9%	2.7%

51. [The 3.4% annual growth in total ATMs between 1993 to 2005 differs from the 4.1% shown in Table 7.3 as a result of fewer uncongested and partially congested (and faster-growing) airports being included in the sample of 19 compared with the previous sample of 30].

52. Two aspects of the distribution of Cargo ATMs stand out. Firstly, even by 1993, Cargo ATMs at 2.4% were a smaller proportion of total ATMs at heavily congested airports compared to other airports which averaged some 4.0%.
53. Secondly, in the following eleven years, Cargo ATMs grew by around 4% a year at uncongested and partially congested airports, but decreased by almost 1% a year at the six heavily congested airports reporting data.
54. Table 7.6 examines the trend in CATMs and PATMs at those 12 airports able to provide information back to either 1975 or 1986 (or 1991 in the case of Brussels).

Table 7.6: Passenger and Cargo ATMs at 12 Airports, 1975, 1986 or 1991 and 2005

Airport	Data for	CATMs in start year (and % age of ATMs)	CATMs in 2005 (and % age of ATMs)	AAGR %
<i>Heavily congested:</i>				
London-Heathrow	1975	20,670 (8.1%)	2,853 (0.6%)	- 6.4 %
London-Gatwick	1975	6,559 (8.9%)	2,630 (1.0%)	- 3.0 %
Frankfurt	1975	25,388 (13.5%)	22,265 (4.6%)	- 0.4 %
Düsseldorf	1975	2,283 (2.9%)	686 (0.4%)	- 3.9 %
Paris-Orly	1986	7,431 (4.5%)	12 (0.0%)	- 28.7 %
Milan-Linate	1975	5,164 (7.0%)	1,351 (1.4%)	- 4.4 %
<i>Partially congested:</i>				
London-Stansted	1975	1,234 (34.0%)	11,647 (6.5%)	+ 7.8 %
Amsterdam	1975	14,686 (11.3%)	17,747 (4.4%)	+ 0.6 %
Paris-Charles De G.	1986	4,947 (3.4%)	37,692 (7.3%)	+ 11.3 %
Zürich	1975	4,079 (3.8%)	1,199 (0.5%)	- 4.0 %
<i>Uncongested:</i>				
Brussels	1991	32,976 (18.8%)	24,679 (10.7%)	- 2.0 %
Milan-Malpensa	1975	3,126 (19.2%)	5,586 (2.5%)	+ 2.0 %

55. The figures show that the decline in all-cargo ATMs at the six major congested airports has been continuing for at least thirty years. Carrying at newer secondary airports such as London-Stansted, Milan-Malpensa and Paris-Charles de Gaulle appear to have benefited from the losses at the primary airports. Of the other airports only Amsterdam has shown an increase in CATMs between 1975 and 2005, although the market share of all-cargo flights has still declined from 11.3% to 4.4% - this reflects the prevailing policy objectives.

56. It is clear that, apart perhaps from Frankfurt, cargo flights have largely been excluded from the heavily congested airports since 1975, almost certainly due to other potential uses for those slots being valued more highly. There is no evidence that all-cargo ATMs have declined faster at the two airports which have engaged in secondary slot trading – London-Heathrow and London-Gatwick.

(v) Passenger ATMs

57. If the all-cargo ATMs are excluded, the resultant passenger ATMs at the nineteen reporting airports for the period 1993 – 2004 are as shown in Table 7.7.

Table 7.7: Passenger ATMs at 19 Airports, 1993 and 2005

Airport category Year	Uncongested 7	Partially congested 6	Heavily congested 6	Total 19
1993	773,622	986,510	1,347,640	3,107,772
2005	1,404,894	1,585,666	1,679,342	4,669,902
Total Growth	81.6%	60.7%	24.6%	50.3%
AAGR %	5.1%	4.0%	1.9%	3.5%

58. The data confirm that passenger ATMs [PATMs] have grown significantly more slowly at heavily congested airports, despite these airports also suffering the greatest losses of non-commercial flights and of all-cargo ATMs. The lack of spare capacity at the six heavily congested airports has resulted in PATMs growing by an average of only 1.9% a year, less than half the rate of partially congested airports, and more than 60% less than for uncongested airports.

(vi) Scheduled and Charter Passenger ATMs

59. Within the total number of passenger ATMs as shown in Table 7.7, there is also an important distinction to be made between scheduled and charter flights.

60. As with cargo flights (discussed above) there are two types of airlines offering charter flights. The first group will have the necessary licences to operate both scheduled and charter flights and be able to transfer slots for charter flights to scheduled flights, which would be expected to have a higher slot valuation.

61. However, there will be some non-EU airlines that only operate charter services (and in some cases may only be permitted to operate charter services), and their slots would not be capable of being used for a scheduled operation, unless they could be transferred to a scheduled airline by means of secondary trading.

62. The evidence for such change in use of slots is not comprehensive for two reasons. Firstly, ACI does not record the number of charter flights in its annual data reports, and this study has had to rely on information provided by a smaller number of individual airport companies.

63. Secondly, the economic regulation of charter services has changed significantly over the past thirty years. In particular, following liberalisation of air transport in the EC, Community carriers may now freely provide both scheduled and charter services, and many services which were previously charter services, particularly those from Germany, are now reclassified as scheduled services. In addition, transatlantic charters have substantially diminished in importance compared with their position in 1975. Finally, low cost (scheduled) carriers are now carrying large numbers of holiday travellers who historically used charter flights for stage lengths of up to three hours.
64. As a result, it would be expected that charters, as a proportion of the total number of passenger ATMs, were in decline at all European airports. From the data provided by seven airports, it is possible to see whether this trend has been exaggerated at the more heavily congested airports as a result of airlines trading up their own charter flights to become scheduled flights, or – where permitted - of trading their slots to other scheduled airlines.
65. The figures in Table 7.8 are for the seven airports that have been able to provide data on both scheduled and charter passenger flights in both 1975 (or 1986) and 2005.

Table 7.8: Charter Passenger ATMs at 7 Airports, 1975 or 1986 and 2005

Airport	Data for year	Charters in start year (and % age of PATMs)	Charters in 2005 (and % age of PATMs)	AAGR %
<i>Heavily congested:</i>				
Düsseldorf	1975	24,685 (32.8%)	11,679 (6.3%)	- 2.5 %
Paris-Orly	1986	12,194 (7.8%)	8,460 (3.8%)	- 1.9 %
Milan-Linate	1975	0 (0.0%)	0 (0.0%)	-
<i>Partially congested:</i>				
Amsterdam	1975	20,036 (21.5%)	28,531 (7.4%)	+ 1.2 %
Paris-CDG	1986	2,706 (1.9%)	21,856 (4.6%)	+11.6 %
Zürich	1975	9,191 (8.8%)	12,273 (5.4%)	+ 1.0 %
<i>Uncongested:</i>				
Milan-Malpensa	1975	5,734 (43.6%)	15,368 (6.9%)	+ 3.3 %

66. (Although the BAA [British Airports Authority] was unable to provide the historic information for 1975, it should be noted that, under previous traffic direction regulations from the UK government, charter flights were not permitted at London-Heathrow in 1975. They are now permitted but are operated to only a limited extent).
67. Despite all the caveats noted above concerning trends in charter flights overall, there would seem to be strong evidence that charter flights have continued to grow at the four partially and uncongested airports replying, but decreased at the heavily congested airports.

68. The conclusion drawn is that scheduled passenger services have continued to increase their share of slots at the most heavily congested airports, whether it has been at the expense of general aviation and other non-commercial flights, of all-cargo flights or of passenger charter flights.

(vii) Passengers per Passenger ATM

69. This section examines whether there has been a greater increase in average passengers per passenger ATM at the more heavily congested airports when compared with the partially congested and the uncongested airports.

70. It looks solely at the period 1993 to 2005, and shows the total number of terminating passengers and the number of PATMs recorded by ACI in those two years for the 30 airports reporting in both years. These passengers are on both scheduled and charter flights.

71. [The following Section 7.4 examines in detail the change in passenger numbers, and passengers per scheduled passenger ATM between 1975 and 2005, based on seat input data from the ABC / OAG schedules].

72. Table 7.9 shows the growth rates of terminating passengers between 1993 and 2005.

Table 7.9: Passenger Numbers at 30 Airports, 1993 and 2005

Airport category Year	Uncongested 14	Partially congested 10	Heavily congested 6	Total 30
1993	80,700,900	128,243,870	147,128,789	356,073,559
2004	197,896,797	262,744,856	201,612,159	662,253,812
Total Growth	145.2%	104.9%	37.0%	86.0%
AAGR %	7.8%	6.2%	2.7%	5.3%

73. Despite the slowdown in traffic following the events of 2001, total passenger growth at these thirty major European airports has still averaged 5.3% a year since 1993. However, the growth rates at the uncongested airports, including many of the secondary airports around the major cities, has grown at 7.8%, compared to only 2.7% a year at the most heavily congested airports. This strongly suggests that there has been considerable extra demand for services for the most congested airports that has not been met as a result of the lack of available slots.

74. It has not been possible to determine the change in average passengers per PATM at all 30 airports, as information on 1993 PATMs from ACI is only available for 19 of the airports. However, for those nineteen airports, the following table has been constructed, showing how the average number of passengers per PATM has varied between 1993 and 2005 at each category of airport.

Table 7.10: Average Passengers per PATM for 19 Airports, 1993 and 2005

Airport category Year	Uncongested 7	Partially congested 6	Heavily congested 6	Total 19
1993	62.2	75.8	109.2	86.9
2005	77.0	100.4	120.1	100.4
Growth – pax/flt	14.8	24.6	10.9	13.5
Growth - %	23.8%	32.4%	10.0%	15.6%
AAGR %	1.8%	2.4%	0.8%	1.2%

75. The average number of passengers per flight at the most heavily congested airports was 109 in 1993, or 75% greater than at the uncongested airports. By 2005, the figure had grown by 10% to 120.1, but growth at the uncongested airports was greater, with the result that the average number of passengers at heavily congested airports is now only 56% larger.
76. Nevertheless, the difference in average passengers per PATM is still great, and demonstrates that the average slot at a heavily congested airport is likely to be considerably more productive, thus valuable, in terms of passengers per movement than at an uncongested airport.

7.4 Airport Slot Usage 1975 and 2005 – Scheduled Passenger Flights

7.4.1 Introduction

77. The purpose of this second line of research is to determine how the mix of scheduled passenger services has changed over the period from 1975 to 2005 at a wide variety of European airports, and how this may have varied between congested and uncongested airports.
78. The first objective is to observe the underlying change in slot use that has occurred at all European airports over this period of time, reflecting trends unconnected with increasing congestion. This will include changes such as:
- the impact of airline deregulation in Europe;
 - the decline of charter flights, both intra-European and transatlantic, as many have been replaced by scheduled flights;
 - the recent growth of a pattern of low-cost carrier [LCC] networks of flights between 500 and 2,500 kilometres;
 - the major increase in flights between West and East Europe since 1990;
 - the trend for increased long-haul leisure flights prompted by the reduction in average fares and increased use of ‘Extended Twin Operations’ [ETOPS] capable aircraft;

- the increase in rail competition for flights of less than 500 kilometres, including the opening of the Channel Tunnel between France and the U.K.;
 - the increasing non-stop range of long-haul aircraft;
 - the almost complete elimination of multi-sector scheduled flights with three or more sectors
 - the lengthening of block times, caused by the acceptance by airlines and airports of the economic benefits of increasing available slots per hour at congested airports, which has had greater impact on short haul flights compared to long-haul flights, due to the disproportionate increases in cost and resources required by those carriers.
79. The second objective is to measure any residual difference in airport slot use that may be due solely to increasing congestion at major airports, and to consider whether these changes will be accelerated, reduced or altered by the introduction of legalised secondary trading in slots.
80. 1975 was chosen as a year in which the growing impact of slot congestion had not yet seriously begun to affect airlines' use of slots – in short, if an airline wished to start a new service from any airport in Europe in 1975 it would usually be able to acquire the necessary slots for that operation, even in peak hours. To a certain extent, slots were already in short supply in peak hours at London-Heathrow and Paris-Orly even by 1975, but for all practical purposes, slots were available when required.
81. The specific year 1975 was selected as the start point of the exercise because it is exactly thirty years before the 2005 period, and is therefore comparable to the twenty year forecast period to 2025. As in 2002, following the cutback of services following 9/11, the slot situation at airports in 1975 had been eased by the major recession caused by the first fuel crisis of 1974.
82. 1975 is therefore considered to be a good benchmark year.
83. At some of these airports, a similar uncongested situation still applied in 2005, even though they may be subject to coordinators. Two non-coordinated, but schedules facilitated airports [Birmingham and Nice] have been included in the study to ensure that there are at least a few examples of major airports still with a broad range of slot availability in 2005, even in the peaks.
84. As in the preceding Section 7.3, the study compares trends at congested airports from 1975 to 2005 with trends at partially congested and uncongested airports. It also seeks to measure any difference at those UK airports, where secondary slot trading is deemed to be legal and has been exercised, with other congested airports.

7.4.2 Original Data

85. The data for this part of the study has been taken from the May 1975 issue of the ABC World Airways Guide, and from data provided by the OAG World Airways Guide for the first week of May 2005. The month of May was selected as being representative of the whole year, avoiding the troughs of mid-winter and the peak of peaks in mid-summer.

86. Data for departures from the thirty five airports referred to in Section 7.2 have been analysed. One airport – Paris-Le Bourget – had scheduled passenger flights in 1975, but not in 2005; and six airports – London-Stansted, London-City, Frankfurt-Hahn, Brussels-Charleroi, Düsseldorf-Niederrhein, and Milan-Bergamo – had scheduled passenger flights in 2005, but not in 1975.
87. The prime data sets recorded for each departure in the first seven days of May were:
- First airport of arrival
 - Final airport of arrival
 - Aircraft type
 - Number of installed seats (actual advertised for 2005, average for each aircraft type in 1975)
 - Kilometres between departure airport and final airport of arrival measured as Great Circle distance
88. Other sets of data recorded from the printed timetable for 1975 were:
- Airline
 - Day of departure
 - Time of departure
 - Full routing of multi-sector flights
89. The full electronic data for 2005 has a much more detailed set of information for each flight, including where airlines code-share on flights.
90. As far as possible, given the limitations of any data series, all code-share operations have been shown only once and no scheduled flights have been excluded. The OAG does not include charter flights, and so these are excluded from the study. A small number of regional airlines, who elect not to publish their schedules in the OAG, are also excluded.

7.4.3 Derived Data

91. The initial division of this data was into five geographic regions, using the IATA regions as the main structure:
- Domestic – the following decisions were made:
 - domestic routes from London and Birmingham include the Isle of Man and the Channel Isles, but not Gibraltar or Bermuda;
 - domestic routes from Paris and Nice include Corsica but not the overseas departments in the Caribbean or the Indian Ocean;
 - domestic routes from Frankfurt, Düsseldorf and München in both 1975 and 2005 include flights to Berlin and destinations that were in East Germany in 1975;

- domestic routes from Prague exclude flights to cities that were in Czechoslovakia in 1975 but are today in Slovakia;
 - domestic routes from Spanish airports include the Balearic and Canary Isles and Melilla;
 - domestic routes from Lisbon include Madeira and the Azores;
 - domestic routes from Copenhagen exclude the Faeroes and Greenland.
- Europe West – the current definition has been used throughout, which includes the former East Germany, but none of the recent accession countries.
 - Europe East – this includes all the recent accession countries, and extending as far as Turkey, Russia and the countries of the Caucasus.
 - Africa and Asia, including Australasia
 - The Americas
92. It should be noted that where a multi-sector flight operates to destinations in more than one zone, it is the zone of final airport that is used.
93. The second derivation is the weekly number of departures to each geographic zone in each of 1975 and 2005, and this is shown as an average annual growth rate [AAGR%] over the thirty year period.
94. The third derivation is the average number of seats used in the aircraft flying to each zone, as an indication of the number of passengers likely to be on the flight.
95. The fourth derivation is the average distance in kilometres between the departure airport and the final airport of arrival, expressed as a straight Great Circle distance.
96. The fifth and final derivation is the weekly number of available seat kilometres [ASKs] determined by multiplying the average number of seats by the average distance in kilometres.
97. In general, the analysis has concentrated either on the average annual growth rates over thirty years [AAGR%] of each set of data, or on the actual levels in 1975 and 2005.

7.4.4 Results of Analysis

98. The basic data is summarised in the Tables 7.11 to 7.13, with 7.11 showing the statistics for 1975, 7.12 for 2005, and 7.13 comparing the two years in terms of AAGR %.

Table 7.11: ABC Data May 01-07 1975

ABC Data May 01-07 1975		Uncongested Airports 19	Partially Congested Airports 10	Heavily Congested Airports 6	TOTAL Airports 35
Destination of flight					
Domestic					
	Weekly departures	1,845	1,945	2,249	6,039
	Weekly seats	182,375	212,690	244,510	639,575
	Weekly ASKs	78,314,370	95,239,950	108,002,970	281,557,290
	Average seats	99	109	109	106
	Average kilometres	429	448	442	440
Europe West					
	Weekly departures	2,321	3,536	3,172	9,029
	Weekly seats	266,455	419,040	390,685	1,076,180
	Weekly ASKs	224,597,390	362,597,750	317,289,925	904,485,065
	Average seats	115	119	123	119
	Average kilometres	843	865	812	840
Europe East					
	Weekly departures	400	185	181	766
	Weekly seats	35,595	19,200	22,920	77,715
	Weekly ASKs	35,107,420	23,254,370	33,511,840	91,873,630
	Average seats	89	104	127	101
	Average kilometres	986	1,211	1,462	1,182
Africa and Asia					
	Weekly departures	249	537	596	1,382
	Weekly seats	39,765	95,370	117,130	252,265
	Weekly ASKs	195,119,735	596,565,780	832,540,310	1,624,225,825
	Average seats	160	178	197	183
	Average kilometres	4,907	6,255	7,108	6,439
The Americas					
	Weekly departures	186	419	369	974
	Weekly seats	43,160	107,690	107,750	258,600
	Weekly ASKs	283,640,060	800,764,390	729,997,670	1,814,402,120
	Average seats	232	257	292	266
	Average kilometres	6,572	7,436	6,775	7,016
Total					
	Weekly departures	5,001	6,622	6,567	18,190
	Weekly seats	567,350	853,990	882,995	2,304,335
	Weekly ASKs	816,778,975	1,878,422,240	2,021,342,715	4,716,543,930
	Average seats	113	129	134	127
	Average kilometres	1,440	2,200	2,289	2,047
	Average ASKs / Dep.	163,323	283,664	307,803	259,293
Percent of Weekly departures					
	Domestic	36.9%	29.4%	34.2%	33.2%
	Europe West	46.4%	53.4%	48.3%	49.6%
	Europe East	8.0%	2.8%	2.8%	4.2%
	Africa and Asia	5.0%	8.1%	9.1%	7.6%
	The Americas	3.7%	6.3%	5.6%	5.4%
Percent of Weekly seats					
	Domestic	32.1%	24.9%	27.7%	27.8%
	Europe West	47.0%	49.1%	44.2%	46.7%
	Europe East	6.3%	2.2%	2.6%	3.4%
	Africa and Asia	7.0%	11.2%	13.3%	10.9%
	The Americas	7.6%	12.6%	12.2%	11.2%
Percent of Weekly ASKs					
	Domestic	9.6%	5.1%	5.3%	6.0%
	Europe West	27.5%	19.3%	15.7%	19.2%
	Europe East	4.3%	1.2%	1.7%	1.9%
	Africa and Asia	23.9%	31.8%	41.2%	34.4%
	The Americas	34.7%	42.6%	36.1%	38.5%

Table 7.12: OAG Data May 01-07 2005

OAG Data May 01-07 2005		Uncongested Airports 19	Partially Congested Airports 10	Heavily Congested Airports 6	TOTAL Airports 35
Destination of flight					
Domestic					
	Weekly departures	5,658	5,488	4,293	15,439
	Weekly seats	649,526	700,233	557,732	1,907,491
	Weekly ASKs	345,585,693	365,173,252	281,261,533	992,020,478
	Average seats	115	128	130	124
	Average kilometres	532	522	504	520
Europe West					
	Weekly departures	13,338	14,542	7,489	35,369
	Weekly seats	1,541,001	1,813,817	1,023,503	4,378,321
	Weekly ASKs	1,569,601,251	1,855,640,188	1,100,467,637	4,525,709,076
	Average seats	116	125	137	124
	Average kilometres	1,019	1,023	1,075	1,034
Europe East					
	Weekly departures	2,121	1,474	1,103	4,698
	Weekly seats	199,854	177,161	142,939	519,954
	Weekly ASKs	216,230,211	237,157,951	211,865,151	665,253,313
	Average seats	94	120	130	111
	Average kilometres	1,082	1,339	1,482	1,279
Africa and Asia					
	Weekly departures	713	1,359	1,558	3,630
	Weekly seats	137,690	317,430	422,378	877,498
	Weekly ASKs	710,332,022	2,286,948,147	2,971,660,440	5,968,940,609
	Average seats	193	234	271	242
	Average kilometres	5,159	7,205	7,036	6,802
The Americas					
	Weekly departures	416	1,245	1,373	3,034
	Weekly seats	95,991	328,469	402,219	826,679
	Weekly ASKs	689,596,284	2,481,386,811	2,860,432,331	6,031,415,426
	Average seats	231	264	293	272
	Average kilometres	7,184	7,554	7,112	7,296
Total					
	Weekly departures	22,246	24,108	15,816	62,170
	Weekly seats	2,624,062	3,337,110	2,548,771	8,509,943
	Weekly ASKs	3,531,345,461	7,226,306,349	7,425,687,092	18,183,338,902
	Average seats	118	138	161	137
	Average kilometres	1,346	2,165	2,913	2,137
	Average ASKs / Dep.	158,741	299,747	469,505	292,478
Percent of Weekly Departures					
	Domestic	25.4%	22.8%	27.1%	24.8%
	Europe West	60.0%	60.3%	47.4%	56.9%
	Europe East	9.5%	6.1%	7.0%	7.6%
	Africa and Asia	3.2%	5.6%	9.9%	5.8%
	The Americas	1.9%	5.2%	8.7%	4.9%
Percent of Weekly Seats					
	Domestic	24.8%	21.0%	21.9%	22.4%
	Europe West	58.7%	54.4%	40.2%	51.4%
	Europe East	7.6%	5.3%	5.6%	6.1%
	Africa and Asia	5.2%	9.5%	16.6%	10.3%
	The Americas	3.7%	9.8%	15.8%	9.7%
Percent of Weekly ASKs					
	Domestic	9.8%	5.1%	3.8%	5.5%
	Europe West	44.4%	25.7%	14.8%	24.9%
	Europe East	6.1%	3.3%	2.9%	3.7%
	Africa and Asia	20.1%	31.6%	40.0%	32.8%
	The Americas	19.5%	34.3%	38.5%	33.2%

Table 7.13: Average Annual Growth Rates 1975 to 2005

OAG Data May 01-07 2005		Uncongested Airports 19	Partially Congested Airports 10	Heavily Congested Airports 6	TOTAL Airports 35
AAGR % Increase over 1975					
Destination of flight					
Domestic	Weekly departures	3.81%	3.52%	2.18%	3.18%
	Weekly seats	4.32%	4.05%	2.79%	3.71%
	Weekly ASKs	5.07%	4.58%	3.24%	4.29%
	Average seats	0.50%	0.52%	0.60%	0.51%
	Average kilometres	0.72%	0.51%	0.44%	0.56%
Europe West	Weekly departures	6.00%	4.83%	2.90%	4.66%
	Weekly seats	6.02%	5.01%	3.26%	4.79%
	Weekly ASKs	6.70%	5.59%	4.23%	5.51%
	Average seats	0.02%	0.17%	0.35%	0.13%
	Average kilometres	0.63%	0.56%	0.94%	0.69%
Europe East	Weekly departures	5.72%	7.16%	6.21%	6.23%
	Weekly seats	5.92%	7.69%	6.29%	6.54%
	Weekly ASKs	6.25%	8.05%	6.34%	6.82%
	Average seats	0.19%	0.49%	0.08%	0.29%
	Average kilometres	0.31%	0.33%	0.05%	0.26%
Africa and Asia	Weekly departures	3.57%	3.14%	3.25%	3.27%
	Weekly seats	4.23%	4.09%	4.37%	4.24%
	Weekly ASKs	4.40%	4.58%	4.33%	4.43%
	Average seats	0.64%	0.92%	1.08%	0.94%
	Average kilometres	0.17%	0.47%	-0.03%	0.18%
The Americas	Weekly departures	2.72%	3.70%	4.48%	3.86%
	Weekly seats	2.70%	3.79%	4.49%	3.95%
	Weekly ASKs	3.01%	3.84%	4.66%	4.09%
	Average seats	-0.02%	0.09%	0.01%	0.09%
	Average kilometres	0.30%	0.05%	0.16%	0.13%
Total	Weekly departures	5.10%	4.40%	2.97%	4.18%
	Weekly seats	5.24%	4.65%	3.60%	4.45%
	Weekly ASKs	5.00%	4.59%	4.43%	4.60%
	Average seats	0.13%	0.24%	0.61%	0.26%
	Average kilometres	-0.22%	-0.05%	0.81%	0.14%
	Average ASKs / Dep.	-0.09%	0.18%	1.42%	0.40%

99. This data is shown graphically in *Appendix 4* for each of the three airport groupings, and also for the total. Four separate charts are shown for each group of airports:

- The number of weekly departures in 1975 and 2005, analysed by each of the five geographic regions
- The AAGR% showing the average annual growth in departures in total, and for each region
- The change in the average number of seats per departure, in total and by region
- The change in the average length of flight (in kilometres), again in total and by region.

7.4.5 Weekly Scheduled Departures

100. The analysis shows that the number of scheduled departures per week from the 35 selected airports rose from 18,190 in 1975 to 62,170 in 2005. This is a 3.4 fold increase over the period, or an AAGR of 4.2% a year.

101. It will be seen that the increase has been notably greater at the uncongested airports (at 5.1% a year) than at either the partially congested airports (4.4% a year) or the heavily congested airports (3.0% a year). This is to be expected as, by definition, congested airports have the least capacity to absorb additional flights.

102. There are however some exceptions – weekly scheduled passenger departures at London-Gatwick continued to rise by 6.1% a year, but this is believed to be predominantly at the expense of passenger charter and cargo flights which have been substituted.

103. By comparison, the three airports with the highest levels of congestion – London-Heathrow, Paris-Orly and Milan-Linate – have only managed to increase their number of weekly scheduled departures by 2.4%, 1.7% and 0.6% a year respectively. At London-Heathrow, this will have been assisted by increases in hourly declared scheduling rates, albeit at the expense of increased block times caused by congested runways, taxiways and airspace. However, environmental limits on the number of ATMs permitted at Paris-Orly and Milan-Linate will have contributed strongly to this lack of growth.

104. What is of more importance is to observe the different rates of growth by geographic region.

105. Overall:

- Domestic routes are up by 3.2% a year
- Europe West routes are up by 4.7% a year
- Europe East routes are up by 6.2% a year
- Africa and Asia routes are up by 3.3% a year
- The Americas routes are up by 3.9% a year
- All routes are up by 4.2% a year

106. As expected, the recent rapid growth in routes linking east and west Europe has been substantial, while the other above-average growth has been seen in routes to West Europe, fuelled by the conversion of charter flights to become scheduled flights, and by the recent rapid surge of LCC flights aided by significant cost and fare decreases.

107. By comparison, the growth of intercontinental flights has been more staid, at a combined average of 3.5% a year.

108. However, when the same analysis is made by category of airport, a different picture emerges. Table 7.14 shows marked differences in AAGR% by category of airport and by global destination.

Table 7.14: Growth Rates by Destination by Airport Category, 1975 to 2005

Airport category Destination	Uncongested 19	Partially congested 10	Heavily congested 6	Total 35
Domestic	3.81%	3.52%	2.18%	3.18%
Europe West	6.00%	4.83%	2.90%	4.66%
Europe East	5.72%	7.16%	6.21%	6.23%
Africa and Asia	3.57%	3.14%	3.25%	3.27%
The Americas	2.72%	3.70%	4.48%	3.86%
Total	5.10%	4.40%	2.97%	4.18%

109. The heavily congested airports show much lower growth in terms of domestic flights and flights to Europe West than either the partially congested or the uncongested airports; but much greater increases to the Americas. The situation is more complex on flights to Europe East, Africa and Asia.

110. As a result, domestic flights from the six heavily congested airports increased by only 90% over the period 1975 to 2005, while flights to the Americas increased 3.7 fold.

111. This can be explained by those airlines holding slots, and with the ability to offer either short haul or long haul flights, choosing to trade up the value of each slot by substituting long-haul flights for short-haul. This is feasible under existing slot exchange rules.

112. Under current rules, it has also been possible for airlines to buy up other (normally failing) airlines, and convert their slots, often from short-haul to long-haul. Examples include BA's acquisition of British Caledonian, Dan-Air and CityFlyer Express. In the future, the possible legalisation of secondary slot trading could be expected to enhance this trend, by enabling other operators of short-haul services (only) to sell their slots to those operators able and wishing to operate long-haul services.

7.4.6 Average Seats per Flight

113. The following three tables show the number of seats by route group by airport group for both 1975 and 2005, and the actual increases between the two years.

Table 7.15: Average Seats per Flight 1975, by Destination and Airport Category

Airport category Destination	Uncongested 1975	Partially congested 1975	Heavily congested 1975	Total 1975
Domestic	99	109	109	106
Europe West	115	119	123	119
Europe East	89	104	127	101
Africa and Asia	160	178	197	183
The Americas	232	257	292	266
Total	113	129	134	127

Table 7.16: Average Seats per Flight 2005, by Destination and Airport Category

Airport category Destination	Uncongested 2005	Partially congested 2005	Heavily congested 2005	Total 2005
Domestic	115	128	130	124
Europe West	116	125	137	124
Europe East	94	120	130	111
Africa and Asia	193	234	271	242
The Americas	231	264	293	272
Total	118	138	161	137

Table 7.17: Average Change in Seats per Flight 1975-2005, by Destination and Airport Category

Airport category Destination	Uncongested Increase	Partially congested Increase	Heavily congested Increase	Total Increase
Domestic	16	19	21	18
Europe West	1	6	14	5
Europe East	5	16	3	10
Africa and Asia	33	56	74	59
The Americas	- 1	7	1	6
Total	5	9	27	10

114. These final figures could also be analysed in terms of average annual rates of increase of aircraft seat per year from 1975 to 2005.

115. The figures show that, in 1975, airports that are heavily congested today already had (on average) larger aircraft operating to each geographical region, and in total, than partially congested airports, which in turn used larger aircraft than uncongested airports. This suggests that, even as early as 1975, airports with higher levels of slot utilisation were already experiencing a reaction from airlines suffering from slot shortages, causing them to meet increasing demand by increasing average aircraft size rather than by increasing frequencies.
116. By 2005, the differentiation was even greater. The average aircraft size at uncongested and partially congested airports had increased by 5 and 9 seats respectively, but by 27 seats at the most heavily congested airports. It is no coincidence that the European airports targeted by the future operators of the A380 are predominantly the heavily congested ones – London-Heathrow and Frankfurt in particular.
117. There are some notable variances by geographical area, particularly in services to the Americas, where the average aircraft size of 266 seats in 1975 (comprising a mix of narrow bodied Boeing 707s and DC8s, plus a small number of B747-100s, Tristars and DC10s) had only increased by 6 to 272 in 2005 – most of these small and large transatlantic aircraft have been replaced by mid-size B777s and A330s. This trend has been assisted by changes in many EU-USA bilaterals which have enabled more competitors to compete on the major routes, leading to higher frequencies with smaller aircraft, and many more new routes to be opened, often with the smaller aircraft.
118. By comparison, the greatest increase has occurred on routes to Africa and Asia where the majority of flights in 1975 had been by the smaller narrow-bodied aircraft such as the Boeing 707 – it is unlikely that a further significant growth in average seats per flight remains. Even so, it is notable that far and away the largest growths have been at the six heavily congested airports.
119. This suggests that any increased ability for airlines to upgrade the use of slots – by adding the possibility of secondary trading to the existing ability for airlines to swap routes within their own portfolios – is likely to lead to a further increase in average aircraft size, as witnessed by the replacement (through artificial slot exchanges) at London-Heathrow of routes to France with a small aircraft by routes to Australia with a B747.

7.4.7 Average Kilometres per Seat

120. The following three tables show the average distance flown per seat by route group by airport group for both 1975 and 2005, in kilometres, and the actual increases between the two years.

Table 7.18: Average Kilometres Flown 1975, by Destination and Airport Category

Airport category Destination	Uncongested 1975	Partially congested 1975	Heavily congested 1975	Total 1975
Domestic	429	448	442	440
Europe West	843	865	812	840
Europe East	986	1,211	1,462	1,182
Africa and Asia	4,907	6,255	7,108	6,439
The Americas	6,572	7,436	6,775	7,016
Total	1,440	2,200	2,289	2,047

Table 7.19: Average Kilometres Flown 2005, by Destination and Airport Category

Airport category Destination	Uncongested 2005	Partially congested 2005	Heavily congested 2005	Total 2005
Domestic	532	522	504	520
Europe West	1,019	1,023	1,075	1,034
Europe East	1,082	1,339	1,482	1,279
Africa and Asia	5,159	7,205	7,036	6,802
The Americas	7,184	7,554	7,112	7,296
Total	1,346	2,165	2,913	2,137

Table 7.20: Change in Average Kilometres Flown 1975 to 2005, by Destination and Airport Category

Airport category Destination	Uncongested Increase	Partially congested Increase	Heavily congested Increase	Total Increase
Domestic	103	74	62	80
Europe West	176	158	263	194
Europe East	96	128	20	97
Africa and Asia	252	950	- 72	363
The Americas	612	118	337	280
Total	- 94	- 35	624	90

121. The average distance flown per seat in 1975 from heavily congested airports was 57% further than from uncongested airports. By 2005, this had risen to 116%, or more than double the level at those airports with a large number of available slots.

122. When analysed by geographical region, the differences are more random, with heavily congested airports offering the shortest average flights on domestic and American routes, the longest flights to other European cities, and average distances to Africa and Asia.

123. The most significant aspect of the data is that, between 1975 and 2005, the average distance flown per seat actually declined by 7% at uncongested airports, and by 2% at partially congested airports, but grew by 27% at the most heavily congested airports. Partially, this is believed to be the impact of Alliances reducing intercontinental flights at certain mid-size airports such as Copenhagen, Zürich, Brussels and Vienna, while concentrating them at Frankfurt, Paris-Charles de Gaulle and Amsterdam. At the two main airports which have permitted secondary slot trading, London-Heathrow and London-Gatwick, the increases were 23% and 141% respectively – the strong increase at the latter airport is partly due to the rapid growth of flights to the USA by airlines denied the ability to fly from London-Heathrow by the UK-US bilateral.

7.4.8 Average ASKs per Departure

124. The final row in the ‘totals’ columns of Tables 7.11 to 7.13 above shows the average available seat kilometres [ASKs] per departure. They are summarised below in Table 7.21.

Table 7.21: Average ASKs per Departure, 1975 and 2005, by Airport Category

Airport category Destination	Uncongested 19	Partially congested 10	Heavily congested 6	Total 35
Total 1975	163,323	283,664	307,803	259,293
Total 2005	158,741	299,747	469,505	292,478
Actual change	- 4,582	16,083	161,702	33,185
Percentage change	- 2.8%	+ 5.7%	+ 52.5%	+ 12.8%
AAGR %	- 0.09%	+ 0.18%	+ 1.42%	+ 0.40%

125. Thus the average productivity of a scheduled slot at a heavily congested airport in 1975 was nearly double that of one at an uncongested airport; but by 2005, it had become almost three times as productive – or three times as ‘valuable’. At uncongested airports, there had been no significant change in the average number of ASKs per departure, while the most heavily congested airports had shown an increase of 52%, or more than 1.4% growth each year.

126. Further analysis has been made of each individual airport, and of the three groupings, showing the ‘scatter’ of ASKs per departure for each of 16 categories, ranging from 0 to 25,000 ASKs per departure, up to between 5 and 7.5 million ASKs per departure.

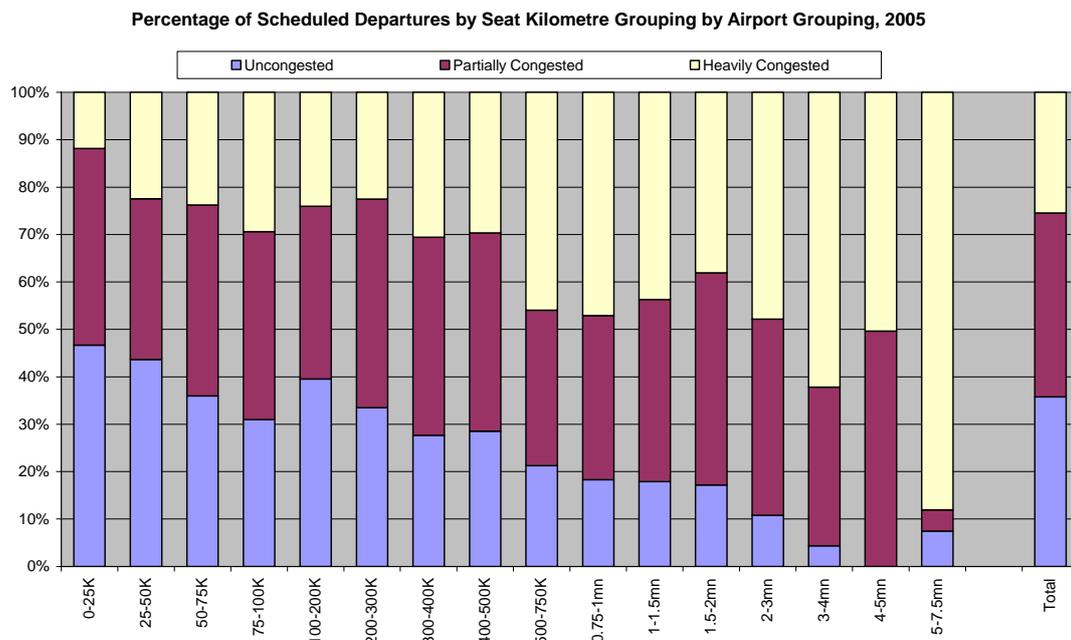
127. The first table shows the ‘raw’ data for each of the three airport groupings and the total for all 35 airports in May 2005, giving the number of weekly departures per ASK grouping.

Table 7.22: Distribution of Departures by Seat Kilometres Provided in 2005, by Airport Category

OAG Data May 01-07 2005		Uncongested Airports 19	Partially Congested Airports 10	Heavily Congested Airports 6	TOTAL Airports 35
Number of Scheduled Departures By Seat Kilometres per departure Between:	and:				
0	25,000	3,063	2,725	776	6,564
25,000	50,000	4,550	3,531	2,343	10,424
50,000	75,000	3,362	3,766	2,219	9,347
75,000	100,000	2,326	2,976	2,205	7,507
100,000	200,000	5,151	4,745	3,130	13,026
200,000	300,000	2,146	2,819	1,442	6,407
300,000	400,000	590	892	652	2,134
400,000	500,000	208	305	216	729
500,000	750,000	132	203	285	620
750,000	1,000,000	66	125	170	361
1,000,000	1,500,000	239	512	583	1,334
1,500,000	2,000,000	204	531	452	1,187
2,000,000	3,000,000	173	662	765	1,600
3,000,000	4,000,000	31	239	444	714
4,000,000	5,000,000	0	74	75	149
5,000,000	7,500,000	5	3	59	67
Total		22,246	24,108	15,816	62,170

128. The following diagram shows the percentage of each category of flight (in terms of seat kilometres per departure) occurring at uncongested, partially congested and heavily congested airports.

Figure 7.3: Percentage of Scheduled Departures by Seat Kilometre Grouping by Airport Grouping, 2005

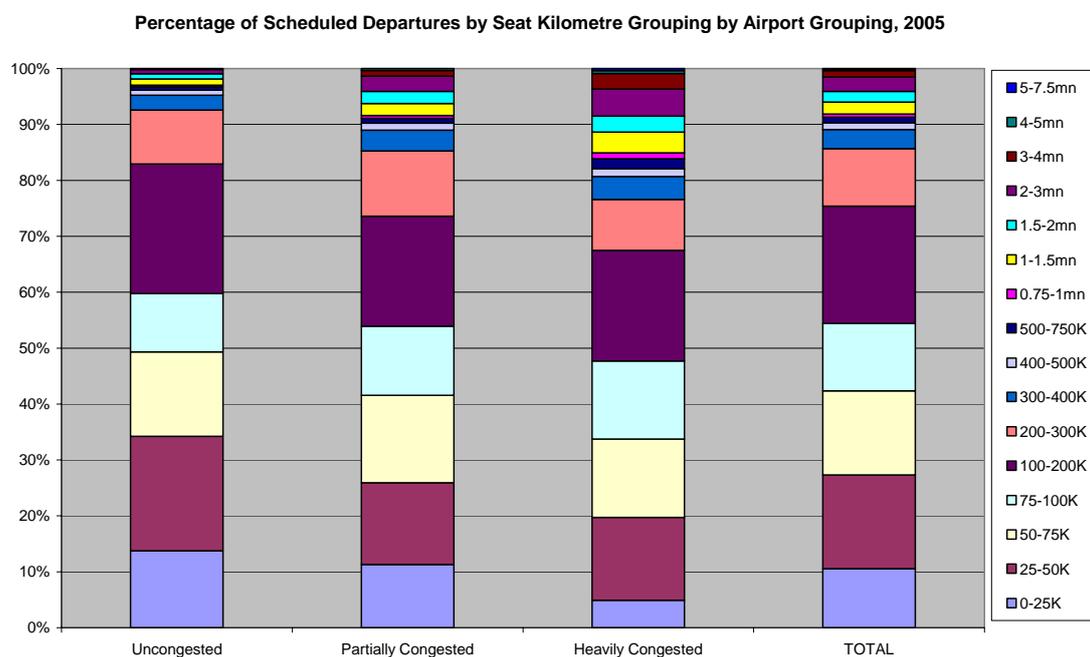


129. The chart shows convincingly that the percentage of low ASK flights, resulting from operating small aircraft on short routes, is much greater at uncongested airports than at heavily congested airports, suggesting that they have been priced out of the more congested airports.

130. By contrast, large aircraft flying long distances are almost entirely to be found at those airports with a restricted number of slots available.

131. This same data can also be examined in a different format in the next chart, which shows the split of flights in terms of ASKs per departure for each of the three airport groupings and the total.

Figure 7.4: Percentage of Scheduled Departures by Seat Kilometre Grouping by Airport Grouping, 2005



132. The distinctive shape of the three groupings is believed to represent accurately the impact of congestion upon airline choices of how best to utilise their available slots. Where slots are scarcest, airlines tend to replace low-utilisation slots, as measured by ASKs [or average aircraft size times average journey length], with services providing far greater ASKs per departure.

7.4.9 Summary

133. The average productivity of a scheduled slot at a heavily congested airport in 1975 was nearly double that of one at an uncongested airport; but by 2005, it had become almost three times as productive – or three times as ‘valuable’.

134. Although termed ‘uncongested’, these 19 airports are major airports in their own right – all but two (Birmingham and Nice) are currently coordinated.

135. Almost all of these changes, especially after the 1993 legislation came into effect, will have been accomplished by airlines upgrading the use of their own slots, either by replacing domestic and European flights with long-haul flights, or by increasing the average size of their aircraft. Others may have achieved the same results by acquiring short-haul airlines and then converting the slots for long-haul use.
136. The expectation is that a possible change in legislation regarding secondary slot trading will lead to airlines that currently only have the opportunity to use the slots for short-haul (or cargo or charter) flights being able to transfer them to airlines that are capable of generating significantly larger numbers of available seat kilometres (and therefore revenue passenger kilometres, revenues, and profits) and which are prepared to pay for the privilege.
137. With airlines at the heavily congested airports growing both their average aircraft size, and their average length of journey, when compared with relatively uncongested airports, it can be seen that the impact on available seat kilometres is overwhelming.
138. These assertions are discussed in Chapter 8 with a variety of airlines, airline organisations and other stakeholders to determine whether this is a reasonable set of assumptions.

7.5 Airport Slot Usage 2005 – Coordinator Statistics

139. The third main line of enquiry was to examine current data provided by coordinators to determine whether the data for the most heavily congested airports differed significantly from those for uncongested airports.
140. Statistical information was requested from the coordinators of 26 of the airports studied. The smaller airport-system airports such as London-Luton, Brussels-Charleroi, Düsseldorf-Niederrhein and Frankfurt-Hahn are not coordinated, and could not provide the necessary data.
141. Lengthy meetings were held with eight airport coordinators covering nineteen of the airports – Airport Coordination Limited (for London-Heathrow, London-Gatwick and London-Stansted); AENA (for Madrid, Barcelona, Palma and Malaga); Assoclearance (for Rome-Fiumicino, Rome Ciampino, Milan-Linate, Milan-Malpensa and Milan-Bergamo); Austrian SCA (for Vienna); Swiss Slot Coordination (for Geneva and Zürich); ACN (for Amsterdam); Brussels Slot Coordination (for Brussels); and Sweden Airport Coordination (for Stockholm-Arlanda and Stockholm-Bromma). Meetings with the coordinators for Prague, Copenhagen and Lisbon were replaced with written questionnaires.
142. The team has also addressed a meeting of the full membership of the coordinators' trade body EUACA, and met a smaller meeting of the core coordinator membership dealing with major issues such as secondary trading. The views of Cohor (for Paris-Orly and Paris-Charles de Gaulle) and Germany Airport Coordination (for Frankfurt, Düsseldorf and Munich) were obtained at these meetings.

143. The team also assisted EUACA to organise a seminar on Secondary Trading in Amsterdam in June 2006. It was attended by over 130 delegates representing coordinators, airports, airlines, governments, civil aviation authorities and academia. The sessions covered all relevant aspects and added greatly to each party's understanding of the complex issues surrounding secondary slot trading and the associated issues of primary slot allocation. The papers and debate have, where relevant, been incorporated into this study.
144. A large number of coordinators were able to return the statistical analysis, while other coordinators not originally circulated (such as those responsible for Oslo and Budapest) requested a copy of both the statistical and interview questionnaires, so that their thoughts could be incorporated into the study.
145. The data analysis concentrates on comparing total slot capacity with total slot demand and usage for the two seasons Summer 2005 and Winter 2005-2006, and observing how the level of utilisation varied across the coordinated airports.
146. Where current data for 2005/2006 has not been made available, the study has used ACI data for 20 airports for 2002-2003 from their paper 'Study on the use of airport capacity' published in May 2004.
147. Where additional information has been provided by a number of coordinators, the number of slots allocated from the pool have been compared with those allocated according to grandfather rights, to see how far the ratios correlate with overall congestion.
148. Then, to obtain a measure of slot mobility, as far as the statistical data has allowed, information was examined on slot exchanges and transfers for each of the three categories of slot mobility allowed for under Section 8a-1 of the current version of EC Regulation 793/2004 – that is to say:
- (a) slots transferred by an air carrier from one route or type of service to another route or type of service operated by that same carrier
 - (b) slots transferred:
 - i. between parent and subsidiary companies, and between subsidiaries of the same parent company
 - ii. as part of the acquisition of control over the capital of an air carrier
 - iii. in the case of a total or partial take-over when the slots are directly related to the air carrier taken over
 - (c) exchanged, one for one, between air carriers
149. In general, the coordinators have found it difficult to provide statistics on these more detailed aspects of slot mobility, but the study team has drawn what conclusions it can from the data and the discussions held with the coordinators.

150. Finally, ACL have provided detailed evidence on the number of ‘artificial’ trades, where valuable slots at London-Heathrow and London-Gatwick have been exchanged, often for ‘junk’ slots which have then been handed back to the coordinator. This data allows for analysis to be made of the airlines buying and selling (or leasing) slots, and an indication of the routes and aircraft sizes involved. A summary has been provided in Section 5.2 above. This provides a good guide as to the likely shape of secondary slot trading if it is made legal throughout the Community, but is not of itself sufficient to provide an indication of the probable scale of such trading.

7.5.1 Slot Availability and Slot Allocation

151. Table 7.23 compares the number of slots allocated at the seasonal IATA Slot Allocation meetings and the total number of slots made available by airport, where this information has been provided for 2005/2006.

Table 7.23: Available and Allocated Slots 2005/2006 by Coordinated Airport

Season	Summer 2005 (2002)			Winter 2005/2006 (2002/2003)		
	Airport	Available slots	Allocated slots	% age	Available slots	Allocated slots
Heavily Congested						
London-Heathrow	294,686	292,849	99.4%	194,334	193,593	99.6%
London-Gatwick	173,600	176,872	101.9%	117,747	102,746	87.3%
Paris-Orly	151,396	151,396	100.0%	99,371	99,371	100.0%
<i>Dusseldorf</i>		<i>129,468</i>			<i>88,088</i>	
<i>Frankfurt</i>		<i>284,949</i>			<i>201,157</i>	
Milan-Linate	66,402	67,141	101.1%	44,982	44,685	99.3%
Partially Congested						
London-Stansted	157,325	131,194	83.4%	104,958	77,528	73.9%
Paris-Charles de Gaulle	420,546	368,875	87.7%	284,886	244,966	86.0%
Amsterdam	270,000	298,923	110.7%	180,000	183,127	101.7%
Copenhagen	306,187	195,772	63.9%	207,417	117,229	56.5%
Zurich	234,812	182,528	77.7%	152,292	109,851	72.1%
Rome-Fiumicino	332,010	247,412	74.5%	224,910	141,485	62.9%
<i>Madrid</i>		<i>253,875</i>			<i>182,973</i>	
<i>Palma</i>		<i>138,376</i>			<i>50,261</i>	
<i>Malaga</i>		<i>69,482</i>			<i>40,616</i>	
Uncongested						
Brussels	247,814	195,734	79.0%	167,874	113,014	67.3%
Stockholm-Arlanda	335,048	178,436	53.3%	226,968	103,908	45.8%
Stockholm-Bromma	60,543	22,258	36.8%	41,013	13,776	33.6%
<i>Munich</i>		<i>235,767</i>			<i>166,435</i>	
Geneva	140,616	82,522	58.7%	94,206	63,756	67.7%
Milan-Malpensa	258,230	172,664	66.9%	174,930	108,377	62.0%
Milan-Bergamo	73,780	38,085	51.6%	49,980	28,662	57.3%
Rome-Ciampino	81,158	27,567	34.0%	54,978	18,951	34.5%
<i>Barcelona</i>		<i>179,130</i>			<i>126,637</i>	
Lisbon	127,224	89,033	70.0%	91,875	58,918	64.1%
Oslo	313,565	127,720	40.7%	212,415	79,640	37.5%
Budapest	175,770	82,768	47.1%	119,070	44,972	37.8%

152. Figures in italics are data for 2002/2003, and are taken from the ACL May 2004 'Study on the use of airport capacity', with its detailed data for twenty major airports. (Data is also available for four airports not included in this study - Dublin, Las Palmas, Lyon, and Vienna).

153. The number of available slots relates to the number of slots in each season that may be bid for by airlines, whether for scheduled or charter flights, passenger or cargo. Generally, airlines bid for series of flights across the whole season, with ad hoc flights being dealt with once all series flights have been accommodated as far as possible.

154. There are two main approaches to determining capacity. One is to take the maximum physical capability of the airport in terms of runway movements per hour, and to multiply that by 24 hours, seven days, and 31 weeks for the IATA Summer period, or 21 weeks for the IATA Winter. As a general rule, the capacity levels for airports with 24 hour capability have been shown as seasonal totals assuming only a 17 hour operating day, although there will be additional night-time capacity.
155. The second approach is to take these maximum figures and modify them for one of three main reasons:
- a) to allow 'firebreaks' at off-peak times of the day, where lower hourly rates are allowed, so that any backlog of traffic can be caught up
 - b) to have lower hourly rates, or total allocations, at certain times of the day, normally reflecting airport closures at night, or restrictions on the overall number of night flights
 - c) an artificial number of total flights per season to reflect environmental concerns. Where this is significantly below the physical capability of the airspace and the runways, this can lead to higher runway rates per hour in the peak hours, and lower rates in off-peak hours.
156. The table shows the maximum permissible number of movements at each airport for both Summer 2005 and for Winter 2005/2006. The airport with the greatest capacity available is Rome-Fiumicino, which permits 90 ATMs per hour throughout the day and throughout the year.
157. Other airports, such as London-Heathrow and London-Gatwick, with severe night flight restrictions, cannot achieve such annual limits; while Paris-Orly, Amsterdam and Milan-Linate are additionally restricted below their physical capability by year-round environmental limitations.
158. The table then compares these physical or arbitrary ATM limits with the total number of slots allocated to airlines at the IATA bi-annual conferences.
159. As a general rule, slots allocated in the winter season represent a lower proportion of total available slots, particularly at airports such as London-Gatwick where charter flights (which have a distinct seasonal pattern) form a significant proportion of the total. Those airports which had a higher winter ratio were London-Heathrow – albeit only slightly – and Geneva, where there is a strong winter sports peak.
160. The percentage of available slots allocated varies considerably between airports. The four heavily congested airports to make this information available (London-Heathrow, London-Gatwick, Paris-Orly and Milan-Linate) allocated slots for more than 99% of the available slots in Summer while many other airports allocate less than 60% of the available slots. It is predominantly from the data in this table that airports have been defined as 'heavily congested', 'partially congested' or 'uncongested'.

7.5.2 Slot Demand and Slot Allocations

161. The following table compares the actual slot allocations made at the IATA Conferences with the number of slots applied for in advance of the Conferences.

Table 7.24: Slots Requested and Allocated 2005/2006 by Coordinated Airport

Season	Summer 2005 (2002)			Winter 2005/2006 (2002/2003)		
	Airport	Slots requested	Allocated slots	% age	Slots requested	Allocated slots
Heavily Congested						
London-Heathrow	337,962	292,849	86.7%	220,185	193,593	87.9%
London-Gatwick	211,761	176,872	83.5%	115,983	102,746	88.6%
Paris-Orly	193,167	151,396	78.4%	120,120	99,371	82.7%
<i>Dusseldorf</i>	<i>138,890</i>	<i>129,468</i>	<i>93.2%</i>	<i>88,414</i>	<i>88,088</i>	<i>99.6%</i>
<i>Frankfurt</i>	<i>304,198</i>	<i>284,949</i>	<i>93.7%</i>	<i>205,247</i>	<i>201,157</i>	<i>98.0%</i>
Milan-Linate		66,687			44,685	
Partially Congested						
London-Stansted	134,354	131,194	97.6%	77,973	77,528	99.4%
Paris-Charles de Gaulle	449,360	368,875	82.1%	281,929	244,966	86.9%
Amsterdam	298,923	298,923	100.0%	183,127	183,127	100.0%
Copenhagen	<i>191,613</i>	<i>184,763</i>	<i>96.4%</i>	<i>130,566</i>	<i>132,328</i>	<i>101.3%</i>
Zurich	182,528	182,528	100.0%	109,851	109,851	100.0%
Rome-Fiumicino		245,453			141,485	
<i>Madrid</i>	<i>275,479</i>	<i>253,875</i>	<i>92.2%</i>	<i>188,255</i>	<i>182,973</i>	<i>97.2%</i>
<i>Palma</i>	<i>140,581</i>	<i>138,376</i>	<i>98.4%</i>	<i>51,001</i>	<i>50,261</i>	<i>98.5%</i>
<i>Malaga</i>	<i>69,260</i>	<i>69,482</i>	<i>100.3%</i>	<i>39,618</i>	<i>40,616</i>	<i>102.5%</i>
Uncongested						
Brussels	194,990	195,734	100.4%	109,074	113,014	103.6%
Stockholm-Arlanda	<i>187,300</i>	<i>172,900</i>	<i>92.3%</i>	<i>124,200</i>	<i>124,600</i>	<i>100.3%</i>
Stockholm-Bromma		22,258			13,776	
<i>Munich</i>	<i>235,968</i>	<i>235,767</i>	<i>99.9%</i>	<i>165,097</i>	<i>166,435</i>	<i>100.8%</i>
Geneva	82,522	82,522	100.0%	64,743	63,756	98.5%
Milan-Malpensa		170,302			108,377	
Milan-Bergamo		36,910			44,685	
Rome-Ciampino		26,137			18,951	
<i>Barcelona</i>	<i>205,811</i>	<i>179,130</i>	<i>87.0%</i>	<i>140,371</i>	<i>126,637</i>	<i>90.2%</i>
Lisbon		89,033			58,918	
Oslo		127,720			79,640	
Budapest		82,768			44,972	

162. It will be noted that, at airports which are considered to be 'heavily congested', the number of slots allocated at the IATA Conferences form a smaller proportion of the total number of slots applied for.

163. Thus at London-Heathrow, the coordinators were only able to satisfy 86.7% of demand in Summer 2005, and 87.9% in Winter 2005/2006. The shortfall at London-Gatwick was even greater in Summer, with only 83.5% of requests being met. It is believed that the 'true' demand for slots at both London-Heathrow and London-Gatwick is much greater than the figures would suggest, as airlines have learnt not to bid for slots if they know they have no chance of obtaining them.

164. At almost all other reporting airports, both partially congested and uncongested, it would seem that the coordinators were able to meet all demand in 2005/2006, with only Paris-Charles de Gaulle (year-round), London-Stansted (year-round) and Geneva (winter) having to refuse any of the requests. The figures for Paris-Charles de Gaulle are very high and do not appear to reflect airline experience in generally being able to obtain slots there as and when requested. The difficulties experienced in Barcelona in 2002/2003 have been resolved with the provision of additional runway capacity since then. Similarly, the opening of additional runway capacity at Madrid in 2006 is expected to eliminate any surplus of requested slots.

165. The figures (in italics) for Summer 2002 have to be treated carefully. Many of the slot requests will have been made before the events of September 11th 2001, and some of these will have been withdrawn shortly after the slot allocations had been made in December 2001 as the economic impacts of that day's events became apparent.

166. Generally, the IATA Conferences result in most airports allocating slightly more slots than are requested in advance, with the highest level being seen at Brussels, where the ratio reached 103.6% in Winter 2005.

7.5.3 Actual Usage of Slots

167. The IATA seasonal allocations provide a snapshot of demand for an airport many months before the intended flights are actually flown.

168. Many changes will occur between the slots being allocated and the flights flown. The coordinators keep a record of the actual number of allocated flights, with another snapshot being recorded at the IATA deadline date, at which time all known surplus slots ought to be returned to the coordinator by the airline possessing them, for re-allocation.

169. The final check has been to compare the actual number of slots used at the end of the season with the original IATA allocation.

170. Table 7.25 shows the actual results for those airports that have provided the figures for the year 2005/2006, and for other airports for the year 2002/2003, as a percentage of the original IATA allocations.

Table 7.25: Slots Allocated and Used 2005/2006 by Coordinated Airport

Season	Summer 2005 (2002)			Winter 2005/2006 (2002/2003)		
	Airport	Allocated slots	Used slots	% age	Allocated slots	Used slots
Heavily Congested						
London-Heathrow	292,849	289,124	98.7%	193,593	189,405	97.8%
London-Gatwick	176,872	169,169	95.6%	102,746	95,128	92.6%
Paris-Orly	151,396	146,223	96.6%	99,371	91,755	92.3%
<i>Dusseldorf</i>	<i>129,468</i>	<i>109,517</i>	<i>84.6%</i>	<i>88,088</i>	<i>70,358</i>	<i>79.9%</i>
<i>Frankfurt</i>	<i>284,949</i>	<i>272,335</i>	<i>95.6%</i>	<i>201,157</i>	<i>190,773</i>	<i>94.8%</i>
Milan-Linate	66,687	61,201	91.8%	44,685	38,638	86.5%
Partially Congested						
London-Stansted	131,194	120,365	91.7%	77,528	75,511	97.4%
Paris-Charles de Gaulle	368,875	321,948	87.3%	244,966	204,572	83.5%
Amsterdam	298,923	255,125	85.3%	183,127	148,252	81.0%
Copenhagen	<i>184,763</i>	<i>154,748</i>	<i>83.8%</i>	<i>132,238</i>	<i>106,739</i>	<i>80.7%</i>
Zurich	182,528	142,500	78.1%	109,851	85,000	77.4%
Rome-Fiumicino	245,453	217,518	88.6%	141,485	119,482	84.4%
<i>Madrid</i>	<i>253,875</i>	<i>217,216</i>	<i>85.6%</i>	<i>182,973</i>	<i>155,871</i>	<i>85.2%</i>
<i>Palma</i>	<i>138,376</i>	<i>113,310</i>	<i>81.9%</i>	<i>50,261</i>	<i>45,141</i>	<i>89.8%</i>
<i>Malaga</i>	<i>69,482</i>	<i>57,342</i>	<i>82.5%</i>	<i>40,616</i>	<i>32,327</i>	<i>79.6%</i>
Uncongested						
Brussels	195,734	151,458	77.4%	113,014	91,285	80.8%
Stockholm-Arlanda	<i>172,900</i>	<i>142,529</i>	<i>82.4%</i>	<i>124,600</i>	<i>99,668</i>	<i>80.0%</i>
Stockholm-Bromma	22,258			13,776		
<i>Munich</i>	<i>235,767</i>	<i>206,590</i>	<i>87.6%</i>	<i>166,435</i>	<i>144,333</i>	<i>86.7%</i>
Geneva	82,522	69,285	84.0%	63,756	48,800	76.5%
Milan-Malpensa	170,302	153,191	90.0%	108,377	90,647	83.6%
Milan-Bergamo	36,910	33,505	90.8%	28,662	18,903	66.0%
Rome-Ciampino	26,137	23,196	88.7%	18,951	15,712	82.9%
<i>Barcelona</i>	<i>179,130</i>	<i>160,237</i>	<i>89.5%</i>	<i>126,637</i>	<i>112,343</i>	<i>88.7%</i>
Lisbon	89,033	79,242	89.0%	58,918	49,480	84.0%
Oslo	127,720			79,640		
Budapest	82,768	74,562	90.1%	44,972	43,623	97.0%

171. The Summer 2005 percentages ranged between 77.4% at Brussels and 98.7% at Heathrow. The Winter percentages ranged between 66.0% at Milan-Bergamo and 97.8% at Heathrow.

172. There will be many reasons why these percentages vary. For example, a new airline may seek slots at an airport after the IATA allocation, and find that there are spare slots still available. This could even lead to more flights being operated than originally allocated.

173. However, there is a reasonably close correlation between heavily congested airports and high levels of IATA allocations being operated. It is airports such as these that do not suffer from a large number of airlines operating series of flights close to the 80% 'use it or lose it' condition, as – over time – such flights have been replaced by operations more likely to earn higher profits and therefore more likely to operate 100% of any allocation.

174. Once again, the figures for Summer 2002 have to be treated with caution, as many long-haul operators cancelled services once the full economic impact of '9/11' became apparent.

7.5.4 'Grandfather' Slots and Pool Slots

175. All coordinators were asked to provide information regarding the relationship between the percentage of slots allocated to existing historical usage or 'grandfather' rights, and all other slots allocated from the pool as primary allocations.

176. Table 7.26 gives the data as reported by ten of the twenty-seven airports questioned.

Table 7.26: Historical Slots and Total Allocated Slots 2005/2006 by Coordinated Airport

Season	Summer 2005 (2002)			Winter 2005/2006 (2002/2003)			
	Airport	Allocated slots	Historical slots	% age	Allocated slots	Historical slots	% age
Heavily Congested							
London-Heathrow	292,849	289,664	98.9%	193,593	192,276	99.3%	
London-Gatwick	176,872	162,533	91.9%	102,746	86,499	84.2%	
Paris-Orly	151,396			99,371			
<i>Dusseldorf</i>	<i>129,468</i>			<i>88,088</i>			
<i>Frankfurt</i>	<i>284,949</i>			<i>201,157</i>			
Milan-Linate	67,141			<i>43,089</i>			
Partially Congested							
London-Stansted	131,194	110,825	84.5%	77,528	64,911	83.7%	
Paris-Charles de Gaulle	368,875			244,966			
Amsterdam	298,923			183,127			
Copenhagen	<i>184,763</i>			<i>132,238</i>			
Zurich	182,528	131,967	72.3%	109,851	88,622	80.7%	
Rome-Fiumicino	245,453			141,485			
<i>Madrid</i>	<i>253,875</i>			<i>182,973</i>			
<i>Palma</i>	<i>138,376</i>			<i>50,261</i>			
<i>Malaga</i>	<i>69,482</i>			<i>40,616</i>			
Uncongested							
Brussels	195,734	134,509	68.7%	113,014	78,834	69.8%	
Stockholm-Arlanda	<i>172,900</i>	147,436	82.6%	<i>124,600</i>	88,998	85.7%	
Stockholm-Bromma	22,258	17,174	77.2%	13,776	11,130	80.8%	
<i>Munich</i>	<i>235,767</i>			<i>166,435</i>			
Geneva	82,522	62,992	75.4%	63,756	48,888	76.7%	
Milan-Malpensa	170,302			108,377			
Milan-Bergamo	36,910			28,662			
Rome-Ciampino	26,137			18,951			
<i>Barcelona</i>	<i>179,130</i>			<i>126,637</i>			
Lisbon	89,033	67,363	75.7%	58,918	43,008	73.0%	
Oslo	127,720			79,640			
Budapest	82,768	38,440	46.4%	44,972	24,570	54.6%	

177. This table is the most appropriate when considering the level of ‘slot mobility’ in the current system.
178. At the most heavily congested airports, slot mobility – when considered as the proportion of slots that are available for primary allocation – is at its lowest. At London-Heathrow, less than one per cent of all slots are now allocated by the slot coordinator. More than 99% are passed on, year to year, as historical or grandfather slots to the airline that were last awarded those slots. This lack of available slots at Europe’s most congested airport has been made more acute by the ability of airlines to trade slots rather than hand them back to the coordinator.
179. For other airports reporting, the range lies between 68.7% [Brussels – Summer] and 85.7% [Stockholm-Arlanda – Winter], with figures of 45-55% being reported by the facilitated airport of Budapest.
180. Generally, it would seem that around 25% of slots are made available every season at all but the most heavily congested airports. It is also possible that the adoption of de facto secondary trading at both London-Heathrow and London-Gatwick has affected the level of slots being returned to the pool, as most airlines will be aware that they could instead be traded with other airlines. However, the lack of data from the four other heavily congested airports prevents that conclusion from being drawn with any level of confidence.

7.5.5 Primary Allocation of Slots

181. Coordinators were asked to provide data on the primary allocation of those slots not covered by historical or grandfather rights, according to the category of airline being awarded them, particularly new entrants and others, and by nature of operation, whether long-haul or short-haul, passenger or cargo.
182. Few coordinators were able to provide this data in sufficient detail, but the results of information provided by Brussels, Zürich and Geneva appear to be sufficiently consistent with their other data to merit further study.

Table 7.27: Primary Slot Allocation at Brussels, Zürich and Geneva 2005/2006

Airport	Brussels	%	Zurich	%	Geneva	%
Total Annual Slots Available - Year 2005/2006	415,688		377,104		234,822	
Slots applied for at IATA Slots Conferences	304,064		292,379		147,265	
Slots allocated at IATA Slots Conference - Total	303,611		292,379		146,278	
Total slots allocated at slot return deadline	259,688		254,424		126,879	
Slots used or forecast to be used per year	242,743		227,500		118,085	
Slots identified by allocation process: of which:	311,036	100.0%	289,759	100.0%	146,961	100.0%
slots allocated according to 'grandfather rights'	213,343	68.6%	220,629	76.1%	111,880	76.1%
slots allocated according to slot allocation priorities: and allocated to:	97,693	31.4%	69,130	23.9%	35,081	23.9%
New entrants - domestic and intra-EC/EEA routes	1,607	0.5%	6,924	2.4%	2,578	1.8%
New entrants - all other routes	984	0.3%	2,353	0.8%	168	0.1%
New entrants - cargo flights	0	0.0%	0	0.0%	0	0.0%
Existing airlines - domestic and intra-EC/EEA routes	47,810	15.4%	47,286	16.3%	26,147	17.8%
Existing airlines - all other routes	44,506	14.3%	12,047	4.2%	4,628	3.1%
Existing airlines - cargo flights	2,786	0.9%	520	0.2%	1,560	1.1%
Proportion of primary slots allocated to:						
New entrants	2,591	2.7%	9,277	13.4%	2,746	7.8%
Domestic and EC/EAA routes	49,417	50.6%	54,210	78.4%	28,725	81.9%
Cargo flights	2,786	2.9%	520	0.8%	1,560	4.4%

183. These figures suggest that for these three partially or uncongested airports, around 70-75% of all slots in 2005-2006 were allocated according to historical slot usage through the grandfather rights principle, leaving more than a quarter of the slots being allocated from the pool in accordance with the directives of EC Regulation 793/2004.

184. From this small sample, it would appear that – for airports with large numbers of available slots – there is insufficient demand from new entrants to warrant the setting of a 50% target for new slots. New entrants at Brussels accounted for 2.7% of all primary slot allocations, with the figures for Zürich and Geneva being 13.4% and 7.8%.

185. Secondly, domestic and intra EC/EAA flights formed the majority of all new successful slot allocations, ranging from 50.6% at Brussels to 81.9% at Geneva.

186. Thirdly, additional cargo flights, at less than 5% of new operations at each airport, suggest that the downward trend in all-cargo operations at major European airports has not been halted, and is continuing to decline.

7.5.6 Slot Exchanges

187. Although discussions with the various EC airport coordinators and their trade body EUACA have proved very fruitful, there are few detailed statistics to measure the current mobility of slots according to the provisions of Chapter 8a-1 of the EC Slot Regulations amendment, 793/2004.

188. Only one coordinator – for Stockholm-Arlanda – was able to provide data on how many changes of slot use were made during the period April 2005 to March 2006, and these are shown below in Table 7.28.

Table 7.28: Slot Exchanges at Stockholm-Arlanda, 2005/2006

Airport	Stockholm-Arlanda	%
Total Annual Slots Available - Year 2005/2006	562,016	
Slots applied for at IATA Slots Conferences	282,660	
Slots allocated at IATA Slots Conference - Total	282,344	
Total slots allocated at slot return deadline	232,912	100.0%
Slots used or forecast to be used per year	n.a.	
Slot exchanges noted by coordinator by EC category:		
	793/2004 Ref. 8a-1	
- change of route or service type, no change of carrier	a)	2,860 1.2%
- transferred between carriers with the same parent company, etc.	b)	728 0.3%
- exchanged, one for one, between air carriers	c)	728 0.3%
- transferred between carriers by way of an 'artificial' exchange	-	0 0.0%

189. It will be noted that the overall level of change, once the IATA slot allocations have been made, is remarkably small, totalling less than 2%. In the case of Stockholm-Arlanda, there were 2,860 slot changes noted relating to 8a-1 a), within the same airline. This is equivalent to four round trips a day, or 28 departures per week.

190. One round trip a day was transferred between carriers with the same parent [8a-1 b)], and a further one round trip a day was exchanged between independent carriers under regulation 8a-1 c).

191. No artificial exchanges involving the use of 'junk' slots were noted during the year.

192. It is not known how representative such figures are, as most coordinators do not record such changes, although each change of use has to be verified and checked against capacity parameters.

7.5.7 Artificial Slot Exchanges

193. Earlier in this Report, at Section 5.2, an analysis by ACL was made of the nature and level of slot exchanges made at London-Heathrow and London-Gatwick Airports, often using the mechanism of 'junk' slots and money exchanges in accordance with the U.K Court's understanding of EC Regulation 793/2004.

194. The team also analysed the data provided by ACL and drew similar conclusions, which, for convenience, are repeated here in this section of the study:

"ACL has provided the European Commission and the study team with details of trades at London-Heathrow and London-Gatwick from Summer 2001 to Summer 2006 by season, and have made their summary analysis as follows:

(i) Types of Trades

Slot transactions take a number of forms and fulfil various purposes:

- *An outright sale of slots on commercial terms*
- *A lease of slots on commercial terms*
- *As part of the transfer of a ROUTE from one carrier to another*
- *As part of the restructuring of a bankrupt air carrier (eg Sabena or Swissair)*
- *To redeploy slots within an airline alliance or other group of carriers*
- *To temporarily babysit surplus slots*

(ii) Benefits of Slot Trading

Generally slot trades result in the substitution of short-haul services operated by small aircraft with long-haul, large aircraft services. Analysing only those slot transfers that were commercial transactions, and excluding intra-Alliance transfers, it would appear that the average aircraft size increased some 81% from 139 to some 250 seats per slot. Actual seat numbers are used wherever possible, but when a slot is purchased by an airline with a wide range of aircraft sizes, the average fleet size has been used – thus 196 seats for British Airways and 326 for Virgin.

If slot productivity is measured in terms of the number of ASKs produced, then the increase in productivity will be much greater still. For example, when the Heathrow-Lyons route of the Air France BAe 146 was replaced by a B747-400 of Qantas to Sydney, the ASKs per slot rose 89-fold from 76,000 to 6,767,000. Similarly, the Air France Canadair to Paris being replaced by the Jet Airways B777-200 to Bombay resulted in a 115-fold increase in productivity, from 17,500 ASKs to 2,020,000.

“The study team has made its own analysis of 499 slots traded at London-Heathrow between 2001 and 2006 and generally agrees with this analysis, but has made additional studies of the data. It has calculated that, during this period, approximately:

- 73% of the outright acquisitions of slots were by British Airways,
- 13% by Virgin Atlantic,
- 11% by two other long-haul airlines, Emirates and Qantas.
- and 3% by a new entrant, Jet Airways of India

The foreign long-haul carriers (including the new entrant airline) and Virgin Atlantic will have used these slots entirely for additional intercontinental services, and will not have enhanced intra-Community services. Because BA will have shuffled around its new purchases of slots within its own substantial slot portfolio, it is not possible to say how many of their purchases led to an increase in intra-Community routes that would otherwise have been sacrificed to make way for additional long-haul flights.

The ACL figures conclusively suggest that – at least during the period 2001 to 2006 – BA, the dominant carrier at London-Heathrow, has been enabled to increase its slot portfolio by secondary trading.

Figures also provided by ACL to the EUACA Seminar show that Virgin Atlantic Airways first moved to London-Heathrow in 1991, and first obtained slots through secondary slot trading in 1993. ACL have calculated that of the 312 weekly slots now operated by Virgin Atlantic, some 168, or 54%, were obtained by secondary slot trading, with the greatest number of purchases being in 2003 and 2004 from FlyBe and SN Brussels.

A second set of figures was provided regarding the booming UK – India market, where a sudden relaxation of the bilateral has allowed a substantial broadening of the number of airlines that can operate in the market, and the number of frequencies that can be flown.

The direct market had been suppressed by the Indian Government's reluctance to expand the number of permissible flights, possibly because it believed that its own carrier, Air India, would not be able to obtain slots for new services at London-Heathrow, whereas the British airlines would be able to redeploy from within their own slot portfolio. As a result, there has, until now, been a flourishing group of airlines catering for the UK – India market by offering sixth-freedom services over intermediate points, predominantly in eastern Europe, the Middle East and the Central Asian republics.

The liberalisation of the bilateral has enabled additional direct flights to replace some of these sixth-freedom services which are expected to have lost significant amounts of traffic back to the direct routes.

In Summer 2004, the direct market was restricted to 70 slots or 35 round trips a week. By Summer 2006, this had risen to 230 slots. Of the additional 160 slots required by the airlines concerned:

- 60 slots were obtained by the incumbent airlines (BA, bmi and Virgin Atlantic) by using slots previously used for other services, expected to be predominantly short and medium-haul
- 46 were allocated by ACL from the slot pool, from slots which were either returned from airlines that failed to achieve an 80% usage, or that no longer required them, or were still remaining unused in the slot pool. A second new entrant, Air Sahara of New Delhi, acquired its slots from this source, while Jet Airways also acquired a proportion of its slots in this manner.
- the remaining 54 weekly slots were obtained through artificial slot exchanges, which, amongst other changes, allowed Jet Airways to acquire peak time slots for its new London-India services.

Further analysis has shown that, over the five year period, of the 499 slots a week which have been traded, some have been traded more than once. For example, on its demise some Sabena slots were transferred to SN Brussels; some of these were then transferred to Virgin Atlantic, which then leased a proportion of these to other airlines until such time as it would require them to be transferred back for its own use. With the total number of Heathrow slots being some 8,700 a week, it would thus appear that almost 6% of slots have changed hands in that five year period. There are no records to show the percentage of trades in previous years.

In addition, during the period 2001 to 2006, the number of slots allocated from the pool by ACL at London-Heathrow has declined significantly, from some 220 a week in 2001 to around 120 by 2006.

ACL expressed the view that trading would be even greater at both London-Heathrow and London-Gatwick if secondary trading were to be expressly approved in the EC Slot Regulation, as some airlines, which are not yet comfortable that such trading is permitted, would then feel confident of the status of the slots that they purchased. ACL suggest that BA were more active at an early stage, because of their confidence in the approach to such trading in the UK (understood to be approved by the UK Government), and that their share of trades is likely to decrease in the future, as other airlines began to engage in secondary trading.

This view is disputed by the leading trader, BA, which is confident that most, if not all, airlines are aware of the potential for trading and that there is little reticence amongst the airline community today. BA still trades in slots, but is wary of some of the new entrants from the Middle East who can afford to pay aggressive prices for slots.

Whilst there is therefore evidence that secondary trading has facilitated new entry and increased competition at London-Heathrow, evidence of the impact on fares of secondary slot trading at London's airports is inconclusive. Indirectly, however, such an impact may be seen in the lower fares on the London – India routes, resulting from additional competition on these routes enabled, in part, by such new entry”.

195. During the study, the only other information that has come to light regarding examples of artificial slot exchanges at other European airports is in relation to Oslo-Fornebu. The Oslo coordinator advised that similar artificial exchanges involving the use of ‘junk’ slots occurred at that airport until it closed in 1998. Further details are to be found in Section 8.4 of this Report.

7.6 Forecast Growth of Slot Demand 2005 – 2025

196. In order to determine the potential level of secondary slot trading by 2025, not only at London-Heathrow and London-Gatwick, but at all airports likely to be severely congested by 2025, it is necessary to understand the likely trends in both demand and supply of slots over this period.

197. A variety of organisations provide regular forecasts of air traffic activity. A selection of the most relevant ones is provided below.

7.6.1 From 2004 to 2023 by Airbus

198. Airbus, in its latest 'Airbus Global Market Forecast 2006-2025', published in November 2006, has forecast global Revenue Passenger Kilometres [RPK] to increase at an average annual rate of 4.8% to 2023. This is a reduction of 0.5% on the forecast made two years earlier, reflecting the rapid growth seen in the first two years 2004 and 2005 having taken some of the forecast growth out of the following years.

199. Although the European region is normally considered to be one of the more mature markets, with growth rates below the global average, Airbus are now forecasting total RPKs on routes to and from Europe to also average 4.8% a year for the next twenty years, with domestic and intra-European routes growing by 4.3% and international routes growing faster at 5.0% a year. RPKs by European airlines are forecast to grow by 4.6% in the twenty year period, with other airlines to Europe growing by more than 5%.

7.6.2 From 2005 to 2024 by Boeing

200. Boeing Commercial Aeroplanes, in its 'Boeing Current Market Outlook 2005', has also forecast global air passenger traffic, as measured in RPKs, to increase by an average rate of 4.8% a year through to 2024. This forecast was made in 2005, significantly after the various 'shocks' to the global aviation industry (2001 US terrorist attacks; SARS; Gulf War) were considered to have lost their influence in terms of impact on air traffic. By region, the forecasts for the key European market segments are listed below, with those of Airbus (2006) shown in brackets:

Europe – Europe	3.4%	(4.1%)
Europe – Middle East	5.1%	(6.2%)
Europe – South West Asia	5.6%	(6.1%)
Europe – South East Asia	4.9%	(5.3%)
Europe – China	6.1%	(6.2%)

201. Thus although Boeing and Airbus agree on the total global growth rates, Airbus is more optimistic for European routes than is Boeing.

7.6.3 From 2005 to 2024 by Rolls Royce

202. Rolls Royce, in its 'The Outlook 2005-2024', has forecast global RPKs to increase by an average annual rate of 4.4% through to 2024, compared to 5.6% for 1983-2002.

203. By region, the forecasts are as follows:

Europe – Europe (legacy airlines)	3.4%
Europe – Europe (low cost carriers)	3.7%
Europe – North America	4.0%

Europe – Asia / Pacific	6.1%
Europe – Middle East and Africa	5.1%
All European airlines	4.4%

204. Even though the Rolls Royce forecast is lower than that of either Airbus or Boeing, it should be noted that all these three forecasts have been prepared by manufacturers who would expect to benefit from more optimistic forecasts, and they should be subjected to some degree of caution.

7.6.4 From 2005 to 2009 by the International Air Transport Association (IATA)

205. IATA, based on its own survey of member airlines, reported the following estimates of average annual growth of air passenger traffic in December 2005 for the period 2005 – 2009 as follows:

Total international	5.6%
Europe – Europe	5.1%
Europe – North America	5.3%
Europe – Middle East	6.6%
Europe – Asia and Pacific	5.9%

206. Although these figures are higher than those of the manufacturers, it should be noticed that they cover a much shorter time period. Almost all the forecasts predict higher growth rates in the early years, tailing off towards the end as ‘market maturity’ is believed to be approached.

7.6.5 From 2004 to 2020 by the Airports Council International (ACI)

207. The ACI, in their ‘ACI Worldwide and Regional Forecasts; Airport Traffic 2005-2020’ publication, have remained fairly conservative in their outlook for air passenger traffic growth. For the period 2004-2020, ACI forecast global passenger growth at an average annual rate of 4.7%. The key market segments are listed below:

Europe – Domestic	3.1%
Europe – International	4.2%

7.6.6 From 2006 to 2012 by Eurocontrol

208. Eurocontrol, a European aviation industry organisation, forecasts flight movements for the Eurocontrol Statistical Reference Area [ESRA], which incorporates the whole of geographical Europe (not just EC member states). In its ‘Medium-Term Forecast; Flight Movements 2006-2012’, Eurocontrol predicts that there will be 26% more air transport movements in 2012 than there were in 2005, which equates to an average annual growth rate of 3.3% throughout the ESRA.

7.6.7 From 2005 to 2017 by the U.S Federal Aviation Authority (FAA)

209. In its ‘FAA Aerospace Forecasts, Fiscal Years 2006-2017’, the FAA forecasts that the growth of passenger enplanements on all flights to and from the USA – by both US carriers and foreign carriers – will increase by an average rate of 5.0% per annum between 2005 to 2017. This was partially based on a forecast of U.S economic growth averaging 3.1% a year, and represents growth rates expected in what is probably the most mature aviation market in the global context.

7.6.8 From 2003 to 2020 by the World Tourism Organisation (WTO)

210. In its ‘Tourism 2020 Vision’, last updated in 2003, the WTO forecast global growth of tourist numbers (not just air passengers) at around 4.1% from 1995 to 2020, compared to the 4.5% it had forecast in 2000. This has taken into account the loss of tourism during the 2001-2003 period caused by the global recession and the increased security tensions. The forecast for the decade 2010 to 2020 is for a global increase of some 4.5% a year. The forecast increase for Europe is lower, at around 3.2% a year for the later decade.

7.6.9 Summary

211. Table 7.29 below summarises the key forecasts from each report.

Table 7.29: Summary of Relevant Demand Forecasts

Organisation	Region	Period	Variable	AAGR %
Airbus	Europe – Europe	2006 – 2025	RPKs	+ 4.1
Boeing	Europe – Europe	2005 – 2024	RPKs	+ 3.4
Rolls Royce	Intra-Europe (legacy carriers)	2005 – 2024	RPKs	+ 3.4
IATA	Europe – Europe	2005 – 2009	RPKs	+ 5.1
ACI	Europe – Dom.; Intl.	2004 – 2020	RPKs	+ 3.1; + 4.2
Eurocontrol	Europe – World	2006 – 2012	ATMs	+ 3.3
FAA	US – International	2006 – 2017	Passengers	+ 5.0
WTO	World	2003 – 2020	Passengers	+ 4.1

7.6.10 Forecasts used for This Study

212. This study has given stronger weight to the forecasts of Eurocontrol, partly because it is the only one that has forecast air transport movements, but also because it has a greater incentive than most to generate realistic forecasts of detailed traffic flows to each European airport. As it deals with all air traffic above specified flight levels in Europe, it alone is able to look at the total aviation picture in real time, and analyse the short-term fluctuations and possible longer term strategic implications.

213. Eurocontrol has forecast total European ATMs to grow by an average of 3.3% a year from 2006 to 2012, and it can be assumed that this would be likely to drift down towards 3.0% for the following period 2012 to 2025. In addition, the forecast covers large areas of eastern Europe where airport congestion is unlikely to be a major issue, even by 2025, but where growth is predicted to be more rapid. The forecasts for the congested north-western area of Europe are likely to be lower, based on maps and data published in its latest 2004 edition of 'Challenges to Growth'. (The next edition is not due until later in 2007).

214. Having considered the various studies and forecasts, this study has elected to use as its central forecast the following forecast average growth rate for the period 2005 to 2025:

Air Transport Movements 3.1%

215. The relationships between ATMs, passengers per flight and RPKs per flight for the period 2005 to 2025 (when compared with the historic data for 1975 to 2005) are maintained, and are shown in Table 7.30.

Table 7.30: Historic and Forecast Growth Rates

Variable	AAGR% 1975 to 2005	AAGR% 2005 to 2025
Growth in Passengers per flight	0.40%	0.34%
Growth in Kms per flight	0.22%	0.19%
Growth in RPKs per flight	0.62%	0.53%

216. This is consistent with a continuing increase in the average journey length of passengers, and of an increased number of seats and passengers per flight, and results in the following average annual growth rates for each variable for 2005 to 2025:

Air Transport Movements 3.1%

Passenger Numbers 3.5%

Revenue Passenger Kilometres 3.7%

217. This forecast of demand is unchanged, whether or not secondary slot trading is adopted throughout Europe, as it is independent of the forecast capacity growth, which will similarly affect the relationship between demand for, and supply of, airport slots.

7.7 Forecast Capacity Growth at European Airports 2005 – 2025

218. Alongside the forecast of growth of demand for aircraft slots analysed in the previous section, it is also necessary to determine whether the growth of airport capacity will keep up with the increases in demand.

219. Some twenty major European airports were asked to fill in a questionnaire detailing their current usage of slots by category of airline and flight type, and also to provide details of the number of runways operated in 1975 and 2005 together with the maximum slot capacity available in each year. They were also asked for their best estimates of runways and slots available by each of 2015 and 2025.

220. A good response was received regarding the detailed split of traffic in 2005, but only seven airports felt sufficiently confident to provide forecasts of runways and slots for the future years. Their responses are shown below in Table 7.31. It should be noted that the definition of ‘runways’ is not the total number of runways available for use, but the maximum number that can be in use at the same time.

Table 7.31: Forecasts of Slot Capacity 2025 by Airport

Airport	Dusseldorf	Frankfurt	Amsterdam	Zurich	Brussels	Dublin	Milan - Malpensa
Category 2005	Heavily Congested	Heavily Congested	Partially Congested	Partially Congested	Uncongested	Uncongested	Uncongested
Runways 1975	2	2	2	2	3	1	2
Slot Capacity 1975	186,000	482,000	300,000	180,000	-	-	180,000
Runways 2005	2	3	3	3	3	1	2
Slot Capacity 2005	267,000	527,000	450,000	340,000	465,000	330,000	361,000
Runways 2015	2	4	4	3	3	2	3
Slot Capacity 2015	322,000	755,000	550,000	350,000	505,000	650,000	430,000
Runways 2025	3	4	4	3	3	2	3
Slot Capacity 2025	353,000	755,000	600,000	450,000	505,000	690,000	430,000
Growth of capacity 2005 - 2025	32.2%	43.3%	33.3%	32.4%	8.6%	109.1%	19.1%
AAGR %	1.4%	1.8%	1.4%	1.4%	0.4%	3.8%	0.9%

221. Of these airports, only one (Dublin) expected to provide sufficient capacity in twenty years’ time to match the predicted growth of ATMs. The rest predicted average growth in slot supply of between 0.4 and 1.8% a year, or (on average) less than half the predicted growth of demand.

222. In order to draw conclusions on the likely growth of secondary trading in the EU, a more detailed study was made of eight heavily and partially congested airports, including three of those in the above table, using a range of source materials.

223. These eight airports are:

London-Heathrow

London-Gatwick

Paris-Orly

Paris-Charles de Gaulle

Amsterdam

Düsseldorf

Frankfurt

Milan-Linate

224. When asked to name the most slot congested airports in Europe, the AEA Secretariat and airlines meeting with them also nominated eight airports. Seven of them were as in the list above, but their list also included Madrid. Madrid has not been studied in detail as – although the airport has recently been heavily congested – it has now completed a doubling of runway and terminal capacity and is unlikely to be severely congested again before 2025.

225. The airport listed above, but not mentioned by AEA, is Paris-Charles de Gaulle, and this has been included because, although currently having sufficient capacity to meet most demand, it would appear that it will be heavily congested by 2025.

7.7.1 London-Heathrow

226. London-Heathrow currently has two parallel runways which are generally operated in segregated mode, with one used for arrivals only and one for departures only, although a small number of mixed-mode movements are currently made on the Southern runway to assist flights to and from Terminal 4.

227. The BAA states that the maximum slot capacity at the moment is some 517,000 slots a year, while the ACL data for 2005/2006 states that some 489,000 slots were made available.

228. Currently, the BAA is restricted by the British Government from operating more than 460,000 slots a year on environmental grounds, although that is being relaxed to 480,000 once its fifth terminal is available for use in 2008. Nevertheless, the BAA reported some 471,986 ATMs in 2005 plus a further 5,904 other movements. For 2004, ACI reported 469,763 ATMs plus 6,236 other movements.

229. The airport is severely restricted for night operations.

230. At the moment there is no agreement on any further growth of slots between 2008 and 2025, although two possibilities are being examined. One is for an extension of mixed-mode operation on the current two runways. This would be expected to increase annual slot utilisation by a further 50,000 slots a year to 530,000, provided that an area equivalent to the existing area enclosed by the 57 decibel noise contour is not breached.

231. The second possibility is for a third parallel runway of some 2,000 metres catering for short and medium haul aircraft only. The UK White Paper on Aviation estimated that (without allowing for any mixed-mode operation on existing runways) this could increase total Heathrow capacity to some 655,000 ATMs a year, or 42% more than today, giving an AAGR of 1.8% for the twenty year period to 2025. It is unlikely to be in operation before around 2018, if it is ever permitted at all, due to the strength of opposition on environmental grounds.

232. This study assumes that the third runway will not be constructed before 2025, but that mixed-mode will be allowed, giving an average capacity growth of some 0.7% a year through to 2025. If the third runway is constructed before 2025, this would be reflected in an average growth rate of 1.8% a year compared with 460,000 slots in 2005.

7.7.2 London-Gatwick

233. Gatwick is currently a single runway airport, with the highest level of use of any single runway IFR [Instrument Flight Rules] airport in the world.

234. The BAA advised that the maximum slot capacity at the moment is some 333,000 slots a year, while the ACL data for 2005/2006 states that some 291,000 slots were made available.

235. Currently, the BAA is not restricted by environmental limits, apart from strict regulations regarding the number of night flights that can be operated.

236. In 2005, the BAA reported 252,227 ATMs plus 9,047 other movements. For 2004, ACI recorded 241,489 ATMs plus 9,640 other movements.

237. U.K. government policy, [as outlined in its White Paper 'The Future of Air Transport' December 2003] has ruled out any second runway being commenced before 2019, and – even if constructed – it is unlikely to be operational before 2024. As such, no allowance for any growth in capacity has been made for Gatwick up to 2025.

238. As pressure on all London's airports increases over the coming years, the level of ATMs operated at Gatwick is likely to increase gradually from some 250,000 towards 265,000 as more of the 'unpopular' slots are filled.

239. Regarding other airports in the London airport system, the expectation is that a second runway will be constructed at London-Stansted before 2020, while London-Luton is also considering an application for a replacement runway which will increase runway slot capacity. London-City is planning to increase its movement rate, but the scope for yet further increases is reducing. These increases in supply may help to accommodate some flights unable to obtain slots at the two major hub airports, but are unlikely to meet all demand. The solution for London is therefore unlikely to be found in additional runways in the next twenty years, and will require some form of optimisation process to improve airport productivity, such as secondary slot trading.

7.7.3 Paris-Orly

240. Paris-Orly has two almost-parallel runways, plus a third shorter runway, and is capable of handling some 300-350,000 movements a year, even though it is closed at night.

241. However, strict environmental limits placed upon it by the French Government restrict Aéroports de Paris to no more than 250,000 ATMs a year. There is no expectation of any relaxation of this policy in the next twenty years.

242. Paris-Orly is believed to have handled close to 250,000 ATMs each year since around 1996. However, for 2004, ACI reported 218,978 ATMs plus 3,747 other movements. Cohors, the coordinator for Paris-Orly, reported 237,978 ATMs for 2005/2006, but has stated that this does exclude a number of Public Service Obligation [PSO] operations. Of the total, the French Government is allowed to allocate 20%, or 50,000 slots, for PSO operations. Currently, some 37,000 slots are so used, and there is a possibility that this might be agreed as the new maximum limit for PSO flights.
243. It has been assumed that the actual usage in 2005 was around 240,000 ATMs, close to the Government-permitted limit, and that the maximum achievable in 2025 will be 250,000.

7.7.4 Paris-Charles de Gaulle

244. In the last few years, Paris-Charles de Gaulle has grown from a two parallel runway airport to a four parallel runway airport, but the full use of all four runways is not yet complete.
245. Currently, the slot coordinator is able to offer some 108 movements per hour – which would give some 668,000 movements across a 17-hour day, and 943,000 for a full 24 hour operation.
246. For 2004, ACI reported 516,425 ATMs plus 9,235 other movements, suggesting that only around 70-75% of slots are currently used. Cohors reported 526,520 ATMs in 2005/2006.
247. However, there are strict controls on night movements, with the result that there are currently less slots available for night cargo flights than there are requests for slots.
248. Within the next year or so, the runway limit will rise to 120 movements an hour, or 742,000 ‘day’ movements, and 1,050,000 total movements.
249. There are no plans for a further increase of runway capacity at Paris-Charles de Gaulle. Elsewhere in the Paris airports system, Paris-Le Bourget is retained solely as a GA facility, because of its airspace interaction with Paris-Charles de Gaulle, and the earlier plan to build a third airport at Chaulnes has been dropped. There is unlikely to be any agreement for a third airport within the next five years, although it is quite possible that another major facility will be open by around 2020. There is some scope for a small number of flights to be accommodated at the more distant Beauvais and Vatry Airports, but their use will be limited unless there are significant improvements in surface access.

7.7.5 Amsterdam

250. Amsterdam currently has five operational runways. Theoretically, with an ability to offer 100 ATMs an hour today, it could offer 620,000 slots a year during the 17-hour day, plus additional slots at night. This could grow to 675,000 day-time ATMs as hourly capacity increases by 2025 to 109.
251. However, Amsterdam has to comply with extremely complex environmental legislation which currently restricts operations to some 450,000 ATMs a year.

252. There is no expectation of any further increases in capacity or of any relaxation of the environmental limits, but, as older and noisier aircraft are slowly phased out, there is an expectation by the airport authorities that – by 2025 – the airport may be able to handle some 600,000 ATMs a year under the existing environmental restrictions.

253. In 2005, Amsterdam reported that it handled some 420,700 ATMs plus 16,000 other flights. For 2004, ACI reported 402,738 ATMs and 15,875 other flights. In both years the maximum target was not achieved, although the level of surplus capacity is not considerable.

254. There are no secondary airports serving Amsterdam which could take unplaced demand for ATMs, although there is a long-term ambition for an upgrade of Lelystad airfield to the north east of the city.

7.7.6 Düsseldorf

255. Düsseldorf Airport has two runways capable of handling 45 ATMs an hour, or 278,000 movements during the 17-hour operating day.

256. Although the airport is currently permitted to handle 261,340 ATMs a year, it is restricted to 131,000 in the six summer months, suggesting an achievable annual total of only some 250,000 ATMs. This results in the two-runway airport being able to handle only as many ATMs as the single runway at London-Gatwick.

257. In 2005, the airport reported handling 186,000 ATMs plus 14,700 other movements. For 2004, ACI reported 186,568 plus 14,016. There is thus some scope for additional ATMs today.

258. There are no plans for further runway developments before 2025, but the airport authorities are confident that by that time they will be allowed to use the airport up to its full technical capability of 57 slots an hour, or 353,000 slots for daylight hours.

259. Should Düsseldorf Airport not be able to meet all demand, there are additional airports available at Niederrhein (85 km NW of Düsseldorf), Dortmund (75 km to the NE) and the short runway at Mönchengladbach (30 km to the W), all with substantial spare capacity.

7.7.7 Frankfurt

260. Currently the airport operates two parallel but not fully independent runways, and offers 80 movements an hour. The total ATMs during a 17 hour day are thus some 495,000, rising to around 540,000 to allow for restricted numbers of night movements between 2300 and 0100 and between 0400 and 0600.

261. For 2004, ACI reported 469,187 ATMs plus 8,288 other movements, or very close to the achievable maximum once ‘unsaleable’ slots are taken into account.

262. The third parallel runway currently planned will enable an increase of 50% in ATMs, or 743,000 during the day and around 810,000 a year overall if restricted numbers of night flights are allowed to remain.

263. Overflow capacity is available at Frankfurt-Hahn airport, 110 kms to the West. However, if capacity does become a major problem, the alternative Lufthansa hub of Munich is likely to take a greater share of the surplus demand than Frankfurt-Hahn.

7.7.8 Milan-Linate

264. Milan-Linate has a single short runway of 2,440 metres, suitable only for short and medium haul flights. However, it is much closer to the city centre and other major demand areas than either Milan-Malpensa or Milan-Bergamo, with the result that short-haul airlines have always preferred to operate from there, even without the possibility of longhaul interline traffic.

265. The airport is now able to offer only 18 slots an hour for ATMs, which amounts to 111,000 slots for a 17 hour day across the year, but is further restricted on environmental grounds from handling more than 105,000 ATMs a year. Before this restriction came into force, Milan-Linate had been able to offer 32 ATM slots an hour, to give a capacity of some 198,000 a year. In 1998 it handled 122,000 commercial movements and a further 34,000 other movements.

266. ACI data for 2004 showed 94,525 ATMs plus 27,238 other movements, predominantly business and general aviation. The Italian coordinator, Assoclearance, advises that the airport handled 99,839 ATMs in 2005/2006.

267. No additional capacity is likely to become available at Linate before 2025 – all the capacity growth is expected at Milan-Malpensa, which currently has sufficient capacity to cope with the city's requirements, and lies 50 kms to the NW. In addition, there is further capacity available at Milan-Bergamo, which is 50 kms to the East.

7.7.9 Other European Airports

268. In association with ECAC, Eurocontrol published its 2004 Report on Challenges to Growth, which analysed the probable situation in 2025 at the top 133 airports in the wider Europe that each handled a minimum of 20,000 instrument flight rules [IFR] operations and which account for some 90% of IFR flights at all ECAC [European Civil Aviation Conference] airports. Although the 133 airports are listed, the report gives no figures for any individual airport. The survey is based on replies from 69 of the 133 airports, complemented by data obtained from non-responding airports on earlier occasions.

269. Eurocontrol has four growth scenarios for the period 2003 to 2025, with average annual growth rates of IFR movements (which will be very close to the figures for all ATMs) of 4.3%, 3.6%, 3.2% and 2.5%.

270. Were the highest growth rate scenario to occur, Eurocontrol calculate that some 17 airports would experience demand of more than 500,000 ATMs a year by 2025, a figure achieved by only one airport today, and four would have demand for more than a million flights a year.

271. However, from their survey, 75% of the top 133 airports see no possibility for building runways in the next twenty years. As a result, under the fastest growth scenario, and with all new investments taken into account, more than 60 airports are forecast (by Eurocontrol) to be unable to handle the typical busy hour demand without generating delays and turning away demand, and the top 20 would be saturated for at least eight to ten hours each day.

272. The study concludes that – with the most fast growing scenario – there could be a market for up to ten new major reliever airports (handling between 70 and 140 movements an hour), and a further fifteen medium-sized airports handling 35-70 movements an hour.
273. Eurocontrol has not produced similar forecasts for each of the three lower growth forecasts. Instead it recommends solutions be found for the worst-case scenario, on the assumption that the forecasts would remain the same for all four scenarios, but that it would take longer before each scenario reached exactly the same position.
274. This study has considered that Scenario 3, with an average growth rate of movements of 3.2% a year, is the most likely, and – based on the Eurocontrol study - calculates that, by 2025, some twelve to fourteen European airports are likely to be saturated for eight to ten hours a day. All of these are expected to be in member states of the Community, and to include each of the eight airports studied above, and examined in further detail in Chapter 9.
275. This study is requested to indicate at which Community airports secondary slot trading would be most likely to take place given the excess of demand compared to supply for slots either throughout the day or at certain peak times only.
276. Table 7.32 (taken from Eurocontrol/STATFOR/Doc 86 of July 15th 2004) indicates [for the second quarter of 2004] the top twenty-five European airports in terms of IFR movements per day. All of the airports except Zürich, Oslo and Istanbul were in the fifteen EU member states as at 2004 – none are in the ten recent accession countries or current candidate member states.

Table 7.32: Daily IFR Movements at the 25 Largest European Airports, April-June 2004

Airport	IFR Movements Q2/04	Airport	IFR Movements Q2/04
Paris-Charles de Gaulle	1,459	Vienna	678
Frankfurt	1,352	Paris-Orly	635
London-Heathrow	1,315	Manchester	620
Amsterdam	1,166	Milan-Malpensa	596
Madrid	1,103	Düsseldorf	561
Munich	1,059	Palma	549
Rome-Fiumicino	852	<i>Oslo</i>	<i>546</i>
Barcelona	817	London-Stansted	534
Copenhagen	762	Athens	519
London-Gatwick	713	Dublin	501
<i>Zürich</i>	<i>707</i>	Helsinki	476
Stockholm-Arlanda	702	<i>Istanbul</i>	<i>468</i>
Brussels	695	All 2,000 airports	44,923

277. These 25 airports handled some 19,385 IFR movements per day in the second quarter of 2004, or 43% of the European total.

278. It is expected that the great majority of all potential secondary slot trades in the Community will be in the 22 EC airports listed above, although there are certain to be some airports in that list that will still have sufficient capacity to meet demand in 2025 without the need for significant levels of slot trading – notably Madrid, Munich, Barcelona, Stockholm-Arlanda, Brussels, Athens and Dublin – provided that any expected capacity increases are built. There may also be some trading at airports currently outside the top 25 that also have very restricted capacity, such as Milan-Linate.

7.7.10 Summary

279. In general, planned increases in slot supply between now and 2025 will fall significantly short of the expected increases in demand, although the situation will improve at a small number of airports.

280. The situation at the eight airports studied in detail in Chapter 9 is expected to worsen over time as forecast increases in demand averaging 3.1% a year far exceed any guaranteed increases in capacity. The demand for each slot is therefore forecast to increase and put any poor user of current slots under severe pressure to either use the slot more efficiently or enable some other air carrier to take over the slot.

8 Industry Expectations of the Impact of Secondary Trading

8.1 Introduction

1. The study team has collected a broad range of views on the likely effects and consequences of secondary slot trading, and any implications.
2. Face to face discussions have been held with representatives of a broad range of the following stakeholders:
 - Airport Operators, and their Association
 - Airport Slot Coordinators, and their Association
 - Airlines, and various Airline Associations
 - Governments and Politicians
3. The aviation impact of secondary slot trading was not discussed with other stakeholders such as the ultimate consumer, resident communities close to airports, and environmental groups.
4. These discussions have been augmented by detailed questionnaires and an analysis of studies and position papers.
5. The views of these organisations on the detailed application of secondary slot trading are examined in Chapter 11, and their views on primary slot allocation matters are covered in Chapter 12.
6. The study has benefited from discussions or evidence from the following organisations.

8.1.1 Views of Airport Operators

7. Two lengthy meetings were held in Brussels with the slots sub-committee of Airports Council International for Europe [ACI-Europe] at which a wide range of subjects was comprehensively covered. Eleven major airport operators were represented at the second meeting, and a wide range of views and opinions was expressed.
8. Lengthy face-to face interviews were also held with representatives of three of the four main hub airport operators:
 - Aéroports de Paris, regarding Paris-Orly, Paris-Charles de Gaulle and Paris-Le Bourget
 - British Airports Authority, regarding London-Heathrow and London-Gatwick
 - Schiphol Airport, regarding Amsterdam
9. A full-length meeting with Frankfurt Airport was not scheduled, and was replaced by a written response to a detailed questionnaire, and a short discussion.

10. A broader range of airports provided valuable historic and forecast data which has been analysed in Chapter 7.

8.1.2 Views of Airport Slot Coordinators

11. The study team attended two discussion sessions with EUACA in Dublin and London. The Dublin meeting was the occasion of their annual conference, where, over a lengthy session especially arranged to accommodate the study team, some 18 coordinators took the opportunity to present their own views of the impact of secondary slot trading. At a further meeting in London, a smaller group of seven coordinators with a special interest in secondary slot trading met with the study team. At these meetings, the views of Cohor, the coordinator for Paris-Orly and Paris-Le Bourget were obtained.

12. In parallel with these meetings, separate lengthy meetings were held with each of the following coordinators:

- ACL in London, regarding London-Heathrow and London-Gatwick
- AENA in Madrid, regarding Madrid, Barcelona, Palma and Alicante airports
- Assoclearance in Rome, regarding the various airports serving Rome and Milan
- In Zürich, for Zürich and Geneva Airports
- Vienna Airport
- Amsterdam Airport
- Brussels Airport
- In Stockholm, for both Stockholm-Arlanda and Stockholm-Bromma Airports

13. In addition, detailed questionnaires were completed by coordinators for the following airports:

- Budapest Airport
- Copenhagen Airport
- Lisbon Airport
- Oslo Airport
- and by FHKD for Düsseldorf, Frankfurt and Munich Airports.

14. These discussions were in addition to the requests for data analysed in the previous section.

8.1.3 Views of Airlines

15. Meetings were held with IATA in Geneva; with the Association of European Airlines [AEA] in Brussels, at which seven individual airlines were represented; with the International Association of Charter Airlines [IACA] also in Brussels; and with the European Regional Airlines Association [ERA] in the UK. A detailed questionnaire was also given to the European Low Fares Airlines Association [ELFAA].
16. Separate meetings were held with major airlines that have been engaged in secondary slot trading, and full length questionnaires were returned by others. Separate discussions were also held with a number of airlines during and after the EUACA seminar on June 28th in Amsterdam. Airlines with which the subject has been discussed were British Airways, Virgin Atlantic, flybe, American, United and Alitalia. In addition, relevant comments were obtained from other airline contributors, including Thomson Airlines and Condor Airlines.

8.1.4 Views of Governments

17. The study team has met with Government officials to obtain broader policy perspectives on secondary slot trading, both in Europe and the USA. These perspectives, together with views expressed by Government representatives at the EUACA seminar, have been used to provide a backcloth against which the more detailed views of the industry and others have been reflected.
18. In addition the team has studied carefully the various responses made by Member States to the ECAC report on 'Outcome of Study on Slot Allocation Procedures' (December 2005) where the topic of secondary slot allocation – although not central – was covered.
19. The FAA report on 'Congestion, Delay Reduction and Operating Limitations at Chicago O'Hare International Airport; Proposed Rule and Notice' [14 CFR Part 93, March 2005] provided an insight into the US Government's views of the impact of secondary trading.

8.1.5 EUACA Seminar

20. In addition to these face-to-face and small group interviews, the study team assisted EUACA to organise a seminar on secondary slot trading in Amsterdam on June 28th 2006, at which a wide range of papers was presented covering the views of all major stakeholders. The seminar was attended by more than 100 representatives of airports, coordinators, airlines, and governments. The study team used the seminar to capture as wide a range of additional industry views as possible in an effective and efficient manner.
21. Apart from the presentations themselves, a full record was taken of all comments from the floor, and discussions held with a variety of interested parties during the breaks between sessions and afterwards.

8.2 Analysis of Views

22. The comments in this section refer specifically to the expected impact of secondary slot trading as currently practised at London's two main hub airports.

23. Stakeholder views on the impact of several possible adjustments to this basic model are recorded in Chapter 11, where each possible increase or decrease in fetters is discussed.
24. Similarly, in Chapter 12, stakeholder views on any possible changes to the method of primary slot allocation are discussed separately.

8.3 The London Experience

25. In Chapter 5.2, details were given of the levels of secondary trading at London-Heathrow during the period 2001 and 2006, with evidence from ACL on trading from earlier dates.
26. The evidence would appear to be quite conclusive that airlines operating short-haul routes have tended to sell either to the dominant hub operator – which has a broad range of both short-haul and long haul routes – or to other airlines that operate only long-haul routes.
27. Generally, those airlines that sold slots were either in financial distress, or had decided to take a profit on their London-Heathrow slots and move to London-Gatwick or another London area airport. Between 2001 and 2006, only three airlines that sold slots at London-Heathrow were still operating at that airport in 2006. One was United Airlines, which sold four daily slots in 2002, following the events of September 2001; another was Air France, which traded in slots operated by its franchise carrier FlyBe, but retained its own flights to Paris; and the third was Virgin Atlantic, which has engaged in a large number of transactions, whether purchases, sales or leases.
28. Following slot transfer, the average aircraft size has increased substantially, based on calculations made by ACL, and as confirmed by an analysis of the sales made, and – where analysis has been possible – there has also been a significant increase in average distance flown.
29. In discussion, BA was asked to comment on whether the slots they purchased had been used for short, medium or long-haul flights, but replied that it was extremely difficult to be sure. It was acknowledged that the end result of all the extra slots acquired had been an increase in the long-haul proportion, but that most of these flights would have been operated in any event, but at the expense of BA's own short and medium-haul flights. It was agreed that the net effect of many of the purchases by BA had led to short-haul services being retained rather than sacrificed, in order to hold on to important transfer passengers.
30. As a result of using purchased slots for retaining short and medium-haul routes, BA finds that it is often outbid by other long-haul airlines for available slots.
31. In general terms, BA believes that the experience at London-Heathrow is that secondary trading has led to:
 - a higher utilisation of slots overall;
 - a more efficient use of each slot;
 - more new entrants;
 - and a shift to long-haul.

32. The services considered to be most at risk are the short-haul operations of other airlines; and with high levels of frequency on short-haul business routes being trimmed. BA confirmed that the airlines that have benefited have generally been those operating long-haul routes, including new entrants.
33. The BAA generally agrees with this view, and expects that secondary trading has led to:
 - more emerging markets being served, with a resultant consumer benefit
 - an improved utilisation of slots resulting from the fact that they have had to be purchased and are no longer a free resource
 - higher airport revenues, both aeronautical and commercial
 - higher airline profitability
 - and improved airline yields – with business routes being favoured over leisure routes
34. The coordinator for London's airports – ACL – commented that, originally, only a small group of airlines (led by BA) had the necessary courage to engage in secondary trading. Latterly, more airlines, such as Jet Airways, have come in. ACL believe that such trading will continue to increase at London-Heathrow, and the complexion of the airport's business would change enormously. Recent statistics show that the number of European routes served from London-Heathrow has reduced since 2001, while the number of long-haul destinations has continued to grow. Similarly the average weekly frequency on short-haul routes has declined, while it has increased for long-haul routes.
35. ACL commented that BA cannot always afford to buy the available slots, and has recently been outbid by Qantas, Emirates, and Etihad. They believed that an increasing number of UK regional routes are now vulnerable, as the increasing emphasis on the greatest efficiency in use of scarce airport capacity will tend to increase the trend of long-haul high capacity slot bids successfully buying up short-haul slots. ACL believe that the type of airlines which are likely to engage in secondary trading are those that put the greatest value on the slots and can achieve the highest yields, such as Singapore Airways, Emirates, and Qantas, and those that can maximise the contribution to their route systems.

8.4 The Oslo Experience

36. Although no other EU airport currently engages openly in secondary slot trading, there is some relevant experience to draw on from a non EU member state, namely Norway. The coordinator for Oslo commented on the fact that – when it was heavily congested – there had been significant levels of slot trading at Oslo-Fornebu until it was closed in 1998 and all services were transferred to the more capacious Oslo-Gardermoen airport.
37. The experience at Oslo-Fornebu was that the transactions would be undertaken using the same method as that still practised in London. That is to say, if airline A wanted a slot from airline B, airline A obtained a slot from the slot pool, which was then exchanged with airline B. Airline A obtained the slot it wanted, and airline B returned the slot it acquired back to the pool. The coordinator cannot be sure whether or not money was involved.

38. The current coordinator for Oslo comments that their experience from the old airport showed that large carriers were able to obtain attractive slots from smaller regional carriers. Secondary trading was seen to benefit those larger carriers that had available funds, as smaller domestic and regional carriers, probably with poor finances, transferred their slots to their wealthier and larger competitors.
39. To a certain extent, this could be seen to benefit the smaller carriers if they were able to develop point to point flights at other airports with the money received. In the short run the transfer would lead to better cash reserves, but the loss of the slots could in the longer term lead to fewer passengers, and longer term financial losses. However, the alternative may have been immediate closure of the airline. (This would appear to demonstrate that secondary trading 'under duress' has allowed airlines to maintain operations. It therefore can be argued that secondary trading opens up the economic options available to carriers).
40. Charter carriers were seen to be more flexible due to the leisure character of their flights, and they were more willing to fly from a different airport. During the peak holiday season, it is very important for charter carriers to schedule flights in the peak morning period, due to their need to schedule at least two round trips per day to leisure destinations. This gives them little flexibility, and could result in them accepting slots at a less convenient origin airport, or even destination airport.
41. The net effect was that services to the smaller regional domestic cities and on short international flights were reduced in favour of the larger network carriers, who were able to exploit their accumulated slot portfolios in order to reorientate their regional network service. In the case of Oslo, most of the replacement flights were to other European cities, due to the lack of a substantial long-haul market, but such services would have used larger aircraft to fly longer distances.

8.5 The Views of Industry Stakeholders

(i) Airports

42. For the airport industry, a combined view has been put forward by ACI-Europe on the expected impact of secondary slot trading in Europe. In a report specifically written for this study, they comment as follows:

“ACI-Europe has considered for some time that it may be advantageous to allow air carriers to carry out secondary trading of slots. However, the impact of secondary trading of slots will vary from airport to airport and the benefits may only be forthcoming under certain circumstances.

ACI-Europe recognises from the practical experience of London-Heathrow Airport, for example, that secondary trading has led to a more efficient use of slots at this highly congested airport by allowing air carriers to adapt their service to meet the changing needs of the aviation market through a mechanism which reflects the market value of those services. The pressure of demand for slots has led to the development of a practice of exchanging valuable slots for slots at less valuable times together with a significant monetary compensation. At Heathrow, as the number of pool slots declines over time, there is evidence to suggest that the purchase of slots by one carrier from another carrier will become more important as a mechanism for obtaining slots and will avoid the need for an artificial slot exchange.

The key reasons that air carriers seek to acquire desired slots in this way seem to be to obtain a series of lined-up daily slots; to secure the use of slot pairs throughout the summer and winter seasons; and to offer long haul services which are typically more profitable than most other services.

The key reason that air carriers sell slots is that they are faced with the financial value of selling, and this exceeds the financial value to the airline of continuing to operate that slot. Other reasons include the need to obtain cash when facing financial difficulties.

In general, slots exchanged in this way have resulted in the substitution of short-haul services operated by small aircraft with long-haul large aircraft services at peak times, and led to a significant improvement in the efficiency with which scarce runway capacity is used. It has also resulted in stimulating competition by allowing air carriers to compete as new entrants on certain routes by using the secondary market to rearrange their slots portfolio”.

43. ACI-Europe appears to recognise that slot trading can provide a market solution for airlines in financial distress. It also believes that allowing secondary trading will mean that trading in junk slots would simply wither away.
44. Other comments made by individual major airport operators are as follows:
45. The BAA believed that, if the European Commission were to allow open secondary slot trading, with clearer rules, it would lead to an enhanced knowledge of the practice amongst airlines, and more trades in the UK.
46. Evidence provided by ACL at London-Heathrow suggested to BAA that such trading leads to ‘better’ use of the slots, with bigger aircraft, more passengers per aircraft, and longer routes.
47. BAA’s expectations for the impacts of secondary trading were listed in paragraph 8.3 above on the London experience.
48. Frankfurt Airport is of the view that allowing secondary slot trading would lead to less babysitting of valuable slots by small aircraft if such slots could be leased out rather than sold outright.
49. The airport was not concerned that there might be a loss of feeder routes from other German airports, because Lufthansa and other airlines recognised the valuable interline connections they provided – Frankfurt is more of a network hub airport than London-Heathrow, which is more of an Origin and Destination airport.

50. Without secondary slot trading, Frankfurt Airport did not see how vital new carriers such as Etihad, Qatar, Jet Airways and others could enter the market, providing new routes to expanding markets and incidentally providing new competition to the incumbents. Trading was necessary to prevent sclerosis of the airport network, and to help it adapt to changing market conditions.
51. Amsterdam Airport was not confident that it could forecast the impact of secondary slot trading at its own location. It is aware that the current lack of night slots constrains the development of additional freighter services, and to some extent also long-haul passenger services arriving early in the morning; while the lack of slots in the morning peak prevents non-Netherlands based short-haul carriers from introducing morning and evening peak flights for business travellers. However, it was not able to forecast if these airlines could afford to purchase the extra slots necessary.
52. Aéroports de Paris believed that permission to engage in secondary slot trading at Paris would encourage airlines such as Emirates, Etihad and Qatar to pay substantial sums for slots that could not be afforded by most European airlines, including Air France. The view was also held that low cost carriers would be most unlikely to purchase slots.

(ii) Airport Coordinators

53. In its own presentation at the EUACA seminar, the Chairman of EUACA stated that:

“Today it does not always seem to be clear where the industry would go once secondary trading is officially existent. It is widely up to the airlines to decide how they would use their slot portfolio. Network carriers in particular would have to decide on their feeder services. We expect however that the usage of slots will improve”.

54. The views of London’s coordinator, ACL, are seen above in the section on the London Experience, and also in Chapter 5.2. The views of the Oslo coordinator are also seen above in the section on the Oslo Experience.
55. The following are the views of those airport coordinators that have yet to experience any secondary slot trading.
56. The coordinator for Amsterdam expected that the main network carriers, predominantly KLM, would be expected to bid for more morning peak slots.
57. The coordinator for Brussels suspected that many of the buyers would be intercontinental carriers seeking arrivals or departures around 08:00 hours. Although hub carriers would normally be expected to be among the buyers, the view was that SN Brussels would not be interested in purchasing slots, except perhaps for additional point to point business routes to Europe in the peak hours. It is possible that carriers such as Lufthansa might be interested in purchasing peak slots for routes to its own hub airports in order to provide valuable feed for onward long-haul flights.
58. The coordinator for Budapest considered there was a clear danger that richer airlines would dominate the market, which could result in competition problems.

59. The coordinator for Frankfurt could not be sure whether – after legalisation – there would be a short burst of trading followed by much lower levels, or whether the number of trades would initially be small. It was probable that the large, healthy carriers would aim at rounding up their slot portfolio, while other bids would concentrate on the real prime times. It was unclear whether, for example, leisure or cargo operators would be a prime actor, as they normally have more scheduling flexibility and also generally are less well-funded. There was some concern that the introduction of trading might have a negative impact on the willingness of carriers to push for the extra capacity increases indeed.
60. The coordinator for Lisbon considered that the impact of secondary trading would be minimal. It was felt that the Portuguese carriers would not use this mechanism to get more slots, nor would they lease or sell slots to foreign competitors. Secondary trading would not increase competition, but it would concentrate slots in the larger airlines.
61. The coordinator for Madrid believed that the home network carrier, Iberia, would almost certainly be a net buyer of slots, while financially weaker airlines – many of whom were new entrants and smaller carriers - would be sellers. It was felt that low cost carriers would not be active acquirers of slots.
62. The coordinator for Milan and the other Italian airports believed that it was very hard to foresee the impact of secondary slot trading. Nonetheless, they expected major carriers to strengthen their competitive position through the acquisition of peak time slots at their own hubs. Apart from the major European airlines, it was expected that North American, Taiwanese, and Middle Eastern carriers would be net purchasers in order to reinforce their competitive position. In short, smaller airlines would sell while larger carriers would buy.
63. The coordinator for Stockholm believed that buyers would be few because of the current level of surplus capacity, however it was presumed that financially weaker carriers were likely to want to sell. There was a clear risk that financially strong carriers would end up squeezing out weaker competitors.
64. The coordinator for Vienna suspected that airlines with large slot holdings (such as Austrian) would be the sellers and new entrants would be the buyers.
65. Finally, the coordinator for Zürich and Geneva believed that the better financed European network carriers would be expected to purchase slots at Zürich in the peak hours. Owing to its recent financial problems, Swiss could be expected to be a net seller of slots, particularly since it holds a large number of such slots at both Zürich and Geneva.

(iii) Airlines

66. The views of BA, a major player in the secondary slot trading markets in London, were summarised in the earlier sub-section headed the London Experience.
67. At the meeting with IATA, the organisation commented simply that the routes most at risk were those with the lowest average yield and regional routes generally, with long-haul routes benefiting. The types of airlines buying and selling could not be confirmed in advance.

68. Similarly, the meeting with AEA and a group of seven airline managers did not give detailed expectations. However, it was generally agreed that those thin regional routes that did not have PSO protection were at most risk, as well as some leisure flights and perhaps some thin peripheral routes to Eastern Europe. It was commented upon that the share of slots of AEA members – the major European airlines – was expected to continue to shrink as new entrants, some European but mainly long-haul, entered the market. This suggests a view among some of the members that secondary trading could be a threat and potentially damaging to their commercial interests.
69. At a meeting with the IACA secretariat, the view was expressed that charter operators could be both sellers and buyers, with the smaller companies selling slots and some of the bigger carriers, such as TUI, finding it preferable to pay for some peak slots in order to maintain large flight operations from major congested airports. Although the numbers of slot trades at London-Gatwick have been much smaller than at London-Heathrow, two slots were transferred between two independent charter airlines, and a major charter company purchased 21 slots in Summer 2004 from BA.
70. Finally, the secretariat of ERA, the European Regional Airlines Association, believed that the routes most at risk were the scheduled services between hub airports and regions, especially those designed to meet business demand, both for point to point and for onward connections. On commercial grounds, very thin routes would probably be discontinued.
71. It was believed that, with regard to existing regional services between major congested hub airports and the regions, it will be material for owners of those businesses to capitalise on the assets and sell the slots. It is highly unlikely that the purchaser of the slots would be a regional airline - privately owned medium-haul and long-haul airlines will be the biggest beneficiaries.

(iv) Governments and Politicians

72. The views of those officials with which the subject was discussed had fewer insights into exactly what the impact was likely to be, and were concerned more about the ability of the mechanism to promote greater competition. Key responses include the following.
73. The UK Department for Transport believed that the mechanism would lead to greater numbers of slots being held by new entrants, but did not specify which kind of routes they expected to see developed, and which sacrificed.
74. In his address to the EUACA seminar, the MEP Ulrich Stockmann forecast that the introduction of slot trading would reward established airlines which have built up slot holdings over time. Their market valuation would appreciate through such windfall gains. (Comment: The counter argument is that established carriers would argue that they had invested in these routes over time, hence slot values recognised this aggregated investment). Mr Stockman believes this effectively discriminates against new entrants, who are obliged to pay for slots at congested airports. Accordingly, established incumbents would benefit financially, and their hold over airline markets would be reinforced.

8.6 Summary

75. Although there is not a complete unanimity of view among the various stakeholders with which this subject has been discussed, there was widespread agreement on the following key points:

- a) Slots will tend to be sold or leased by airlines in a weaker commercial position and purchased by airlines with stronger finances, most notably network carriers based at the airport hub in question and those based in the rapidly expanding Asian economies.
- b) Slots used for short-haul routes would be culled, especially those characterised by less-than-average numbers of transfer passengers. Typically, these would be routes serving peripheral regions or Member States and operated with smaller than average aircraft.
- c) Routes benefiting from more slots would tend to be long-haul. This would enhance competition on existing routes, as well as providing the opportunity to launch some new routes. Network carriers with large slot portfolios may also purchase slots in order to retain important short-haul feeder routes, while also extending their long-haul network.
- d) Secondary slot trading would appear to have encouraged the operation of new competitive service from London-Heathrow to Asia, and allowed rapid expansion of service to growing markets. This effect would be expected at other airports if secondary slot trading were permitted. Airports denied this ability appear to have attracted far fewer services by new entrants on these routes.
- e) Charter and leisure flights are generally expected to lose some of their slots at major congested airports, although it should be emphasised that experience to date at London-Gatwick has proved the reverse of this consensus view.
- f) Allowing secondary slot trading could lead to less babysitting of valuable slots by small aircraft of the incumbent slot-holder, by making them available on lease to a wide variety of other airlines. This would lead to a more productive use of slots until such time as the original airline re-establishes service.
- g) Airlines that sell slots are quite likely to exit the airport completely and establish operations at substitute secondary airports with lower, or indeed zero slot acquisition costs. They would then face the challenge of building up demand for their services, without the potential advantage of attracting as much interlining traffic.

9 Statistical Assessment of Impact of Secondary Slot Trading

9.1 Basic Premise Regarding Secondary Slot Trading Regulations

1. In order to provide a workable basis from which to evaluate and calculate the likely effects of the introduction of secondary slot trading, this Chapter 9 – which is designed to provide substantiated data – has been based on the assumption that secondary slot trading is applied across the EU without specific conditions. Since, apart from the requirement for there to be an “artificial” exchange of slots (see Section 4.7), this is how slot trading is practised in the UK, this approach enables the valuable experience learnt from slot trading at London airports to be measured and applied where appropriate across Europe.
2. This premise is equivalent to amending Article 8a 1 (c) of the EC Slot Regulation to state that slots may be “freely exchanged or transferred between air carriers, whether or not for valuable consideration”. This wording would therefore not allow slots to be held by persons other than air carriers, nor would it require pre-trade or post-trade transparency. (The effects of these possible modifications, and some others, are explored later, in Chapter 11.)
3. Applying what is, in effect, the current ACL practice enables a statistical assessment to be made on firm ground – the experience of ACL over the past five years, and the actions of airlines in the light of the practice.
4. The statistical forecasts developed in this section are then developed into broader economic forecasts in Chapter 10 to determine the overall economic impact throughout the EU of introducing secondary slot trading on this basis.
5. To the extent that the introduction of secondary slot trading might impact on primary slot allocation, this is analysed in Chapter 12. The study team has also been requested by the Commission to consider three possible changes to primary slot allocation (changing the 80/20 use-it-or-lose-it ratio, adopting an auction mechanism, and withdrawing slots). These proposals, and their impacts on the predictions contained in this Chapter 9, are examined in some depth in Chapter 12.

9.2 General Methodology

6. In the first half of this Section, from 9.3 to 9.14, the general methodology is explained and the various parameters that need to be forecast are examined, along with the data sources used and the general approach to forecasting.
7. Following this, in Section 9.15, eight airport cases are studied in detail, each of the airports already being heavily congested or expected to be heavily congested by 2025.
8. Two forecasts are then developed for each of these airports for the year 2025. The first forecast seeks to determine the mix of traffic expected at each airport on the assumption that secondary slot trading is *not* introduced, while the second seeks to determine the mix if such trading is allowed. The difference between the two forecasts is the impact that secondary slot trading is forecast to have, on passengers, on available seat kilometres, and on the airline mix.

9. Section 9.16 takes the results for the eight selected airports and estimates an overall figure for all EU airports in 2025, based on forecasts of the number of airports expected to be partially or heavily congested at that time.
10. Summarised, the forecasting methodology is as follows:
 - a) Eight of the most congested airports in Europe are identified (London-Heathrow, London-Gatwick, Paris-Orly, Paris-Charles de Gaulle, Amsterdam, Düsseldorf, Frankfurt and Milan-Linate)
 - b) Basic operational data (flights, passengers, average distance flown, revenue and costs) for each airport in 2005 is analysed by 13 types of flight, giving a range of parameters
 - c) The data for London-Heathrow and London-Gatwick is reduced to what would have been expected if the known secondary trades had not taken place, so as to achieve a common base level of no secondary trading at any of the eight airports
 - d) Average forecast growth rates are then applied to these 2005 amended base figures for each airport to determine demand in 2025 on the assumption of no secondary trading. These forecasts take into account trends over the period 1975 to 2005 in terms of average flight distances, average passengers per flight and long-term trends in both category of flights and destination groups served
 - e) The number of flights is capped by expected capacity limits in 2025 for each airport
 - f) Forecasts are then made of the differences to be expected if secondary trading is allowed at each airport, relying heavily on trends observed at the two London area airports between 2000 and 2005. A range of parameters is derived, meeting the requirements of the economic impact study which follows in Chapter 10
 - g) The forecasts are then grossed up to represent the sum of all congested airports in 2025, based on the Eurocontrol study 'Challenges to Growth' of 2004
 - h) The impact of Secondary Trading is measured by the difference between the base case figures for 2025 and the forecast figures assuming secondary trading.

9.3 Impact on the Total Number of Slots Used

11. The data available from secondary trading at London-Heathrow and London-Gatwick, as provided by ACL, does not conclusively prove whether secondary trading has led to a higher proportion of total available slots or of total allocated slots being used.
12. As secondary trading affects only slots previously allocated, it would not appear to affect the number of 'primary' slots allocated from the pool. Such slots are only allocated if incumbent or new entrant airlines are able to discern route opportunities for the few scattered slots remaining in the pool at the most congested airports, irrespective of whether secondary trading is introduced. However, if secondary trading is introduced throughout the EU, there might be some marginal increase in the take-up of such pool slots. Airlines might calculate that such slots may, if operated so as to qualify for historical precedence, become valuable in the secondary trading market downstream.

13. Discussions with airlines suggest that airlines that are about to cease operations at an airport, either willingly or through bankruptcy, will almost certainly arrange for their slots to be traded to other airlines for cash rather than surrender them back to the pool for no payment. As the acquiring airlines will wish to ensure that the usage of such slots reflects the cost of their acquisition, it can be expected that such slots will be subject to higher utilisation than if they had been re-allocated (at no cost to the applicant) from the pool. As only one historical example, Air Lib when facing bankruptcy in 2003 would have been able to sell some or all of its 40,000 slots at Paris-Orly.
14. The historical evidence provided by coordinators, supported by the comments of a wide variety of airlines and airports, is that pool slots allocated to new entrant airlines are less likely to be fully utilised, either because of difficulties for some potential new entrants in obtaining licences or traffic rights or attracting the investment required to start up, or because poor results in the early stages of operation have prevented them achieving the 80% usage required to attract historical precedence.

9.4 Impact on Airline Competition

15. Under one, strict, interpretation of Paragraph 8a 1 (c) of the EC Slot Regulation 793/2004, airlines can only exchange slots with other airlines, not increase or decrease their slot holding. In that sense, the level of competition is fixed once the primary allocation has been made. However, under another, more liberal, interpretation in the UK, airlines have been able to increase or decrease their share of slots at London-Heathrow and London-Gatwick through secondary trading. Analysis has been made of the known trades at these airports to determine how far competition has been increased or reduced.
16. In this study scheduled airlines have been divided into four main types:
 - dominant incumbent at each airport, defined as the carrier based at the airport holding the greatest number of slots;
 - other incumbents at each airport;
 - low-cost carriers;
 - and other new entrants (other than low cost carriers) since 2000
17. Their operations have been divided into:
 - long-haul services (i.e. beyond Europe as defined by IATA);
 - domestic and European services with aircraft of more than 100 seats
 - domestic and European services with aircraft of less than 100 seats
18. Compared with scheduled flights, the numbers of charter flights and all-cargo flights are small, and these are shown separately, but are not further sub-divided.

19. For each of the eight airports where secondary trading might be expected if it were introduced, estimates have been made of the likely outcome in terms of airlines trading in slots, based on experience to date in London and on discussions with a range of airlines.
20. Based on historical data provided by ACL for Heathrow and Gatwick, and on the views of a wide range of stakeholders, Mott MacDonald considers that secondary slot trading at airports throughout Europe would have the following effects:

- Existing hub operators at congested airports are likely to be strong purchasers of slots, as they obtain strong network benefits from an additional destination or frequency, compared with an identical operation by an airline not based at that airport. There is just one, dominant, incumbent airline at six of the eight airports studied. There is a second major hub-carrier (bmi) at London-Heathrow while at Milan-Linate Alitalia, its largest airline, operates only one third of all flights.

These dominant hub carriers are expected to increase their number of long-haul flights by buying slots from airlines which have been using them for short-haul flights, although they may also use some slots they purchase to maintain or strengthen important short-haul feeder routes.

- New entrants are also expected to be strong purchasers, especially intercontinental airlines with strong financial backing and seeking to serve fast-growing routes. At London, Virgin Atlantic purchased a large number of slots in the 1990s to help it become a strong intercontinental airline, a route followed later by Emirates and Jet Airways of India, and likely to be followed by more recent newcomers such as Etihad, Qatar Airways and a number of Chinese airlines. Significantly, short-haul new entrants are not expected to be able to afford to compete with these airlines in purchasing slots.
- Low cost airlines acquired slots at London-Gatwick in 2002, when transatlantic carriers released many slots, but the general expectation of airports and airlines is that it will not be common for them to purchase slots because of their reluctance to incur such cost. In addition, low-cost airlines are penalised more by operating at congested airports than other airlines as their operating strategy relies heavily on guaranteed, rapid turnrounds, which can rarely be achieved at the major congested airports.
- Other incumbent long-haul airlines are expected to be net purchasers of slots.
- Incumbent short-haul airlines are expected to be net sellers of slots. These airlines are predominantly those European airlines based in other Member States that are not allowed (currently) to operate long-haul flights to non-EU destinations from hub airports outside their own Member State.
- Airlines operating small aircraft on European routes – typically by members of the European Regional Airlines Association – are expected to be net sellers, faced with comparing the value of their slots in the market with the profits generated from using them on their own routes. Even the dominant incumbent airlines may find it difficult to justify slot usage by small aircraft on short routes, unless the resulting volumes of high-yield long-haul connecting traffic are substantial.

- Airlines operating charter flights are expected to convert them to scheduled flights where possible, or trade slots used for the more marginal of their operations to other airlines. This is based on the general expectation that scheduled flights, especially long-haul flights, are more profitable owing to competition being limited (by restrictions, in relevant air service agreements, on the number of carriers which may be designated to operate).
 - Long-haul cargo flights are generally more profitable than short-haul passenger scheduled flights, but nevertheless, historical trends show that they have been reducing in number at all major hub airports, and this trend is expected to increase if secondary trading makes it easier for airlines to obtain value from releasing slots. The reason why these flights are likely to decrease rather than increase is believed to be because the 'penalty' of transferring to a more distant secondary airport is far less for cargo services than for passenger services. (An extra hour for surface access for a tonne of cargo – even for perishables – is of far less significance than it would be for a business passenger). The cargo airline would be able to obtain a cash payment for its slots far greater than any inconvenience or loss of traffic that it would suffer from moving to a more distant airport. (The impact is likely to be less at Amsterdam and Frankfurt, where the key stakeholders – the cargo airlines, the airports and the governments – are keen to see the airports retain their strong cargo operations). In terms of the surface access environmental impacts of transferring either cargo or passenger flights to secondary airports, the comparison is not clear. Forty tonnes of cargo could possibly be transported to the city centre by just three large trucks, but 250 passengers might require one or two coaches and perhaps 100 cars and taxis.
 - The situation is different for short-haul scheduled cargo flights which are generally operated on behalf of the cargo integrators (predominantly DHL, FedEx, TNT and UPS) and postal authorities. Almost all of these operate at night, and face little competition for or shortage of the slots that they prefer, providing overall environmental limitations are not breached. These operators are unlikely to be either buyers or sellers of slots.
21. The situation regarding PSOs [Public Service Obligation routes] is expected to remain unchanged. The current rules allow Member States – if they so wish – to protect routes from 'regional airports' to major hubs by ensuring that slots are protected for such services. Some countries such as France and Italy use this ability to protect a large number of routes which could otherwise have difficulty in accessing their national network hubs. Other countries such as the United Kingdom prefer to let the market decide slot usage and have yet to authorise any PSOs to a London area airport. The current proposals to amend the PSO regulations clear up several areas needing more clarity but are not expected to lead to significant changes. Mott MacDonald assumes that many PSOs will remain in place from 2005 to 2025, but that pressure on slots, particularly at Paris-Orly and Milan-Linate, may result in a small proportion being lost over the forecast period.
22. The current EU proposals to amend the Third Package seek to limit the use of PSOs to routes within Member States, and do not encourage the use of PSOs to protect routes from smaller Member States to the major European hubs. No new intra-state PSO routes have been assumed by 2025.

23. One of the likely effects is an increase in the market share of existing dominant incumbent airlines, particularly if they have developed a strong interlining hub. Although this can possibly be viewed as a deterioration in competition at any one airport, a broader view can be taken whereby – for example – a strengthened oneworld Alliance (BA and partner airlines) at London-Heathrow will be competing with a strengthened Star Alliance (Lufthansa and partners) at Frankfurt, and a strengthened Skyteam Alliance at Paris-Charles de Gaulle and Amsterdam (Air France, KLM and partners). As a result, decreased levels of competition at each individual airport may be accompanied (even compensated) by increased levels of competition between alliances at different airports.

9.5 Impact on Geographical Destination of Flights

24. It is possible to measure the impact of secondary trading on the geographical destination of the flights.
25. The ACL data for London-Heathrow shows that airlines operating short-haul services tend to trade slots to airlines operating, or capable of operating, long-haul services. Excluding trades between partners in an alliance, of 499 weekly slots traded between airlines in the period April 2001 to March 2006 (and still held by the airline that acquired them), 93% of all trades were from airlines that only operated short-haul services from Heathrow, with the remaining 7% from airlines that only operated long-haul flights.
26. All 100% of these slots were acquired by airlines that either operate only long-haul services from Heathrow (27%) or by BA (73%) which could be expected to use many of the newly-acquired slots for long-haul services. However, when airlines with existing large slot portfolios acquire additional slots, it is not always possible to determine the net effect on their operations. When asked, British Airways was not able to say what additional flights were operated as a result of slots being acquired over this five year period. As an example cited by British Airways, a specific pair of acquired slots might be used for an existing short-haul operation, which was moved from its existing slots in order to allow a new long-haul service to be operated at optimal timings. Alternatively, those acquired slots might enable the airline to maintain a high frequency on a key short-haul feeder route, which would otherwise have been sacrificed in order to allow a new long-haul service to be operated. Occasionally, a large slot acquisition might lead to a whole revamp and cascading of operations at an airport by a major airline, and it would be difficult to determine what had been the net effect of such a slot acquisition.
27. However, analysis of other trades involving airlines with a simple route structure – for example, at London-Heathrow, trades from Air France to Emirates – does enable specific geographical impacts to be determined.
28. Analysis of the smaller number of short-term slot leases between airlines (excluding transactions between alliance partners) shows a similar but less marked pattern. 37% of the 90 leases were from short-haul airlines, but only 21% of the leases were to short-haul airlines. The majority of the leases were between two long-haul airlines.
29. Sales and leases by airlines within the two main alliances (oneworld and Star), and recorded by ACL, are more complicated, and show some unexpected evidence of long-haul partners transferring slots to short-haul partners; however there is little doubt that such leases will be reversed when the greater needs of the alliance require it.

9.6 Impact on Average Flight Distance in Kilometres

30. Detailed analysis in Chapter 7 has shown that, as airports become more congested, average flight distances tend to increase, even if secondary trading is not permitted. This is no doubt the result of those airlines with a range of scheduled opportunities (predominantly the airlines based at the airport) substituting some of their short-haul services with more profitable long-haul services.
31. Analysis of the trades at Heathrow confirms that, where airlines not based there have acquired extra slots, the increase in average kilometres per flight has normally been dramatic. But for dominant airlines with a large portfolio of slots such analysis is fraught with uncertainty.
32. As an example, it could be assumed that a dominant incumbent airline purchases slots from an airline that was operating it on a 700 km sector; and that the net effect is that the dominant airline introduces a new wide-body service to the Far East, or say 6,000 kms. However, the purchasing airline would quite possibly have introduced that service in any case, perhaps substituting it for one of its own domestic services of some 500 kms. As a result, the true impact of acquiring a slot may be of replacing a 700 km service with one of 500 kms – the benefit to the dominant carrier being the network and interline benefits of its domestic operation compared to a ‘spoke’ operation for the carrier trading in the slot.
33. In general terms, it can be assumed that trades will lead to an increase in average flight distances, but, as the example above demonstrates, this may not be the result of every trade.

9.7 Impact on Average Aircraft Size

34. Similar considerations also relate to the impact upon average aircraft size, and therefore average passenger numbers per flight. Average aircraft size has been increasing at all airports, not just those currently allowing secondary trading.
35. The ACL data does not give the actual number of seats for the airlines that have transferred or acquired slots. Certain conclusions can be drawn by looking at the range of aircraft sizes operated by each airline, but this can be very broad for dominant airlines with a large slot portfolio. As with the example analysed in 9.6 above, the net movement for a dominant airline might be the retention of a small or medium-sized aircraft operation, on the assumption that it would have had to give way for a wide-bodied aircraft of the same carrier, but was able to benefit from the acquisition of slots from an airline possibly operating the same aircraft type.
36. Nevertheless, where it can be measured at London-Heathrow, the increase in aircraft size following an artificial slot trade has often been quite dramatic, although it could be less so in the future once most of the slots used for smaller aircraft operations have been traded. The information on the smaller number of trades at London-Gatwick is less conclusive, with several trades being conducted between airlines with similar sized aircraft.

9.8 Impact on Average Passengers per Flight

37. In this study standard passenger load factors across the whole exercise have been adopted rather than actual load factors recorded at each of the eight airports for each of the twelve categories of passenger flight. This was partly because of the difficulty of ensuring that the figures for each airport were available for each flight category, but more to reflect that load factors would fluctuate over time, and by airport, and that it was more important to be able to compare 'before' and 'after' in 2025 rather than seek statistical accuracy for 2005.
38. The average passenger load factors used are based on average load factors seen throughout Europe today for scheduled flights. The averages for AEA airlines in 2005 were:
- Domestic and European flights 65.6%
 - Long-haul flights 80.1%
 - Charter flights 79.3%
39. This difference is related closely to the larger average aircraft size used on long-haul flights. Based on the mathematics of probability, by far the most difficult seats to fill are the last ten seats on any aircraft, irrespective of actual aircraft size. As a result, the 'loss' of ten seats on a small aircraft is a much higher proportion of the total seats.
40. The load factors used for this study are as follows:
- 60% for short-haul aircraft of under 100 seats,
 - 70% for short-haul aircraft over 100 seats, and
 - 75% for long-haul flights
41. However, based on industry data, low cost carriers are assumed to operate at an 80% load factor if operating with more than 100 seats (and 70% if less than 100 seats), and charter carriers are assumed to operate at an 85% passenger load factor.
42. Depending upon the type of airline transferring or acquiring, slots and the aircraft size assumed, the calculation of the change in average passenger numbers per flight is automatic.

9.9 Impact on Passenger Revenue per Flight

43. Information from AEA on average passenger revenue per passenger kilometre by airline type and by route group (domestic and intra-European; long-haul; and non-scheduled or charter) has been used to determine the total passenger revenues of both the transferor and the transferee airline, to assess the net change in passenger revenue per flight and overall. This forms a necessary component of the economic impact assessment in Chapter 10.
44. The difference in average yield between long-haul and short-haul is significant. AEA data for 2004 was as follows:

Table 9.1: AEA Revenue per RPK, and Operating Ratios

Route Group / Parameter	US cents per RPK, 2004	Operating Ratio, 2003
'Long-Haul'	7.11	105.0
'Europe and Domestic'	17.03	95.7
'Non-Scheduled'	6.34	99.1

45. These figures have been used for most categories of flights in the detailed calculations. For low cost carriers (LCC), it has been assumed that they achieve average short-haul revenues of 12.77 US cents per RPK, or 75% of the AEA rate for short-haul flights, and have an operating ratio of 102.5, based on profitability estimates of LCCs generally.
46. Charter airlines (not members of AEA) are expected to have the same overall costs as AEA non-scheduled operations – 6.34 cents per RPK - but to achieve a higher operating ratio, also of 102.5.
47. The resultant passenger revenue per flight is increased to provide total revenue per flight, by making an allowance for additional cargo revenue based on AEA data, which shows that cargo revenue on long-haul flights of AEA members is equivalent to 15% of the passenger revenue, while the figure for short-haul is 2.5%. It has been assumed that cargo revenue for LCCs and charter airlines is negligible.
48. The study forecasts airline incomes to 2025 at 2004 real levels. There is no expectation of the general levels of operating ratio varying between now and 2025. The airline industry is extremely competitive today, and is expected to remain at least as competitive in the future. Restrictive air service agreements enable a small number of long-haul flights to be extremely profitable while others, such as on the more competitive Atlantic routes, will not be achieving ratios as high as 105.0.
49. All-cargo operations obviously do not provide revenues per RPK, but it has been possible to derive revenue data by making the assumption that average revenue per all-cargo flight is at 80% of the average revenue of all long-haul flights (or of all short-haul flights for Milan-Linate) and the operating ratio has been assumed as being 100.0.

9.10 Impact on Airline Cost per Flight

50. As outlined above, operating ratio data from AEA by route group for 2003 has been used to determine total airline costs, by applying the ratios to the calculated revenues, thus allowing the impact of changes to be measured.

9.11 Impact on Aircraft Type

51. Because of differing impacts upon the environment of differing aircraft types, and their age, an assessment has been made of an 'average' trade at each airport in terms of the aircraft type used by both airlines, so that the implications for local noise, local air pollution and global air pollution can be studied.

52. With some 300 aircraft types and sub-types operating scheduled passenger services today worldwide, according to OAG, and with many of them using a range of engines, it is not feasible to determine an actual level of environmental impact resulting today at each of the eight airports, and likely to result in 2025.
53. Therefore, one aircraft type has been selected to represent each of the thirteen categories of route to provide a reasonable approximation of the levels of noise and emission pollution likely to be found at each airport, both in 2005 and 2025. Where more than one engine type is regularly fitted to an aircraft type, the noise and emission characteristics have been averaged across all engine types. Each of the selected aircraft is expected to still be in operation by 2025, although it would be expected that some newer models will be introduced in that time which will reduce average environmental impact.
54. To an extent, the environmental impacts in 2025 may therefore be slightly overstated, but what is of most importance is not the change between 2005 and 2025, but the difference in 2025 between the two options – with and without secondary trading - and this difference is unlikely to be strongly affected by any subsequent change in aircraft mix.
55. The aircraft selected are as in Table 9.2.

Table 9.2: Aircraft Types Selected by Flight Category for 2005 and 2025

Flight Category	Aircraft	Flight Category	Aircraft
Long-Haul		Short Haul (>100 seats)	
Dominant incumbent	B777-200	Dominant Incumbent	CRJ-200
Other incumbents	A330-200	Other incumbents	CRJ-200
New entrants	B777-200	Low Cost carriers	DHC8-400
Short-Haul (<100 seats)		Other new entrants	ERJ-145
Dominant incumbent	A320-200	Others	
Other incumbents	B737-700	Charters	A321-200
Low Cost carriers	B737-800	Cargo	B747-200
Other new entrants	A319-100		

56. By measuring the changes in numbers of movements for each aircraft type, and noting the associated average number of passengers and average distance flown, it has been possible in Chapter 10 to determine the environmental impact of adopting secondary trading.

9.12 Impact on Journey Purpose of Passengers

57. Based on detailed knowledge of the journey purposes by final destination of all passengers from London-Heathrow and London-Gatwick (source: CAA Passenger Surveys) it is possible to determine the probable business / leisure ratios for each of the thirteen categories of flight.

58. The figures for the two London airports are derived from this data, with reduced levels of business travel on low cost and charter flights, also based on survey data.
59. These forecasts have then been used to derive similar figures for the other six airports, but calibrated to reflect the known total business / leisure ratio as reported by Paris-Orly, Paris-Charles de Gaulle and Düsseldorf. The business ratio was not available for Amsterdam, Frankfurt and Milan-Linate airports, and assessments have been made based on the other five airports.
60. The forecast changes by route group and by airline type will affect the overall business / leisure split at each airport, and in Chapter 10 assessments are made as to the impact this has both on the commercial revenues of airports and also on the assessment of welfare economics.

9.13 Impact on Transfers and Surface Access Requirements

61. Similarly, information from London's airports has been used to determine the impact on transfer traffic that the forecast changes in airline and route mix might have. The detailed level of interline traffic by route group has been used to derive an average percentage of travellers for each flight category that will be terminating their flights at the airport ("origin and destination" passengers or "O&D", as distinct from passengers "connecting" to another flight at the same airport). For example, the level of connecting traffic will be higher for dominant incumbents and other carriers based at the airport hub in question than for other airlines, while it will be lower for LCCs and charter airlines.
62. The total split of O&D / connecting traffic has been provided by Amsterdam, Düsseldorf and Frankfurt airports, and these have been used to calibrate the data obtained for London. The figures for the two Paris airports and Milan-Linate have been based on the results of the other five airports.
63. The importance of this data is that it helps to determine the impact of secondary trading on the total number of O&D passengers at each airport, which allows an assessment to be made of the impact on surface access requirements at each airport, in terms of travel costs, congestion and pollution.

9.14 Use of Alternative Airports

64. Where flights are displaced from a congested primary airport as a result of the sale of the slots associated with them, it is necessary to determine what proportion of them are likely to be transferred to secondary airports serving the same city compared with the proportion which are simply no longer operated. This has an important economic impact on those passengers who are no longer able to fly to or from their preferred destination airport.
65. For those who would have started or ended their journey at the congested EU airport, extra expense will be incurred in travelling to and from the more distant secondary airport, assuming they choose to continue to make the journey. Others who might have been intending to transfer at the congested airport might alternatively transfer instead at an alternative EU airport, or even – for intercontinental transfers – at a non-EU airport.

66. Because the impacts at each airport are affected by locational and competitive situations peculiar to them, it has not been possible to determine robust statistical data suitable for conversion into measurable economic impact.

9.15 Forecasts for Each of Eight Congested Airports

9.15.1 Introduction

67. The same general approach has been taken in determining the probable impact of allowing secondary trading in slots at each of eight airports expected to be heavily congested by 2025.
68. The eight airports selected are intended to represent all those that are heavily congested today together with one example (Paris-Charles de Gaulle) that is expected to become heavily congested well before 2025. The other seven airports have all been cited by AEA as major problem airports for airlines, together with an eighth (Madrid) which is now coming out of that category following the construction of a second parallel pair of runways.
69. In 2005, these eight airports handled some 290 million passengers, or nearly 30% of the one billion passengers carried each year by the 400 airports belonging to ACI-Europe. However, it is believed that they represent around 90% of the throughput of airports within the EU that might be affected today by the introduction of more widespread secondary trading.
70. In *Appendices 5 to 14* are shown the calculations for each of the eight airports, plus a sub-total for the eight airports, and an estimate of the overall impact for the EU. Each appendix has three parts. The first part covers the traffic assumptions and derivatives; the second covers the financial assumptions; and the third details the other information necessary for determining the economic impact assessment.
71. In the first appendix table for each airport, a detailed analysis has been made of the number of departures by scheduled aircraft from that airport in the first week of May 2005, and this has been multiplied by 100 to give an annual total of arrivals and departures.
72. Eleven categories of scheduled airline operation have been analysed, with four airline types (dominant, other incumbent, low cost, and other new entrants) and three operational types (long-haul; short-haul with aircraft with more than 100 seats; and short-haul with less than 100 seats). There are assumed to be no long-haul flights by low cost airlines.
73. For each category, the average number of seats and the average distance flown has been computed from OAG data for 2005, and an average annual passenger load factor assumed, based on historical data from AEA for its members, with higher load factors assessed for low cost airlines.
74. In addition, an assessment has been made of the number of charter flights believed to be operated in 2005, based on information wherever available. These have been shown as operating with an average 200 seats at an 85% load factor on an average range of 1,800 kilometres, similar to the non-scheduled activities of AEA members.

75. Cargo flights have been similarly included to ensure the total number of flights approximates to the known usage of each airport. Cargo flights are assumed to fly the same average distance as all long-haul scheduled passenger flights, except in the case of Milan-Linate where, because of its short runway, the average distance of all short-haul flights with more than 100 seats has been used.
76. From this data it has been possible to draw certain derivatives, notably the number of passengers per year, and the number of revenue passenger kilometres [RPKs].
77. In the second appendix table for each airport, this operational data for 2005 is merged with financial data provided by AEA to generate total revenues and costs of each category of operation. Revenue per RPK by route group in 2004, plus the known split between passenger and cargo revenues and the operating ratios recorded by AEA members in 2003, have been used to generate total revenues and costs for each airline type, including charter flights and all-cargo flights. (Except for Milan-Linate, all-cargo flights are assumed to be only long-haul, but incurring only 80% of the total operating cost of long-haul passenger flights, and at an assumed operating ratio of 100%; for Milan-Linate, with its short runway, the cargo flights are once again assumed to be short-haul).
78. In the third appendix table for each airport are shown the aircraft types associated with each flight category, for conversion into environmental impact figures, together with assessments of the probable business / leisure split, and the local O&D / transfer split, again to assist with economic impact assessments.

9.15.2 Forecasting assumptions

79. Based on data and information obtained (Chapters 5 and 7) and views expressed by stakeholders (Chapter 8), assessments have been made of the likely use of slots at each airport in 2025, on each of two assumptions. The first analysis is made on the assumption that secondary trading of slots is not permitted; and the second forecast assumes that secondary slot trading is both permitted and widely used by the airline community. The difference between these two forecasts is necessary in order to understand the economic impacts of permitting secondary trading.
80. An important pre-requisite to developing a forecast for each airport in 2025 is to determine what would have been the expected mix of traffic at London-Heathrow and London-Gatwick in 2005 had there been no secondary slot trading between 2001 and 2005. The detailed ACL data has thus been used to 'undo' all the trades recorded in that period, to determine what would have been the likely mix of traffic in 2005 in terms of airline type, flight type, aircraft size, distance flown and ASKs produced. This is then used as the 'base' 2005 forecast for these two airports along with the actual data for the other six airports studied.
81. The derivation of the status quo option for 2025 relies very heavily on the observed changes in aircraft size, flight distance and airline type changes between 1975 and 2005 noted in Chapter 7. The derivation of the secondary slot trading option depends heavily on the observed changes at London-Heathrow and London-Gatwick since 2001, detailed in Chapter 5.2.
82. As a general rule, for the continuation of the status quo, the average distance flown by each category of traffic is forecast to grow by 4% between 2005 and 2025, or an average of 0.19% a year, in line with observed experience between 1975 and 2005.

83. Average aircraft size is expected to continue to grow by around 0.34% a year, again similar to that observed between 1975 and 2005. This has been modelled in the tables by increasing the average size of all long-haul and charter aircraft by 20 seats between 2005 and 2025; and of all short-haul aircraft over 100 seats by an extra 10 seats. Short-haul aircraft of less than 100 seats are given no increase in size between 2005 and 2025.
84. For each airport, a summary table of predicted supply and demand of slots has been used to determine the pressure on airlines (and reflected in slot values) to participate in trades.
85. In order to forecast the expected 'status quo' outcome in 2025, not allowing for any secondary trading, the most important aspect is to determine the percentage of slots operated by each of the thirteen categories of flight. From this figure, all other parameters are derived.
86. The judgements made have been based very strongly on the observed trends at congested airports between 1975 and 2005 – particularly the growth of long-haul scheduled flights at the expense of all other categories, together with the growth of short-haul low-cost flights. These trends have been continued through to 2025 as the shortage of slots continues, with those airlines fortunate enough to have slots being able to increase aircraft size and – for some airlines – able to use bilateral rights to operate longer distance flights at the expense of short-haul flights.
87. The trend towards fewer charter and cargo flights seen between 1975 and 2005 is also continued.
88. The forecasts for each individual airport reflect experience at that particular airport over the thirty year period, together with any specific information provided by airlines, airports or coordinators.
89. The forecasts for 2025 on an assumption of secondary slot trading being allowed from around 2008 onwards are based very heavily on the experience of the two London airports between 2001 and 2005.
90. The same approach is taken, of amending the slot percentages of each of the thirteen flight categories. As a general rule, the background trend expected between 2005 and 2025 is taken as a guide as to what will happen, but with the added ability of airlines to enter the airport, or to increase or decrease their slot holdings. No further amendments are made as to average aircraft size or distance flown.
91. The decisions for each airport are generally in line with the assumptions shown above in Section 9.4, with the dominant incumbent airlines seeking to increase their total slot holdings, both for new long-haul routes and also to retain valuable short-haul feeder routes; with long-haul new entrants paying to compete on major growth routes, particularly to and from Asia; with other incumbents losing ground on both long-haul and short-haul routes; and with all other short-haul operators, including low-cost carriers, losing some of their slots. Once secondary trading is introduced, all-cargo airlines and charter-only airlines are expected to sell a significant proportion of their slots to airlines able to operate long-haul scheduled passenger services, which are considered to be the 'climax' or maximum use of scarce slots.
92. Once again, detailed knowledge of the operational and competitive situation of each airport has been used to temper the application of these changes – for example, the lack of a suitable runway at Milan-Linate for long-haul flights, and the known airline preferences for London-Heathrow and Paris-Charles de Gaulle for long-haul flights over London-Gatwick and Paris-Orly.

(i) London-Heathrow

93. Using data from Chapter 7, Table 9.3 summarises the slot situation at London-Heathrow in 2005 and the expected outcome in 2025. In summary, no third runway has been assumed before 2025, but an extra 20,000 slots a year will be available once Terminal Five is completed, and a further 50,000 a year on the assumption that mixed-mode operations will be permitted on the current two runways. One extra runway will be available at London-Stansted, to which some displaced services are likely to transfer, sometime around 2015.

Table 9.3: Slot Capacity and Demand 2005 and 2025 – London-Heathrow

London-Heathrow	2005	AAGR %	2025
Capacity limit (set by Govt.)	460,000	0.7%	530,000
Capacity used	460,000	0.7%	530,000
Slots requested	558,000	3.1%	1,030,000
Shortfall of capacity	98,000	8.5%	500,000
Excess Demand as %	21.3%		94.3%

94. Although it would appear that requests for slots were only some 21% greater than the number of slots available in 2005, it is strongly believed that there is a far greater latent demand from airlines that have realised the futility of making applications.
95. Even so, with the growth of air transport movements (ATMs) in Europe forecast to continue at around 3.1% a year, the shortfall of capacity at London-Heathrow by 2025 is expected to be at least 500,000 slots a year, putting immense pressure on airlines to use their slots effectively whether or not secondary trading applies.
96. The forecast of changes in slot shares by traffic segment relies on the actual changes observed between 1975 and 2005, and the details of slot trades undertaken between 2001 and 2006.
97. The estimates for the 2005 base line calculations are based on the known trades at London-Heathrow between 2001 and 2006, as advised by ACL, worked backwards to replace the new operations with those that they have replaced.
98. One of the specific difficulties in forecasting for London-Heathrow (and, indeed, for all of the eight airports to a greater or lesser extent) is determining what changes there might be if a Transatlantic Common Aviation Area (TCAA) agreement takes effect before 2025, which would allow a large number of US, Canadian and other European airlines to seek slots at London-Heathrow for services to and from North America. Currently, under the UK-USA air services agreement only two US airlines are permitted to operate at London-Heathrow. This study has excluded the probability of the TCAA taking effect but, if it did, the pressure for slots used for existing short-haul services to be traded will become even greater.
99. The detailed calculations can be seen in [Appendix 5](#). In summary, the salient points can be found in Table 9.4 below.

Table 9.4: Summary of Forecasts for 2025 – London-Heathrow

London-Heathrow	2005 - actual	2005 – base line	2025 – no trading	2025 – with trading	2025 variance
ATMs – flights	460,000	460,000	530,000	530,000	-
Passengers per flight	139.5	133.8	158.0	166.9	+5.6%
Passengers (000)	64,180	61,558	83,766	88,453	+5.6%
Revenue Pax Kms (mn)	262,182	234,698	396,570	454,950	+14.7%
Passenger Revenue (\$mn)	21,744	19,904	31,809	35,589	+11.9%

100. In summary, assuming no TCAA agreement, it will be seen from *Appendix 5* that the dominant airline, British Airways (BA) would be expected to increase its share of ATMs from 40% to 45%, and its share of RPKs in 2025 from 39.2% to 43.1%, while new entrant airlines could expect to see a 69% increase in their share of RPKs, from 3.3% to 5.5%.

101. Scheduled long-haul flights in total would increase from providing 90.8% of all RPKs up to 92.8%.

102. The number of displaced short-haul flights in 2025 would be some 37,100. It is assumed that one quarter of these transfer to London-Gatwick, by acquiring slots from other less-productive uses; one-half are accommodated at London-Stansted, London-Luton and London-City; and that one quarter are no longer flown.

103. Detailed calculations show that the proportion of business passengers (39.2% in 2005) is expected to fall to 38.3% in 2025 assuming no secondary trading, and to 37.5% if secondary trading is allowed, because of the changing mix of services.

104. Meanwhile, the level of local origin and destination traffic (68.5% in 2005) is expected to fall slightly to 68.3% in 2025 assuming no secondary slot trading, and to 66.5% if secondary trading is allowed.

(ii) London-Gatwick

105. Table 9.5 summarises the slot situation at London-Gatwick in 2005 and the expected outcome in 2025, based on information presented in Chapter 7 above. No second runway is expected to be available before 2024 at the earliest, and is therefore not taken into account for the purposes of this forecast. There is therefore predicted to be no increase in available capacity at London-Gatwick.

Table 9.5: Slot Capacity and Demand 2005 and 2025 – London-Gatwick

London-Gatwick	2005	AAGR %	2025
Capacity limit (achievable)	265,000	-	265,000
Capacity used	265,000	-	265,000
Slots requested	328,000	3.1%	605,000
Shortfall of capacity	63,000	8.6%	340,000
Excess Demand as %	23.8%		128.3%

106. Requests for slots were known to be some 24% greater than the number of slots available in 2005, but once again it is suspected that there is a much greater latent demand from airlines that realise the severe slot restrictions that exist.

107. Even so, with the growth of ATMs in Europe forecast to continue at around 3.1% a year, the shortfall of capacity at London-Gatwick by 2025 is expected to be at least 340,000 slots a year, again putting great pressure on airlines to use their slots effectively if secondary trading is to be introduced.

108. As with London-Heathrow, an assessment has been made of the mix of traffic in 2005 on the assumption that no secondary trading had taken place between 2001 and 2006. However, the net effect of the relatively small amount of trades taking place is negligible.

109. The base forecast for 2025 continues the trends seen during the period 1975 to 2005, with a significant increase in long-haul scheduled passenger flights by a variety of airlines, but only a small increase by the dominant carrier BA, which is expected to concentrate its activities as far as possible at London-Heathrow.

110. The forecast for 2025, on the assumption of secondary slot trading, is for a further concentration of long-haul flights, but no further increase in total slots held by the dominant incumbent. However, the number of new entrant long-haul slots is expected to almost double.

111. The following Table 9.6 summarises the detailed tables to be found in [Appendix 6](#).

Table 9.6: Summary of Forecasts for 2025 – London-Gatwick

London-Gatwick	2005 - actual	2005 – base line	2025 – no trading	2025 – with trading	2025 variance
ATMs – flights	265,000	265,000	265,000	265,000	-
Passengers per flight	121.5	121.8	134.1	140.1	+4.5%
Passengers (000)	32,195	32,266	35,530	37,121	+4.5%
Revenue Pax Kms (mn)	74,317	74,646	91,334	111,726	+22.3%
Passenger Revenue (\$mn)	6,637	6,701	8,160	9,726	+19.2%

112. Again, the impact of a TCAA agreement by 2025 has been discounted. Were it to take effect, the majority of the US and Canadian airlines currently operating at London-Gatwick would probably seek to transfer their operations to London-Heathrow, resulting in a surge of other long-haul services and medium haul routes taking their place – many of them displaced from London-Heathrow.
113. In summary, assuming no TCAA, it will be seen from *Appendix 6* that the dominant airline (British Airways) would probably lose a small amount of market share in terms of flights, from 37.0% to 36.0%, but increase its share of RPKs in 2025 from 25.4% to 26.8%, while new entrant airlines could expect to see a 57% increase in their share of RPKs, from 13.3% to 20.8%.
114. Scheduled long-haul flights in total would increase from providing 59.0% of all RPKs up to 67.6% if secondary slot trading is allowed.
115. After allowing for some 9,300 displaced short-haul flights transferring from London-Heathrow, the net number of short-haul flights displaced from London-Gatwick in 2025 would be some 8,000. It is assumed that one-half of these are accommodated at London-Stansted, London-Luton and London-City; and that one half are no longer operated.
116. Detailed calculations show that the proportion of business passengers (15.9% in 2005) is expected to rise slightly to 16.8% in 2025 assuming no secondary trading, and to 17.8% if secondary trading is allowed.
117. Meanwhile, the level of local origin and destination traffic (84.1% in 2005) is expected to decrease to 82.6% in 2025 assuming no secondary trading, and to 81.5% if secondary trading is allowed.

(iii) Paris-Orly

118. Table 9.7 summarises the slot situation at Paris-Orly in 2005 and the expected outcome in 2025, based on information presented in Chapter 7 above.

Table 9.7: Capacity and Demand 2005 and 2025 – Paris-Orly

Paris-Orly	2005	AAGR %	2025
Capacity limit (environmental)	250,000	0.0%	250,000
Capacity used	223,000	0.6%	250,000
Slots requested	300,000	3.1%	550,000
Shortfall of capacity	77,000	7.0%	300,000
Excess Demand as %	34.5%		120.0%

119. No allowance has been made for any increase in the number of slots made available by 2025 as a result of any reduction in the number of PSO routes.

120. Requests for slots were known to be some 34% greater than the number of slots available in 2005, but it is suspected that there is a much greater latent demand from those airlines that realise the severe slot restrictions that exist. However, with spare capacity at Paris-Charles de Gaulle in 2005, most demand was probably accommodated at one or other of the airports.
121. Even so, with the growth of ATMs in Europe forecast to continue at around 3.1% a year, the shortfall of capacity at Paris-Orly by 2025 is expected to be at least 300,000 slots a year, again putting great pressure on airlines to use their slots effectively. By 2025, there will be no spare capacity at Paris-Charles de Gaulle to accommodate those airlines whose first preference is for Paris-Orly.
122. Once more, the impact of a possible TCAA agreement by 2025 has been discounted, but is considered to have a minimal impact at Paris-Orly, as Paris-Charles de Gaulle is expected to remain as the preferred airport for transatlantic flights.
123. The situation in Paris is that, although Paris-Orly is more central for O&D traffic than Paris-Charles de Gaulle, the latter is now becoming the airport of choice, especially by long-haul airlines seeking interline feed. LCCs are however targeting Paris-Orly, and increasing pressure on the French Government to justify the maintenance of certain PSO routes.
124. The base forecast for 2025 assumes only small changes in the number of slots operated by each of the main airline types, with Air France and new entrants increasing their slot shares marginally, at the expense of all other categories. However, the replacement of short-haul by long-haul flights continues throughout the period. All PSO flights are assumed to be maintained.
125. If secondary slot trading is allowed, it is expected that Air France would trade in a significant number of slots to the other three categories of scheduled carriers, and use the proceeds to acquire additional slots at its main base at Paris-Charles de Gaulle, emulating the activity of British Airways in London in moving from the secondary airport to the primary airport. The replacement carriers would tend to use the Air France slots for more long-haul flights, although there is expected to be a small growth in intra-EU flights by new entrants and LCCs.
126. There is expected to be strong pressure on PSO flights, and the expectation is that some of the smaller routes will cease, while others may use larger aircraft.
127. Table 9.8 summarises the detailed tables to be found in [Appendix 7](#).

Table 9.8: Summary of Forecasts for 2025 – Paris-Orly

Paris-Orly	2005 – actual	2025 – no trading	2025 – with trading	2025 variance
ATMs – flights	223,000	250,000	250,000	-
Passengers per flight	107.3	117.1	127.7	+9.1%
Passengers (000)	23,925	29,274	31,929	+9.1%
Revenue Pax Kms (mn)	35,750	47,892	53,752	+12.2%
Passenger Revenue (\$mn)	3,688	4,813	5,552	+15.3%

128. In summary, on the assumption of secondary trading, but no TCAA, it will be seen from *Appendix Z* that the dominant airline (Air France) is expected to lose a significant amount of market share in terms of flights, from 60.0% to 51.0%, and lose a smaller share of RPKs, from 45.2% to 39.3%, while new entrant airlines could expect to see a major increase in their share of RPKs, from 7.0% to 12.0%.

129. Scheduled long-haul flights in total would increase from providing 16.0% of all flights to 18.0%.

130. The number of displaced short-haul flights in 2025 would be some 3,750. It is assumed that most of these will no longer be flown, although some could be accommodated at Beauvais. On the assumption that no third Paris airport is available by 2025, it might be possible for some of the smaller aircraft used on domestic PSO routes to be allowed to join the business aviation and GA flights at Paris-Le Bourget.

131. Detailed calculations show that the proportion of business passengers (37.7% in 2005) will be almost unchanged whether or not secondary trading is permitted.

132. The level of local origin and destination traffic (77.1% in 2005) is expected to slip back to 76.9% in 2025 assuming no secondary trading, but rise to 79.0% if secondary trading is allowed.

(iv) Paris-Charles de Gaulle

133. Table 9.9 summarises the slot situation at Paris-Charles de Gaulle in 2005 and the expected outcome in 2025, based on information presented in Chapter 7 above. The capacity limit is raised as both the airport and the air traffic control provider are able to increase the hourly runway rate following the recent introduction of additional runways. No third Paris airport is forecast to be opened by 2025.

Table 9.9: Capacity and Demand 2005 and 2025 – Paris-Charles de Gaulle

Paris-Charles de Gaulle	2005	AAGR %	2025
Capacity limit (achievable)	668,000	0.5%	742,000
Capacity used	526,000	1.7%	740,000
Slots requested	731,000	3.1%	1,347,000
Shortfall of capacity	205,000	5.6%	607,000
Excess Demand as %	39.0%		82.0%

134. The large proportion of slot applications refused in 2005 compared with the fact that only 86% of the available slots were used suggests that the data may not be strictly comparable.

135. However, what is not in debate is that capacity is expected to grow by an average of only 1.7% a year between 2005 and 2025, at a time when demand for ATMs is expected to continue to grow inexorably by 3.1% a year. Thus excess demand will continue to be important at Paris-Charles de Gaulle, even if the figures for slot requests shown above give a false impression. As before, this will put great pressure on airlines to make best use of the slots they possess, and – if allowed – to trade their slots to airlines that can make better use of them.

136. Again, the impact of a possible TCAA agreement by 2025 has been discounted, but it could have a significant impact at Paris-Charles de Gaulle, especially if airlines seeking to use London-Heathrow as a European gateway are forced by lack of slots to go elsewhere.

137. With no allowance for secondary slot trading, the market shares of low-cost, charter and all-cargo flights are expected to decline in percentage terms (although still increasing in actual slots operated) with Air France growing at their expense, plus a small number of new entrants. There would however be a 37% increase in the percentage share of long-haul flights, rising from 19.3% in 2005 to 26.5% by 2025.

138. The expectation is that the adoption of secondary slot trading would exaggerate these changes. Air France would be expected to transfer many flights from Paris-Orly, to increase its slot share from 53% to 58%, while new entrants would more than double from 3.0 to 7.5%. All other market segments would expect to lose market share. Long-haul flights would rise even faster, to represent 34% of all flights.

139. Table 9.10 summarises the detailed tables to be found in [Appendix 8](#).

Table 9.10: Summary of Forecasts for 2025 – Paris-Charles de Gaulle

Paris-Charles de Gaulle	2005 – actual	2025 – no trading	2025 – with trading	2025 variance
ATMs - flights	526,000	740,000	740,000	-
Passengers per flight	101.4	122.8	133.1	+8.4%
Passengers (000)	53,340	90,849	98,477	+8.4%
Revenue Pax Kms (mn)	171,847	350,776	420,422	+19.9%
Passenger Revenue (\$mn)	14,547	28,661	33,631	+17.3%

140. In summary, on the assumption of secondary trading, but no TCAA, the details in [Appendix 8](#) show that, although the dominant airline (Air France) is expected to gain a significant amount of market share in terms of flights, up from 53.0% to 58.0%, partly through re-locating some flights from Paris-Orly, its RPK market share is expected to rise more slowly, from 51.0% to 51.9%. New entrant airlines could expect to see their share of RPKs more than double, from 4.9% to 10.2%.

141. Scheduled long-haul flights in total would increase their share of RPKs from 85.8% to 89.5%.

142. The number of displaced short-haul flights in 2025 would be some 25,900. It is assumed that around half of these will be accommodated at Paris-Orly, displacing other short-haul flights, while the other half will be no longer be operated, although some could be accommodated at Beauvais. A substantial number of charter and all-cargo flights are also expected to be unplaced, although some might transfer to the all-cargo airport at Vatry.

143. Detailed calculations show that the proportion of business passengers (36.4% in 2005) will rise slightly to 36.7% in 2025, without secondary trading, and rise further to 37.7% if trading is permitted.

144. The level of local origin and destination traffic (72.1% in 2005) is expected to slip back to 70.6% in 2025 assuming no secondary trading, and fall further to 69.0% if secondary trading is allowed.

(v) Amsterdam

145. Table 9.11 outlines the slot situation at Amsterdam in 2005 and the expected outcome in 2025, based on information presented in Chapter 7 above. The significant increase in available slots from 440,000 a year to some 600,000 does not reflect additional runway capacity, or improved flow rate, but – through the improvements in aircraft noise – the greater number of flights that can be allowed under the current local noise limitations.

Table 9.11: Capacity and Demand 2005 and 2025 – Amsterdam

Amsterdam	2005	AAGR %	2025
Capacity limit (environmental)	450,000	1.5%	600,000
Capacity used	440,000	1.6%	600,000
Slots requested	545,000	3.1%	1,005,000
Shortfall of capacity	105,000	7.0%	405,000
Excess Demand as %	23.9%		67.5%

146. The growth in capacity available is an assessment by Amsterdam Airport, based on expected reductions in aircraft noise per ATM, allowing more movements to take place within an unchanged overall noise limit.

147. This will allow movements to increase by an average of 1.6% a year, although this is still only half the expected rate of ATM growth at 3.1% a year. Thus slot applications, which exceeded supply by 24% in 2005, are expected to continue to grow, and to be some 68% in excess of capacity by 2025, causing pressure from those airlines currently not able to access Amsterdam but capable of using the existing slots more efficiently.

148. The impact of a possible TCAA agreement by 2025 has been discounted, but it could have a significant impact at Amsterdam, especially if airlines seeking to use London-Heathrow or Paris-Charles de Gaulle as a European gateway are forced by lack of slots to go elsewhere.

149. The expectation is that KLM, as the dominant incumbent, will seek to increase its proportion of slots, both for long-haul flights and for key feeder routes, as it seeks to compete with the three larger hubs of London, Paris and Frankfurt. New entrants will also seek to increase their share from the current low of 1.7%. As elsewhere, the impact of congestion is expected to lead to an increase in the proportion of long-haul flights at the expense of those short-haul, charter and all-cargo flights not operated by KLM.

150. With secondary slot trading permitted, these trends will be exaggerated, with new entrants in particular being able to increase their presence. The main losers will be the other short-haul incumbents, and the low cost carriers, which will find it difficult to afford additional slots.

151. Table 9.12 summarises the detailed tables to be found in *Appendix 9*.

Table 9.12: Summary of Forecasts for 2025 – Amsterdam

Amsterdam	2005 – actual	2025 – no trading	2025 – with trading	2025 variance
ATMs - flights	440,000	600,000	600,000	-
Passengers per flight	90.4	105.8	122.7	+16.0%
Passengers (000)	39,754	63,450	73,618	+16.0%
Revenue Pax Kms (mn)	115,425	214,078	278,734	+30.2%
Passenger Revenue (\$mn)	10,117	18,230	23,175	+27.1%

152. In summary, assuming secondary trading, and no TCAA, it will be seen from *Appendix 9* that the dominant airline (KLM) is expected to gain a significant amount of market share in terms of flights, up from 46.5% to 49.0%, although RPK market share is expected to rise more slowly, from 45.8% to 47.5%. New entrant airlines could expect to see their share of RPKs more than double, from 7.2% to 15.2%.

153. Scheduled long-haul flights in total would increase their share of RPKs from 79.0% to 83.2%.

154. The number of displaced short-haul flights in 2025 would be some 18,000. It is assumed that most of these will cease to be operated at all, possibly as many as 80% of them, as few are likely to be accommodated at Rotterdam, and there are currently no secondary airports available. A development of the small airport at Lelystad may be able to assist in the longer term. Many feeder flights seeking to link peripheral regions of the EU with a major hub may be able to re-locate to other potential hubs with spare capacity such as Brussels.

155. Detailed calculations show that the proportion of business passengers (32.6% in 2005) will rise slightly to 33.2% in 2025, without secondary trading, and further to 34.2% if trading is permitted.

156. The level of local origin and destination traffic (57.5% in 2005) is expected to reduce to 55.3% in 2025 assuming no secondary trading, and fall further to 52.5% if secondary trading is allowed.

(vi) Düsseldorf

157. Table 9.13 summarises the slot situation at Düsseldorf in 2005 and the expected outcome in 2025, based on information presented in Chapter 7 above. Although heavily congested in 2005, significant increases in capacity are forecast by 2025 which will increase the availability of slots for much of the intervening period. However, by 2025, surplus slot demand will have returned once more to the situation currently experienced.

Table 9.13: Capacity and Demand 2005 and 2025 – Düsseldorf

Düsseldorf	2005	AAGR %	2025
Capacity limit (achievable)	267,000	1.4%	353,000
Capacity used	186,000	3.2%	350,000
Slots requested	250,000	3.1%	460,000
Shortfall of capacity	64,000	2.7%	110,000
Excess Demand as %	34.4%		31.4%

158.Despite only using some 70% of its available capacity in 2005, slot requests exceeded slot allocation by some 34%, suggesting that there is heavy morning and evening peak demand for slots by short-haul airlines, but with significant levels of unwanted slots in the middle of the day and at weekends.

159.Although currently considered as one of the eight most slot-constrained airports in Europe by members of AEA, it does intend to increase its slot availability by an average of 3.2% a year between 2005 and 2025, thus keeping pace with the expected growth of demand, but not exceeding it. The current level of unsatisfied slot demand is thus expected to remain in 2025.

160.The impact of a possible TCAA agreement by 2025 has been discounted. It is considered that few airlines would regard Düsseldorf as having the potential to become a major gateway for intercontinental services, with Frankfurt being favoured.

161.As a result, the forecast situation in 2025, without secondary slot trading, is not significantly different to that prevailing today, apart from the inexorable increase in average aircraft size and average flight distance. The main difference will be in the number of short-haul flights operated by aircraft with less than 100 seats. This is expected to decline as passenger demand on each such routes increases, and the aircraft are replaced with others of more than 100 seats.

162.The availability of secondary trading is not expected to lead to major changes in the airport mix.

163.Table 9.14 summarises the detailed tables to be found in [Appendix 10](#).

Table 9.14: Summary of Forecasts for 2025 – Düsseldorf

Düsseldorf	2005 - actual	2025 – no trading	2025 – with trading	2025 variance
ATMs - flights	186,000	350,000	350,000	-
Passengers per flight	86.9	102.5	103.3	+0.7%
Passengers (000)	16,162	35,885	36,143	+0.7%
Revenue Pax Kms (mn)	23,743	62,026	64,397	+3.8%
Passenger Revenue (\$mn)	3,064	7,264	7,511	+3.4%

164. It will be noted that, at Düsseldorf, the impact of secondary trading is expected to be relatively minor, due to the ability of the airport to increase its slot capability in line with demand, although noting that the airport is already congested today, particularly during the morning and evening peaks. Trading in these peaks might be expected, but generally they would be between two scheduled short-haul airlines each operating in excess of 100 seats, and therefore not affecting the calculations.

165. In summary, assuming secondary trading and no TCAA, it will be seen that the dominant incumbent airline (Lufthansa) is not expected to gain any market share in terms of flights, constant at 38.0%, while its RPK market share is expected to slip from 17.3% to 16.6% - the share is so low because of the use of much smaller aircraft on average by Lufthansa than by other airlines, notably the major leisure airlines operating scheduled services. Although still the major airline at Düsseldorf, Lufthansa is not strongly dominant. New entrant airlines can expect to see their share of RPKs increase by a third, from 15.4% to 20.5%.

166. Scheduled long-haul flights would remain few in number, but would increase their share of RPKs from 43.0% to 45.8% if secondary slot trading is allowed.

167. There would be no displaced short-haul flights in 2025 as a result of the introduction of secondary trading.

168. Detailed calculations show that the proportion of business passengers (34.9% in 2005) will fall to 32.9% in 2025, without secondary trading, but partially recover to 33.5% if trading is permitted.

169. The level of local origin and destination traffic (87.4% in 2005) is expected to fall slightly to 86.5% in 2025 assuming no secondary trading, and a little further to 86.3% if secondary trading is allowed.

(vii) Frankfurt

170. Table 9.15 summarises the slot situation at Frankfurt in 2005 and the expected outcome in 2025, based on information presented in Chapter 7 above. Frankfurt will benefit from the third parallel runway that is currently planned, but this is insufficient to meet the increase in demand expected over the next twenty years.

Table 9.15: Capacity and Demand 2005 and 2025 – Frankfurt

Frankfurt	2005	AAGR %	2025
Capacity limit (achievable)	525,000	1.6%	725,000
Capacity used	510,000	1.6%	700,000
Slots requested	560,000	3.1%	1,030,000
Shortfall of capacity	50,000	9.9%	330,000
Excess Demand as %	9.8%		47.1%

171. With slot demand in 2005 expected to exceed actual slot usage by only 9.8%, it could be considered that Frankfurt does not have a significant capacity problem, but it is generally accepted that capacity provision is significantly less than total demand, and that the planned extra runway is sorely needed.
172. This extra runway will provide another 200,000 slots, an average increase of 1.6% a year to 2025. Almost all will be used, because demand is growing at double that rate, at around 3.1% a year. As such, secondary slot trading would be expected to have a significant impact on the usage of slots at Frankfurt by the end of the period.
173. The impact of a possible TCAA agreement by 2025 has been discounted in this study, but it could have a significant impact at Frankfurt as it is regarded by transatlantic airlines as a major European gateway. Some airlines might choose Munich as their replacement if they fail to access Frankfurt.
174. As the prime European hub for the Star Alliance, it has been assumed that Lufthansa and its partners will do all that they can to maximise their slot holdings and to maximise the use they make of such slots, both for long-haul flights and for the vital short-haul feeder flights, many of which will justify large short-haul aircraft.
175. Similarly, new entrants, particularly from Asia, will seek to obtain many of the new slots to be made available by the additional runway, or to purchase them if allowed.
176. Although Star Alliance cargo flights are likely to hold on to the majority of their slots, other operators might be prepared to transfer to Frankfurt-Hahn, or even further afield, while the airlines offering scheduled flights purely to holiday destinations may be willing to transfer to more distant airports such as Cologne or Stuttgart.
177. LCCs currently hold a very small share of the Frankfurt slots and are unlikely to see a significant increase, either with or without trading.
178. With secondary trading, the other incumbents, operating mainly short-haul routes from other Member States, will be under severe pressure to transfer their slots to Lufthansa and long-haul airlines.
179. Table 9.16 summarises the detailed tables to be found in [Appendix 11](#).

Table 9.16: Summary of Forecasts for 2025 – Frankfurt

Frankfurt	2005 - actual	2025 – no trading	2025 – with trading	2025 variance
ATMs - flights	510,000	700,000	700,000	-
Passengers per flight	102.2	120.6	126.6	+5.0%
Passengers (000)	52,117	84,386	88,594	+5.0%
Revenue Pax Kms (mn)	172,920	328,603	363,334	+10.6%
Passenger Revenue (\$mn)	15,129	27,693	30,074	+8.6%

180. In summary, assuming secondary trading and no TCAA, it will be seen that the dominant incumbent airline (Lufthansa) is expected to gain a small amount of market share in terms of flights, up from 54.0% to 56.0%, while RPK market share remains almost constant. It remains strongly dominant. New entrant airlines can expect to see their share of RPKs more than double, up from 3.5% of RPKs to 8.0%.

181. Scheduled long-haul flights would increase their share of RPKs from 84.5% to 86.2% if secondary slot trading is allowed.

182. There could be as many as 21,000 displaced short-haul flights in 2025 if secondary trading is permitted, but all of these will be by aircraft with less than 100 seats. It is suspected that about one third would transfer to Frankfurt-Hahn, but that most would cease operating, or seek alternative hub opportunities such as Munich or Berlin.

183. Detailed calculations show that the proportion of business passengers (34.2% in 2005) will fall slightly to 33.7% in 2025, without secondary trading, and further to 33.4% if trading is permitted.

184. The level of local origin and destination traffic (73.0% in 2005) is expected to fall to 71.7% in 2025 assuming no secondary trading, and slightly further to 71.2% if secondary trading is allowed.

(viii) Milan-Linate

185. Table 9.17 summarises the slot situation at Milan-Linate in 2005 and the expected outcome in 2025, based on information presented in Chapter 7 above. The current slot limitation is based on environmental, not operational, constraints and there is no expectation of it being either relaxed or withdrawn by the Italian authorities. Although there is excess demand for this closest (to the city) of the three Milan airports, there will continue to be sufficient slot capacity at Milan-Malpensa and Milan-Bergamo to enable all slot demand for Milan to be met.

Table 9.17: Capacity and Demand 2005 and 2025 – Milan-Linate

Milan-Linate	2005	AAGR %	2025
Capacity limit (environmental)	105,000	0.0%	105,000
Capacity used	95,000	0.5%	105,000
Slots requested	157,000	3.1%	290,000
Shortfall of capacity	62,000	5.6%	185,000
Excess Demand as %	65.3%		176.2%

186. Based on information submitted to ACI for 2002/2003, it would appear that slot demand for Milan-Linate is far greater than the available capacity, possibly as much as 65% greater.

187. The current capacity limit of 105,000 ATMs a year is unlikely to be lifted between now and 2025, as the Italian Government seeks to transfer the bulk of demand to the more distant airport of Milan-Malpensa. As a result, latent demand for Milan-Linate is expected to grow considerably, but with the knowledge that an alternative location does still exist, even if it is less attractive for airlines. Although this is unlikely to affect the level of potential trading at Milan-Linate, it does suggest that the slot trade values will be lower than at some other airports for which there are no convenient alternatives with spare capacity.
188. There would be no impact at Milan-Linate of a possible TCAA agreement by 2025, because of its inability to handle long-haul flights. It should also be noted that the Italian Government still exercises traffic distribution rules to determine which categories of flights may use Milan-Linate.
189. Without secondary slot trading, operations at Milan-Linate are expected to be similar in 2025 to today's – the dominant incumbent, Alitalia, only operates some one third of all flights, and seeks solely to satisfy O&D demand for central Milan, and not to attract interline traffic: interline traffic is the function of Milan-Malpensa.
190. Growth through to 2025 will predominantly be by increasing average journey length and aircraft size, but with no great change in the destinations offered because of the airport's inability to support long-haul services. Cargo and charter flights already achieve only small market shares.
191. The introduction of secondary slot trading is unlikely to lead to major changes. The same inability to handle long-haul flights affects the probability of secondary trading having much of an impact at an airport. The only airlines that would regularly consider purchasing slots would be those operating short and medium-haul services with narrow-bodied aircraft, but almost all of the existing flights at Milan-Linate fall into this same category. Thus an airline with a more profitable route might purchase slots from an airline struggling to make a profit, but it would be unlikely to generate significant changes in average aircraft size, or average length of flight, the two most important impacts expected from secondary trading. In general, the beneficiaries are expected to be the major, non-Italian, scheduled airlines.
192. Table 9.18 summarises the detailed tables to be found in *Appendix 12*.

Table 9.18: Summary of Forecasts for 2025 – Milan-Linate

Milan-Linate	2005 - actual	2025 – no trading	2025 – with trading	2025 variance
ATMs - flights	95,000	105,000	105,000	-
Passengers per flight	100.9	108.0	108.6	+0.5%
Passengers (000)	9,581	11,344	11,399	+0.5%
Revenue Pax Kms (mn)	7,374	8,857	8,882	+0.3%
Passenger Revenue (\$mn)	1,067	1,313	1,325	+0.9%

193. In summary, on the assumption of secondary trading and no TCAA, it will be seen that there will be few significant changes. The dominant incumbent airline (Alitalia) is expected to gain a small amount of market share in terms of flights, up from 34.5% to 36.0%, while RPK market share rises from 27.5% to 28.7%. There are forecast to be no new entrant airlines if there is no secondary trading, but permission for such trading is expected to lead to a 3.0% share of flights and 3.3% share of RPKs. All of these additional flights by Alitalia and new entrants are expected to be taken from the large number of short-haul flights operated by other incumbents and the low cost airlines.

194. As a result there are no displaced short-haul flights resulting from secondary trading. Surplus demand, as seen from the forecast number of slot requests, is expected to be satisfied at Milan-Malpensa and Milan-Bergamo.

195. Detailed calculations show that the proportion of business passengers (30.0% in 2005) will rise to 30.4% without secondary trading, and to 31.1% if trading is permitted.

196. The level of local origin and destination traffic (estimated at 90.2% in 2005) is expected to ease back to 90.1% if there is no secondary trading, and to 89.9% if secondary trading is allowed.

(ix) Sub-Total for the Eight Airports Studied

197. Taking the eight airports in total, table 9.19 summarises the slot situation in 2005 and the expected outcome in 2025, based on the information presented above.

Table 9.19: Capacity and Demand 2005 and 2025 – Eight Congested Airports

Total for the eight airports	2005	AAGR %	2025
Capacity limit	2,990,000	0.9%	3,570,000
Capacity used	2,705,000	1.4%	3,540,000
Slots requested	3,429,000	3.1%	6,317,000
Shortfall of capacity	724,000	7.0%	2,777,000
Excess Demand as %	26.8%		78.4%

198. Thus the unsatisfied demand in 2025 at these eight airports – at around 2.8 million flights a year – exceeds the total operation at those airports today.

199. Table 9.20 summarises the detailed tables to be found in [Appendix 13](#).

Table 9.20: Summary of Forecasts for 2025 – Eight Congested Airports

Total for the eight airports	2005 - actual	2005 – base line	2025 – no trading	2025 – with trading	2025 variance
ATMs - flights	2,705,000	2,705,000	3,540,000	3,540,000	-
Passengers per flight	107.7	106.7	122.6	131.4	+7.2%
Passengers (000)	291,256	288,704	433,933	465,182	+7.2%
Revenue Pax Kms (mn)	863,588	836,403	1,500,136	1,756,195	+17.1%
Passenger Revenue (\$mn)	69,652	74,236	127,942	146,582	+14.6%

200. Thus, it is forecast that secondary trading would lead to an additional 31.2 million passengers a year travelling through these eight airports, giving an increase of 17% in revenue passenger kilometres, and additional airline passenger revenues of some \$18.6 billion a year.

9.16 Forecast Impact at All EU Airports

201. In order to prepare a total economic impact study, it is necessary to consider the impact throughout the twenty-five (and soon to be twenty-seven) member states of the EU of any permission to allow secondary slot trading as defined above, both in 2005 and in 2025.

202. The method of determining the situation in 2005, when secondary trading was practised at London-Heathrow and London-Gatwick, but not elsewhere, has assumed that the level established in London is around 90% of what would have happened in London in 2005 if the EC Slot Regulation had expressly permitted secondary slot trading. Based on discussions with BA and ACL, where differing views were given as to the level of potential trading which had not taken place, it is assessed that there might be 10% more trading at London today if all airlines were confident of the legality of the process and there was more open discussion of the options.

203. In addition, it is suspected, from anecdotal evidence from airlines, airports and slot coordinators, that many of the remaining six airports studied would have experienced some smaller levels of secondary slot trading, most probably at Frankfurt in peak hours, but with no, or almost no, trading at Düsseldorf or Milan-Linate. It is assessed that such additional trades at these six airports would represent around 10-15% of the levels of trading experienced in London. It is not believed that – in 2005 – there would have been any significant demand for secondary trades at any other EU airport.

204. Thus it is suspected that the true total demand for secondary slot trading in Europe in 2005 was around 25% greater than that observed at London-Heathrow and London-Gatwick.

205. The situation in 2025 will be different. The calculations earlier in this section have made estimates of the level of secondary trading expected at all eight study airports. What is required is an estimate of additional trades at all other EU airports in 2025.

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206. This requires an estimate of the total number of airports in Europe likely to be congested in 2025, based on forecasts of both slot supply and demand for each airport, and estimates of the possible level of secondary trading at each.
207. The most comprehensive study made to date of congested airports throughout Europe was by Eurocontrol (in co-operation with ECAC) in its 'Challenges to Growth', published in December 2004.
208. It reported that 75% of European airports see no possibility for building new runways in the next twenty years, despite demand for flights expected to grow – under its most optimistic scenario – by a factor of 2.5, or 4.7% a year.
209. Under this high growth scenario, it calculated that more than 60 airports throughout Europe will be congested and the top 20 – all within the EU – will be saturated for at least eight to ten hours a day in 2025.
210. At the lower rates of growth (3.1%) adopted by this study – and very similar to the 'most likely' scenario put forward by Eurocontrol – the number of 'congested' and 'saturated' airports will be lower, but no calculations of the exact numbers were made.
211. Currently, the eight airports studied handle approximately 30% of all the passengers at the 400 European airports represented by ACI, the vast majority of which will never be sufficiently congested to benefit from the possibility of secondary trading. Thus there is (theoretically) a maximum factor of around 3.3 to gross up the impact of secondary trading at the eight study airports to represent the total EU impact.
212. This study assumes that approximately 50% of all EU passengers will be travelling to or from EU airports that will be heavily congested in 2025, whereas 30% are using the eight study airports today.
213. As a result, it has been estimated that the number of flights and passengers handled by all congested airports in 2025 is expected to be some 165% of the figure for the eight airports studied. The level of confidence in the ratio of 1.65 is not total – the range of probability is however confidently believed to be between 1.45 and 1.80.
214. Table 9.21 summarises the forecasts for all of the EU airports from *Appendix 14*, based on a ratio of the eight airports to all congested airports of 1:1.65

Table 9.21: Summary of Forecasts for 2025 – Estimate of All EU Airports

Total for all congested EU airports	2005 – with trading	2005 – base line	2025 – no trading	2025 – with trading	2025 variance
ATMs - flights	2,705,000	2,705,000	5,841,000	5,841,000	-
Passengers per flight	107.9	106.7	122.6	131.4	+7.2%
Passengers (mn)	291.9	288.7	716.0	767.6	+7.2%
Revenue Pax Kms (mn)	870,347	836,403	2,475,224	2,897,722	+17.1%
Passenger Revenue (\$mn)	70,092	74,236	211,104	241,861	+14.6%

215. It is therefore forecast that the probable number of passengers at Europe's most congested airports will increase by some 51.6 million passengers a year by 2025 if secondary slot trading is permitted, allowing airlines to offer an average increase of 17% extra revenue passenger kilometres per flight, for no increase in the number of flights flown.

10 Assessment of Economic and Environmental Impacts

10.1 Introduction

1. The previous chapter provided detailed forecasts of traffic at eight European airports, extrapolated to provide an EU-wide perspective, on potential changes in the number and types of flights in 2025 both with and without the introduction of secondary slot trading. This chapter uses those forecasts to develop quantitative and qualitative analyses of the economic and environmental impacts of introducing secondary slot trading. These are summarised in an Appraisal Summary Table (AST). Specifically, the effects on the following impact areas are discussed:

- producer and consumer welfare;
- the degree of competition, both between airlines and between hubs;
- airport finances;
- CO₂, NO_x and noise emissions;
- local and wider economic costs and benefits; and
- the effect on thin community routes.

2. This chapter is structured as follows. Each of the above issues is covered in turn, with each subsection describing the economic issues, the form of the quantitative analysis carried out, and the results of that analysis. Finally, conclusions are drawn, based on the quantitative analysis, and summarised in the AST. Chapter 11 takes these quantitative conclusions, and discusses them in the wider context of the qualitative findings from previous chapters, to provide an overall synthesis of the impacts associated with the introduction of secondary trading.

10.2 Impacts on Welfare

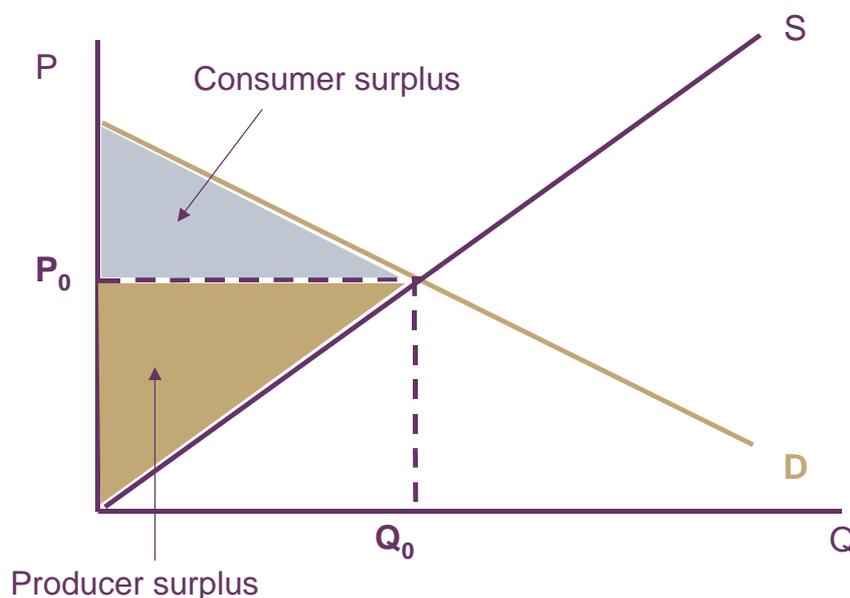
10.2.1 Background

3. Basic economic theory suggests that, in a competitive market, prices are set at the intersection between the demand curve, reflecting consumers' willingness to pay for different levels of output, and the supply curve, reflecting producers' willingness to sell at different levels of output. Consumer surplus (a measure of consumer welfare) is driven by the value of output to consumers, as indicated by their willingness to pay, less the value paid, in our case, to airlines. Producer surplus (similarly a measure of producer welfare), on the other hand, is equal to the price earned by airlines less the value they require.⁵⁶

⁵⁶ Although in a sector such as aviation where network externalities are important, a single flight might contribute to overall airline producer surplus by more than the strict margin of that flight, due to it feeding passengers onto a flight with a higher profit margin.

4. In Figure 10.1⁵⁷, consumer surplus is represented by the grey shaded triangle bounded by the demand curve, the y-axis, and the line from intersection of the demand and supply curves and the price level, P_0 . Across this triangle, there are some consumers who would be willing to pay more for the good or service (e.g. as a result of higher-than-average incomes or the need to travel for business reasons), but who are able to pay less thanks to the market-clearing price being set at a lower level.
5. Similarly, producer surplus is given by the brown shaded triangle bounded by the supply curve, the y-axis and the line from intersection of the demand and supply curves and the price level, P_0 . Across this triangle, there are some producers willing to sell the good or service for less than the market-clearing price (e.g. by being more efficient or by benefiting from lower input prices).

Figure 10.1: Definitions of Consumer and Producer Surplus



6. It can be seen from the figure that shifts in the demand and supply curves will alter the balance between amounts of producer and consumer surplus. Similarly, the shape of the demand and supply curves will have an important impact on the absolute levels of welfare - for example, a flatter demand curve (more elastic, where a small change in price leads to a larger demand response) leads to an overall lower level of consumer surplus.
7. It can be seen, therefore, that any changes in the supply of different types of flights as a result of the introduction of secondary slot trading will have an impact on welfare. There are two likely mechanisms by which welfare would be affected:
 - a change in the supply of flights of a certain type (e.g. dominant incumbent long haul) will lead to a movement *along* the demand curve - see Figure 10.2;

⁵⁷ The figure assumes, for ease of exposition, that there is a single market-clearing price for the flight in question. To the extent that airlines undertake yield management, then this will not be the case, as this enables different prices to be charged to different consumers on the basis of their revealed willingness to pay. We return to this issue below.

- an additional *shift* in the demand curve as a change in the mix of flights alters the overall level of demand at given prices or generalised costs, either via serving a destination for the first time, or increasing frequency on an existing route - see Figure 10.3.

Figure 10.2: Movement Along the Flights Demand Curve

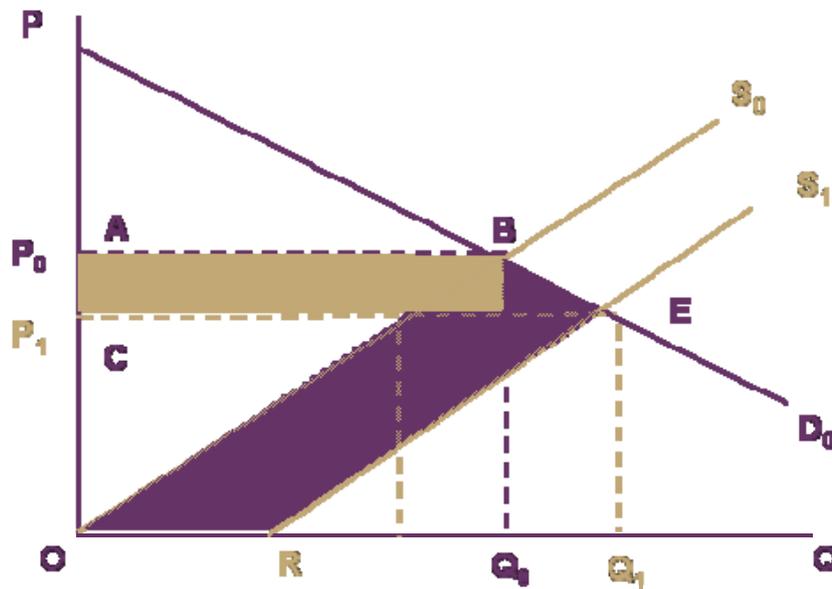
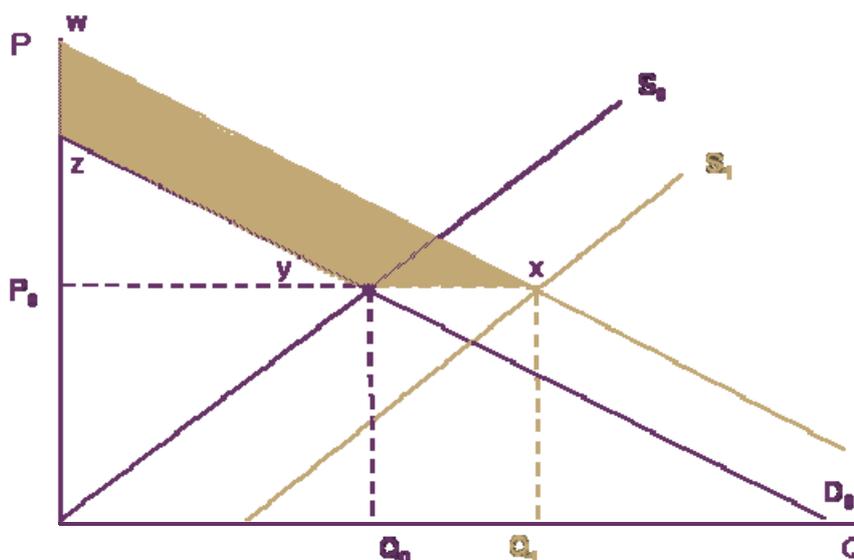


Figure 10.3: Additional Shift in the Demand Curve



8. It can be seen in the first figure that an increase in the supply of a particular flight type as a result of the introduction of secondary trading is likely to reduce the price⁵⁸ - and hence increase consumer welfare - by a combination of reducing the price paid by existing consumers (who previously were willing to pay the higher price, shown by rectangle ABCD) and attracting new passengers (who are now willing to pay the lower price, shown by triangle BDE). In this situation, producer surplus falls by the rectangle ABFC, since existing passengers are paying less per flight, but increases by the area EFOR (where O, as drawn, is the origin), reflecting the increased volume at price P_1 . Whether producer surplus increases or decreases depends on the shape of the demand and supply curves.
9. However, if the demand curve shifts out as a result of increased frequency, then it is possible that prices will not move at all, with the overall effect on consumer welfare given by the quadrangle WXYZ. Importantly, it can be shown that, for a parallel shift in the demand curve, quadrangle WXYZ in Figure 10.3 (the increase in consumer surplus in the no price change case) is equal in area to the shape ABEC in Figure 10.2 (the increase in consumer surplus in the case where price falls). It can also be shown that producer surplus is the same in the two cases. In the latter case, both gross and net increases in producer surplus are equal to the rectangle YXQ₀Q₁, reflecting that more passengers are being carried at the same price.
10. As to which of these impacts within a particular flight type is observed is determined by the following three factors:

⁵⁸ Strictly speaking, 'price' in Figures 10.2 and 10.3 should be referred to as generalised cost, which includes the time cost component of taking a flight.

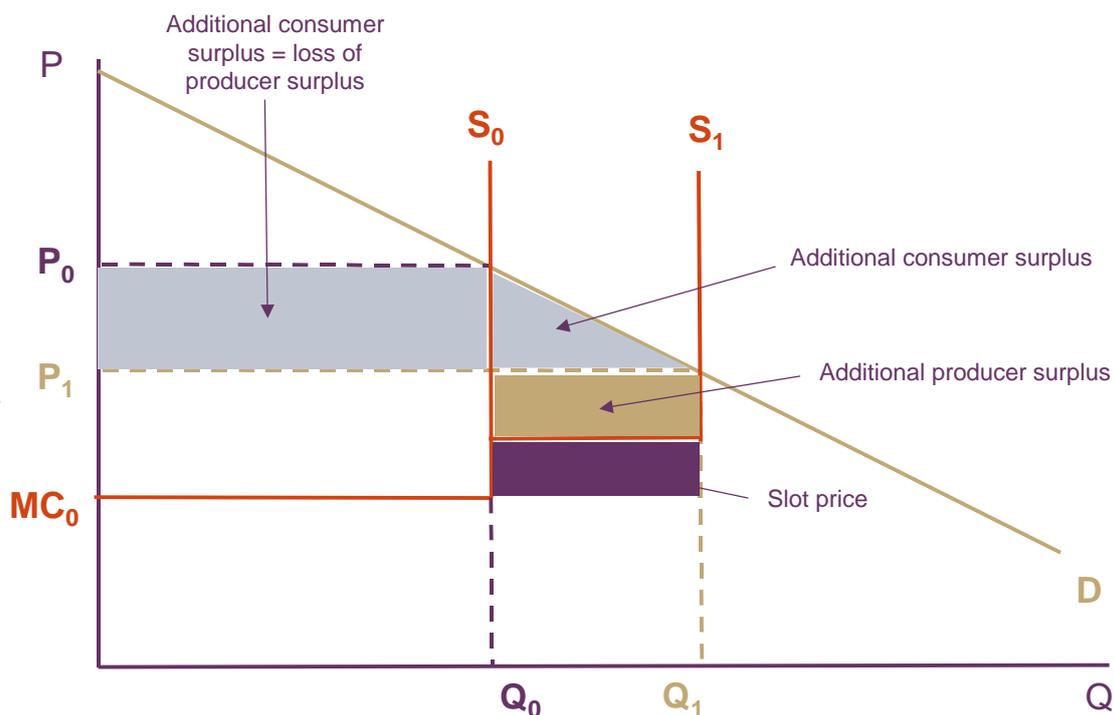
- a) *Whether the increase in supply leads to a new destination being served or an increase in frequency on an existing route* - serving a new destination should (except in the case where there is pent-up demand (at given fares) on a route that fills up an additional flight) lead to a larger shift in the demand curve than adding more frequency onto an existing route, although even in the former case it is likely that average yield will be lower than the current average, otherwise arguably the route would already be available⁵⁹. In the latter case the overall balance of demand impacts depends on the proportion of time elements in the generalised cost of flights - if the additional frequency significantly reduces the time component of generalised cost, then it could be the case that the reduction in fares necessary to induce the additional demand when supply increases is lower, or even zero. An analysis of the market by the study team suggests that around 20% of supply increases may lead to new destinations being served (such as to new points in India and China), with the remainder coming from increases in frequency on existing routes.
- b) *The extent to which a dominant incumbent can raise entry barriers* - taking the case in Figure 10.2, a new entrant on a route would gain surplus equivalent to the area EFOR, while the incumbent would lose surplus of area ABFC. This has important implications for behaviour. If the incumbent can push the cost of a slot up sufficiently, perhaps by virtue of its dominant position (which will be supported by the grandfathering of slots), then a new entrant will not find it worthwhile to earn the difference between revenue earned (EFOR) and the slot cost. Similarly, if the incumbent decides it is strategically important to prevent new entry, then the price it would pay for a slot (that could otherwise be used to compete against it) would be equivalent to ABFC (which it stands to lose), plus the network benefits gained (assuming the slot is not used on the same routes the incumbent is already operating, but instead on a feeder route). The net effect of such behaviour is, arguably, to reduce the efficiency of slot usage, and transfer value from potential new entrants to incumbents. However, in *overall* welfare terms, what is more important is whether strategic behaviour would prevent new demand from being created. Arguably if incumbents push slot prices up for strategic reasons, then there is less likelihood of new demand being generated by, for example, new routes being flown by new entrants.
- c) *Whether airlines will be able to capture consumer surplus via price discrimination* - airlines' yield management strategies are designed to reveal each consumer's willingness to pay, thereby transforming consumer surplus into producer surplus. It may be the case that consumer welfare does not increase as a result of price discrimination. To the extent that secondary slot trading leads to routes being operated by airlines with more efficient yield management practices (they would have a higher net present value, or NPV, per flight than less efficient operators and would be willing to trade), then any increase in supply of a certain route type will lead to less of an increase in consumer surplus than would otherwise be the case - although overall benefits would still rise.

⁵⁹ Unless bilateral agreements between countries currently restrict the number of flights between two destinations.

11. In practice, the supply curve of flights is unlikely to be of the conventional upward sloping type illustrated above, but rather L-shaped as illustrated below in Figures 10.4 and 10.5, with fairly elastic supply (broadly constant marginal cost) up to the limit imposed by slot supply and completely inelastic above that. In this type of market, fares (P) will exceed marginal cost (MC) if the slots constraint bites, with airlines earning producer surplus. If the constraint does not bite, fares will be set at marginal cost (including normal profit) and there will be no producer surplus. Given our focus on congested airports, where slots have to be rationed, we conclude that producer surplus will in aggregate be positive on constrained routes. In the presence of trading, with slots used where demand and returns are greatest, producer surplus will probably be earned on many if not most flights at such airports.

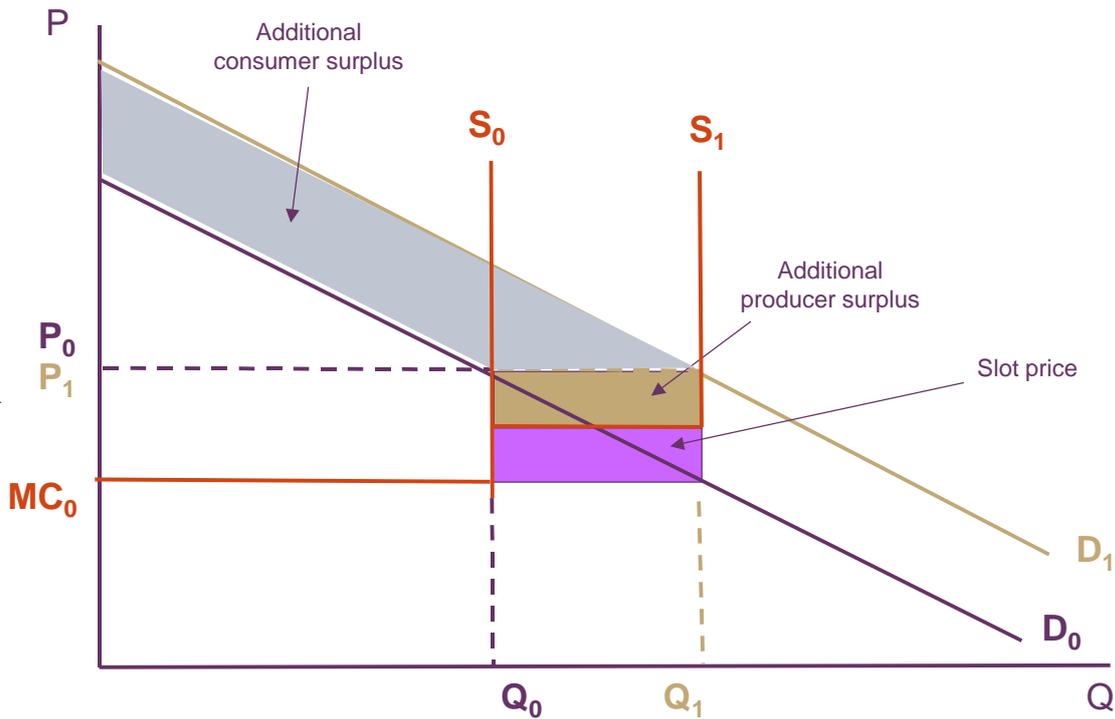
12. With these supply conditions the analysis of demand and consumer surplus is essentially the same as in the simple case, but producer surplus may depend on the varying margin of fare levels over marginal cost. If demand shifts upwards as a result of trading, for the reasons given above, this potentially enables airlines to maintain a higher margin over marginal cost for all their flights⁶⁰. For the purpose of our quantitative analysis we have assumed fixed fares and slot values when calculating impacts on producer surplus, which means that the estimates of producer surplus are likely to be biased upwards to the extent that sufficient net additional demand is not generated at current fare levels.

Figure 10.4: Fixed Slot Supply



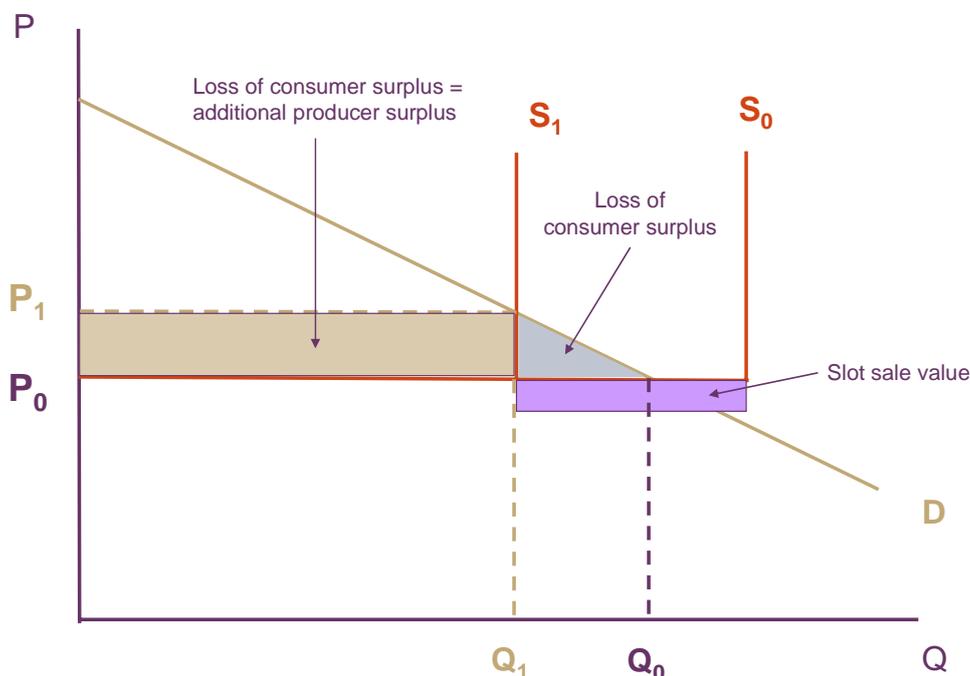
⁶⁰ The distribution of producer surplus between slot buyers and sellers depends on the relationship between slot values – the prices willingly paid by airlines at the margin for extra slots – and fares/demand. If higher demand and fares are anticipated and fully reflected in higher slot prices there will again be no difference in producer surplus for slot buyers, and commensurately greater gains for slot sellers.

Figure 10.5: Fixed Slot Supply with Higher Demand



13. Figures 10.4 and 10.5 show the impacts of trade for slot purchasers, where the number of flights increase. The counterpart is the sale of slots by operators of flights of lesser economic value. Their position is illustrated in figure 10.6, on the assumption that producer surplus is zero pre-trade and that demand conditions remain unchanged. The selling airline gains both some producer surplus, if reduced flight numbers on their routes permits a rise in fares, and the proceeds of the slot sale. Consumer surplus is reduced. A similar analysis applies for alternative assumptions about pre-trade conditions and demand impacts.

Figure 10.6: The Impact on Slot Sellers



14. It is important to note that the analysis in figures 10.4 - 10.6 still assumes that the market clears, just as in the simple analysis in figures 10.1-10.3. Fares will be set by airlines so that demand is on average no greater than available supply without significant non-price rationing. We have no reason to believe that, though there will be non-price rationing on some individual flights while others are undersubscribed, airlines will not set average fare levels for particular flight types so low that there is persistent and general excess demand. It would not be rational for the airline industry to act in this way, notwithstanding that individual airlines may choose to do so on some routes for some of the time, perhaps for network management reasons.

10.2.2 Welfare Impacts

15. The welfare effects due to slot trading will depend on the impact that trading has on the number and types of flights operated at each EU airport. The results of the forecasting exercise outlined in Chapter 9 provide some high level estimates of the changes that might be expected to occur by 2025 as a result of the introduction of slot trading. However, these estimates only consider net changes in the number of flights operated under a set of generic operator and route types. They are not able to account for changes in the actual destinations serviced, nor do they consider the demand side effects that would be required to induce these changes. For example, it is not possible to say whether an increase in the number of long haul flights from London Heathrow is due to a new destination being serviced or additional flights being added to an existing route. The discussion in the previous section suggested that the welfare effects for consumers as a whole will be the same regardless of whether flight numbers on a particular route type change due to increased frequency or new destinations; however, these considerations are important for estimating the impact on airlines, and hence producer welfare.
16. The approach that the study team has taken in estimating the welfare effects to slot trading is based on estimating the change in producer and consumer surplus in 2025 arising from the change in slot usage under the 'slot trading' and 'no slot trading' scenarios described in Chapter 9. The overall welfare effects have been built up from the sum of the welfare effects for each generic route type and each of the study airports. These are then grossed up to give an estimate of the overall EU wide impact of trading. *Appendix 15* shows how these calculations have been carried out.
17. Each route type at each airport is assumed to be a separate market in terms of the supply and demand of flights. It is assumed that for each of these, the market will clear at the volume of flights given by the Chapter 9 forecasts. In the scenario assuming no slot trading the market clearing price is estimated from the average fare levels assumed for each route type. In the 'slot trading scenario' the analysis considers two alternatives:
 - Demand curve shift: where the change in flight numbers is due to a change in the destinations serviced or the generalised costs on existing routes, and hence there will be no change in the market clearing price for flights.
 - Price shift: where the change in flight numbers is due to a change in capacity on existing routes and the market clearing prices will change according to the elasticity of demand for that route type.
18. The analysis undertaken for the latter scenario, in which prices were assumed to adjust to clear the market, led to a negative welfare estimate. This reflected the fact that prices fell on average to below cost levels, leading to a loss in producers' surplus which exceeded the gain in consumers' surplus. Given that in such cases either costs would need to fall to preserve margins or such trades would not occur, only the results from the demand curve approach are presented in Table 10.1. This might be seen as an upper bound of the potential welfare impact, given that the price shift approach would be expected to lead to lower results, given the restrictions in the modelling approach, leading to a negative value were alleviated.

Table 10.1: Total Welfare Outcomes Resulting from Introducing Secondary Trading Assuming a Demand Shift (€m)

Flight Category	Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	EU Total
Long-haul		4,540	1,690	196	6,099	4,312	211	3,247	0	20,295	33,486
Short-haul >100 seats		-320	184	611	187	255	110	-26	-2	999	1,649
Short-haul <100 seats		2	-2	-17	-4	-31	-7	-16	-2	-76	-126
Others		0	-124	-10	-934	-436	-24	-257	0	-1,785	-2,945
Total		4,223	1,747	780	5,348	4,099	290	2,949	-3	19,433	32,064

Source: Study team calculations

19. The approach we have taken in this analysis estimates the welfare effects for consumers and producers separately, under the assumption that airlines charge the average fare level for all passengers. However, in practice the yield management techniques used by airlines mean that they are able to achieve some degree of price discrimination. This may mean that airlines could be able to capture a significant proportion of the estimated consumer surplus, although the total welfare effect will be unaffected by this redistribution between consumers and airlines. The study team has not attempted to assess the potential size of effect of this redistribution.
20. Table 10.2 shows what happens to consumer welfare as a result of the introduction of secondary trading - assuming the result from above that consumers in aggregate will be indifferent between prices falling to induce demand as supply increases, and demand rising as frequency increases and new routes are flown. Technically the relative effects in the two cases will depend on how any outward shift in demand affects the price elasticity at given volume levels: an iso-elastic shift would mean a greater gain in consumer surplus in the high demand case; while an absolute flattening of the demand curve for given volume would mean a smaller gain. Our analysis, based on a parallel shift, lies between these two cases, but exactly what kind of demand shift is most likely in practice will depend on the precise circumstances.
21. As is emphasised in the Introduction [Section 2.6], due to a number of uncertainties, our forecasts are broad-brush estimates of the likely impacts of introducing secondary trading. Correspondingly, estimates of welfare impacts are also aimed at reflecting the magnitude and direction of changes due to legalising trading, rather than providing precise forecasts.

Table 10.2: Consumer Welfare Outcomes Resulting from Introducing Secondary Trading (€m)

Flight Category	Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	EU Total
Long-haul		4,418	1,639	187	5,941	4,198	203	3,168	0	19,754	32,594
	Dominant incumbent	2,728	518	0	2,596	1,665	0	1,163	0	8,670	14,306
	Other incumbent	603	252	78	786	0	0	0	0	1,719	2,837
	New entrant	1,087	868	109	2,560	2,533	203	2,005	0	9,365	15,452
Short-haul >100 seats		-404	192	624	194	296	116	-28	-1	989	1,632
	Dominant incumbent	75	-61	-100	130	231	0	73	14	362	597
	Other incumbent	-479	197	272	-175	0	0	-203	-19	-407	-672
	Low-cost	0	-85	26	-54	-97	0	0	-15	-224	-370
	New entrant	0	141	426	293	161	116	102	18	1,258	2,076
Short-haul <100 seats		-9	-6	-18	-43	-78	-8	-45	-2	-209	-345
	Dominant incumbent	0	-6	-14	0	-48	0	-10	0	-77	-128
	Other incumbent	-9	0	-4	-43	-27	-8	-36	-2	-129	-213
	Low-cost	0	0	0	0	0	0	0	0	0	0
	New entrant	0	0	0	0	-3	0	0	0	-3	-5
Charter		0	-46	-9	-101	-49	-24	0	0	-229	-378
Cargo		0	-84	0	-867	-398	0	-262	0	-1,611	-2,658
Total		4,006	1,696	784	5,124	3,969	287	2,832	-4	18,694	30,845

Source: Study team calculations

22. The table shows that, under the assumptions made for this calculation, and also in Chapter 9, consumer welfare across the eight featured airports is expected to increase by over €18bn as a result of the introduction of secondary trading. Across the whole EU, consumer welfare is estimated to increase by close to €1bn. These effects are measured relative to a counterfactual situation in 2025 where trading had not been introduced. Thus, new benefits of this magnitude do not accrue each year; rather, welfare gains are this much higher in 2025 than if trading had not been legitimised. Some additional benefits will accrue each year, as airlines are better able to respond to shocks, but these have not been modelled explicitly.
23. Consumers benefit most highly at Paris-Charles de Gaulle, Amsterdam, and London-Heathrow. These three major hub airports account for nearly two-thirds of surpluses generated. Consumer welfare is positive at seven out of the eight congested airports analysed. However, consumer benefits are relatively modest at Düsseldorf, and at Milan-Linate they are negative. As explained in Chapter 9, most of the impact of introducing trading at Düsseldorf relates to new entrants flying long haul and the use of larger planes on short haul routes, and the consumer welfare impacts reflect this. At Milan-Linate, the slightly negative result is due to the different elasticities used for those low-cost and conventional carriers (see [Appendix 15](#) for these assumptions) which are predicted to exchange slots.
24. Interestingly, while it is to be expected from the results shown in the previous chapter that most of the benefits of introducing trading will come from increasing long-haul flights, these are evenly split between passengers on dominant incumbents' and new entrants' flights. There are some interesting further points to note:
- consumer surplus increases slightly on short-haul routes operating larger aircraft, and decreases where smaller planes are used;

- this first effect is largely down to new entrants on these routes;
- some of the disbenefits arising from other incumbents moving out of London-Heathrow and Paris-Charles de Gaulle are recovered at London-Gatwick and Paris-Orly, respectively.

25. Section 10.3 below considers some of the competition aspects of these results.

26. Table 10.3 shows the impact on producer welfare of introducing secondary trading, assuming fares do not change in real terms (i.e. sufficient demand is induced by increased frequency and connectivity to prevent fares from having to fall as supply increases).

Table 10.3: Producer Welfare Outcomes Resulting from Introducing Secondary Trading (€m)

Flight Category	Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	EU Total
Long-haul		153	64	11	197	142	10	100	0	676	892
Dominant incumbent		105	22	-	105	73	-	56	-	360	476
Other incumbent		26	13	5	36	-	-	-	-	79	105
New entrant		22	30	6	56	69	10	44	-	236	312
Short-haul >100 seats		105	-11	-17	-9	-51	-8	3	0	13	17
Dominant incumbent		-17	11	7	-27	-44	-	-16	-1	-88	-116
Other incumbent		122	-18	-13	38	-	-	30	1	160	211
Low-cost		-	10	1	11	9	-	-	-1	30	39
New entrant		-	-14	-11	-30	-16	-8	-11	-	-90	-118
Short-haul <100 seats		13	4	2	49	58	2	37	0	166	219
Dominant incumbent		-	4	1	-	34	-	6	-	46	60
Other incumbent		13	-	0	49	20	2	31	0	116	153
Low-cost		-	-	-	-	-	-	-	-	0	0
New entrant		-	-	-	-	5	-	-	-	5	6
Charter		0	4	-1	18	5	0	0	0	26	34
Cargo		0	3	0	26	9	0	6	-6	38	57
Total		271	65	-5	280	163	4	146	-6	918	1,219

Note: The change in producer surplus between the 'with' and 'without' trading scenarios is net of the cost of purchasing slots.

Source: Study team calculations.

27. The table shows that the maximum increase in producer surplus (assuming airlines cannot appropriate the increased consumer surplus via yield management) arising from the introduction of secondary trading is just over €900m at the eight study airports and just over €1.2bn across the whole EU. This represents the maximum potential gain, as any change to the assumption that fares do not change will result in total producer surplus decreasing as existing passengers pay less, and new passengers are attracted to travel by lower fares. The minimum change in producer surplus is bounded by zero, as airlines would not trade if the total gain to them from trading - strategic and financial - were negative.

28. There are several reasons why it is reasonable to assume that prices will not have to change much as a result of introducing trading:

- there is a strong likelihood that demand will be created as a result of changes in the route types being flown, leading to some shifting out of the demand curve;

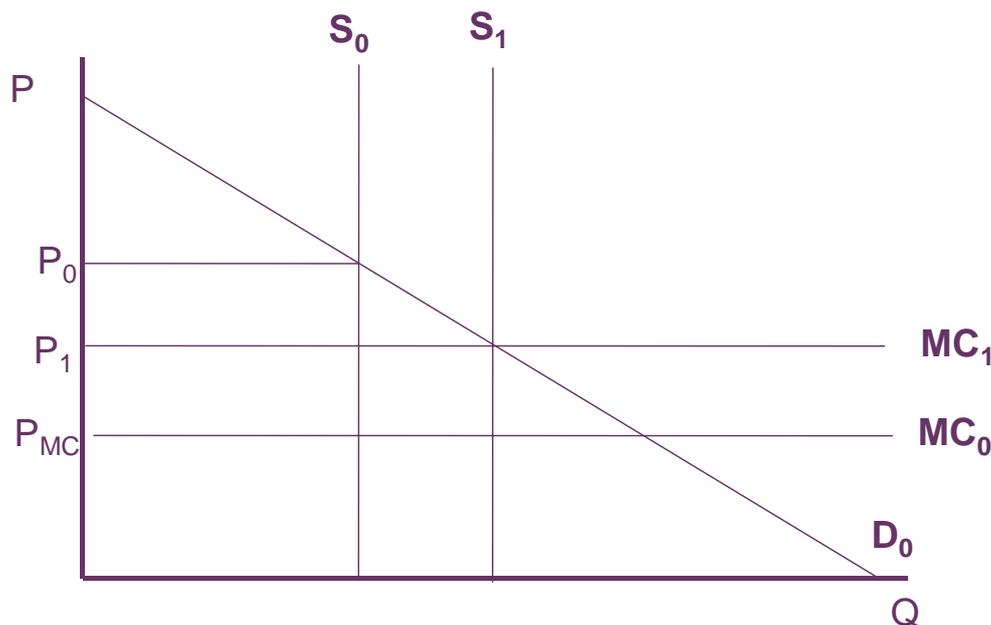
- while it is likely that airlines will have to cut prices to attract new customers as supply increases, it is possible that airlines will not have to cut prices for existing consumers because of the adoption of yield management practices;
 - to the extent that incumbents are able to exploit a dominant position on a route (or route type) and prevent entry by having a higher willingness to pay than new entrants, then the price effects will be limited. However, if new entry on existing routes does occur, this will force incumbents to cut prices (unless the new entry is less abstractive and more generative due to attracting a different type of passenger). Nevertheless, as shown in Chapter 9, the extent of new entry will be small relative to the total number of flights, suggesting this impact will be correspondingly small.
 - Given the high level of demand relative to capacity in some airports, fares might not always in practice be set high enough to clear the market, and so some excess demand may remain. In this case it may not be necessary to reduce fares at all in order to ensure that demand is sufficient to fill additional slots when trading occurs, even if underlying demand remains unchanged, and this will affect the detailed welfare effects. If fares remain the same, the increase in consumer surplus will be lower, as existing passengers gain no benefit – prices were previously too low and passengers were already benefiting from that. But at the same time producer surplus will increase more, because airlines no longer lose revenue from existing passengers. So the existence of excess demand before trading is likely to affect mainly the distribution of welfare gains between passengers and airlines rather than the total welfare improvement. (Although the mechanism is different, there is some similarity between this case and the situation where airlines price discriminate; in both cases only the distribution of welfare gains is different, though with price discrimination passengers start with lower welfare because airlines have already extracted some of their surplus through selective use of higher fares.)
29. Table 10.3 casts some noteworthy insights. Firstly it can be observed that there are transfers between operators of short-haul routes. Secondly, new entrants and dominant incumbents are predicted to experience a loss of surplus as they buy slots for use on short-haul routes. These typically operate at a financial loss, leading to an increase in surplus for other incumbents who sell them. Of course, there are network benefits that are not captured in this analysis, but these will contribute towards producer surpluses on long-haul routes. Thirdly, on account of the fact that long-haul routes are more profitable, the table confirms that the greatest potential for increases in producer surplus occurs at those airports with the greatest predicted scope for growth in consumer surplus. Finally it should be noted that while the producer surplus estimated by this analysis is relatively low, there is significant scope for airlines to use price discrimination in order to capture part of the estimated change in consumer surplus.

10.2.3 Other Considerations

30. As discussed previously, these welfare calculations are based on high-level estimates of how slot trading is likely to affect the patterns of flights operated from each of the study airports. The level of aggregation in these estimates means that it has not been possible to quantify the impact that trading would have on EU and non-EU carriers. However, Table 10.3 shows that the majority of the producer surplus benefits are likely to occur on long-haul routes and that these benefits will be relatively evenly split between incumbent and new entrant airlines. In almost all cases EU carriers will be the dominant incumbent airlines and operate the short-haul routes at the study airport. The only routes-type likely to have a significant presence from non-EU carriers will be long-haul routes operated by 'other incumbents' and 'new entrants'. It would therefore be reasonable to assume that the majority of the welfare benefits associated with slot trading will accrue to EU airlines, either in the form of the revenues associated with additional flights, or through the value of slots sold to non-EU new entrants.
31. It is worth noting that the welfare increases described in these tables may actually underestimate the net impact of introducing secondary slot trading. This is because the modelling in Chapter 9 does not explicitly quantify the effect of some flights displaced by trading moving to secondary airports. As this happens, the welfare of affected consumers - who may pay lower fares at secondary airports - is not reduced by as much, although there may be some offsetting generalised cost increases if the average consumer has to travel further, or faces lower frequencies and facilities at the substitute airport.
32. It should also be emphasised that the cost of slots and the increase in supply of flights will be related. This is shown in Figure 10.7, where the simplifying assumption that other elements of marginal cost are invariant to (i.e., do not vary with) quantity, has again been made. Due to limited supply of slots, fares are initially set at P_0 rather than at MC_0 . Supply of certain flight types will increase (from S_0 to S_1) as a result of trading as long as this doesn't go beyond the point where fare (P_1) equals the new marginal cost, including the slot cost (i.e. the slot cost does not exceed $P_1 - MC_0$)⁶¹. There is no sense in which the cost of new slots can be "passed on" into higher fares than ruled before trading.

⁶¹ Note that the modelling carried out for Chapter 9 assumes that margins will remain negative for short-haul operations by non-low cost carriers. Their existence is justified as feeder routes into long-haul services (the network benefits argument). In this case, the slot cost would be passed onto consumers through higher fares.

Figure 10.7: Impact of Changes in Slot Costs on Air Fares



33. Discussions with equity and debt analysts have suggested that secondary trading will exert a limited impact on airline finances. Equity values are predicted to increase to some extent as a result of maintaining load factors despite switching to larger aircraft, and of obtaining access to airports where airlines are currently unable to obtain slots. Furthermore, access to debt markets might be easier for airlines if slots can be used as collateral⁶². This will either lead to cheaper costs of debt for airlines, or the ability to increase gearing for the same cost of debt, thereby resulting in enhanced equity values. From a technical standpoint, as is currently the case, few carriers would be valued by equity analysts on the basis of slot holdings, since this could lead to volatile valuations as capacity is changed at airports.
34. An interesting counterpoint to this analysis relates to measured rates of return, which will fall as assets in the form of slot valuations are added to the balance sheet. This may not only affect investor behaviour, as the low profitability of airlines is fully exposed, but will also provide airline management with stronger incentives to improve efficiency. Either way, the likely effect is that overall economic efficiency will be improved in ways not captured by the numerical estimates.

10.2.4 Summary of Welfare Impacts

- i. Previous chapters have estimated the overall net increase in passenger demand due to the introduction of secondary trading, which is driven by more efficient slot use. Gains in some route types would be partially offset by reductions on others.

⁶² If airlines are able to add grandfathered slots to their balance sheets following a legitimisation of secondary slot trading, then they may be able to raise finance against the slots. There will be important considerations such as the value at which the grandfathered slots will be included on the balance sheet, and the treatment of slots by ratings agencies and banks, which will affect the improvement in airline finances experienced.

- ii. In order to encourage this increase in demand as supply of certain route types increases, fares may need to fall, thereby generating higher welfare for existing passengers as well as new passengers.
- iii. However, increased frequency on some routes and, especially, the development of new routes may itself generate higher demand and increase passenger welfare for given fare levels, so reducing the need for any reduction in fares. In overall terms, consumer welfare across the EU, which does not alter significantly across these two scenarios, is expected to increase by around €1bn as a result of the introduction of trading.
- iv. Producers - namely airlines and/or airports (see Section 10.4 below) - will benefit from higher demand per slot, and the amount airlines will be prepared to pay for additional slots will reflect their assessment of whether fares will need to fall and hence the potential increase in passenger revenue. In total, producer welfare across the EU is expected to increase by up to €1.2bn as a result of the introduction of trading. This is likely to lead to an uplift in equity values, both directly, and indirectly through greater access to debt markets if slots can be collateralised.
- v. The overall increase in welfare, taking suppliers and passengers together, of as much as €2bn, may depend to a limited extent on how the increase in demand is generated, which is closely linked to fare levels.
- vi. Passengers benefit from using routes where fares fall and/or frequency increases, while those customers displaced when slots are sold experience a reduction in welfare. Airlines benefit from higher revenues per passenger but incur additional costs in operating services on otherwise insufficiently profitable routes.
- vii. The precise distribution of welfare gains between passengers and suppliers will depend on elasticities of demand and supply in the market and on the ability of airlines to extract consumer surplus for themselves by means of price discrimination. Crucially, the welfare benefits will accrue largely to suppliers rather than passengers if passenger demand is relatively price sensitive (and so there is little consumer surplus to be had), or if airlines are able to price discriminate very efficiently.

10.3 Impacts on Competition

35. Table 10.4 shows the overall change in the proportion of flight types as a result of secondary trading, based on the forecasts provided in Chapter 9.

Table 10.4: Change in Proportion of Flight Types due to Secondary Trading

Flight Type	London-Heathrow		London-Gatwick		Paris-Orly		Paris-C. de Gaulle		Amsterdam	
	No Trading	With Trading	No Trading	With Trading	No Trading	With Trading	No Trading	With Trading	No Trading	With Trading
Long-haul										
Dominant Incumbent	14	18	4	6	3	3	14	18	9	11
Other Incumbent	21	22	7	8	10	11	11	12	8	8
New Entrant	2	4	3	6	3	4	2	5	2	4
Short-haul >100 seats										
Dominant Incumbent	26	27	32	30	50	45	37	39	28	32
Other Incumbent	34	27	5	7	9	14	13	11	15	15
Low Cost Carriers	0	0	24	20	10	11	4	3	10	8
New Entrant	1	1	4	6	1	4	1	3	2	3
Short-haul <100 seats										
Dominant Incumbent	0	0	1	0	7	3	2	2	10	7
Other Incumbent	2	1	1	1	4	3	5	2	4	2
Low Cost Carriers	0	0	0	0	0	0	0	0	0	0
New Entrant	0	0	0	0	0	0	0	0	1	0
Charter	0	0	18	16	3	2	4	2	5	4
Cargo	1	1	1	0	1	1	8	6	9	8

Flight Type	Dusseldorf		Frankfurt		Milan-Linate		Total 8 airports	
	No Trading	With Trading	No Trading	With Trading	No Trading	With Trading	No Trading	With Trading
Long-haul								
Dominant Incumbent	2	2	12	14	0	0	9	12
Other Incumbent	3	3	10	10	0	0	10	10
New Entrant	3	4	1	3	0	0	2	4
Short-haul >100 seats								
Dominant Incumbent	19	19	37	38	34	35	32	33
Other Incumbent	22	22	15	13	23	21	17	16
Low Cost Carriers	20	20	2	2	40	38	8	8
New Entrant	3	4	2	3	0	3	2	3
Short-haul <100 seats								
Dominant Incumbent	18	18	5	5	1	1	5	4
Other Incumbent	10	9	5	3	1	0	4	2
Low Cost Carriers	0	0	0	0	0	0	0	0
New Entrant	0	0	0	0	0	0	0	0
Charter	2	1	3	3	1	1	4	3
Cargo	0	0	10	9	1	1	5	5

36. The overall picture that emerges is characterised by five key elements:

- dominant incumbent operators increase their shares of flights in the short- and long-haul markets, and are predicted to move from secondary to primary airports (e.g. from London-Gatwick to London-Heathrow and from Paris-Orly to Paris-Charles De Gaulle);
- new entrants increase in size considerably on a relative basis both in the short- and long-haul markets;
- these gains tend to be at the expense of other incumbents in the short-haul market, which are predicted to transfer their services to secondary airports (e.g. from London-Heathrow to London-Gatwick and from Paris-Charles de Gaulle to Paris-Orly);
- charter flights are predicted to lose out as a result of this shift of other flights towards secondary airports;
- there is a switching away from smaller aircraft to larger aircraft on short-haul routes.

37. Taken as a whole, this suggests there will be a slight rise in diversity of users at airports on the different route types, and an increase in the market share of dominant incumbents, particularly at hub airports.
38. The analysis in the previous section provides some useful insights into the incentives on different operator types as far as strategic behaviour is concerned. Where incumbent operators are aware that an available slot is likely to be bid for by a potential competitor, they have strong incentives to bid up to the value of the reduction in revenues they are likely to experience, plus any network benefits they might gain from using the slot as, for example, a feeder route. In the case where the routes operated are generally not in direct competition with an incumbent, the slot cost will reflect the NPV of the route the purchaser wishes to use the slot for as well as that of the seller's route to be lost.
39. However, if the incumbent decided to behave strategically, the cost of the slot would rise and trades would decrease, potentially preventing gains in welfare from the new entry and increased efficiency of slot usage. If this strategic behaviour predominated, then slot prices would rise on average and trade would be limited, leading to a potentially large reduction in the welfare available from introducing trading.
40. The main mechanisms for preventing such strategic behaviour are
 - i. the banning of restrictive covenants in slot exchange contracts that prohibit using slots in competition with the seller;
 - ii. active policing by competition authorities in the slot market; and
 - iii. operating 'blind' slot trading, where participants are unaware of who is buying available slots. Perversely, it may be the case with this third mechanism that it would lead straight to the undesirable consequences highlighted above - with no awareness of who is bidding for a slot, incumbents would automatically bid their maximum value, reflecting the risk that a competitor could gain the slot.
41. Chapter 11 considers competition impacts further, including the issue of: whether competition between or within hubs is more relevant

10.4 Impacts on Airport Finances

42. Section 10.2 above assumes that welfare increases resulting from secondary trading are shared between airlines and consumers. Yet, more efficient usage of slots will increase passenger numbers at both primary and secondary airports (to the extent that flights flown by carriers selling slots are moved to secondary airports). To address this issue, the forecast impacts from the previous chapter have been used to estimate, on an airport-by-airport basis, the change in commercial revenues (i.e., those revenues which do not directly relate to the aeronautical operations of the airport)⁶³ earned as a result of the introduction of secondary slot trading. These are shown in Table 10.5.

⁶³ Examples of aeronautical revenues are runway charges, and per passenger charges paid by airlines. Commercial revenues are derived from all other activities—e.g., shops in the terminals and car parking charges.

Table 10.5: Change in Annual Airport Commercial Revenues due to Secondary Trading

Airport	Change in commercial revenues (€m)	Change in commercial revenues (%)
London-Heathrow	25.3	5.6
London-Gatwick	5.6	4.5
Paris-Orly	27.8	8.3
Paris-Charles de Gaulle	80.0	7.7
Amsterdam	86.3	13.8
Düsseldorf	1.9	0.7
Frankfurt	154.4	4.8
Milan-Linate	0.4	0.5

Note: The change in commercial revenues is obtained by multiplying the change in passenger numbers for each airport from Chapter 9 by average commercial revenues per passenger from the airport's annual report.

Source: Various airport annual reports and study team calculations

43. The table shows that the greatest impact in financial terms is seen at Frankfurt, Paris-Charles de Gaulle and Amsterdam airports, as a result of the greater increases in passenger numbers forecast at these airports shown in Chapter 9. On a percentage basis, however, the impacts are greatest at the two Paris airports and Amsterdam, due to higher commercial revenues per passenger.
44. These impacts are consistent with the view of equity and debt analysts interviewed by the project team, who consider that there is likely to be an impact on airport equity valuations as a result of the more efficient use of capacity by airlines (i.e. higher numbers of passengers per slot, derived from the use of larger aircraft that are generally able to achieve higher load factors). The position will vary, nonetheless, on an airport-by-airport basis. With unregulated airports, the increase in passenger numbers should improve their financial position, particularly if they are secondary airports that can also increase landing charges to reflect increased demand for slots by displaced carriers. On the other hand, more passenger numbers at airports subject to economic regulation may have limited financial consequences (unless landing charges are set without reference to commercial revenues—the 'dual till' approach), although in the short term, volume outperformance against regulatory targets could improve their financial position.
45. One important question to consider is whether the introduction of secondary slot trading would impact on incentives for airport operators to invest in new capacity. The total return on slots will increase with trading, as they are used more efficiently. Hence, the level of capacity needed to meet any given level of demand will be reduced; although, the potential rate of return to airport owners who can sell (more efficiently used) marginal slots will be increased. Accordingly, it could be argued that the incentive to deliver a (somewhat lower) optimal level of capacity will actually be increased if auctioning of new slots is permitted.

10.5 Impacts on the Environment

10.5.1 Introduction

46. To the extent that the introduction of slot trading will impact the type of flights flown, the average distance flown and the type of passengers flying, the environment will be affected by the introduction of slot trading. The following sections consider direct atmospheric emissions, ambient air quality and ambient noise level changes that might result from slot trading. These are discussed in detail in Sections 10.5.3 to 10.5.6.
47. The approach that has been taken to assessing these impacts is as follows. The section sets out a qualitative discussion of some of the main environmental impacts of slot trading and how these are likely to occur. Where the data permits, quantification has been undertaken. This quantification is not intended to provide an exact assessment of the impact of slot trading but rather to provide a sense of the direction and magnitude of change that is likely to occur, leaving aside unforeseen events impacting on the aviation industry.
48. Where quantification is undertaken this is assessed by assigning typical aircraft and engines for different flight types (long haul, cargo etc.) and different airlines (dominant incumbents, new entrants etc.). The emissions and noise data for these generic aircraft are then used as the basis for calculating the assessed change in emissions and noise, as a result of the forecast flight pattern and airline type changes. The net effect of secondary trading in 2025 is identified and presented as a proportion of the 2025 forecast without trading, providing an indication of how much (or little) emissions and noise might be increased in the future as a result of slot trading. Table 10.6 below shows the aircraft assumptions for flight type (long haul, short haul) and airline type (dominant incumbent, net entrant etc.) that underlie the assessed changes.

Table 10.6: Categorisation of aircraft type by flight type and airline type

Flight type	Aircraft type	Flight type	Aircraft type
Long Haul		Short Haul - under 100 seats	
- Dominant incumbent	B777-200	- Dominant incumbent	CRJ-200
- Other incumbents	A330-200	- Other incumbents	CRJ-200
- New entrants (since 2000)	B777-200	- Low Cost Carriers	DHC8-400
Short Haul - over 100 seats		- Other new entrants (since 2000)	ERJ-145
- Dominant incumbent	A320-200	Others	
- Other incumbents	B737-700	- Charters	A321-200
- Low Cost Carriers	B737-800	- Cargo	B747-400
- Other new entrants (since 2000)	A319-100		

Source: Study team assumptions, Chapter 9.

49. Using these classifications, and the forecasts of the impact of secondary trading on flight mix, this section presents a discussion of the likely direction and impact on the environment of the introduction of secondary trading. The following sections discuss the impact of slot trading on direct atmospheric emissions, ambient air quality and ambient noise level changes.

10.5.2 Impact of Slot Trading on Atmospheric Emissions

50. The introduction of slot trading might be expected to impact on atmospheric emissions in the following ways:

- Take off and landing emissions as different sized aircraft are substituted
- Altitude emissions as different lengths of flights are flown
- Different emissions as the surface access patterns change in accordance with changes in passenger mix and, perhaps more important, total number of passengers carried.

51. Each of these impacts is discussed in turn in the following sections. While aviation and surface access modes of transport give rise to a wide variety of different atmospheric emissions, in this study, we consider some key emissions - carbon dioxide, nitrogen oxides (NO_x) and hydrocarbons - which are broadly indicative of the magnitude of environmental impact caused by the introduction of slot trading⁶⁴. Where there is more than a marginal impact on emissions arising from slot trading, a monetary valuation of the projected change is undertaken.

10.5.3 Local Air Quality Impacts from Aviation

52. The results of the modelling suggest that secondary trading will create an incentive for efficient use of slots with consequent substitution of smaller aircraft by larger aircraft. As different sized aircraft have different levels of emissions, emissions levels will change as a result of secondary trading. Table 10.6 shows NO_x and hydrocarbon emissions associated with different aircraft types. It shows that emissions vary quite significantly between aircraft types. For example, an A319-100 emits significantly fewer hydrocarbons and NO_x emissions than a B747-400. Given these differences, as flight types change as a result of slot trading (and thus the aircraft used to deliver these flights) emission levels will also change. These variations are further complicated by different engine types that can be fitted to the same aircraft and the different types of craft assumed to be flown by different airlines (dominant incumbent, new entrant etc.). While hydrocarbons might be expected to increase as short haul aircraft are substituted for long haul aircraft, a change in the mix of airline type will also affect emissions. For example, an increase in dominant incumbents assumed to be employing cleaner aircraft has the potential to reduce emissions.

⁶⁴ Carbon dioxide contains carbon and oxygen. While carbon dioxide does not directly impair human health, as a greenhouse gas it traps infrared radiation thus contributing to the potential for global warming. Nitrogen oxides (NO_x) contain nitrogen and oxygen. In the atmosphere, NO_x can contribute to formation of smog and, can impair visibility but most importantly, reacts with ozone to form nitrogen dioxide (NO₂) – a pollutant with known health consequences. Hydrocarbons are substances containing only hydrogen and carbon. A number of the resultant hydrocarbon compounds contribute to the formation of smog and ozone, in addition to driving the oxidation of NO_x to form NO₂.

53. While this analysis has concentrated primarily on the impact of NO_x and hydrocarbon impacts during the landing and takeoff cycle (LTO), it should be noted that recent research indicates that non-LTO emissions, occurring during the cruise phase of flights, could also have significant impacts in terms of ground level ozone⁶⁵. The study found that the effects of non-LTO emissions of NO_x on ground level ozone were an order of magnitude larger than that of the LTO NO_x emissions. Unfortunately the study team has not been able to include a quantification of these effects in this analysis.
54. In order to assess the impact of these changes, generic emissions need to be established for different flight types: long haul, small short haul aircraft, larger short haul aircraft, cargo and charter and by different airline type. These generic emissions have been calculated by averaging across the typical aircraft and engine types used for these different types of flight, as set out below in Table 10.7.

Table 10.7: Local NO_x and Hydrocarbon Emissions by Aircraft Type per Landing and Takeoff Cycle (grammes)

Aircraft	Hydrocarbons	NO _x
A319-100	312	12,175
A320-200	312	12,175
A321-200	312	12,175
A330-200	3,649	34,794
B737-700	1,812	8,760
B737-800	1,812	8,760
B747-400	3,999	57,335
B777-200	1,393	38,518
CRJ-200	731	2,155
DHC8-400	1,812	8,760
ERJ-145	452	3,126

Source: ICAO Aircraft Engine Emissions Databank, derived from the average of the engine types available.

55. On the basis of these categorisations, Table 10.8 shows the indicative average emissions for different types of flight for both hydrocarbons and NO_x.

⁶⁵ CICERO (2004), 'Study on the air quality impacts of non-LTO emissions from aviation', September.

Table 10.8: Indicative Average Emissions by Aircraft Flight Type for Landing and Takeoff

Nature of flight (grammes)	Hydrocarbons	NO _x
Long-haul average	2,145	37,277
Short-haul average 100+	1,062	10,468
Short-haul average -100	932	4,049
Charter	312	12,175
Cargo	3,999	57,335

Source: Study team calculations based on ICAO Aircraft Engine Emissions Databank data.

56. Using these categorisations and emission data, Table 10.9 below shows the projected changes between 2005 and 2025 in hydrocarbon and NO_x emissions with and without secondary trading. The last row shows the net impact of secondary trading - that is, the impact of secondary trading on emissions over and above changes that are projected as part of the baseline scenario. It is important to note that these results focus on the absolute change in emissions, rather than the change in emissions per passenger kilometre. Consequently, while absolute emissions of NO_x are forecast to increase by more than 7% as total passengers also increase by 7%, passenger kilometres are forecast to rise by 17% with the result that emissions per passenger kilometre fall noticeably.

Table 10.9: Projected Changes in Landing and Takeoff Emissions as a Result of Secondary Trading (tonnes)

Emissions	Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	Total EU airports
Hydrocarbons											
2005 baseline		736	274	234	727	663	217	732	122	3,705	
2025 without trading		909	292	265	1,041	857	415	986	136	4,901	8,087
2025 with trading		903	296	291	1,019	840	417	975	130	4,871	8,037
Net effect of trading		-6	4	26	-22	-17	2	-11	-6	-29	-50
Net effect of trading as a % of 2025 baseline		-1	1	10	-2	-2	1	-1	-4	-1	-1
NO_x											
2005 baseline		8,369	3,768	3,175	10,116	7,832	1,470	10,026	987	45,743	
2025 without trading		10,611	3,939	3,623	15,624	10,971	3,344	14,331	1,081	63,524	104,815
2025 with trading		11,749	4,273	3,824	16,725	11,879	3,471	15,065	1,104	68,090	112,349
Net effect of trading		1,137	334	201	1,101	908	127	734	23	4,565	7,534
Net effect of trading as a % of 2025 baseline		11	9	6	7	8	4	5	2	7	7

Source: ICAO Aircraft Engine Emissions Databank and study team calculations.

Hydrocarbon results

57. The results show that annual emissions of hydrocarbons are forecast to increase by 32.3% across the EU25 from 2005 to 2025, based on the eight airports studied⁶⁶. A marginal but insignificant⁶⁷ improvement is expected with secondary trading with annual emissions of hydrocarbons forecast to increase by 31.5%. The majority of the increase in annual emissions of hydrocarbons from 2005 to 2025 across the EU25 is likely to come from anticipated growth in the aviation sector rather than from the introduction of secondary trading.
58. Across Europe as a whole, secondary trading is anticipated as having a broadly neutral impact on hydrocarbon emissions. At an airport level however, the impact will vary. The table shows that at the majority of the case study airports, hydrocarbon emissions are expected to be reduced as a result of secondary trading compared to the baseline scenario. There are exceptions to this, notably at Paris-Orly where the net effect of secondary trading is anticipated to an approximate 10% increase in hydrocarbon emissions compared to the baseline scenario.
59. In addition to these changes being driven by a short haul to long haul switch, they are also driven by the switching between different types of carrier with regard to incumbency status. To the extent that dominant incumbents might employ newer aircraft than other incumbents or new entrants, emissions would fall if the introduction of secondary trading resulted in increased slot holdings by dominant incumbents. This can be seen by comparing typical aircraft emissions for short haul incumbents to long haul dominant incumbents: if a typical aircraft employed by a short haul incumbent is a B737-700, this has higher emissions for landing and takeoff than a typical aircraft employed by a dominant long haul incumbent using a B777-200. Therefore, in addition to the switch to long haul from short haul affecting emissions, the switch between different types of airline with regard to their incumbency status also impacts on emissions.
60. The results of the modelling presented in this section are highly contingent on the assumptions made regarding the aircraft used for different types of flight by different types of aircraft carrier. This are intended to be illustrative rather than definitive. With regard to hydrocarbon emissions, the results suggest that the net effect of secondary trading on hydrocarbon emissions will be broadly neutral across Europe. This is because while the switch from short haul flights to long haul flights is expected to increase emissions, to the extent that newer long haul aircraft replace older short haul aircraft, emissions will decrease, netting off this effect. Therefore, two main messages arise from this analysis:
- Hydrocarbon emissions can be expected to increase, although not significantly, as short haul flights are replaced by long haul flights
 - Hydrocarbon emissions can be expected to decrease, although not significantly, if market concentration by dominant incumbents takes place and if these dominant incumbents employ cleaner aircraft than other market participants.

⁶⁶ This only includes hydrocarbon emissions associated with landing and take off. Other hydrocarbon emissions will be associated with taxiing, idling and maintenance activities such as painting, which will be subject to other management measures likely to reduce the contribution of these activities. In terms of overall hydrocarbon emissions from an airport, it is these other sources that are likely to be the major contributor.

⁶⁷ i.e. within the margin of error for the calculation.

61. In both cases the contribution to hydrocarbon emissions from other airport activities, including the aircraft taxiing and idling, will be dominant and any management of these sources is likely to have a greater impact in terms of overall hydrocarbon emissions.
62. While the net effect of both of these drivers is difficult to forecast, the analysis undertaken for this report suggests that impact may be broadly neutral with regard to hydrocarbons.

NOx results

63. In comparison with annual hydrocarbon emissions, which are forecast to rise across the EU25 by 32.3% from 2005 to 2025, annual NOx emissions are forecast to increase by approximately 38.9% during the same period. While the majority of the increase in NOx is due to forecast growth in aviation, the net effect of secondary trading on NOx emissions is not insubstantial; the increase in annual NOx emissions over the same period would be 48.9% with secondary trading⁶⁸. The modelling carried out for this project suggests that the impact of secondary trading may be around a 7% increase in annual NOx emissions relative to the 2025 baseline, again reflecting a 7% increase in the number of passengers forecast to be carried.
64. The increase is driven by the switch from short haul to long haul flights at the most congested airports, reflecting the greater pressure on inefficient users of slots. While for hydrocarbons this effect is anticipated to be largely netted off by the effects of greater concentration of flights by dominant incumbents with cleaner aircraft, this effect is not as prevalent in the case of NOx emissions.
65. Again, the results of the modelling presented in this section are highly contingent on the assumptions made regarding the aircraft used for different types of flight by different types of aircraft carrier. As such they are intended to be illustrative of the types of effects that could occur rather than definitively defining the type of effects that will occur. However, the overall result is an expected increase in NOx emissions in locations where relevant Air Quality Limit Values may be already breached. This may have implications in terms of the extent of NOx emissions control required to accommodate increases in passenger numbers and changes in aircraft resulting from secondary trading and will put additional pressures on regions already with NOx and particulate matter problems.

Quantification of NOx impact

66. Although the relative change in NOx emissions that might result from secondary trading is quite noticeable, the magnitude is less important in the context of regional emissions. However, an indicative estimate of the damage associated with this has been undertaken, as shown in Table 10.10 below. The cost estimate used is based on research undertaken for the Clear Air For Europe (CAFÉ) research programme. Its estimates are based on the social cost and estimate the marginal damage caused by additional NOx emissions. A low, central and high scenario is provided for all EU25 countries as well as an EU average. Using country-specific and an EU average cost, the table provides an indication of the value of NOx impact that could be caused by flight changes induced by secondary trading.

⁶⁸ As for hydrocarbons, this only includes NO_x emissions associated with landing and take off. Other NO_x emissions will be associated with taxiing and idling which will be subject to other management measures likely to reduce the contribution of these activities. In terms of overall NO_x emissions from an airport, aircraft landing and take off are likely to be a major contributor along with vehicular emissions associated with surface access.

67. The table shows that based on an EU-average marginal cost of NO_x, the cost of the impact might be in the region of approximately €30 - €90 million. To put this in the context of the number of flights across Europe, this is equivalent to approximately £15 cost per flight (total impact cost of the central scenario divided by the 5,841,000 flights anticipated at all congested European airports in 2025 with slot trading). It should be noted that this number represents an average cost per flight, rather than the actual cost caused by higher emitting aircraft. Consequently the cost impact per flight will be higher for higher emitting aircraft and lower for lower-emitting aircraft. In addition, the table shows that the damage costs vary depending on the airport at which emissions are being injected into. For example, the costs can be seen to be higher at congested airports like London-Heathrow, Paris-Charles de Gaulle and Amsterdam where there are higher emissions.
68. To the extent that these additional NO_x emissions begin to reach environmental constraint levels, abatement measures and the cost of these measures will become relevant. If these emissions can be abated more cheaply than the assessed cost of the impact, the abatement cost should be considered as the cost to society rather than the impact cost to the environment, which no longer occurs due to the abatement.
69. The exception to this would be at airports where local air quality is currently compromised (i.e. the annual mean Air Quality Limit Value for NO₂ is breached) as the cost for abatement becomes a cost for compliance rather than to compensate for damage. The wide range of measures available to manage local air quality and the lack of air quality data specific for each airport available precludes any assessment of this cost in this study. This is a key issue as the likely compliance costs will be greater than the abatement costs. A more detailed examination of local circumstances is required and would yield likely abatement costs associated with neutralising the effect of secondary trading on NO_x emissions and consequent local air quality.

Table 10.10: Indicative Damage Cost of Change in NO_x Emissions as a Result of Secondary Trading

Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	Total EU airports
Increase in NO _x (tonnes)	1,137	334	201	1,101	908	127	734	23	4,565	7,532
Indicative damage to local air quality (€m)										
Low	4.4	1.3	1.5	8.5	6.0	1.2	7.0	0.1	30.0	33.1
Medium	7.9	2.3	2.9	15.8	11.2	2.3	13.1	0.3	55.8	61.8
High	11.4	3.3	4.2	23.1	16.3	3.3	19.1	0.4	81.1	90.4

Source: Study team calculations based on data from AEA Technology Environment (2005), 'Damages per tonne emission of PM_{2.5}, NH₃, SO₂, NO_x and VOCs from each EU25 Member State (excluding Cyprus) and surrounding seas'.

70. With respect to NO_x emissions then, the introduction of secondary trading is forecast to increase emissions by approximately 7% across Europe. This impact is expected to be larger at airports with greater congestion levels where the pressure to switch from lower emitting short haul flights to higher emitting long haul flights will be greater, as driven by the greater excess demand at these airports. The impact costs associated with these emissions can be significant and increase by a factor of magnitude depending on whether a low, central or high impact cost scenario is adopted. To the extent that these additional emissions breach environmental constraints at specific airports, the costs of abatement need to be considered. It is possible that these costs may be greater than the impact costs presented here, thus resulting in a larger net reduction against the welfare benefits of introducing secondary trading. However, given the differentiated nature of local air quality issues, such costs need to be considered at the local level. This is beyond the scope of this study but could be a useful area for further research.

10.5.4 Carbon⁶⁹ Emission Impacts from Aviation

71. In addition to local air quality, a change in the mix of aircraft and flights being flown as well as any change in the average distances flown, will also affect the environment through carbon dioxide (CO₂) emissions, and other harmful emissions that are proxied by CO₂.
72. If the introduction of slot trading increases the average distance travelled, by increasing the number of long haul flights, CO₂ emissions can be expected to increase. In addition to this, the larger aircraft used for long haul flights emit a higher tonnage of CO₂ per kilometre than short haul flights, as shown in Table 10.11 below. Consequently it is anticipated that the introduction of slot trading will result in higher CO₂ emissions in aggregate and the consequent damage associated with this. This damage may be partially offset if the introduction of slot trading results in fewer high-emitting cargo flights being flown. In addition, while absolute levels of carbon emissions are likely to increase, to the extent that long haul flights are more efficient emitters of carbon per kilometre, emissions per passenger kilometre will be reduced⁷⁰.

⁶⁹ In this report, reference to carbon emissions is as CO₂.

⁷⁰ This is because long haul aircraft are lower emitters of carbon than short haul flights (due to the high levels of landing and takeoff emissions being averaged out over greater distances). Thus, while a switch to more long haul flights will increase the overall level of emissions, a greater number of passenger kilometres travelled will be achieved for this level of pollution (compared to the same level of pollution with a greater proportion of short haul flights) although this will be countered by the increased CO₂ emissions associated with surface transport for journeys no longer taken by plane.

73. When considering the impact of carbon emissions from aviation on the environment it is important to account for the additional environmental damage caused by ‘radiative forcing’ whereby emissions at altitude are more damaging than those at ground level. The IPCC has estimated that the full external cost impact of climate change due to aviation emission is 2.7 times the CO₂ damage cost.⁷¹ The damage cost used in this assessment is therefore multiplied by 2.7 in order to take account of radiative forcing⁷². Evidence on the damage cost of CO₂ is taken from the Eurocontrol cost-benefit paper, which shows a low, central and high damage cost estimate of 10Euros/tonnes, 30 Euros/tonne and 50 Euros/tonne respectively.⁷³ These ranges are broadly consistent with the social cost of carbon used in other literature.⁷⁴ As this damage relates to global warming a generic damage cost estimate is appropriate rather than country-specific estimates.
74. The table presents indicative average emissions by flight type. This is based on a number of sources, as detailed in the notes below the table. The table shows that there is significant variation in CO₂ levels depending on flight type⁷⁵. Cargo flights are the heaviest emitters of CO₂ whereas short haul flights with less than 100 seats and charter flights are the lowest emitters: the heavier an aircraft, the higher its average emissions (assuming the same level of emissions technology being applied). With such marked differences in emissions between flight types, it would be anticipated that the introduction of secondary trading (and the consequent changes in flight patterns) will have noticeable effects on the level and pattern of CO₂ emissions.

Table 10.11: Indicative Average Emissions by Flight Type for CO₂ Emissions (kg CO₂/km)

Nature of flight	CO ₂ (kg per km)
Long-haul average	37.0
Short-haul average >100 seats	11.3
Short-haul average <100 seats	4.9
Cargo	65.0
Charter	4.9

Source: Study team calculations based on data sources. Eurocontrol (2005), ‘Standard inputs for EUROCONTROL Cost Benefit Analyses’ drawing on evidence from CE Delft (2001), ‘Economic incentives to control the global environmental impact of European aviation/Level of the incentive’. Solution for environment, economy and technology, The Netherlands. Draft preliminary study. May. Final version of CE Delft report uses same ranges – CE Delft (2002), ‘Economic incentives to mitigate greenhouse gas emissions from air transport in Europe’, July. Cargo aircraft emissions of 1 tonne of CO₂ per tonne-kilometre as per Royal Commission on Environmental Pollution (2002), ‘The Environmental effects of civil aircraft in

⁷¹ IPCC (1999), ‘Aviation and the Global Atmosphere’.

⁷² As the emissions data used includes landing and takeoff in addition to altitude emissions, applying the radiative forcing multiplier to all emissions overstates the value of damage.

⁷³ Eurocontrol (2005), ‘Standard inputs for EUROCONTROL Cost Benefit Analyses’ drawing on evidence from CE Delft (2001), ‘Economic incentives to control the global environmental impact of European aviation/Level of the incentive’. Solution for environment, economy and technology, Delft, The Netherlands. Draft preliminary study. May. Final version of CE Delft report uses same ranges – CE Delft (2002), ‘Economic incentives to mitigate greenhouse gas emissions from air transport in Europe’, July.

⁷⁴ The Defra/Treasury research suggests a social cost of carbon of £70 a tonne (central scenario), rising by £1 a year. In 2025 the social cost of carbon is therefore estimated to be £95 a tonne. Converting this into a carbon dioxide social cost and converting into Euros, gives a social cost of carbon dioxide of £32 a tonne, consistent with the central range presented here. Defra/HM Treasury (2002), ‘Estimating the social cost of carbon’, January.

⁷⁵ Emissions data for landing and takeoff emissions and emissions at altitude.

flight', November. It is assumed that the average tonnage carried by cargo-only aircraft is 65 tonnes. Charter emissions assumed to be the same as short haul aircraft with less than 100 seats.

75. Table 10.12 shows the anticipated increase in CO₂ emissions as a result of the introduction of secondary trading. This shows that the introduction of slot trading is anticipated to increase CO₂ emissions by some 8% across the EU25 relative to a scenario with no slot trading. Within this, different airports will experience different increases, with the most congested airports having the highest increases. For example, London Heathrow (highly congested) is forecast to have the largest increase compared to Milan-Linate (less congested) which is forecast to have the smallest increase. However, given that CO₂ emissions do not damage local air quality per se, these differences in distribution of additional carbon emissions is less important than the overall level of emissions being released into the atmosphere, thus increasing the level of greenhouse gases.

Table 10.12: Impact of Slot Trading on Carbon Dioxide Emissions (mt CO₂)

Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	Total EU airports
2005 baseline	43.0	11.0	6.0	51.0	43.0	3.0	56.0	1.0	214.0	216.0
2025 without trading	61.0	13.0	8.0	84.0	60.0	8.0	82.0	1.0	317.0	531.0
2025 with trading	70.0	16.0	8.0	90.0	66.0	9.0	87.0	1.0	347.0	575.0
Net effect of trading	9.0	3.0	1.0	7.0	5.0	1.0	5.0	0.0	30.0	44.0
Net effect of trading as a % of 2025 baseline	15.5	20.4	10.8	8.1	8.8	7.8	5.5	0.4	9.5	8.4

Source: Study team calculations based on data sources and forecasts of the impact of slot trading. Eurocontrol (2005), 'Standard inputs for EUROCONTROL Cost Benefit Analyses' drawing on evidence from CE Delft (2001), 'Economic incentives to control the global environmental impact of European aviation/Level of the incentive'. Solution for environment, economy and technology, The Netherlands. Draft preliminary study. May. Final version of CE Delft report uses same ranges – CE Delft (2002), 'Economic incentives to mitigate greenhouse gas emissions from air transport in Europe', July. Cargo aircraft emissions of 1 tonne of CO₂ per tonne-kilometre as per Royal Commission on Environmental Pollution (2002), 'The Environmental effects of civil aircraft in flight', November.

76. As suggested above, the switch to long haul flights, which is forecast as a result of secondary trading of slots, drives this increase in carbon emissions. This increase is partly netted off by reductions in cargo flights at some of the most congested airports. The results presented above include these cargo reductions at the main airports across Europe. However, it must be borne in mind that most cargo flights are likely to be displaced to less central airports when slot trading is introduced, rather than ceasing altogether. Non-integrator cargo flights are the more likely to be displaced, as such flights are less airport dependant than integrator cargo flights. Consequently, to the extent that displacement rather than reduction occurs, the results presented above may underestimate the increase in CO₂ emissions overall.

77. In addition, to the extent that the reduction in short haul flights results in greater use of alternative modes of transport, the carbon emission estimates provided above will understate the increase in carbon. Given current networks, the substitutability of air transport for alternative forms is transport is relatively low. However, network improvements in the closest substitutes such as rail could encourage greater substitution. While rail transportation has lower carbon emissions per passenger than air transport, displacement of passengers onto trains as a result of slot trading would mean higher carbon emission increases than those presented here (which do not take account of such displacement).

78. While the increase in carbon emissions as a result of slot trading presented here is shown in terms of the absolute net increase overall, another way to consider this increase is relative to the emissions from the next best alternative form of transport. That is, the net additional emissions which are made by aviation over and above alternative ways of transporting passengers. While rail is the closest substitute to air transport, given the increasing time differences as journey length increases, substitutability is limited. In addition, substitutability is dependant on the existence of network connections. Current multimodal interchange is limited due to the lack of integrated transport links at airports. Without being able to accurately predict passengers' substitution patterns across Europe for different routes, it is difficult to assess how much of the projected increase in carbon emissions is additional to the emissions that would be generated from alternative forms of transport.
79. In Table 10.13, a range of cost scenarios is applied to these projected changes in CO₂ emissions as a result of slot trading. The projected increase in emissions is shown and a low, central and high impact cost estimate applied to this. The table shows that these costs could be between approximately €bn and €6bn, depending on which impact cost scenario is adopted. Using the central estimate, costs might be in the region of €3.5bn. If the current framework for carbon emissions from aviation were to change such that abatement were required, abatement costs would be the relevant social costs to consider as these would be the costs borne by airlines and ultimately consumers. If airlines were included alongside other carbon emitters in a market such as the EU ETS the relevant costs would be the cost of emissions allowances under the trading system (which are likely to be lower than airline-specific carbon abatement costs). These considerations aside, the introduction of slot trading and the consequent changes in flight mix that will result are likely to increase carbon emissions as more long haul flights are flown. The cost of this damage to society is notable.

Table 10.13: Indicative Damage Cost of Change in CO₂ Emissions as a Result of the Introduction of Slot Trading (€m)

Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	Total EU airports
Increase in CO ₂ (m tonnes)	9	3	1	7	5	1	5	0	31	44
Indicative damage (€m)										
Low	254	73	22	182	144	17	122	0	814	1,197
Central	762	218	67	546	431	51	366	0	2,441	3,592
High	1,269	364	111	910	718	85	610	1	4,068	5,986

Source: Study team calculations based on CO₂ emissions data and forecasts of the impact of secondary trading.

80. While considering the absolute increase in carbon emissions, it is also important to consider emissions per kilometre travelled and whether this changes as a result of slot trading. Clearly, if longer distances are being travelled for the same level of emissions, the benefit to society is greater than if shorter distances were being travelled (given that air connectivity is valuable to society). By the same argument, if emissions increase as a result of slot trading but air connectivity is greater, while the costs of emissions to society increase so do the benefits that are derived from the activity generating the emissions. Thus the cost to society of increased emissions might be lower than the full impact cost suggested above.

10.5.5 Surface Access Impacts on Atmospheric Emissions and Local Air Quality

81. As well as changing aircraft associated emissions, changes in the flight mix will change the way in which passengers access airports. For example, short haul passengers might be more likely to use public transport than long haul passengers. In addition, as the short haul/long haul mix changes this may result in changes in type of traveller, resulting in more business travellers than leisure travellers for example. Such changes in passenger mix will have implications for the mix of surface access to airports across Europe. In addition, and probably more importantly, if secondary trading results in more passengers being carried each year, this will increase the number of passengers accessing the airport, thus increasing emissions.
82. The impact of changes in the flight mix on surface access is difficult to assess without data showing surface access mode and distance travelled by flight type (short haul, long haul, cargo etc.). While some data is available on surface access mode by business and leisure passengers travelling to Gatwick and Heathrow, this is not readily available across Europe or for passenger surface access by distance travelled.⁷⁶ However, the greater impact on surface access is anticipated as being generated from additional passengers travelling after secondary trading is introduced. Table 10.14 shows that the impact on surface access emissions as more passengers are carried as a result of slot trading could be significant. The actual impact is dependant on the distance travelled by passengers for each airport. Assuming a generic journey distance of 100km per passenger, the project increase of 51 million additional passengers as a result of slot trading would increase CO₂ emissions by nearly 460,000 tonnes a year.

Table 10.14: Increase in Surface Access CO₂ Emissions as a Result of Additional Passengers being Carried Following the Introduction of Secondary Trading

Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	Total EU airports
Additional passengers carried	4,686,923	1,591,166	2,655,825	7,627,828	10,167,975	258,125	4,208,418	54,164	31,250,424	51,563,200
Illustrative emissions per passenger (kg)	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Illustrative increase in emissions (tonnes)	41,681	14,150	23,618	67,834	90,423	2,295	37,425	482	277,908	458,550

Source: Study team calculations based on data from Mott MacDonald 'Key European Hubs: Comparison of aviation policy', May 2003 and ATOC/The Railway Forum (2004), 'Rail and the Environment', October. Assumption – average passenger travels 100km to airport by weighted average surface access mode.

83. As this is a potentially significant source of emissions at a local level, Table 10.15 quantifies the negative impact these emissions cause, using the impact cost of carbon emissions cited previously⁷⁷. Results are shown for the low, central and high impact cost values.

⁷⁶ A 2003 report by Mott MacDonald sought this business/leisure ratio from key European airports. In most instances it was not available. Mott MacDonald 'Key European Hubs: Comparison of aviation policy', May 2003

⁷⁷ Here, the 'radiative forcing' multiplication factor is not required because the emissions are not made at altitude.

Table 10.15: Value of Impact Caused by Additional Surface Access Emissions for Illustrative Passenger Distance Travelled (€m)

Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	Total EU airports
Indicative cost of carbon emissions (€m)										
Low	0.42	0.14	0.24	0.68	0.90	0.02	0.37	0.00	2.77	4.57
Central	1.25	0.42	0.71	2.04	2.71	0.07	1.12	0.01	8.33	13.74
High	2.08	0.71	1.18	3.39	4.52	0.11	1.87	0.02	13.88	22.90

Source: Study team calculations based on data from Mott MacDonald 'Key European Hubs: Comparison of aviation policy', May 2003 and ATOC/The Railway Forum (2004), 'Rail and the Environment', October and CE Delft (2002), 'Economic incentives to mitigate greenhouse gas emissions from air transport in Europe', July. Assumption – average passenger travels 100km to airport by weighted average surface access mode.

84. Using the assumption that the average journey distance to an airport is 100km, the table shows the increase in the number of passengers travelling after slot trading could result in between approximately €m and €23m of carbon emissions damage. Clearly this result is highly dependant on the number of surface access kilometres travelled across Europe. If the number of kilometres is lower, the damage will be lower and vice versa. Consequently, it is hard to draw any conclusions on the basis of this illustrative modelling other than that surface access emission costs could be significant. However, it should be noted that even if distances travelled were higher, the additional carbon emissions from more passenger throughput is minimal compared to carbon emission increases from aircraft themselves. In addition, deterioration in local air quality and the environmental constraints associated with this will check the increase in carbon emissions. The effect of increased surface access emissions in the form of hydrocarbons, NOx, particulates and so forth on local air quality could be significant, depending on the level of pollution in the receiving environment. This is of most concern where housing is located within 20 metres of the emissions source. Given the wide variations in transport network and population density across Europe, and within individual countries, it is not possible to assess what the overall impact of such emissions might be across Europe.

10.5.6 Impact of Slot Trading on Ambient Noise

85. In addition to the impact of slot trading on emissions, effects on noise levels at airports and in the surrounding area might also result. For example, the switch to more long-haul flights being operated as a result of the introduction of slot trading might mean that noise increases, to the extent that long-haul aircraft generally make more noise than short-haul aircraft during landing and takeoff. Conversely, a reduction in cargo flights might be expected to reduce overall noise levels, given that such flights are normally high generators of noise. As for the assessment of emissions, flight type averages were calculated on the basis of noise generated during landing and takeoff. The categorisation of aircraft type into flight types is the same as that set out in Table 10.5. The assessed noise generated for each individual aircraft type for landing and takeoff is set out in Table 10.16 below. In addition, the EPNdB⁷⁸ reference engine is shown.

⁷⁸ EPNdB – the Effective Perceived Noise Level, in decibels, is a measure of the noise impact of an aircraft based upon an aggregated measurement of noise experienced at different surface locations during the landing and take off cycle.

Table 10.16: Noise from Landing and Takeoff by Aircraft Type (decibels)

Aircraft	Noise	EPNdB / reference engine
A319-100	91	CFM56-5B5/P
A320-200	93	CFM56-5B5/P
A321-200	95	CFM56-5B5/P
A330-200	96	CFM56-5B5/P
B737-700	93	CFM56-7B27
B737-800	93	CFM56-7B27
B747-400	101	CF6-80C2B1F
B777-200	95	RR Trent 877
CRJ-200	84	CF34 – 3BI
DHC8-400	85	PW150
ERJ-145	86	AE3007

Notes: The noise values assume the aircraft is fully loaded at takeoff and landing. For approach, the noise is 2000m from the runway when the aircraft is at 120m height on the 3° descent during landing. Lateral / full power is the average noise 450m either side of the runway during takeoff. Flyover is the noise at ground level taken 6500m from the start of the takeoff, on a normal takeoff procedure. Only a single reference engine has been used for simplicity. Noise measurement is based on an equally weighted average of full power noise, approach noise and flyover noise.

Source: ICAO Aircraft Engine Emissions Databank

86. In order to assess the broad impact of slot trading on noise, a high-level assessment was made of the likely change in noise as a result of the change in flight mix anticipated from the introduction of secondary trading. This was based on the ‘effective perceived noise level range’ (EPNdB) which measures the noise from an aircraft engine at given reference conditions (e.g. distance, time). The scale takes into account differences in tone due to the movement of the aircraft at different stages in the landing and takeoff cycle.
87. Table 10.17 below provides an indication of the types of EPNdB levels associated with different types of aircraft, as differentiated by the nature of the flight being undertaken. The average indicative values were calculated based on typical aircraft flown for different flight types (long haul, charter etc.) and the EPNdB associated with their engines. The values are based on an average of the noise footprint associated with full power (450m either side of the runway during landing and takeoff), approach noise (2000m from the runway when the aircraft is at 120m height on the 3° descent during landing) and flyover noise (at ground level taken 6500m from the start of the takeoff, on a normal takeoff procedure). Equal weightings have been used
88. The table shows that noise impact varies significantly depending on the type of flight/aircraft being flown. For example, of passenger flights, long-haul flights generate the highest noise levels with an average EPNdB of 96. The noise generated by charter flights is of a similar level while for short-haul flights of greater than or less than 100 seats it is lower. Cargo flights generate the highest noise levels due to the prevalence of B747-400 operations. To the extent then that secondary trading of slots changes the flight mix, noise levels are also anticipated to change. Before discussing illustrative modelling results, a number of caveats should be noted.

Table 10.17: Noise Classification of Aircraft by Nature of Flight using EPNdB

Nature of flight	Indicative average EPNdB
Long-haul average	96
Short-haul average <100 seats	92
Short-haul average >100 seats	85
Charter	95
Cargo	101

Source: Study team calculations based on ICAO Aircraft Engine Emissions Databank

89. It is important to note that the noise measurements used in the modelling are based on the assumption of maximum take-off weight on all flights, irrespective of the actual weight, which will vary with the amount of fuel taken on-board (and reflecting distance to be flown) and the actual number of passengers and weight of cargo. The analysis provides an indicative average assessment of the absolute level of noise emitted for different flight types thus enabling the identification of instances where overall noise levels might reach unacceptable levels.
90. It should be noted that the EPNdB is indicative of the aircraft contribution alone and does not take background noise into account or, indeed, the location of noise sensitive receptors near to each airport. Changes in the aircraft mix will affect background noise. However, the balance of importance between aircraft contribution and background noise is dynamic and it would require a separate research project to identify the impact of flight type changes on the overall noise mix in the area surrounding an airport. Consequently, for the purposes of this indicative analysis, consideration of background noise is omitted.
91. With this background and these caveats in mind, the impact of slot trading on noise at the airports under consideration is shown in Table 10.18 below. It shows the indicative average change in the EPNdB at different airports, as affected by the anticipated changes in flight mix as a result of secondary trading. The net effect of slot trading on noise is shown in the last row.

Table 10.18: Indicative Change in Average Aircraft EPNdB as a Result of Slot Trading

Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total EU airports
2005 baseline	93.65	93.33	92.66	93.14	92.64	89.84	93.24	92.84	92.92
2025 without trading	93.91	93.56	92.72	93.87	93.02	90.67	93.57	92.86	93.22
2025 with trading	94.21	93.64	93.09	94.15	93.54	90.74	93.87	92.88	93.51
Net effect as result of trading (average EPNdB per flight)	0.29	0.07	0.37	0.28	0.52	0.07	0.30	0.03	0.29

Source: Study team calculations based on ICAO Aircraft Engine Emissions Databank

92. The table shows that the effect of slot trading on (foreground) noise is marginal—the increase in noise ranges between a 0.03 and 0.52 increase in the EPNdB. As increases in perceived noise below 1 decibel are usually considered to be imperceptible to the human ear these types of changes would be expected to have a neutral impact on noise at the airports considered. Therefore even at the most congested airports it is not anticipated that secondary trading of slots and the consequent changes in flight mix will increase the average EPNdB by a noticeable amount. As the overall increase in noise is not anticipated as being significant, it has not been quantified for the purposes of this report.
93. However, while the overall impact is anticipated as being marginal, specific noise patterns within the average noise level are important. For example, there may be a concentration of long-haul flights during peak hours such that the noise level is higher during these hours than on average across the day. Clearly this flight type distributional issue is already experienced at airports. To the extent that slot trading allows for a better allocation of high-value flights during peak hours, this concentration might be expected to increase. However, as highlighted in the discussion surrounding NO_x emissions, where constraints on noise levels are in place, noise levels will not be able to rise above the specified levels. Consequently, noise abatement measures may be required.
94. Finally, it should be noted that in some case slot trading may result in the routes displaced from congested airports shifting to less congested secondary airports. To the extent that this results in increased traffic at secondary airports then slot trading could have a detrimental impact on the local air quality and ambient noise at these airports.

10.6 Impacts on the Local and Wider Economy

10.6.1 Introduction

95. As the introduction of slot trading will affect both the number and type of flights being flown at different airports, the local and perhaps national economies will be affected. The impact of aviation on the local economy has been much discussed in stakeholder circles and the literature associated with this. The sections below set out the main ways in which the introduction of slot trading at European airports might affect the local economy surrounding airports and national economies. Where possible, quantification of the impacts is provided. Where this is not possible, a qualitative assessment of the likely nature of the impact and its size is provided. At the end of this section, a table is provided, summarising these effects.
96. The effect of aviation on the local economy includes the following impacts:
- Changes in employment levels – direct, indirect and induced
 - Catalytic effects
 - i. General productivity effects
 - ii. Agglomeration effects
 - iii. Tourism effects

iv. Competition

v. Gains from trade

- Impact for the local economy of a change in the passenger mix

97. Each of these is discussed in turn below.

10.6.2 Changes in employment levels in the region

98. The contribution of aviation to employment levels is a much-discussed issue. Employment impacts can be considered both along geographical lines (local, regional and national level effects) and in terms of how closely the generated employment effects relate to the airport business functions. With regard to the latter, these are broadly categorised in the following ways:

- direct impacts—employment that is fully or mainly related to the operation of the airport. For example, additional baggage, aircraft storage space and so forth.
- indirect impacts—employment generated in the economy from the chain of suppliers of goods and services for the airport
- induced impacts—spending of the income of employees holding direct and indirect jobs associated with the airport.

99. Each of these different levels of effects is considered in turn. It should be borne in mind that the direct effects especially, and the indirect and induced effects to some degree, will impact mainly on the economies of areas immediately surrounding the airports affected and their wider economic regions. They will thus overstate the impacts on the EU as a whole, which will be negligible after allowing for crowding out effects. This is discussed further in the next paragraph.

Direct employment effects

100. Research into the impact of aviation on direct employment suggests that for every 1 million passengers carried, approximately 1000 direct jobs are created⁷⁹. Therefore, if the introduction of slot trading in Europe results in an increase in passenger loads such that around 52 million more passengers are carried, the overall impact of this on direct jobs in the local economy will be in the region of 52,000, as shown in Table 10.19 below. The table shows indicative numbers of jobs that might be generated at different European airports as a result of additional passengers travelling after secondary trading of slots has been introduced. As would be expected, the more congested the airport the greater the market pressure to increase the passenger throughput through larger aircraft, and thus the more passenger throughput is increased. For example, heavily congested airports such as London-Heathrow, Paris-Charles de Gaulle and Amsterdam are forecast to experience the majority of the employment benefits within the group of eight airport case studies shown in the table. The more passenger throughput is increased, the greater the multiplied effect of direct, indirect and induced employment.

⁷⁹ This rule of thumb is based on the findings presented in ACI Europe (1998), 'Creating employment and prosperity in Europe', September and York Aviation and ACI Europe (2004), 'The social and economic impact of airports in Europe', January.

101. Direct employment impacts would be spread across the different regional and local airports in Europe. While many of these airports will experience increases in passenger loads below one million passengers this does not imply that increases in passenger throughput below this level do not generate employment benefits. The use of this high-level benchmark in the literature on benefits of aviation is a broad indicator of the impact of aviation, rather than implying any kind of threshold for benefits to accrue. To the extent that the relationship between additional passengers and additional jobs is linear, smaller increases in passenger throughput will result in smaller but proportionate increases in direct jobs.

102. The nature of this relationship may also be affected by the size of the airport being considered. For example, to the extent that there are economies of scale in the delivery of airport services, the larger the airport the smaller the marginal impact of additional passengers on job creation. Conversely, the smaller the airport, the larger the marginal impact of additional passengers travelling on job creation. The measured direct effects only include on-site jobs. Allowing for in-flight jobs will raise the numbers slightly, and a shift to long haul from short haul flights due to slot trading may, insofar as the former involve higher employee-hours in-flight and perhaps higher on-site employment if (for example) baggage handling needs are higher, also mean higher numbers. The sign of any net error due to the inappropriate use of this relationship is not therefore entirely clear.

103. Assuming that there is a linear relationship between the number of additional passengers and additional jobs generated, and between the initial scale of the airport and the additional jobs generated, to the extent that slot trading increases passengers per flight and thus passenger throughput, quite substantial local economy benefits will accrue across Member State airports.

Indirect and induced impacts

104. The literature on the economic benefits of aviation usually assesses the impact of indirect and induced impacts together, rather than separating them out. Indirect jobs are those generated in the economy from the chain of suppliers of goods and services for the airport, while induced impacts come from the multiplier impact resulting from direct and indirect jobs (that is, spending of the income of employees holding direct and indirect jobs associated with the airport).

105. The literature suggests that for every 1,000 on-site (direct) jobs supported by European airports the following numbers of indirect and induced jobs are supported at the following geographic levels⁸⁰:

- 2,100 nationally
- 1,100 regionally
- 500 sub-regionally

106. Table 10.19 shows that if around 50,000 direct jobs are generated as a result of the additional passengers being carried as a result of slot trading, around 100,000 indirect and induced jobs may be generated. Again, the scaling factors discussed above with regard to airport size and increases in passenger throughput around the 1 million passenger benchmark are applicable here.

⁸⁰ ACI Europe (2004), 'The social and economic impact of airports in Europe', January. N.B. the regional and sub-regional categories are subsets of the national category rather than being exclusive.

107. Overall then, on the basis of ratios taken from the literature we have cited, up to 160,000 additional jobs may be generated from the introduction of slot trading. However, any assessment of the employment impacts of aviation should take into account two additional caveats, relating to whether these benefits are net new benefits and how projections are influenced by the assessment of future productivity. Each of these is discussed briefly below.

Table 10.19: Direct, Indirect and Induced Job Creation at Airports as a Result of Additional Passengers Carried Following Slot Trading

Airport	London-Heathrow	London-Gatwick	Paris-Orly	Paris-C. de Gaulle	Amsterdam	Dusseldorf	Frankfurt	Milan-Linate	Total Eight Airports	Total EU airports
Net additional passengers travelling	4,686,923	1,591,166	2,655,825	7,627,828	10,167,975	258,125	4,208,418	54,164	31,250,424	51,563,200
Jobs Created										
Direct	4,687	1,591	2,656	7,628	10,168	258	4,208	54	31,250	51,563
Indirect & induced	9,843	3,341	5,577	16,018	21,353	542	8,838	114	65,626	108,283
Total	14,529	4,933	8,233	23,646	31,521	800	13,046	168	96,876	159,845

Source: study team calculations.

108. When assessing employment benefits of aviation it is important to consider whether the jobs created are net new employment opportunities, or whether the generated jobs ‘crowd out’ demand for labour from other industries. Whether this is the case may be affected by the geographical level at which such employment opportunities are considered. For example, at the EU level, assuming that strict immigration controls are maintained, the economy is subject to the NAIRU (Non-Accelerating Inflation Rate of Unemployment) constraint⁸¹. This limits the amount of additional employment that can be generated without generating increases in inflation, to any induced increase in labour force participation, which may well be negligible. However, the mobility of labour in local and regional economies tends not to be subject to this constraint to the same degree as the national economy and, especially, the EU as a whole. To the extent that redistribution of labour occurs between different geographical areas, additional employment will be created in place of additional employment elsewhere. Although at the same time, while more jobs might be created at a congested airport like London-Heathrow, some flights will be displaced to secondary airports like London-Gatwick, thus redistributing job creation between airports.

109. The potential for overestimating the positive impact of aviation on the local economy by applying a ‘jobs created by aviation’ ratio has also been raised in a recent paper by CE Delft which highlights the shortcomings of this type of ratio⁸². While bearing in mind the difficulties of using this type of ratio, one might expect that net jobs are most likely to be created around congested airports, airports to which passengers are diverted, and the surrounding regions. There may be some net job creation in those Member States with the most highly congested airports, but little if any in the union as a whole.

⁸¹ This also assumes that labour force participation is unlikely to increase without increases in wage rates. In a well functioning market, if there is significant demand for labour, supply will become available to meet this. However, this will result in wage rate inflation thus exceeding the Non-Accelerating Inflation Rate of Unemployment.

⁸² Delft (2005), ‘The contribution of aviation to the economy: assessment of arguments put forward’, October.

110. The other issue to note is that projections of future productivity significantly influence the projections of the extent to which additional passenger throughput at airports generates additional jobs: the higher future productivity projections are, the lower the marginal impact on employment of additional passengers. The more productive labour is, the less labour is required to deliver the same output and consequently fewer additional jobs are generated. While this effect could be significant, one must recognise that the higher levels of income and passenger spending which accompany higher productivity will tend to offset this direct impact on the scale of employment effects to some degree.

10.6.3 Catalytic impacts

111. In addition to the direct, indirect and induced benefits of additional passenger throughput at airports, the existence of an airport (or increased capacity at an airport) may have additional benefits on the local economy. Such benefits include encouraging inward investment, increasing productivity, agglomeration effects, development of the tourism industry and improved competition. While these benefits are likely to be largest when a new airport is built and utilised within a local economy, marginal benefits might also be expected to accrue when existing airport capacity is used more efficiently by increasing passenger throughput. Given the difficulty in assessing such benefits and the case-specific nature of such benefits, quantification of such impacts is not straightforward.

112. Earlier research on the benefits of aviation suggested that for every one million passengers carried, 1,800 catalytic jobs were generated⁸³. If this relationship is robust, it would suggest that approximately an additional 93,000 jobs might be generated as a result of slot trading. However, in more recent work on this area, qualitative discussion of these impacts has been favoured over quantification, given the challenges of identifying the impact of an airport on the wider economy. A qualitative discussion approach is adopted here⁸⁴.

(i) General Productivity Effects

113. Availability of transport links and improvement or extensions in these links may have a positive impact on the economy by increasing productivity. Improvements in business travel opportunities may provide one source of such benefits, for example, as may agglomeration effects discussed further below. Scale economies may also help raise productivity in airport-related services. Agglomeration benefits and scale economies will not be included in standard measures of the welfare gain by business travellers, though direct travel cost and demand shift effects should be⁸⁵. However direct substitution of aviation-related jobs for other competing jobs in the local area is unlikely to generate any significant productivity benefit.

⁸³ ACI Europe (1998), 'Creating employment and prosperity in Europe', September

⁸⁴ In the 2004 ACI Europe and York Aviation paper, it was argued that "Generally, the catalytic impacts, particularly business impacts, are best discussed in qualitative terms, illustrating the link between airports, access to air services and the functioning of the wider economy".

⁸⁵ Standard welfare analysis also assumes perfect competition in transport-using industries, and may thus understate the true benefits involved if prices exceed marginal cost. See UK Department for Transport (2006) 'Transport, Wider Economic Benefits and Impacts on GDP', June.

(ii) Agglomeration Effects

114. One way in which transport links may benefit productivity is through agglomeration effects - that is, the effect on productivity of greater density of employment in an area. As transport potentially increases agglomeration in geographical areas, transport improvements may therefore also affect productivity through this mechanism. In this case, better transport links and increased traveller numbers may increase productivity by raising the density of employment in the local areas affected. These impacts are in addition to the direct, indirect and induced employment benefits discussed above.

115. Research recently undertaken at Imperial College London suggests “the relationship between agglomeration and productivity is important in assessing the benefits of transport investment”⁸⁶. The findings to date demonstrate that for manufacturing and service sectors there appears to be a ‘strong link’ between employment density and higher productivity, of 0.04 and 0.12 respectively. This means that for a 1 unit change in employment density, productivity is increased by 0.04% for manufacturing and by 0.12% for the service sector⁸⁷. Since improved business travel opportunities may impact on both these sectors it is possible that there may be significant effects. To quantify fully how the improvements in transport links affect productivity through the agglomeration mechanism, the relationship between transport links and employment density still needs to be quantified⁸⁸. Given that this first causal link has not yet been established in the literature, it is not yet possible to quantify the benefits to productivity of agglomeration. However, the potential benefits associated with this should be borne in mind when considering the impact of aviation on the local economy.

(iii) Tourism

116. Air transport links facilitate the development of tourism by increasing the accessibility of the destinations they serve. This is particularly so for areas which have few other alternative forms of connecting transport, such as islands or more remote areas. The tourism industry in Member States and across the EU may benefit from the introduction of slot trading as more passengers are carried and if changes in the type of passengers being carried results in increased levels of spending per passenger.

117. In order to measure the effect of air transport on the tourism industry, it is necessary to identify what proportion of trips would not be made in the absence of a flight connection. Given the difficulty in assessing this, the quantification of tourism benefits from aviation is complicated. However, indicative examples of the benefits of tourism to the economy are available. For example, it has been estimated that the 10 million passengers arriving in the Ile de France region by air generate €3bn through accommodation requirements alone, sustaining 35,000 employees⁸⁹. In addition, it has been estimated that the 1.9 million overseas visitors arriving at Nice airport in 2000 spent around €1.46bn in the local economy.

⁸⁶ D. Graham, Imperial College London (2005), ‘Wider economic benefits of transport improvements: link between agglomeration and productivity – Stage 1 Report’.

⁸⁷ For further discussion on how the effective level of employment density is calculated see page 34 of the Imperial College London (2005) paper.

⁸⁸ This may be addressed in the second stage of planned research being undertaken on this issue at Imperial College London.

⁸⁹ York Aviation and ACI Europe (2004), ‘The social and economic impact of airports in Europe’, January. Based on STAR UK and Etude IAURIF sources.

118. Additional long-haul flights at congested EU airports will enable increases in inbound tourists to the EU, but likewise will facilitate EU tourists switching to non-EU destinations. EU destinations will be in a position to benefit overall if they are well served by transport modes and remain sufficiently attractive to tourists, but some destinations accessible only by air may lose custom if their economic value is insufficient to compete successfully in the slot market. In such cases Governments are in a position to reserve some slots to the affected destinations by means of the PSO mechanism if tourism and regional policy objectives would otherwise be threatened.
119. The distribution of benefits to the tourism industry will vary across countries and regions, depending on current development of the industry and the potential for further development, as well as the interaction of this with changes in patterns of consumer demand for tourism. While it is beyond the scope of this project to assess the outcome of these dynamics at the level of individual Member States, at a EU level, slot trading should benefit the tourism industry by improving connectivity and increasing the number of passengers carried. This benefit could be significant.⁹⁰

(iv) Competition

120. In principle, better transport links may lead to improvements in competition in local markets which may in turn lead to improvements in business efficiency. However this is only likely to be important in areas where connectivity was previously weak, and the transport improvements yield significantly better access to other markets. Since the improvements in this case are most likely to accrue to congested areas where links are already good, noteworthy competition improvements seem unlikely.

(v) Gains from trade

121. Improvements in transport links may benefit the local (and national) economy by creating opportunities for gains from trade, allowing economies to specialise further. As a result its comparative advantage will be bolstered. Where air freight opportunities are currently limited due to excess demand for flights, increases in average aircraft size which improve the efficiency of cargo flights could lower the cost of carrying air freight. To the extent that more air freight opportunities are available and/or the costs of air freight are lower, additional trades will become possible, increasing the gains for trade to economies within Europe and outside of Europe.

⁹⁰ While the expansion of tourism is generally viewed as being positive it is important to note that there are negative effects associated with this. For example increased levels of noise pollution, increased levels of congestion, possible destruction of local habitats and so forth.

(vi) Impacts of the Change in Passenger Mix

122. The introduction of slot trading is likely to impact on the passenger mix flying into different airports. At busy congested hub airports such as London-Heathrow and Paris-Charles de Gaulle, the mix is forecast to become concentrated towards business and long-haul passengers, reflecting the greater margins that can be made on such flights. In comparison, secondary and regional airports may not experience such a large concentration towards these types of flights. The impact on the local economy will therefore depend on the type of airport and the nature of the change that occurs when slot trading is introduced. At congested hub airports, greater concentrations of business passengers and long-haul passengers might benefit the local economy if there are higher levels of average passenger spend for these types of travellers compared to short-haul European passengers. This benefit would occur for spending within the airport and beyond the airport. At secondary and regional spoke airports, overall passenger spend is likely to increase as passengers are displaced from hub airports. To the extent that slot trading boosts the aggregate number of passengers carried, passenger spending will increase. Within this, redistribution of spending will occur between regional and hub airports.

10.6.4 Summary

123. Table 10.20 below summarises the earlier discussion on the impact to the local and national economies triggered by the introduction of slot trading. Where quantification of the impact is possible, this is shown in the table. Where it is not possible, a qualitative indication of the impact is given. The strong caveat noted above about crowding out should be borne in mind. This could mean that the net effect for the EU as a whole, and even for individual Member States, is at best marginal.

Table 10.20: Impact of Slot Trading on the Local Economy

Type of impact	Direction of impact	Indicative strength of impact
Direct employment	Positive	51,500
Indirect & induced employment; of which	Positive	108,500
<i>National</i>	<i>Positive</i>	<i>26,000</i>
<i>Regional</i>	<i>Positive</i>	<i>57,000</i>
<i>Sub-regional</i>	<i>Positive</i>	<i>26,000</i>
Catalytic impacts	Positive	Not quantifiable but potentially significant
Change in passenger mix	Variable,	Not quantifiable
Total	Positive	160,000

Source: ACI Europe (1998), 'Creating employment and prosperity in Europe', September and York Aviation and ACI Europe (2004), 'The social and economic impact of airports in Europe', January and study team analysis.

124. The table shows that overall, slot trading can be expected to increase the number of jobs at airports (direct jobs) as well as beyond, where they are related to the aviation industry (indirect jobs), or as result of the multiplied effects of these jobs (induced jobs). This expansion in employment is due to the growth in the number of passengers being flown as a result of slot trading. However, at an EU level it is not likely that net new jobs will be created due to the effects of aviation employment 'crowding out' employment from other industries. Within this, additional jobs might be created at a local and regional level, where the NAIRU constraint is not as strong as it is at the national or EU level.
125. Increased employment levels are most likely to result at the most congested airports such as London-Heathrow, Paris-Charles de Gaulle and Amsterdam, as this is where the largest increase in passenger throughput is anticipated as a result of the introduction of slot trading. While not readily quantifiable, catalytic impacts resulting from increased numbers of passengers travelling are anticipated to be positive and potentially significant. A range of catalytic benefits are associated with air transport including general productivity and agglomeration effects, development of tourism, competition and gains from trade. While it is difficult to quantify the likely size of these effects, indicative evidence on the contribution that tourism can make to the economy suggests that even these effects in isolation could be significant.
126. Overall then, catalytic impacts might potentially bring significant benefits to the EU economy. With regard to the impact of changes in passenger mix, it is not clear what the overall EU wide effect will be as this will vary depending on individual airports and the spending patterns of different types of traveller⁹¹.

10.7 Conclusions

127. **Welfare effects** – Total welfare is estimated to increase by up to €2.2bn per annum as a result of more flights, often with larger aircraft, becoming available on existing crowded routes and to new destinations. However, the actual level of welfare achieved will depend on the extent to which changes in flight patterns are a result of, or stimulate, shifts in the demand curve rather than due to changes in the fares. The distribution of these welfare effects will depend on the degree of price discrimination that airlines are able to achieve through their yield management processes. Assuming that no price discrimination occurs, consumer welfare is predicted to increase by up to €1bn and producer (airline) welfare by up to €1.2bn. The effect of price discrimination would be for airlines to be able to capture a significant proportion of the estimated consumer welfare benefits. Airlines' market values are likely to rise, both as a result of greater patronage and as a result of being able to raise more debt if slots may be used as collateral.
128. **Transfers to secondary airports** – It is likely that a large proportion of these routes displaced from congested airports as a result of slot trading would transfer to secondary airports. Although these transfers could be considered to increase the generalised cost for consumers on these routes due to using a less favourable departure location, it is unclear to what extent costs would be outweighed by lower landing charges at these airports, leading to lower fares.

⁹¹ To the extent that the introduction of slot trading better aligns the demand for flights with the supply of flights, and higher levels of passenger spending are associated with the newly met demand, changes in the passenger mix might be expected to generate a small but positive impact.

129. **Airport finances** - commercial revenues are predicted to increase by up to 13%, while the impact on landing charges will depend on the regulatory framework at airports subject to economic regulation. Where airports are not subject to economic regulation, a critical influence will be the ability of airlines to lobby for some form of revenue sharing arrangement. The overall impact is likely to lead to a gain in airport market values, and greater incentives to supply necessary increases in capacity.
130. **Competition** - the main concern from a competition perspective is whether dominant incumbents are able to prevent increases in consumer surplus by inflating slot prices and limiting trade. This reflects their strategic desire to avoid new entry which has been shown to reduce the producer surplus of incumbents. We have shown that in the case where prices have to fall to induce demand as supply increases, any such strategic behaviour would result in a transfer of producer surplus between operators and a reduction in the efficiency in slot usage achievable from introducing trading. However, if this behaviour were to prevent the shifts in the demand curve that perhaps lead to the greatest increases in welfare, then there would be a case for introducing some form of alteration to the trading regime seen in the UK, such as post-trade transparency on prices, banning restrictive covenants and the ex ante involvement of competition authorities.. On the plus side, at the moment new entrants (and smaller incumbents) are facing a complete inability to obtain slots where trading is not occurring, with limited access via leftover slots from the pool. The introduction of trading will greatly increase slot mobility, offsetting some of the concerns raised above.
131. **Emissions** – the changes in flight mix triggered by the introduction of slot trading will increase CO₂ emissions directly from aircraft as well as from the transport used by additional passengers accessing airports. Additional CO₂ emissions from aircraft are forecast to be around 8%. The impact cost of this is estimated to be between €1bn and €7bn depending on which impact cost scenario is adopted. The actual increase in surface access emissions is highly differentiated by local characteristics, but if the average distance travelled by a typical passenger to the airport is 100km, the impact cost of an additional 51 million passengers being transported is between €5m and €23m. With regard to local air quality, the introduction of slot trading is forecast to have a marginal or insignificant improvement on hydrocarbons, while annual NO_x emissions are forecast to increase by around 7%. The impact cost of the NO_x increase is anticipated to be in the region of €50m to €130m across Europe but will vary significantly at local level depending on pre-existing local air quality.
132. **Noise** – trading will have a marginal impact, increasing the noise of an average plane by up to 0.52 decibels. A major caveat applies to this modelling – it focuses on foreground noise only. Background noise may increase as well. The modelling also assumes full load factors – as such it shows the maximum level of noise for the average aircraft - but it might underestimate the perceived increase in noise by local residents if load factors increase significantly as a result of slot trading. Also the transfer of displaced routes to secondary airports could result in an increase of noise at these locations.

133. **Local economy** - an increase in the number of passengers will result in jobs being created. While a typical multiplier analysis suggests that many thousands of jobs could be generated, it is not clear that these are jobs that would not exist otherwise – e.g. aviation-related employment may crowd out other employment in the economy. There is more of a constraint on this at a national, and especially EU, level than at a regional level. Consequently while the indicative impacts on employment are positive it is not at all clear that this is a net contribution to the EU economy. But, slot trading will bring other benefits to the local economy such as catalytic impacts - which include agglomeration effects, gains from trade, and general productivity effects. Finally, there is likely to be a beneficial change in the passenger mix towards long-haul passengers.

134. **Thin community routes** - using short-haul routes supporting planes with less than 100 seats as a proxy, the study team’s analysis suggests that 30% of such routes will no longer be flown as a result of the introduction of secondary slot trading.

135. The Appraisal Summary Table below (Table 10.21) summarises this information.

Table 10.21: Summary of Impacts from Slot Trading

Parameter	Impact
Consumer welfare	€1 bn
Producer welfare	0 to €1.2 bn
Competition	Neutral to slight negative
CO ₂	- €1.3 bn to - €6.7 bn
NO _x	- €0 mn to - €34 mn
Noise	Neutral
Local economy	Neutral to slight positive
Thin community routes	Slight negative

Source: Study team analysis.

11 Secondary Slot Trading – Analysis of Likely Effects and Impact of Potential Conditions

11.1 Introduction

1. The traffic estimates derived in Chapter 9 and the economic impact assessments derived in Chapter 10 assume that secondary trading has no conditions attached to it other than those which arise under the current EC Slot Regulation. Yet the imposition of additional conditions may have significant impacts on these estimates and assessments. Accordingly, we discuss these effects in this chapter. Furthermore this chapter considers the likely effects of removing two specific conditions bearing on slot trading as it occurs in the UK at present and is incorporated into our model (see 11.4 below).
2. This chapter first summarises the likely benefits of secondary trading and identifies potential downsides; it then turns to consider whether the removal, or addition, of certain conditions will adversely affect or enhance the outcome.
3. The conclusion which can be drawn from Chapters 9 and 10 is that the likely effects of introducing secondary trading are largely positive in terms of the Commission's objectives. It can be concluded from this Chapter 11, after account was taken of a range of possible conditions which have been discussed with stakeholders, that it would not be desirable to place any conditions on secondary trading, other than to ensure a measure of transparency in the trading process (at least ex post facto, as is the current practice in the UK).
4. Accordingly, this chapter assesses variations to the unfettered secondary trading used as the model in Chapters 9 and 10, based on discussion with the various stakeholders, and drawing on the experience of secondary slot trading in the USA.
5. Chapter 6 reviews secondary trading in some other industries and notes that it is invariably adopted with positive outcomes. Few if any conditions have been applied to these mechanisms (apart from transparency) and none which would appear should be applied to secondary slot trading to achieve the Commission's objectives.
6. Wherever possible, assessments are made as to the impact that each variation or condition might have on the final outcome. These assessments have tended to suggest that such conditions are likely to counteract the positive benefits of secondary trading more than they remedy any negative benefits (in terms of the Commission's objectives).

11.2 Definition of Slot Trading Used in Analysis

7. The definition of the secondary slot trading used in this report is one which approximates closely to actual practice in the United Kingdom.

8. At the moment, the ACL approach is to rely on sub-paragraph 8a 1 (c) of the EC Slot Regulation which states that slots may be exchanged, one for one, between air carriers. The artifice of obtaining 'junk slots' by the purchasing airline, and subsequent exchange of them for slots of another airline, which then returns the 'junk' slots to the coordinator (see Chapter 5.2), achieves the same outcome as secondary slot trading. If secondary trading were to be introduced this device of using 'junk slots' (or needing to engage in an exchange at all) would become obsolete.
9. The estimates and assessments made in Chapters 9 and 10 have also assumed that airlines will be permitted to engage in secondary trading for any consideration including, obviously, monetary consideration. It is important to note (particularly when addressing the transparency issue, as we do below) that the evidence, from both the USA and the UK, is that monetary payment may not be the only consideration passing between parties in secondary slot trading.

11.3 Assessment of the Likely Effects of Secondary Trading

10. It is considered that the introduction of secondary trading is likely to have the following effects having regard to the Commission's objectives as detailed in Chapter 3.
11. Secondary trading is likely to lead to a significant increase in the average productivity of slots used, in line with the objective 'to ensure mobility of slots and efficient transport for passengers and cargo'. The increased opportunity costs of failing to use slots effectively could increase the efficiency of slot use, raising total ASKs.
12. The calculations in Chapter 9 suggest that the average number of passengers per slot for 'Total Europe' congested airports in 2025 will rise by over 7% from 123 to 131 per movement. This compares with the earlier NERA central forecast for secondary trading (alone) of 4% for all Category One airports, and perhaps 4.5% to 5.0% for congested airports. In terms of ASKs per slot, the calculated increase is greater, rising by an average of 17% from 423,700 ASKs per slot in 2025 without secondary trading, to 496,100 ASKs per slot if secondary trading is permitted.
13. Although not quantified, the expectation is that the utilisation of a series of slots will improve marginally, bearing in mind that at currently congested airports such utilisation is well above 80% and much closer to 100%. This could increase slot utilisation by a further 0.5 to 1.0%.
14. Similarly not quantified, it is expected that a few off-peak slots which would otherwise have remained unclaimed in the pool without secondary slot trading will now be requested by airlines that see a value for those slots in the market, and will be prepared, if necessary, to operate marginal services until such times as that value can be realised.
15. Where there are secondary airports competing for the primary market, it is expected that they will enjoy a growth in traffic as airlines gain from selling their slots at the primary airport, and settle for making smaller profits at the secondary airports. Consequently, the existence of a secondary airport helps to maximise liquidity in the slot market at the primary airport. This impact will vary significantly between airports depending on the location and characteristics of any secondary airports. Generalised estimates are difficult to make. The coordinator for Frankfurt, which has no effective secondary airport, told us that long-haul airlines that fail to obtain slots at Frankfurt have to go elsewhere, occasionally beyond the German border.

16. Slot usage will be more concentrated on routes and airlines which deliver higher value to consumers: it will change the pattern of slot usage to a higher proportion of long-haul services and fewer short-haul and charter services. There is likely to be some diversion or abandonment of flights on thin intra-Community routes. To the extent that slots continue to be reserved for PSO services, there will be a corresponding reduction in the potential efficiency benefits to be obtained from secondary trading; however, this impact is likely to be marginal at most airports.
17. Average fares on short-haul flights are likely to be somewhat higher as a result of this structural change. This is due to some reduction in services on these types of routes, except in the cases where new airport capacity is being added or airlines are deriving network benefits from feeder routes. Fares for long-haul flights will probably be reduced somewhat as a result of greater competition on existing routes and the development of new routes adding somewhat to demand.
18. Slot turnover will be higher, especially in the shorter run, as airlines adjust to a more efficient structure by responding to a clear opportunity cost of holding slots. In the long run, airlines will also have the flexibility to adjust their strategies both generally and in response to unexpected demand changes, such as market “shocks” following terrorist incidents. Airlines that have long sought prime time slots at major airports will have the ability to acquire slots by purchase or lease. Current experience at Frankfurt is that the new wave of major Middle East and Asian airlines – Emirates, Etihad, Qatar, Sahara and Jet Airways – have had greater difficulty in accessing slots at Frankfurt, where secondary slot trading is not permitted, than at London-Heathrow. As a result, Frankfurt has been finding it more difficult to compete with London in these growing markets, while the incumbent carriers face less competition in Germany than in the UK. Secondary trading at such airports is likely to promote competition for long-haul operations in particular.
19. The number of slots remaining available in the pool is likely to be smaller under secondary slot trading. Airlines discontinuing a particular operation are more likely to sell the relevant slots rather than release them back to the pool. (This already happens at London.)
20. How long it will take for slot usage to have adjusted fully to the new regime is unclear and will depend on the way the trading regime works. Factors to be taken into account include: a lack of transparency and consequent shortage of information; and strategic behaviour by incumbent carriers who may withhold slots from the market to avoid benefiting their competitors⁹². Such factors may delay adjustment and may leave efficiency gains unrealised.
21. Higher ASKs will lead to some increase in emissions of carbon and other forms of environmental pollution at major congested airports, despite some tendency for greater use of larger, more environmentally efficient (on a per seat kilometre basis) planes. However, the cost of greater environmental degradation will be much smaller than the economic benefits of trading.

⁹² This may be considered unlikely; we have seen no evidence of it to date either in the UK or in the USA: any such concerns by sellers can be reflected in the price they seek for their slots.

22. There will be various impacts on competition in the industry, some adverse and some beneficial. In congested hub airports, where the benefits of trading are likely to be the most pronounced, the share of slots held by major incumbent carriers is likely to increase, reducing within-hub competition. This is due to two factors - strong incentives on incumbents to protect existing routes against competition⁹³, and the network benefits of additional slots accruing more to incumbents than new entrants. But new entrants will if anything be better able to enter the market for long-haul flights by buying slots, as at London-Heathrow where carriers such as Emirates have acquired slots.
23. Competition on routes where frequencies fall, most expected on short haul intra-Community routes, will tend to be reduced; while on long haul and other routes where frequencies rise it is likely to increase. The benefit to travellers will vary according to the proportion of short and long haul flights they take.
24. Competition between major hubs, operated increasingly by major and/or dominant carriers, will increase, especially for long haul flights. It is calculated that by 2025 there will be a strengthening of the slot portfolios of the existing dominant airline at each of the eight airports studied in detail from an average of 47.4% to 49.4%. However, it is recognised that, in general, the dominant airline will be different at each congested airport, and this should lead to a greater degree of competition between the leading European hub airports, increasing the competition for those transfer passengers targeted by each airport and alliance. As hub airports compete more intensively, passengers from non-hub EU airports linked to two or more hub airports will have a wider choice, and be offered more competitive fares.
25. The Commission's aspiration that 'competitive services will be available to travellers and shippers, thus enhancing choice for users and improving value for money' will not always be realised at the same airport, particularly on intra-EU routes. Experience at London-Heathrow shows that slot trading may result in just one carrier offering services on a route (for example London-Heathrow to Budapest) where previously there were two. However, although the second airline may continue to provide competition from a secondary airport, in this case London-Gatwick, the average fare for passengers at London-Heathrow is likely to rise, if only because of the expected reduction in frequency and seat capacity. However, it should be noted that there would be nothing to stop any other airline from buying slots at London-Heathrow in order to provide competition on the route to Budapest (which could well happen if fares were to rise well above cost levels). In this sense the market is contestable. In London, the impact will be mitigated by the existence of competition from four other London area airports (Gatwick, Stansted, Luton and City); but the situation at other congested airports such as Amsterdam and Frankfurt will be more marked, where competing airports are far more distant.
26. Overall, slot trading as currently practised in the UK is not seen to have significantly different impacts on different types of airlines. In general, airlines and airline alliances with large route networks are more likely to be able to pay more for slots than smaller airlines. This suggests that airlines with hubs at congested airports may slightly increase their dominance as a result of a willingness to pay more for slots than airlines that cannot show the same network benefits. However, secondary trading has allowed in particular new entrants from Asia to access London-Heathrow through slot purchases.

⁹³ It is recognised that long-established airlines were able to build up substantial slot portfolios at peak times before major airports became congested, and that this – through 'fossilised dominance' – now gives them entrenched advantages as incumbents against younger airlines that may well be more efficient.

27. Secondary slot trading as practised in the USA and the UK is seen to be neutral and non-discriminatory, as evidenced by the ability of new entrants to access heavily congested airports. However, there is an argument for improving transparency so that all potential vendors and purchasers may be aware of the volume of trades and the airlines involved.
28. Similarly, slot trading as currently practised in the UK is seen to be compatible with the IATA Guidelines which permit secondary trading where local rules allow it.
29. The need for additional airport capacity to be provided to meet underlying demand for air travel will be reduced as slots are used more efficiently, with more passengers being carried on the same number of flights. At the same time, incentives for airport operators to deliver required increases in capacity will if anything be increased, since each new slot created will have a higher utilisation, on average, leading to higher revenues per slot for the airport.
30. There will be benefits for the local economies around congested airports as increased passenger numbers provide additional airport and related job opportunities. There may be wider economic benefits for the EU as a whole if productivity is stimulated, although it is possible that any growth of employment at the congested airports might be at the expense of growth at other airports in the Community.
31. Secondary trading is likely to contribute strongly to the achievement of the Commission's objectives, raising efficiency and the value available to customers. The increase in consumer welfare by 2025 is estimated to be some €31 bn, with producer welfare increasing by up to some €1.2 bn.
32. The impact on intra-Community air routes is expected to be negative, to the extent that many routes to peripheral destinations and Member States may be lost in favour of additional intercontinental flights from congested airports, especially where the route is not transferred to a secondary airport. Where it is considered vital for such a route to be maintained at the primary airport, it may be necessary to ensure that Member States can continue to reserve slots there for such routes (in the same, or a similar, manner as the current provision for PSO routes).
33. Environmental assessments of the impact of secondary trading cover noise and pollution impacts at and around congested airports, and the impact on climate change. Airport noise is considered to be unaffected by secondary trading, as it is forecast that the noise characteristics of new larger aircraft replacing older short-haul aircraft are similar. Particulate pollution around major airports is however expected to increase.
34. Secondary trading is expected to significantly increase the level of CO₂ emissions from congested airports affecting climate change, as a direct result of using larger aircraft flying longer distances from airports affected by secondary trading. Secondary trading is not expected to increase the total number of passenger kilometres flown to and from Europe, but will result in more efficient use of existing runways without the need to build more. As this will result in other less congested airports losing passengers to the more congested airports, the net effect is likely to be relatively small.
35. In any event, the impact of any increase in emissions might be diminished or prevented by the use of other mechanisms. Increased carbon emissions could be dealt with by including aviation in the EU ETS with suitably tough emission allocations, while any increased local polluting emissions and noise could be penalised by Member States through an environmental tax.

11.4 Assessment of Impact of Removing Existing Conditions

36. The existing conditions which have been considered for removal are:
- a) slots may only be allocated to air carriers(Article 8.1);
 - b) the restriction that slots allocated on the “new entrant” basis cannot be exchanged or transferred for two equivalent seasons (Article 8a.2(c)).

11.5 Removal of Restriction on Holders of Slots

37. Under both the EC Slot Regulation and the IATA Guidelines slots can only be allocated to air carriers.
38. We were asked to analyse the potential impact of allowing any persons to hold slots. The implications of this have been broadly discussed with stakeholders.
39. Chapter 5.1 examines in some depth the situation in the USA. There is considerable evidence there of non-carriers holding slots, mainly as security in financings, but also to a limited extent by local authorities or their airports.
40. The ability of financial institutions to hold slots has made it easier for slots to be held as security and such ‘collateralisation’ of slots is extensively used. However, the holding of slots by financial institutions as ‘market-makers’ or market intermediaries has not developed. The holding of slots by regional authorities or their airports has never been frequent and appears to have declined recently (this does not, however, mean that that experience would be replicated in Europe).
41. Other than air carriers, there would appear to be two main categories of person that might be interested in holding slots in Europe: financial institutions and regional or local authorities.
42. Financial institutions were approached in the City of London for their views having regard to the incidence of slot trading in the UK. Although, among those we asked, this possibility does not yet seem to have emerged as particularly meaningful, it may be considered that, in view of the experience in the USA, were secondary trading to be introduced, there would be considerable focus upon it almost immediately.
43. Were financial institutions to become involved as long term holders of slots (as distinguished from having a pure market making role in which they would hold the slots only long enough to trade them on) they would need to ensure compliance with the 80/20 use-it-or-lose-it provision of the EC Slot Regulation. It could however be expected that institutions would insert appropriate covenants in their documentation as to utilisation and other compliance issues and only come into this market if confident that other airlines would take up such slots quickly following any default. But, in any case, the fact that there would be risk to institutions (or any other person) arising from such compliance issues is not a reason for not permitting them to hold slots.

44. In any event, the prospect of acquiring slots, in the expectation of increasing slot values over time, could be attractive enough to overcome such issues. Given that utilisation of their slots would be vital for them to preserve historical precedence, and that they would look for the best return on their investment, it would not seem that slot mobility or efficient utilisation would suffer. A positive effect would be an additional group of potential purchasers to whom slots could be sold quickly if the need arose and who could be prepared to take a longer term view on slots at any time when there might be an industry downturn.
45. In addition, it is likely that the ability of financial institutions to hold slots would facilitate slots being used as security in financial transactions. In the USA, large numbers of slots are “collateralised” as security and there appears to be no reason why airlines in Europe should not benefit from this additional flexibility in their financing arrangements.
46. The net impact on the efficient use of slots at congested airports, on competition between airlines, and on services to peripheral regions has not been easy to assess. However, the expectation is that the financial institutions would behave in a similar fashion to airlines, in that slots would be leased from them for predominantly long-haul operations by large aircraft, and sold by them if the opportunity cost was greater than the current earning power of the slots. The mix of airlines, favouring dominant incumbents and new entrants, would be expected to remain relatively unchanged.
47. One of the effects of secondary slot trading is that new entrants and others will need to pay for slots and therefore require the finance to do so. The ability to ‘mortgage’ the slot to be acquired is one obvious way of securing the necessary finance and therefore enabling carriers which would otherwise be unable to afford slots to acquire them. This would offer a second method (in addition to leasing) of acquiring slots without needing to finance the full value of them, which enables slots to be acquired without paying their full capital value.
48. Leaving aside any considerations of State aid arising, the second group of potential purchasers are those Member States, regional governments and organisations who wish to protect slots for flights between their regions and congested hubs. They would allocate those slots to airlines prepared to offer an agreed minimum frequency and standard of service (akin to the requirements for the imposition of PSOs). Provision for some such flights is already made under the current provisions for PSOs (in accordance with Article 4 of Council Regulation 2408/92) but not all Member States are willing to use this ability to reserve slots on behalf of their peripheral regions, while the conditions for imposition of PSOs (including consideration by other Member States and by the Commission itself) have not always applied to routes to such peripheral points.
49. A replacement carrier could be substituted if the first carrier ceased service. Again, whilst the regional authority might need to move quickly in such circumstances to maintain historical precedence, such considerations are not a reason for denying them the opportunity to hold slots.
50. The holding of slots for such socio-economic purposes could reduce the efficiency of slot utilisation by preserving or substituting the use of small aircraft on short routes at high frequencies. However, it could help to overcome a potential downside of secondary slot trading: the cessation of services considered vital to certain communities. The regional governments and other persons holding slots would be obliged to balance the opportunity cost of such slots against such socio-economic benefits. If used as a substitute for the ability to preserve slots for PSO routes it would be likely to align the strict need for the imposition of the PSO with the true economic value to the Member State of the relevant service.

51. Other potential holders of slots include airport operators. Airports are often concerned to promote an appropriate network of services to meet their own objectives, or those of the local community or Member State. As an example of the potential for this, we were told that the Dutch Government and the management of Schiphol have agreed on a target list of destinations they wish to see served, but have no tool with which to ensure that slots are available to carriers prepared to operate them. It would also be open to governments to acquire slots at major European hub airports to ensure that their carriers were able to gain access to them.
52. However, there are some potential disadvantages to note. Apart from the IATA Guidelines not permitting persons other than air carriers to hold slots (although the Guidelines are not themselves a legal impediment and in any event are not cast in stone) such a unilateral change to slot allocation by the EU could expose Community airlines to retaliatory action elsewhere. Because slots are not route specific (and their value would be reduced if they were) it might not be possible to create a block of “intra-EU slots” which could be held in this way by Community institutions and not by others.
53. In principle, allowing other entities to buy and sell slots may contribute to the efficiency of the slot market by increasing liquidity, helping to stabilise slot values and widening the purchaser base. Any tendency for overall slot usage to fall as a result will be limited by the 80/20 rule and the motivation of these other entities (e.g. financial institutions) to make, rather than lose, money. Widening the market in this way has proved highly beneficial in the USA since carriers have been able to ‘bank’ their slot assets.
54. We detected no enthusiasm for such an extension of the category of potential slot holders amongst any of the existing stakeholders in Europe – Governments, airports, coordinators or airlines – but this may be attributable to the fact that they have spent little time considering the opportunities, (including an appreciation of the USA experience). Whilst showing interest in the possibility of holding slots, discussions with one regional authority suggested that the cost of slot acquisition might not be justified from their budget. On the other hand, it is known that the Government of Guernsey acquired, at a cost of several million pounds, a local airline with the prime purpose of controlling the slots it was able to acquire at London-Gatwick.

11.6 Removal of Existing New Entrant Restrictions

55. In the EC Slot Regulation (Article 8a (2) (c)), it is provided that carriers allocated slots as new entrants may not transfer or exchange them for two equivalent scheduling periods (effectively two years).
56. The IATA Guidelines go even further by prohibiting any airline which has been allocated slots from the pool from transferring those slots until they have been operated for two equivalent scheduling periods (paragraph 6.10.2).
57. To a certain extent, these provisions are a fetter on the ability of all slot holders to participate in secondary slot trading. However, in the case of both the EC Slot Regulation and the IATA Guidelines, the intention is to prevent airlines taking advantage of an enhanced priority (such as new entrant status) simply to transfer their slots to another airline. In a secondary trading situation, this would enable applications under the new entrant rule to be made speculatively so as to earn windfall profits from their immediate (or early) disposal.

58. To remove the restriction on the transfer of new entrants' slots would enable slots to be applied for speculatively and would run counter to the IATA ban on the transfer of slots by any airline allocated slots from the pool.
59. There is a general preference by airline associations, airport and coordinators to leave the rule regarding new entrants' ability to trade unchanged. If the precedence for new entrants is to be retained it would seem self-defeating to allow them immediately to dispose of such slots.
60. Whereas enabling new entrants to sell their slots immediately could increase liquidity in the market to a small extent, this would not seem to override the benefit of retaining the restriction for the reasons given above, including consistency with worldwide practice, as reflected in the IATA Guidelines.

11.7 Assessment of Impact of Increasing Conditions

61. Additional conditions that could be considered by the EC to apply to secondary slot trading include:
 - a) Requirement for pre-trade transparency
 - b) Requirement for post trade transparency
 - c) Restrictive covenants
 - d) Secondary trading to be permissible, but not mandatory

11.8 Requirement for Pre-Trade Transparency

62. An issue which has been discussed with stakeholders is a possible requirement for air carriers to advertise in advance that they are prepared to offer slots for sale or for lease.
63. Currently, air carriers are not required to advertise a willingness to exchange slots, although the opportunity exists for them to do so on an IATA website, or to generally advertise around the airline community.
64. The logic supporting a decision to require such pre-trade transparency for slot sales or leases is that it would help to improve knowledge for potential purchasers, and would be expected to maximise the increase in revenue passenger kilometres for each individual sale, thus maximising both the sale price and the utilisation of the slots and of the airport as a whole.
65. The concern expressed by airline trade associations, together with some airports and coordinators, is that a compulsory requirement to advertise slots could well be detrimental to the concept of secondary slot trading.

66. Currently vendor advertising is usually done discreetly. Airlines tend to inform the marketing manager of the airport and/or the airport coordinator that they might be willing to transfer slots for a reasonable price, or they might directly approach those airlines known to have been active purchasers in the past, and those that have announced their intentions to purchase. Even so, most airlines would recognise the need for the potential vendor's name to be withheld if the vendor so wishes.
67. The reasons for this reluctance are principally concerned with unwillingness to give out market signals (which can often themselves be misinterpreted). Such signals can affect share prices and other perceptions of the vendor airlines, and could influence views on the vendor's commercial intentions (such as to cease operating at the airport or to cease operating certain routes at an airport) or its financial standing (if a potential sale is seen as a cash raising exercise).
68. Another reason is that, for legitimate commercial reasons, the vendor may not wish to discuss the sale of slots with a competitor or be seen to decline to discuss the prospects for sale with certain other airlines.
69. Furthermore, compensation for slot sales may not be purely monetary, and may be linked with (and the vendor's willingness to sell sale may depend entirely on) commercial considerations affecting only particular parties.
70. In discussion, various airline groups and coordinators have expressed the opinion that, if airlines are required openly to declare their interest in selling slots, some will choose to retain their operation, and not to sell at all. Certain stakeholders believed that the impact on potential sales would be significant, and could reduce quite considerably the benefit that would otherwise be expected to accrue from secondary slot trading. But in any event, it can be noted that without any requirement for pre-trade transparency, the secondary trading market in the USA is very active.
71. Linked to pre-trade transparency is the possibility that the vendor airline might have to accept the highest bid (subject only to the proposed new operation being acceptable to the coordinator from a logistical perspective) as this would be expected to maximise the welfare benefit to all stakeholders. It would also be expected to deal with any concern (despite the evidence to the contrary in both the USA and the UK) that competing airlines might be disinclined to trade slots to each other. Several objections to this possibility have been raised.
72. Firstly, the valuation of the highest bidder may still fall short of the internal valuation put on the slots by the incumbent operator, which might then wish to withdraw the slots from sale and find itself unable to do so.
73. Secondly, as stated above, the vendor may be prepared to accept consideration that is not monetary (or not entirely monetary). This could include tangible consideration which it is perfectly proper for the parties to wish to keep confidential. A potential vendor will be more interested in the overall package of benefits it obtains from the sale of slots, not just the headline valuation of the slots themselves. A particular purchaser may not offer the highest potential bid in monetary terms, but may offer marketing, engineering or other agreements which are perceived by the vendor as a greater benefit overall. It would therefore not be possible to state that a particular bid was the highest (except in any monetary terms) and therefore insist that the vendor accept the highest monetary bid.

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74. Thirdly, the highest bid might be from a competing airline which would be expected to use the slots to compete directly with the vendor on the same or another route. The benefit to the vendor could well be greater from accepting a lower bid from an airline that would not (so far as the vendor could tell at the time) use the slot to compete with it. This can be a quite legitimate concern. A commercial enterprise is entitled not to be forced into a situation where its decision to sell an asset results in an outcome which is more commercially disadvantageous than if it had held on to it. This is seen as a major inhibitor to mobility through slot trading.
75. Experience at London-Heathrow suggests that this has not been a common concern to date. Some 85% of outright sales have been by airlines that have left London-Heathrow after the sale, and would therefore be unconcerned as to how the slots were to be used by the purchaser. Again, data from ACL shows that almost exactly 50% of slot leases have been between direct competitors, notably between BA and Virgin Atlantic. Experience in the USA is that direct competitors regularly lend, lease and sell slots to each other. This all suggests that the financial interest in the slot transactions will often outweigh competitive concerns, but it may be dangerous to forecast future practices based on relatively little experience of slot trading in Europe.
76. Fourthly, an airline may be prepared to sell a series of slots, and one airline may be prepared to pay a certain amount for the whole series. Alternatively, two or more airlines may be prepared to negotiate separately for some of the slots, with maybe one or two of the slots remaining unsold. It would be difficult, if possible at all, to determine which set of offers jointly amounted to the highest bid, but it would be clear to the vendor which it prefers.
77. Fifthly, the coordinator may not be able to accept the airline that makes the highest bid if the proposed operation exceeds any of the operational or infrastructure parameters that affect the slot.
78. In summary, it is not considered that any marginal benefits to competitiveness or to increased RPKs per slot from accepting the highest bid will override the inhibiting effect on trading or the inflexibility of relying solely on the highest monetary offer. It would also be difficult to reconcile any requirement for pre-trade transparency and sale (or lease) to the highest bidder with the current ability of airlines simply to exchange slots with each other, whether or not using 'junk slots', without the need for advertising.
79. In order to maximise the efficiency of the slot market and ensure that the potential benefits of trading are realised to the greatest degree possible, the system should be as transparent as possible consistent with the needs of commercial confidentiality and the avoidance of undue inhibitions to trade. Although there may be a strong case for requiring post-trade publication of slot trades, and perhaps of prices, the case for pre-trade transparency, with mandatory advertising of slots, is unproven. In particular, a requirement to sell to the highest bidder seems likely to inhibit secondary trading. On the buyer side, there would be strong incentives on incumbents to bid up slot values, unless alternative buyers are revealed pre-trade and it is revealed that the competitors are unlikely to compete against the incumbent. On the seller side, there would be strong incentives not to sell in view of the risk that a competitor might buy the slot without the seller being able to veto that buyer or set its price accordingly.

11.9 Requirement for Post-Trade Transparency

80. There are two aspects to this issue. One is that all secondary slot trades should be made public after they have been completed, and the second is that the consideration paid for slots should also be made public.
81. Two points favour ex post facto transparency. Firstly, potential buyers and sellers should be aware of how large the market in slots is, and which carriers appear to be active in the market. Without this information, airlines may be less prepared to participate. Secondly, ex post facto transparency will provide an indication of the current sale value of slots at the particular airport. The value will tend to vary at the same airport for a variety of reasons including the day of the week, the time of day, and even season by season. In this way, potential vendors should be able to determine in advance the probable range of prices they will attract, and potential purchasers will know what it might cost to acquire slots. In addition, price signals will be given to both governments and airport operators on the need for additional runway capacity at or near the congested airport.
82. In general, airlines appear to be relaxed about the publication of slot transfers after the event (which means that post trade transparency would be unlikely to constrain the secondary trading market). Interested parties can in any event compare the users of slots before and after each IATA season commences by a detailed analysis of timetables. ACL currently keep a record of slot transfers at London-Heathrow and London-Gatwick (by means of artificial slot exchanges), and this record has been made available to us for the purpose of this study. The record currently details the selling airline, the purchasing airline, the number of weekly slots, and records notes on each deal, explaining whether or not it is a sale or a lease (if known), as well as other miscellaneous information. It does not record the prices paid, as this is not required by ACL although it occasionally becomes aware of them from airline announcements.
83. Ex post facto transparency therefore requires coordinators to keep a detailed record of all slot transfers, and to publish this record on a regular basis (even on a daily basis if trading is so active).
84. The monetary consideration paid, even if published, might not be a reliable indication of the total consideration passing in all cases. As discussed earlier, the eventual price paid may be a net (or nil) figure after allowing for a range of other non-monetary elements in the negotiation. For example, we understand that on at least one occasion, a London-Heathrow airline purchased slots from another London-Heathrow airline and in return made “less valuable” slots available at London-Gatwick. It is unlikely that one specific valuation was made of the London-Heathrow slots, and another for the London-Gatwick slots. What is more likely is that the airlines agreed on a fixed sum to cover the whole package, and in addition some other elements may have been included, for example maintenance and marketing support.
85. Currently, although not all slot trading prices at the two London airports have become public knowledge, sufficient information has been disclosed voluntarily or has leaked out for potential vendors and purchasers, as well as for governments and airports, to know the generality of prices being paid. It is not clear how the existence of a detailed price record for each slot transfer could add to the level of knowledge, or what use could be made of the extra information, especially when considering how unreliable it might be. These are factors to be borne in mind in considering whether post trade transparency of pricing should be made mandatory.

86. Within the above restraints, post trading transparency is expected to make the secondary trading market work more efficiently. It could help to reduce the possibility of a ‘winner’s curse’ effect seen in common value auctions (of which secondary slot trading would be an example). This curse is caused by companies’ uncertainty as to the probable value of a slot, causing them to be fearful of over-bidding for it. One reaction to this is that bidders bid less often, or bid lower prices than otherwise, to help reduce the likelihood that they will be subject to such an outcome. Publishing data on trades, and the prices, would help to reduce this uncertainty by revealing the valuations put on slots by other airlines, and it might make trades more likely.

11.10 Restrictive Covenants

87. A particular concern of the UK Civil Aviation Authority and the UK Office of Fair Trading⁹⁴ is that agreements between airlines covering secondary trades should not contain any provisions restricting the purchaser from subsequently trading the slots on to any specified person or classes of person (such as a competitor of the vendor airline).

88. In investigating both artificial trading in the UK and secondary trading as permitted in the USA we have found no evidence that such restrictions are sought. The indications from the available evidence are to the contrary: in general airlines do not seem resistant to selling or leasing slots to direct competitors. For example, slots have already been transferred/leased directly between Virgin Atlantic and BA at London-Heathrow (direct competitors on many routes) and we have been told (see Chapter 5.1) that American Airlines and United Airlines frequently “help each other out” with slots at Chicago-O’Hare, and that it is common with other airlines.

89. The likelihood is that a vendor or lessor of slots will, if it wishes, take account of the downside in making slots actually or potentially available to its competitors through the pricing mechanism.

90. It should be noted that there appears to be no concern in the context of the far more significant number of slot exchanges occurring daily at all airports around the world (in order to allow airlines to improve their slot portfolios) that slots may fall into the hands of competitors. Currently, a major airline may exchange slots with, say, a local domestic airline in order to achieve a better schedule for an intercontinental service. With so many of these exchanges going on every day, there must be many occasions where the small domestic airline has – sooner or later – traded these newly-acquired slots with another intercontinental airline. This latter intercontinental operator might use such slots to compete with the original slot holder on the same route, no doubt without either party realising the provenance of these slots. Not only has the original airline taken no interest in the use of that exchanged slot once it has moved on, it has already decided that the new slot times have advantages over the original slot times. If airlines transferring slots were to insist (through sale, lease or exchange agreements with such restrictive provisions) that no subsequent slot exchanges could take place without reference to them, the whole system would probably become unworkable.

⁹⁴ Competition issues associated with the trading of airport slots – a paper for DG TREN by the UK Office of Fair Trading and Civil Aviation Authority’ June 2005

91. In any event, it is difficult to see how such covenants would be lawful having regard to EC Competition Law (Article 81 EC) or the equivalent provisions of the national competition law of Member States. These would make covenants void and unenforceable, and perilous for the parties even to seek to enforce them. If there were concerns in this respect, the Commission could from time to time require to have sight of a random sample of such agreements in the same way that it can in respect of commercial agreements generally in any industry sector.

11.11 Secondary Trading to be Made Permissible, but not Mandatory

92. We deal here with a view put to the study team by certain airport coordinators, and possibly reflecting their governments' own views, that secondary slot trading should be made permissible, but not mandatory.

93. This would allow Member States that are broadly in favour of secondary slot trading to require their airports to participate fully in secondary slot trading, but others would be able to decide to opt out from secondary slot trading.

94. No strong argument was put forward to justify this position, just as no apparently strong arguments have been put forward to us against secondary slot trading in principle. It would seem that much of the concern was over fear of the unknown, as – at many airports (those less congested than others) – the current Regulation is seen to work perfectly well as it is. Indeed, a contrary argument is that the shortfalls of capacity currently seen at just a few airports today will become far more serious over the years to come, and it is necessary to have secondary trading in place (even if it is not practised immediately) so that it is available as soon as the market (rather than governments or regulators) perceives the need for it.

95. In any event, it may be considered that such an opt-out provision could be abused and would not enable consistency of conditions to prevail in the single aviation market: in other words, it could be seen to be incompatible with the Commission's objectives.

11.12 Summary of Assessment

96. This chapter has outlined and evaluated the likely effects of adopting secondary slot trading throughout the EU. In summary, secondary slot trading as currently practiced would appear to be generally beneficial. None of the potential variants, or conditions, examined, except one, provides enhancements which appear to outweigh the disadvantages which would come with them, while many would appear to be unnecessary.

97. The possible condition of ensuring that coordinators regularly publish post-trade details of slot transfers is felt necessary to facilitate the effectiveness of secondary trading in achieving the Commission's objectives.

98. An area for further study is the holding of slots by 'persons' other than air carriers. Despite it being contrary to the current IATA Guidelines, it warrants more detailed consideration. The impact on airport utilisation and airline competition is currently not clear, but at this time the downsides seem limited even if the facility may be used in a limited manner and for very specific purposes, such as in the context of security instruments in financing arrangements.

12 Primary Slot Allocation Issues

12.1 Introduction

1. In the course of our study no necessary implications for the primary allocation of slots have been identified.
2. However, two particular aspects of primary slot allocation were consistently raised by stakeholders during the course of this investigation. Each, whilst not being necessary for secondary trading to work, could be addressed at the same time as secondary slot trading is introduced. They relate to the provisions in the EC Slot Regulation regarding new entrants, and the use of local rules to enhance slot utilisation. These two Sections (12.2 and 12.3) take as given the present administrative approach to primary allocation.
3. Sections 12.4 to 12.6 of this chapter refer to the specific investigation relating to primary slot allocation called for by the Commission. We were asked to consider three potentially very significant changes to the EC Slot Regulation:
 - Amendment of the 80/20 rule so as to achieve higher slot utilisation, and specifically to consider the effects of substituting a 90/10 regime
 - Auctioning of slots as a primary allocation mechanism
 - Withdrawing a proportion of slots subject to historical precedence, so as to increase the pool of slots to be allocated by whichever primary allocation mechanism might apply (thus increasing mobility of slots)

12.2 The New Entrants Provisions

4. “New entrant” is defined in the EC Slot Regulation at Article 2 (b). How new entrants are allocated slots is covered by Article 10 (6).
5. The implicit assumption of the EC Slot Regulation is that giving some precedence to new entrants can be expected to increase competition for airlines already operating at each airport even though each new entrant, by definition, will have no more than four slots (two round trips) a day. (Once it acquires more slots, an airline no longer qualifies as a new entrant).
6. A number of comments were received from stakeholders on this aspect of the EC Slot Regulation, including:
 - Two organisations – AEA and ERA – favoured retaining the provision that 50% of all pool slots should be available to be allocated to new entrants. The AEA pointed out that this is consistent with the current IATA Guidelines. ERA was of the view that this provision is one of the few aspects of the Regulation that helps peripheral areas of Europe gain access to congested airports, often using the services of ERA members.

- By contrast, on behalf of its airport members, ACI stated that the provisions have neither delivered effective competition on existing routes nor encouraged the development of new routes. Indeed, it stated that some of the airlines favoured with new entrant slots have been unable to commence operations, or have quickly discontinued service, with the result that slot utilisation has been damaged. These views echo those of BAA in an earlier submission to the Commission⁹⁵ in which it claimed there was an increasing consensus that the new entrant provisions no longer satisfy the original assumption that they would promote competition.
7. A common view amongst stakeholders appears to be that, if the promotion of greater competition is the key objective, such competition for incumbents can often be mounted more effectively by members of competing alliances, or by the new breed of LCCs, even though they might have significant slot holdings already. A new entrant may be successful in obtaining four slots suitable for competing with up to two existing carriers on an intra-EU route (or to operate to a domestic airport not currently served from any airport in a city's airport system), but thereafter (the argument runs) new entrants cannot rely on precedence to obtain more slots to enable them to build up a sufficient critical mass of services to be competitive.
 8. The conclusion advocated by several stakeholders is that the new entrant rule should either be discontinued, or – at the very least – the percentage of pool slots allocated to such carriers should be reduced to 25 or 30%. (Another alternative – that of allowing each Member State or each airport to determine its own local rules for allocation priorities – is discussed in the next section).
 9. While some of what the study team was told was anecdotal, the views expressed are understandable when the record of many new entrant airlines is examined.
 10. Nevertheless it should be recognised that at Europe's most congested airport, London-Heathrow, these new entrant provisions have helped new competitors such as Emirates, Etihad, Qatar and Jet Airways to establish a foothold. They have subsequently been able to grow through acquiring additional pool slots over time or by purchasing slots from others (but only because they are permitted to do so at London airports). It may well therefore be the case that the combination of the current new entrant rules and secondary trading will be much more effective than the new entrant rules by themselves. A question remains as to whether the acquisition of "free slots" under the new entrant rule was a necessary incentive for this new entry in these cases.
 11. No particular allocation of slots can simultaneously satisfy fully each of the three main objectives of the Commission, namely to maximise the efficiency of slot utilisation while at the same time protecting routes to peripheral destinations, and promoting airline competition for maximum consumer benefit. The introduction of secondary trading, without special provision for the maintenance or development of intra-EU and domestic services, will eventually undermine attempts to promote such services or patterns of such services at the primary allocation stage, making the new entrant rule less effective in this respect. However, as mentioned above, the new entrant rule may be more effective when part of a regime which includes secondary trading.

⁹⁵ 'Alternative mechanisms for allocating slots created by new airport capacity', Section 5, June 2006

12.3 Local Guidelines

12. A number of companies and organisations have submitted that the setting of priorities for primary slot allocation ought to be a matter for each Member State or even for each individual airport, and that – while, for example, the existence of standardised new entrant rules appears logical, and consistent with the IATA Guidelines – local knowledge will normally be able to determine better priorities on an airport by airport basis. To sustain this view one would of course have to assume that such decisions would be made on an objective basis and that their compatibility with Community law was subject to scrutiny by other Member States and the Commission as already provided in the EC Slot Regulation (see below).

13. Under Article 5.1(a) of the EC Slot Regulation, one of the tasks of co-ordination committees is:

‘to make proposals concerning, or advise the coordinator and/or the Member State on: local guidelines for the allocation of slots or the monitoring of the use of allocated slots, taking into account, inter alia, possible environmental concerns, as provided for in Article 8 (5)’.

14. Article 8 (5) reads:

‘the co-ordinator shall also take into account . . . local guidelines proposed by the coordination committee and approved by the Member State or any other competent body responsible for the airport in question, provided that such rules and guidelines do not affect the independent status of the co-ordinator, comply with Community law and aim at improving the efficient use of airport capacity. These rules shall be communicated by the Member State to the European Commission’.

15. Recently, the main focus of coordination committees has been to design local guidelines that refer to the actual use made of slots, and they have sought to tackle problems of poor slot utilisation. Examples of such poor use can result from:

- airlines applying for more slots than they need
- airlines claiming historical slots when they have no intention of using them
- late slot returns, either before or after the hand-back deadline
- charter airlines’ business seasons, which cause major problems in the month of April
- short-season schedules
- late hand-back of shoulder season slots
- arrivals without slots (predominantly positioning flights)
- ‘no shows’, when airlines know in advance that a specific flight will not be operated, but do not advise the coordinator who could otherwise re-allocate the slot.
- ‘off-slot’ operations, with persistent early or late arrivals or departures
- and positioning flights generally which, being empty, amount to poor utilisation of slots.

16. ECAC published its own 'Outcome of Study on Slot Allocation Procedures' in December 2005, which included details of the success to date of such local guidelines instituted throughout Europe.
17. A variety of sanctions has been implemented in such local guidelines to maximise the utilisation of slots, and these have included non-refundable slot reservation fees to penalise no-shows and poor operating regularity.
18. The airports and their coordinators believe that they are now successfully tackling the problem of poor slot utilisation at the most congested airports, and that – as a result – output per allocated slot and airport income per slot have both been improving.
19. The airports are now turning their attention to what they consider to be a further source of wastage, relating to the initial allocation of slots.
20. Again, the existing new entrant rule comes into focus. The case against a standardised new entrant rule (as distinct from local rules which might otherwise address this issue) is twofold. Firstly, the percentage of slots utilised by new entrants is claimed to be markedly poorer than those granted to incumbent carriers, for reasons of financial standing, marketing ability and often the failure to obtain the necessary traffic rights under air service agreements. Secondly, the objectives of the Member State and the airport may be at variance with the objectives of new entrants and the new entrant rules themselves.
21. The terms of Article 5.1(a) allow coordination committees to consider precedence in the primary allocation of slots. Some airports have begun to consider local guidelines that might replace the standard rules for new entrants. Currently, such rules would not 'comply with Community law' (in the sense of infringing the new entrant provisions of Article 10 (6)). However, replacement of the new entrant rule by other rules seeking to improve the percentage utilisation of slots and the actual use of each slot (as measured by annual ASKs) could well meet the objective stated in Article 8 (5) of aiming at improving the efficient use of airport capacity.
22. Airports have been considering a range of local objectives instead of maintaining the new entrant policy. ACI have argued that:

'the 'new entrants' priority should be replaced by provisions to promote 'effective competition', basing the slot allocation on a range of objective criteria . . . which seek to optimise the efficient use of the limited capacity at that airport'.
23. Some airports (or coordination committees) might opt for the approach of maximising ASKs per slot, while others might seek to reward air carriers that operate the quietest aircraft, so as to maximise the number of slots that can be used within any given noise environment limitation. One major hub airport has, with support from its government, agreed on a selection of routes to be favoured, in order to maximise that airport's competitive position against other hub airports, but without sacrificing all the necessary short haul feeder routes.
24. Airports' needs vary, with each airport inclined to follow its own marketing strategy. Consequently, flexibility achieved through local guidelines in determining the priorities for primary slot allocation might be seen as a way forward.

25. There is also a risk that local guidelines (assuming they were effective in anything other than the short term) would not necessarily reflect EC air transport policy more generally. It may be considered that local guidelines should not be permitted to override the objectives of that policy. Further study and consideration might be given to how primary slot allocation policies can be developed, especially where large numbers of slots become available at once (as they did at Paris-Orly in 2003 in the wake of Air Lib's insolvency and cessation of operations). Certain allocation priorities (for example, basing them on what is perceived as most effective in promoting airline competition) may not be capable of judgement by existing stakeholders. Allocation of slots according to such priorities may have to be made by an expert panel which is able to make choices between competing applications on a basis which is consistent with the objectives of EU air transport policy generally. (There are parallels here with the requirements which have led to the process by which the UK CAA, as an expert body, allocates scarce bilateral capacity).
26. However, whatever local objective may have been achieved at the primary allocation stage might not survive secondary slot trading. Secondary trading may radically change the actual use of such slots only a short time after they have been allocated. Unless the local guidelines are strengthened even further to ensure that newly-allocated slots can only be used for the original purpose proposed by the original air carrier, there is no assurance that the original objective will be maintained. As succinctly put by one stakeholder – "one cannot have a prescriptive market as well as a free market".

12.4 Suggested Amendment to the 80% Rule on Slot Utilisation

12.4.1 Current Provision

27. According to Article 8 (2), a coordinator will grant slots requested by an air carrier for the forthcoming season on the basis of historical precedence if:

'that air carrier can demonstrate to the satisfaction of the coordinator that the series of slots in question has been operated, as cleared by the coordinator, by that air carrier for at least 80% of the time during the scheduling period for which it has been allocated'.

28. A 'series' of slots is defined (Article 2(k)) as an allocation of five or more slots at the same time on the same day of the week.
29. This condition is repeated at Article 10 (2). The wording is exactly the same as that used in the IATA Guidelines (para 6.10.7).
30. In other words, if an airline has been granted a departure slot at 14:30 on Tuesdays for a 31 week summer period, it is at risk of not receiving that slot for the following summer unless it can prove that it utilised that slot on at least 25 occasions. If an airline only requested (and obtained) slots for a short ten-week charter series, it would have to have utilised those slots on at least eight occasions.

31. Article 10 (4) states that ‘if the 80% usage of the slots cannot be demonstrated, all the slots constituting that series shall be placed in the slot pool, unless the non-utilisation can be justified’ on the basis of a range of specified mitigating circumstances any of which prevented the air carrier from flying its planned programme. Article 10 (5) states that the Member State or the Commission may choose to adjudicate on any disagreement between the air carrier and the coordinator.

12.4.2 Possible Variation

32. The Commission asked us to consider the impact of amending this ‘use-it-or-lose-it’ provision from the current level of 80% to either 85% or 90%.
33. The Commission’s objective is to ensure that scarce airport resources are used even more strictly to maximum efficiency, and that any unjustified failure to use slots allocated to airlines should be penalised by having them returned to the slot pool for the following season. This would enhance slot mobility if it led to an increase in the number (and range of timings) of slots available in the pool. However, under the current primary slot allocation priorities, it does not necessarily mean that the overall output of such slots (in terms of ASKs) would be increased. It does however encourage full utilisation of slots since to have historical precedence to them withdrawn is a serious penalty for the carrier concerned.

12.4.3 Discussions with Stakeholders

34. This potential variation has been discussed with airlines and airline organisations, with ACI and individual airports, and with EUACA and a large number of individual coordinators.

(i) Airports

35. ACI and those airports interviewed are generally in favour of an increase in the percentage from 80% to at least 85% and more normally 90%. ACI commented that the number of unused slots must be reduced by raising the slot usage rate to at least 90% in order to encourage air carriers not to claim, or to return to the pool, those slots that will not be used, so they may be allocated to airlines which will use them.
36. Both BAA and Frankfurt Airport support increasing the proportion from 80% to 90%, while AdP agrees that the problem needs to be considered, particularly in the peak hours, and said it might support 90%. Amsterdam Airport would be happy to see the 90% limit applied to scheduled airlines, but believes that might be too onerous for charter airlines, for which the 80% limit could be retained.
37. Thus any tightening of the use-it-or-lose-it provisions would appear to be welcomed by the airports, although the actual impact of increasing it from 80% to 90% could not be accurately foreseen.

38. There are two aspects of slot misuse that cause specific concern for the airports. Firstly, it often becomes apparent at the beginning of an operating season that an airline is not going to be able to attain the current 80% requirement, when – for example – it does not operate for the first six weeks of the summer period, or the first four weeks of the winter period. The airports would like the coordinators to be able to withdraw the allocation from the relevant airline at that time, and re-allocate them to another airline to operate the remainder of the season, rather than wait until the following season before re-allocating. Certain safeguards would have to be maintained or introduced, so as not to penalise airlines that had a justifiable reason for non-operation (such as the temporary closure of the airport at the other end of the route), or to take account of whether the replacement airline would be likely to operate more flights for the remainder of the season than the original holder. Increasing the proportion to 90% would enable this procedure to happen more quickly – after just two weeks for the (shorter) winter season.
39. Secondly, a regular concern of the airports is that an airline may be granted slots for a daily service, effectively throughout the year, but then finds that there is only sufficient traffic to justify, say, three flights a week in summer and one in winter, quite possibly a mid-week day. It would duly hand back the un-operated slots at the end of each season, but would be able to justify an 80% operation (or even 90%) for the reduced number of days actually operated. The coordinator is then faced with a series of identical slots for six days in the winter and four in summer that will be far less attractive for any other operator, while the original airline continues to operate at peak times with an irregular operation. However, to hand back slots is not an abuse of the slot allocation system; Article 10 exists to prevent an airline which has not operated all its slots in a particular ‘series’ (same time, same day of the week) from claiming them again the following season.
40. The current sanctions against airlines which abuse their slot allocations by operating less than a set percentage of the relevant series are severe; they will not have any of the slots in that series allocated to them in the next equivalent system on the basis of historical precedence. Therefore, any increase in that required percentage (currently 80%), which would make it more likely that airlines might lose such historical precedence, has to be considered extremely seriously. This is particularly so when it could reduce the utilisation of several series of identical peak-timed slots across all seven days of the week

(ii) Coordinators

41. The views of the airports are not shared by the coordinators.
42. Of the thirteen individual coordinators with whom this was discussed, eleven are content to leave the figure unchanged at 80%, while only two – representing Sweden and Portugal – commented that there might be a case for raising the level, but were prepared to stay at 80%.
43. Of those who added additional detail, ACL (for the UK) thought that increasing the proportion to 90% at London-Heathrow would bring insignificant benefits as the current levels of actual utilisation were already very high. The coordinator for Austria was concerned at raising the level – the current 80% level already causes problems with airlines having to justify each operation cancelled above that limit and raising it to 90% would probably lead to “three times as many problems and discussions”; we understand that coordinators in any event in practice may waive the rule when a major airline just fails to achieve 80%, especially if there could be political ramifications, such as retaliation by non-EU states.

44. The main concern voiced by the coordinators is the same as that of the airports – of airlines being granted series of slots on different days of the week, but using them (to 80 or 90%) on only some days of the week (remembering that a “series” of slots as defined by the EC Slot Regulation is five or more slots on the same day of the week). The problem appears not to stem from the level of the percentage but from the definition of ‘series’.

(iii) Airlines

45. The airlines were unanimous in their preference for 80% to remain the threshold. None of them saw itself as a possible ‘winner’ in being able to obtain some of the additional slots being handed back for re-allocation.
46. IATA referred the study team to its earlier response to the Commission, made in November 2004, when it commented on the Commission’s statement that ‘scarce capacity is not always used to the full’:

‘Scarce capacity is fully used and there should not be a legal requirement for slots to be operated at 100%. Any incentive, regulatory or economic, to try to fully use allocated slots whatever the circumstances could have perverse side-effects, for example on safety. Most cancellations occur for reasons of weather, maintenance or another safety-related concern, not for economic reasons, and they are counted against the 20% tolerance contained in the existing rules. The confiscation mechanism would not contribute to reach the stated policy targets. For example, a slot could be taken away from an airline that operates a wide-body aircraft . . . and redistributed to a carrier that uses narrow-body aircraft, thereby reducing an airport’s passenger throughput’

47. In discussion with the team, IATA members agreed that 80% was an arbitrary number, but that – over the years – it had proved to be a good one and led to decisions being made that were broadly acceptable to both airlines and coordinators.
48. British Airways provided the study team with an in-house document examining the potential impact on the airline of the percentage increasing to either 85% or 90%. It stated that ‘airlines do not need additional incentives to maximise their utilisation of slots, especially at constrained airports such as Heathrow. On average British Airways operates 99.1% of its planned schedule and we have an excellent record of maintaining historic rights to slots’.
49. It might therefore be assumed that an airline such as BA would be relaxed about the extension of the 80% rule to 90%, as it could be expected to penalise other airlines more than itself. But as will be seen in the next Section (12.5.4), which considers the impact of raising the 80% threshold, that is not the case.

(iv) Governments

50. Only one Government representative has commented specifically on the possible change to the 80% rule – the Director General for Civil Aviation (DGCA) for Germany. In his presentation to a Seminar held by EUACA on June 28 2006, the DGCA stated that ‘the 80/20 rule as well as the other internationally agreed rules and regulations [should] stay in force unchanged; this is a crucial requirement to avoid retaliation’.

12.4.4 Analysis of Predicted Impact of Suggested Amendment to the 80% Rule

51. The impact of increasing the use-it-or-lose-it percentage from 80% to either 85% or 90% has been examined against each of the four main objectives of the Commission.

(i) To ensure mobility of slots and efficient transport for passengers and cargo.

52. The expectation is that an increase in the use-it-or-lose-it percentage from 80% would result in an increase in the number of slots returned to the slot pool in advance of each scheduling season, and therefore an increase in slot mobility as measured by the total percentage of slots available for re-allocation.

53. The various coordinators have not provided the exact number of slots currently returned each season under the existing 80% rule, although the general comment is that it is not a large proportion as many airlines are able to make a good case under Article 10 (2) for retaining their slots even though the target may be just missed.

54. Referring back to BA's claim (paragraph 47) that it operates 99.1% of its planned schedule, in order to achieve that average of 99.1% for all its flights, there will always be some flights that achieve only around 80%. As an example, a daily flight year-round on a business route may achieve a very high average figure. However, because both Christmas Day and New Year's Day this coming winter occur on successive Mondays, a decision to cancel both flights owing to predicted poor demand would mean that the average performance on that route on Mondays in winter is already reduced to 90.5%. One additional cancellation on a Monday due to adverse weather or a technical failure would result in that winter Monday slot being confiscated the following winter (and quite possibly, incidentally, being re-allocated to an airline operating a smaller aircraft on a shorter route). The following year, the move of Christmas Day and New Year's Day to a Tuesday could lead to a similar result. The airline is faced with either having to operate the flights on Christmas Day and New Year's Day with very poor loads – with the extra costs involved and to the disbenefit of its employees and of the environment - or plan well in advance to hand back the slots just on those two particular occasions so that they are not counted in the 90%.

55. A copy of the BA briefing paper is attached as Appendix 16 and details a group of adverse impacts on airlines, consumers and the environment.

56. The expectation is that the number of slots returned at 90% would be significantly greater. BA have said that – as at early March 2006 – 11 slots at London-Heathrow were at risk of being returned although none was at that stage guaranteed to be lost. If the percentage were to move to 85%, all those eleven slots would have to be forfeited, and there would be a further 52 slots at risk. At a 90% ruling, all these 63 slots would be lost and a further 573 would be lost if just one more flight were to be non-operated in the remainder of the winter season. As the percentage rises, so the increase in slot mobility would become dramatic.

57. The expected increase in mobility might not however be accompanied by an improvement in the efficiency of air transport. The slots returned are unlikely to form a valuable series for airlines, with perhaps slots at any one specific time becoming available only on some days in winter, or perhaps only on a few days in summer. It is most unlikely that increasing the percentage from 80% to 90% would lead to another airline being able to construct a viable pattern for any one route unless it already held a large slot portfolio and was able to re-arrange the new series of slots. Instead, what might have been a standard daily schedule year-round – offering convenient and efficient transport for consumers - could now be severely disrupted.
58. Furthermore, because the justifications (Article 10 (4)) for retaining a series of slots despite failing to comply with the 80% rule do not include a number of common causes outside the control of airlines, an increase in the percentage required could trigger the sanction even though the failure did not result from a true “abuse” of the coordination system. An obvious, and most important example, is the cancellation of flights due to adverse weather. If an increase in the percentage were to be considered this would need to be addressed. Article 10(4) is designed to deal with abuses. It is questionable whether the concept of ‘abuse’ should be extended to inability to operate for reasons beyond the airline’s control, including adverse weather conditions. If it is, an increase in the percentage, whilst being likely to release more slots into the pool, could result, through no fault of the airline, in severe disruption to the continuity of its services, not only to the disadvantage of the airline but also of the travelling public.

(ii) To strengthen competition at Community airports

59. The existence of more slots in the slot pool might be expected to lead to an increase in competition, as 50% of those slots would be offered first to new entrant carriers.
60. It cannot be assumed, however, that there would be an even spread of airlines being required to hand back slots. With a higher percentage threshold, airlines with large slot portfolios would be able to protect their slots at risk (when for example one aircraft was out of action due to an engineering problem) by cancelling flights on routes with a 100% slot usage record in order – solely - to protect other flights that would otherwise fail to reach the 85 or 90% threshold. Perversely, this could result in uneconomic flights being operated and economic flights being sacrificed so as to meet the requirement, merely because the percentage had been increased.
61. Meanwhile, airlines with a small slot portfolio at the airport in question would have far fewer possibilities of recovering from a difficult situation, and would be likely to lose a greater proportion of their slots.
62. Measuring competition solely in terms of the total number of slots may not be sufficient. The level of competition will also depend on how far the new entrant airlines can use the scattered slots now available, and how far the incumbent airlines can re-work their remaining slots into offering a standardised schedule across the week.

(iii) To match secondary trading with the overall EU (air) transport policy

63. The Commission is seeking to achieve the optimum use of airport capacity and considers that putting a price on slots through the medium of secondary slot trading should help to achieve this objective. However – on the assumption at this stage that pool slots are made available at no cost – there is no guarantee that the successful applicant for slots returned under an enhanced ‘use-it-or-lose-it’ provision is one which will utilise the slots most efficiently.
64. A fundamental question (which increases in importance the larger a slot pool becomes) is why successful applicants should receive such slots at no cost and those who are unsuccessful will have to buy them. There is reason to focus on this point more closely where it is contemplated that many more slots will be available for allocation from the pool. On the other hand, new entrants which may not be able to pay for slots in the secondary market would have a greater chance of acquiring them through primary allocation.
65. Different considerations could apply if the auctioning of slots from the pool were to be introduced (see 12.6 below) because then all carriers seeking allocation of slots would be required to apply for them.

(iv) To ensure compatibility of secondary slot trading with world-wide procedures

66. The “80% rule” is identical under the EC Slot Regulation and the IATA Guidelines. Any change to 85% or 90% would put European airports into a different category unless IATA were to be persuaded to follow the same course. (There may of course be limits to the strict necessity for both systems to be completely compatible).

12.5 Slot Auctions

12.5.1 Current Regulations

67. Primary allocation of slots is first referred to in Article 8 (1) of the EC Slot Regulation:

‘Series of slots are allocated from the slot pool to applicant carriers as permissions to use the airport infrastructure for the purpose of landing or take-off for the scheduling period for which they are requested’.

68. The ‘slot pool’ is defined at Article 10 (1):

‘the coordinator shall set up a pool, which shall contain all the slots not allocated on the basis of Article 8 (2) [relating to historical slots] and 8 (4) [re-timings of historical slots to achieve better schedules]. All new slot capacity determined pursuant to Article 3 (3) will be placed in the pool’. [Article 3 (3) relates to an airport being fully coordinated for the first time].

69. At any time the slot pool is thus the difference between the total declared slot capacity of the airport and the number of slots already allocated, or to be reallocated, in accordance with historical precedence.

70. These available slots have three main sources:

- slots which have not been allocated owing to lack of demand for them;
- slots which have been returned voluntarily by holders or which have been withdrawn under the use-it-or-lose it rule;
- newly created slots.

71. New slot creation could occur for one or more of the following main reasons:

- an increase in the declared hourly slot rate at the airport.;
- an increase in capacity (such as a new runway)
- relaxation of environmental or other restrictions on movement rates

12.5.2 Possible Variation

72. The Invitation to Tender requests this study to:

'identify the effects that possible revised regulation with regard to the allocation of newly created slots would have on the market. Such new regulation could have two, alternative, features: (i) either new slots that have been allocated as a result of expansion of airport capacity can only be exchanged for financial consideration once they have been used for a certain minimum number of consecutive equivalent seasons so as to prevent their quick sale by an air carrier after they have been allocated from the pool, or (ii) the introduction of an auctioning mechanism applicable to those newly created slots which would imply that the new slots would be allocated to the air carrier that bids the highest price'.

73. The Commission has indicated that this study was to assume that, in the event of auctions, each Member State would determine the use of the auction proceeds. This study therefore takes no account of the application of such proceeds.

74. Subsequently, the Commission asked us to:

'analyse why the present system of administrative slot allocation is sub-optimal and [whether it] can be improved by commercial slot allocation'.

75. The prime objective of the ITT's option (i) is to ensure that air carriers will not apply for, and be granted, slots merely to receive immediate windfall profits from selling them on; and of (ii) that the newly created slots would go to the air carrier putting the highest valuation on such slots, to ensure that the most efficient use (ASKs) of the slots is made, leading to the maximum consumer benefit. The intention is not specifically to generate funds for the airport or for any other recipient of the proceeds.

76. It is important to note that, whichever of the proposed paths is followed, two categories of slots will be created for the time being – those that are already in the pool, and those that are newly created, with those in the pool being allocated according to the existing administrative method, and those newly created being either allocated with a minimum period elapsing before they can be traded (option (i)), or auctioned (option (ii)).

77. Although the difference between the two sets of slots may be clear in theory, in practice it may be difficult to determine into which category each specific slot belongs, mainly because of the facility for airlines to exchange historical slots with those in the pool for retiming purposes (Article 8(4)) in advance of the normal allocation process. (It might be considered that this retiming opportunity should be extended to bring the newly created slots within this facility.) These difficulties are raised in the DotEcon study for the UK Department for Transport, 'Alternative allocation mechanisms for slots created by new airport capacity', para. 225 ff, and an unanswered question of the airline stakeholders at para. A3.2.3: 'how would the slot pool integrate into the process? What would be the definition of "new" capacity?'
78. As a result, it would be simpler (and might be logical) – on those relatively rare occasions when an airport declares 'new' capacity' – for all slots available to be allocated at that time (existing pool slots and newly created slots) to be treated identically.

12.5.3 The Present System of Administrative Slot Allocation

79. Article 8 of the EC Slot Regulation describes the current system of administrative slot allocation.
80. First of all, the coordinator needs to decide which series of slots may be retained on an historical precedence basis (Article 8 (2)).
81. Secondly (Article 8 (4)) slots then remaining in the pool may be exchanged for these historical slots 'for operational reasons, or if slot timings of applicant air carriers would be improved in relation to the timings initially requested'.
82. Thirdly, Article 8 (3) states that:
- 'in a situation where all [other] slot requests cannot be accommodated to the satisfaction of the air carriers concerned, preference shall be given to commercial air services and in particular to scheduled services and programmed non-scheduled air services. In the case of competing requests within the same category of service, priority shall be given for year round operations'.*
83. These priorities are often insufficient to reduce the number of airline requests to match the number of available slots, and additional priorities are regularly needed. Many industry observers understand that certain coordinators keep an unofficial record of the number of years any airline has consistently applied unsuccessfully for the same set of slots. The length of waiting-time is taken into account when allocating slots between airlines which satisfy the same criteria.
84. Article 10 (6) states that:

‘slots placed in the pool shall be distributed among air carriers. 50% of these slots shall first be allocated to new entrants unless requests by new entrants are less than 50%. The coordinator shall treat the requests of new entrants and other carriers fairly, in accordance with the coordination periods of each scheduling day. Among requests from new entrants, preference shall be given to air carriers qualifying for new entrant status under both Article 2 (b) (i) and (ii) [namely a non-stop scheduled passenger service between two Community airports with no more than two current operators] or Article 2 (b) (i) and (iii) [defined as a non-stop scheduled passenger air service to a regional airport⁹⁶ not served from that airport system]’.

85. This set of rules for coordinators to follow in allocating slots from the pool would benefit from further expansion. At the most congested airports there will be many applications from air carriers that meet the same objective priority criteria, leaving the coordinator to make a subjective decision (possibly assisted by the coordination committee) based on no additional criteria at all.
86. Against this background final decisions reached may be sub-optimal. However this is not demonstrable unless all the reasons for each application are known.
87. The extent to which ‘commercial slot allocation’ can improve on the current method of slot allocation will depend on whether the provisions giving new entrants precedence are retained.
88. There is wide acceptance among academics and economists that auctioning scarce resources (particularly what may be regarded as scarce public resources) is a most efficient method of allocating that capacity, when compared with the alternatives⁹⁷. We start from this premise before considering whether in the case of slots there are particular reasons for departing from it.
89. It should also be noted here that the role of auctions in allocating slots at congested airports has been recognised by the FAA which has recently announced proposals to employ an auction as a means of allocating the majority of slots at New York-La Guardia, including those currently held. It is also worth remarking that lotteries (referred to as “slotteries”) have been used in the USA when allocating slots (see Chapter 5.1). However, while lotteries are even handed, auctions may be considered more likely to allocate slots to those who value them most and will utilise them most efficiently.

12.5.4 Discussions Held

90. The Commission asked for an assessment of each of the two suggested options. The various stakeholders approached by the team were mainly interested in just one of these, namely auctions. The other option relating to extending the length of time a newly created slot must be held before the air carrier can engage in secondary slot trading was generally considered to have little noticeable impact beyond delaying the point at which the benefits of secondary trading (in terms of putting slots into the most efficient hands) could take effect.

⁹⁶ It should be noted that ‘regional airport’ is not defined in the Regulations, but has been taken to mean a domestic airport

⁹⁷ for example, in a recent (2004) book published by the Cambridge University Press (‘Auctioning Public Assets : Analysis and Alternatives’), the editor (among a number of distinguished contributors) points to auctions being by far the most favoured method for allocating public assets

91. Auctioning was discussed with a variety of airlines and airline organisations, with ACI and individual airports, with EUACA and a large number of individual coordinators, and with governments of some Member States.
92. In addition, we referred back to the earlier NERA Report prepared for the Commission, and the responses received to this report as well as the Commission's subsequent 'Commission Staff Working Document' issued on September 17th 2004.

(i) Airports

93. Airports are generally in favour of the auctioning of slots, but this view is understandably mainly influenced by an expectation that they would be entitled to the bulk of the proceeds.
94. At a meeting with ACI, where eleven airport groups were represented, members generally stated that they would like to see an auction of slots, with the income accruing to the airport or the Member State's government. This would be seen as a reward for efforts to increase capacity, with windfall profits being shared, rather than (as now) accruing solely to the first airline to obtain the slots.
95. At further separate meetings with BAA, Amsterdam and Frankfurt airports, all three bodies confirmed that they were generally in favour of auctioning, but were concerned about the small print of any actual mechanism. BAA would prefer a scheme incorporating a higher posted price in order to sift out those air carriers that valued the slots less highly. Nevertheless, it would accept alternative auction methods. In addition, Frankfurt Airport saw benefit in retaining the administrative system if airports were permitted to exert more influence on the outcome in terms of the types and patterns of service.
96. In contrast, Aéroports de Paris insisted that they did not wish to see an auction method at all. They would prefer to rely on the normal income derived from airlines operating at the airport rather than benefit additionally from scarcity value. But at the same time, they were concerned about whether a secondary market could coexist with an administrative system still allocating new slots for free. (Such slots once allocated could immediately be traded in the secondary market and provide huge windfall profits.)

(ii) Coordinators

97. There was a far greater divergence of opinion among the coordinators.
98. Strong objections to the concept of auctioning slots came from the coordinators for France, the Netherlands, Germany, Norway and Hungary.
99. The Dutch coordinator was strongly of the view that those governments and airports that fail to provide timely additional capacity should not be rewarded by selling off scarce slots for a premium, while those airports that invest in additional runways to meet demand before it arose would effectively be providing additional capacity for free.

100. The Hungarian coordinator believed that auctions would favour those airlines with deeper pockets, which in turn would give them even greater advantages over weaker competitors. It was further claimed that already well-served long-haul routes such as to New York would benefit from additional frequencies at the expense of shorter routes needed to serve regional points.
101. The Norwegian coordinator commented that auctions might trigger the need to adopt a complex institutional infrastructure to administer the process. This might outweigh the potential gains.
102. A further four coordinators, representing Belgium, Spain, Italy and Sweden, were broadly in favour of auctions, all citing airports' increased revenue potential .
103. The Spanish coordinator had a preference for higher posted prices, on the assumption that 90% of the revenue would flow to the airport, and the other 10% to the ANSP. But it still expressed concern over what they referred to as the need to balance free market economics with the need to promote competition.
104. The Swedish coordinator suspected that if revenues accrued to airports, auctions could encourage initiatives aimed at providing further marginal airport capacity for the benefit of airlines and consumers.
105. A different view was expressed by the Austrian coordinator. The Austrian representative was strongly in favour of pricing mechanisms irrespective of the eventual recipient of the auction proceeds. Routes which were felt to merit support should be funded through PSO schemes, financed by government or regional authorities.

(iii) Airlines

106. In its November 2004 response to the EU Working Document regarding Commercial Slot Allocation Mechanisms, IATA stated that: 'slot auctions are unlikely to allocate scarce capacity at European airports in an economically effective manner'. In support of its case it cited three specific aspects of slots that would make it difficult for a normal auction process to be successful:
- *'slots at different times are not a good substitute for each other*
 - *slots have substantial interdependencies, so that a change in one slot has knock-on effects at destination airports, and throughout the network*
 - *slots have substantial demand complementarities such that even if a time is available, the apron space or terminal capacity to handle extra passengers at that time may not be'*
107. In a recent internal paper, British Airways, which strongly supports the argument for secondary slot trading, states that:
- 'British Airways supports the current mechanism for allocating slots at co-ordinated airports . . . we remain unconvinced that an alternative market based mechanism such as primary slot trading would provide a more efficient and workable solution for allocating new capacity'.*

108. The paper questioned whether any benefits would accrue from the adoption of an auctioning process, discussed the specific problems associated with each of the possible auction methods put forward, and listed the unwanted consequences that would probably result. One possibility raised is that airlines would be less hostile to the idea of slot auctions if it could be proved that any additional revenue earned by the airports from such auctions were directly reflected in reductions of airport charges, thereby minimising any additional costs borne by airlines.
109. The European Regional Airlines Association also gave a negative response, for the same reason as the Hungarian coordinator, namely that their members – the regional carriers – would lose out in preference to long-haul operators.

(iv) Governments

110. The UK Government is strongly in favour of auctioning all airport slots, both those newly created, and those pre-existing. The Civil Aviation Authority published a briefing on slot allocation in April 2006, where ‘the CAA’s favoured approach’ to auctioning was published as follows:

‘Under an auction system, slots would be auctioned to the highest bidder (and then be tradeable in the secondary market). The CAA believes that the auctioning of slots from new capacity is attractive in principle, but recognises that there are practical issues to be resolved in the ownership of slots, the mechanics of complex auction schemes and the interaction with any system of economic regulation of airports.

The need for auctioning at airports will depend largely on the competitive pressures and the degree of congestion experienced. Given those circumstances, a permissive approach to reform that allowed individual countries to introduce more demand-responsive systems of allocation would be the best solution. This would allow airports in countries experiencing severe congestion to implement auctioning or other non-discriminatory systems of allocation at those airports, whilst leaving flexibility for others to apply traditional administrative approaches to allocation’.

111. The CAA expects that the proposed reforms to secondary slot trading and primary slot auctions would lead to the three following benefits:

‘For airlines, better access to scarce and valuable airport capacity would be attractive . . .

For passengers, better methods of allocation would better reflect patterns of demand . . .

For the environment, slot reforms would help make better use of existing capacity . . . although more efficient slot use will rarely be a total substitute for new airport capacity’.

112. The UK Department for Transport commissioned a report from DotEcon on ‘Alternative allocation mechanisms for slots created by new airport capacity’, published in June 2006. This was focussed on such alternative mechanisms applying to new airport capacity in the UK. Five alternatives were studied, including continuation of the current administrative method. It concluded that the most suitable in terms of maximising economic benefit was that of a two-stage hybrid allocation process which combines:

‘a relatively simple auction (first stage) that allocates “scheduling rights”; and

detailed administrative coordination carried out by the coordinator (second stage) given the specific requests for timed slots from scheduling rights holders’.

113. The report did note however [para A3.2.3] that in detailed discussions with stakeholders there was a:

‘General comment that the existing process works very well and that ACL operates in the overall best interests of the industry. Most industry stakeholders do not believe that auctions are required.

‘Key issue is to maintain current flexibility and avoid any process that impacts on trading, swaps or slot sitting.

‘Integration with the IATA slot allocation process is key’.

114. A different view is reflected in the comments of the DGCA for Germany:

‘The 80/20 rule as well as the other internationally agreed rules and regulations [should] stay in force unchanged; this is a crucial requirement to avoid retaliation. Primary trading would result in such and therefore is beyond any consideration for Germany’.

(v) Summary

115. The position of the stakeholders can be summarised as follows:

airports favour slot auctions, particularly if they expect to be recipients of any of the proceeds

the views of coordinators were split and therefore inconclusive

airlines argue against auctions (seemingly mainly on the basis that they would thereby be required to pay for slots which otherwise they could expect to be allocated to them at no cost)

Governments have taken up diametrically-opposed positions.

116. None of these views appeared to centre on the objective value of auctions as a method of allocating scarce resources: namely, that through auctions assets accrue to those that value them most and are most likely to use them efficiently.

117. In contrast, we note that comments by stakeholders in the USA on the prospect of the introduction of auctions have centred on practical implementation issues rather than objecting in principle. In the words of an FAA official, US airlines have been ‘sceptical’ about the practicalities of auction design.

118. Consequently, in making this assessment, we have not been faced with any argument based on a rational contradiction of the generally held view of academics, notably economists, referred to earlier, as to the effectiveness of auctions in allocating scarce public resources. Furthermore auctioning avoids the outcome that slots allocated at no cost to airlines under the administrative system could immediately be traded in the secondary market and provide windfall profits. The difficulty with any administrative allocation system remains that, if slots are thereby distributed with particular objectives in mind, in anything but the very short term (by placing some restriction on their use for other purposes or on their being traded for a set period), the use of those slots may be changed or the slots may be traded on.

12.5.5 Analysis of Predicted Impact of Slot Auctions

119. In this section, the impact of the suggested auction of slots is measured against the four main objectives set for this study. (Again, no assumption is made as to the recipient(s) of the proceeds).

(i) To ensure mobility of slots and efficient transport for passengers and cargo

120. Four general conclusions can be drawn from an analysis of the auction process relating to mobility of slots and efficient transport.

121. Firstly, auctioning of slots will not increase the number of slots allocated over the number which would be allocated under the existing administrative process. If auction prices were anticipated as being too high it could lead to a decrease if there were a surplus of slots still following an auction. (However, if the auction process did not dispose all of the slots in a first round, a subsequent “clearing” auction could be held).

122. Secondly, it is fully expected that, compared with the normal administrative allocation process, auctioning will lead to a more efficient distribution of slots – defined as awarding slots to those airlines which value them most highly.

123. Thirdly, if one uses an alternative definition of efficiency, namely ASKs per movement, the outcome is expected to be similar but not identical, as passenger load factors and average yield per RPK (particularly on key short-haul feeder routes) may mean some shorter flights are more profitable than some long-haul flights.

124. Finally, because slots will be sold to those airlines that value them most, the expectation that they will immediately be traded is less likely than if the airlines had been awarded the slots through the normal administrative process. As a result, slot mobility (if measured by the number of trades per season) may be reduced, but the auction mechanism itself is likely to have achieved, and achieved earlier, the outcome that could be expected from secondary trading following an administrative allocation (and without the windfall profits).

(ii) To strengthen competition at Community airports

125. As in the case of secondary trading, the airlines that obtain by auction the greatest number of new slots are likely to be those which expect to make the highest profits from their use. For the same reasons, the expectation is that the main buyers will be the dominant home-based hub operators and other long-haul airlines previously unable to access their preferred airports. With an expectation of a TCAA agreement, slot prices at London-Heathrow are likely to be inflated by new US airlines becoming able to operate there. The result is that dominant hub-based airlines will normally be expected to increase their slot holdings at their home bases, but that the level of competition between services at the various hub airports will strengthen.

126. The impact on consumer welfare is expected to be similar to that assessed for secondary trading, where the use of larger aircraft on longer routes is forecast to lead to significant increases in welfare. Competition between carriers at major airports on intra-Community routes is expected to decline as hub airlines will be able to afford slot prices to maintain their feeder routes but their short-haul competitors would have no similar network benefits to justify paying such high prices.

(iii) To match secondary trading with the overall EU (air) transport policy

127. ERA predict that operators on short-haul routes with small aircraft will fail to obtain by auction any of the more valuable slots, although they may be able to obtain some off-peak slots at low cost. As a result, vital links to the peripheral regions and Member States are likely to be priced out in any auction. Consideration may need to be given to carving out of the auction process enough slots to support services on essential thin routes (perhaps in some manner similar to the current ability of Member States to reserve slots for PSO routes (Article 9)).

(iv) To ensure compatibility of secondary slot trading with world-wide procedures

128. Adopting a method of slot auctions would be incompatible with the current IATA Guidelines. Certain stakeholders are concerned that the adoption of an auctioning procedure could lead to retaliation against EU airlines by other authorities, penalising EU airlines by (for example) using traffic distribution rules to transfer them to secondary airports.

129. The IATA Guidelines are principally concerned with the allocation of slots on a worldwide basis. The US practice of slot lotteries and the proposed slot auction relate only to 'domestic' slots and therefore are essentially of concern only to the US authorities and US carriers. Their apparent incompatibility with the IATA Guidelines therefore assumes less importance. In this context, it should be remembered that secondary slot trading and slot auctions in the USA do not affect "international slots" There is, on the other hand, no distinction drawn in Europe between 'domestic' and 'international' slots and all slots are allocated accordingly and would be subject to the auctioning mechanism if it were to be introduced in Europe.

(v) To assess the impact of each option on secondary trading

130. The Commission's Invitation to Tender also specifically requested consideration of a further two aspects of slot auctions, the first of which was:

'the impact of either option on the competition between air carriers operating at congested airports should be examined from the viewpoint of whether any option would distort slot trading in any way and of what the impact would be on the prices of slots (and thus on air carriers holding large numbers of slots) once an airport is expected, or known, to add capacity to its infrastructure'

131. An analysis of the first option, whereby airlines allocated 'new capacity' slots might be prohibited from secondary trading for an extended period of perhaps two years, is not considered to cause any significant distortion of subsequent secondary trading in the initial period of enforced non-trading. On the assumption that the 'new' capacity did not represent a significant increase in slots, there would still be sufficient slots allocated earlier at the congested airport that would be available for secondary trading.

132. Similarly, it is not believed that auctions will affect secondary trading. Following an auction, airlines that had purchased slots would have an asset value against which they could compare any subsequent offer to buy. On the assumption that the price paid for the auction slot was less than the airline's own valuation of that slot, airlines would still use the same opportunity cost value in determining whether or not to trade at any given price.

133. Secondary trading will of itself affect the competitive situation between different groups of airlines as discussed earlier. It is not believed that the choice of either an administrative allocation of slots or an auction will affect this resultant competitive position in the long-run. In the short-run, an administrative allocation may result in more short-haul flights and more flights allocated to smaller airlines that would not have been able to afford the auction prices (and which might increase competition) but this situation would be subject to the same secondary trading pressures once the initial 'non-trade' period had elapsed.

134. The impact of expected, or known, increases in slot capacity at some future date would be expected to have a significant impact on both the prices offered in secondary slot sales before the new capacity became available, and the eventual prices bid at the auction. Airlines will bid on the basis of their perceived expectations of future slot values. In doing so, they will have in mind a time period during which they would expect to recover such an investment. With most well-signalled, substantial increases in airport capacity taking at least five to ten years to complete, individual carriers will be able to form their own judgements with regard to the prices bid for slots.

(vi) To assess the impact of each option on future airport capacity

135. The Invitation to Tender also requested the following analysis:

'The analysis should also focus on the possible effects of either option on decision making at congested airports as to the planning and execution of the extension of airport capacity'

136. As referred to earlier, the Commission has indicated that, in the event of auctions, this study was to assume that each Member State would determine the use of such proceeds, and that the revenues will not automatically be allocated to an air carrier or air carriers, and not to the airport in question either.

137. This would suggest that the only financial benefit that would definitely accrue to the airport operators would be from the landing and handling fees (and the associated non-aeronautical revenues earned from passengers). To the extent that auctions would be expected to result (on average) in heavier aircraft with more seats than would be obtained from an administrative allocation, airport finances would benefit more from auctions.
138. The decision to invest in additional infrastructure – and particularly in runways which would create further slots – would normally be a straightforward cost-benefit study by either the airport authority, or the government acting on its behalf.
139. It is difficult to envisage how an administrative allocation would be more or less likely to affect a government's (or an airport's) decision whether or not to add yet further capacity, except in so far as the actual level of demand for the additional capacity being provided might indicate just how many more slots were still required.
140. An auction would however prove beyond doubt what the value of each slot was to the airlines, and would give valuable signals to those responsible for airport provision as to the level and timing of the need for increases in capacity, and the willingness to pay.
141. One outcome might be that airlines, having demonstrated the level of demand for additional capacity through the prices paid at auction, might be in a stronger position to press governments and / or airport authorities to address the proven capacity shortfall with further increases in capacity.

12.5.6 Assessment of Possible Economic Impact of Suggested Amendment

142. The key economic impact of auctioning slots will be to bring forward the long run effects of secondary trading.
143. As with secondary trading, the impacts upon short-haul and peripheral routes, and upon airline competition would be very similar. With an administrative allocation, there might be short-term benefits from allocating slots for intra-EU routes and to new entrants, but these effects would be likely to last only as long as these airlines were not permitted to trade these slots.
144. The second main economic impact will be to transfer income from airlines to Member States, and possibly, through them, to airports. This could be reflected eventually in reduced charges to airlines and resulting lower rates and fares for shippers and passengers. The incentive to increase additional runway capacity will be increased if the financial return from auctions is seen to yield benefits to either governments or airports.

12.5.7 Conclusions

145. The option of allocating new capacity at airports by use of an administrative allocation, with the added restriction that successful airlines might not trade those slots for a minimum period, is not considered to cause a problem for stakeholders, nor to render great benefits in terms of the Commission's objectives. It would be a worthwhile exercise to observe the initial allocation of slots at Madrid in Winter 2006/2007 (under the existing EC Slot Regulation) when a significant tranche of new capacity is being added, and to observe the actions of those airlines successful in obtaining slots. It has the potential disbenefit of affording those airlines thereby allocated slots with the opportunity to obtain windfall profits in the secondary market.

146. With regard to auctioning new capacity, there is a significant divergence of views between stakeholders, with airports generally in favour, and airlines almost universally against. Much of the antagonism relates to the perceived difficulties of running a smooth auction procedure which is not too cumbersome and expensive. (But in addition, and no doubt an important consideration for airlines, any auction process implies a cost to airlines in acquiring those slots.) In its study recommending a hybrid auction procedure for new capacity at London-Heathrow, DotEcon recognises the strength of opposition and the potential difficulties by recommending that:

'We strongly recommend experimental testing of the two-stage hybrid allocation under a given hypothetical (though realistic) scenario for release of new capacity. This could involve industry participants who would bid in a mock auction given fictional strategies and budgets. Experimental testing of this type has been widely used for spectrum auctions. Such experimental testing would enable refinement of auction rules. It would allow the industry to understand more about auctions. It would also permit a more refined evaluation of the potential efficiency benefits of auctions given that our current estimates are based on models.'

147. Such a simulation exercise has been carried out in the US in relation to the potential auction of capacity at New York-La Guardia, leading to a decision formally to propose such a procedure. If the proposal is accepted by Congress, the results of the subsequent auction will be valuable. However, it should be remembered that this proposal is for the auctioning of all applicable slots over a rolling ten-year period (see 12.7 below), and is not restricted just to new capacity.

148. There is some concern that although it may be possible to devise an auction scheme which satisfies the immediate objectives, it may be difficult to integrate this smoothly into the existing worldwide scheduling system. Some of the concern could be reduced by conducting the auction some years in advance of the actual transfer of slot holding, so that carriers can determine the use of such slots in association with slots available at other airports.

149. A system of auctions is not seen to be inconsistent with the adoption of a secondary trading system, although in the early stages, air carriers may be hesitant to trade until they become aware of the relative costs of acquisition of slots by each route.

150. With regard to the expected impacts, the main conclusion drawn from the examination is that the beneficial effect of slot auctions on airport productivity is not expected to be dramatic in the long run, as secondary slot trading on its own is expected to result in a similar outcome although it might take a few years longer. But there will be beneficial effects in the short run for congested airports compared with the alternative of administrative allocation.

151. The justification for such a view is taken from the detailed examination of what is already happening at congested airports in Chapter 7, and the predicted result of introducing secondary slot trading, as outlined in Chapter 9.
152. The data show convincingly that, at heavily congested airports, there is already a long-established trend of small aircraft on short-haul routes being replaced by much larger aircraft on long-haul routes. This trend is expected to continue through to 2025, as more and more major airports become heavily congested.
153. In addition, the experience of secondary slot trading at London-Heathrow has shown that this trend has been strengthened, as remaining short-haul operators have been paid to vacate their slots in favour of long-haul operators, both incumbent and new entrant. Auctions will if anything accentuate these trends, and perhaps advance them by one or two years.
154. Auctioning may not be necessary for all significant increases in capacity. Where there is a major increase in capacity – such as at Madrid for Winter 2006-2007 with a doubling of runway provision and an increase in hourly movements from the current 78 to 120 within a short period of time – all airlines are expected to be able to be allocated slots on or close to their preferred timings, for free, with no requirement for an auctioning system. Arguably, there may be situations in which airports which are currently coordinated cease to need to be coordinated once new capacity comes on stream (as at Athens following construction of the new airport).
155. Where there is only a marginal increase in capacity, such as a small increase in the permitted movement rate per hour, the cost of administering an auction for a small number of slots may not be justified.
156. Therefore auctioning might be considered particularly appropriate in those intermediate situations where there is a substantial increase in capacity which is nevertheless still well below market demand. London-Heathrow would be a good example if BAA were to construct a short third runway. Demand for the additional slots if they appear in around 15 years' time would still far outstrip supply. Under these circumstances, an auction mechanism could be expected to result in a greater overall efficiency, measured in ASKs per slot, than if it were left to the normal administrative allocation system.

12.6 Suggested Amendment to Allow Slot Withdrawal

12.6.1 Current Regulations

157. There is nothing in the current EC Slot Regulation that allows for the withdrawal of slots apart from when the use-it-or-lose-it provisions apply (Article 10 (2))
158. However, the subject is covered by the IATA Guidelines at paragraph 5.8:

'Historic slots must not be withdrawn from an airline as a means of providing for new entrants or any other category of aircraft operator. Confiscation of slots for any reason should be avoided unless intentional abuse of the coordination system by an airline is proven'.

12.6.2 Suggested Variation

159. In its Invitation to Tender, the Commission comments that:

'it may be considered that, in general, at extremely congested EU airports, either throughout the day or at certain peak times, slot trading will not lead to a minimum of slot mobility as few or no air carriers are prepared to sell slots. This mobility could be achieved by establishing a fixed percentage – for instance 1% or 2% per scheduling season – that would apply to grandfathered slots. These reclaimed slots would be returned to the pool and become subject to re-allocation. In such case, the 1% or 2% of slots would be withdrawn by the slot coordinator. For further details on such possible mechanism, reference is made to the Commission staff working document of 17 September 2004, part 4.

Analysis will have to focus on:

- a) the link between the extent to which airports are congested on the one hand and the re-allocation of slots after withdrawal of slots on the other, and the beneficial effects this withdrawal may have for slot mobility and efficient use of capacity at such airports. The study should demonstrate whether or not withdrawal will have a more positive effect at the most congested airports compared to airports with less congestion;*
- b) an optimal form of withdrawal (e.g. withdrawal at random or from particular routes or types of routes) and subsequent redistribution of withdrawn slots to achieve the envisaged effects described under a)'.*

160. Paragraphs 4.2.1 to 4.2.6 of the Commission Staff Working Document provide significantly more detail as to how any such proposed scheme might be expected to work, and of the impact that might be expected.

161. The logic behind the proposal is clear from the following extracts from the Commission Staff Working Document:

'Allowing secondary trading may be considered as an important step to promote true slot mobility and make more effective use of airport capacity. One could however question whether such alteration of the present system would do enough to bring about a meaningful 'overhaul' of the current practice of slot allocation specially as the preparedness of air carriers to start selling slots in the first place can not be taken for granted' [Para 4.2.1]

'A more ambitious commercial slot allocation mechanism is especially required for the most congested airports of the EU where slot mobility will be insufficiently improved by the introduction of secondary trading only, as demand exceeds supply of slots severely' [Para 4.2.2]

'The required further flexibility could be achieved by establishing a fixed percentage – for instance 3% per scheduling season – that would apply to grandfathered slots that would be returned to the pool and become subject to re-allocation if, despite the existence of the possibility of commercial slot transfers between air carriers, requests for particular slots are not satisfied either through slot trading or administrative slot allocation for a period of, for instance, 3 years . . . Subsequently, the allocation of the pool slots, which includes the withdrawn slots, will have to take place on an equitable basis without application of the existing '50-50' allocation rule while new entrants will not have priority over incumbents. Thus the distribution mechanism will not favour, or prejudice, any particular category of air carriers' [Para 4.2.3]

'It is important to note that on the basis of this mechanism, at some point in time slots that an air carrier has paid for through the trading mechanism, could become subject to the rule of withdrawal . . . It could be envisaged that these particular slots, which apparently represent a monetary value, would be allocated to the air carriers that would be prepared to pay the highest price' [Para 4.2.4]

'Rather than face forced redistribution, air carriers would be inclined to sell slots. The effects of this proposed mechanism are that slots become mobile and that they will be used efficiently. . . Slot prices are not prone to be too high as the inherent risk would be that they would be left unsold. This will have the advantage that slot trading will become more affordable for all air carriers, with the expected result that slots will eventually go to the air carriers that want them most badly. This, in turn, will imply that the minimum usage rule – which would remain unchanged – is more likely to be met; in this relation a positive effect on the efficient use of airport capacity can be equally expected' [Para 4.2.5]

162. Most importantly, it states at paragraph 4.2.3:

'as a matter of principle only slots that are used for intra-EU operations ('EU slots') would be subject to such withdrawal as a wider application could provoke retaliatory action from the Community's international partners'.

163. Given the Commission's concern, as reflected in the Staff Working Document, that to withdraw slots used for intercontinental services could result in retaliation, we have assumed in approaching the questions asked by the Commission of the team on this occasion, that the Commission contemplates that slots will not be withdrawn from non-EU carriers and that in order to preserve competition between EU and non-EU carriers on intercontinental routes, slots used for intercontinental services will not be withdrawn from EU carriers.

164. This raises a very important issue since under the EC Slot Regulation (save in respect of slots reserved for PSO routes) and under the IATA Guidelines there is no concept that slots must be used on particular routes or for particular services. To introduce a distinction at a particular time between slots which are either 'intra-EU slots' or 'non-EU slots' is merely to point to their use at that particular time. This would require a point at which the use of slots would crystallise making them either 'EU slots' or 'non-EU slots'. Such a crystallisation would not only affect the essential flexibility of the slot system but would have a detrimental effect on the liquidity of slots under a secondary trading system.

165.If the prospect of withdrawing slots at European airports must depend upon such a distinction being made at some point, then it would be necessary to re-assess the likely effects of the introduction of secondary slot trading as it might make the consideration of withdrawing the slots impractical from the start. Although withdrawal of slots is proposed in the USA (see Chapter 5.1) this relates of course only to ‘domestic’ slots. This illustrates an essential difference between the US and the EU systems whereby in the USA ‘international’ slots are a separate category which do not fall within the secondary trading (‘buy/sell’) system nor are subject to any of the provisions designed to relieve airport congestion such as slot auctions, lotteries or slot withdrawal .

12.6.3 Stakeholder Views

166.This proposal has been discussed widely with the most affected stakeholders, the airports, the coordinators, and the airlines.

(i) Airports

167.In discussion with ACI-Europe and eleven of its member airport authorities, there was a general consensus against slot withdrawals. It was argued this would lead to instability in the current system of slot allocation, and routes and schedules provided across the world. (At the time of these discussions, it was not expected that the FAA would favour slot auctions at New York-La Guardia, where presumably such potential instability could also result).

168.In separate discussions with major congested airports, Aéroports de Paris were ‘strongly against’ the principle, Frankfurt Airport ‘strongly rejected’ the principle, BAA was ‘generally against it’, and Amsterdam commented that ‘this is not a good idea as it saddles airlines with a great deal of uncertainty whether they will be able to retain the slots they hold’.

(ii) Coordinators

169.On behalf of all European Union Airport Coordinators, EUACA stated clearly that there should be no slot confiscation. This was repeated strongly by all but one coordinator. The coordinators views can be summarised as follows:-

170.The Dutch coordinator was concerned by the proposal – ‘it would put EU carriers at a disadvantage globally’.

171.The Belgian coordinator believed it would wreak havoc throughout Europe and beyond.

172.The Hungarian coordinator believed it would lead to difficulties in the medium and long-term planning of airlines. Once they were not assured of their operations, they would have difficulty in placing new orders for aircraft.

173.The German coordinator was not in favour. The impacts could not be overstated.

174.The Portuguese coordinator was not in favour, especially as the sole objective appeared to be increased mobility.

175. The Spanish coordinator believed it would destabilise the industry unless clear advance warnings were given. Problems would occur when only one airport withdrew the slots, while the airport at the other end of the route was confirming their availability. There was concern over what method of slot withdrawal might be contemplated.
176. The Italian coordinator was not in favour as it could possibly destroy the economic efficiency of airlines.
177. The Swedish coordinator did not see the proposal as being realistic. He did not believe it would be easy to sell the idea to either new entrants or incumbents.
178. Only the Austrian coordinator could see any benefit in the concept. He believed that the current schedules have ossified the operating programme of the 1950s, and that a major shake-up is required to allow airlines to adapt to the current trading requirements of nations. He is in favour of a one-off withdrawal of all 100% of slots for a fresh start.

(iii) Airlines

179. Although some airlines might be expected to gain from the increased mobility, there was universal concern about the proposal.
180. On behalf of the major European scheduled airlines, AEA is 'vehemently against' the proposal. It argues that historic slots ensure the integrity of the product and bring economic stability to both airports and airlines.
181. The European Regional Airlines are also totally opposed, partially because only short-haul intra-EU routes would appear to be targeted for withdrawal.
182. IATA responded at length to the Commission Staff Working Document, and discussed their response with members of the team. They reiterated that 'slot mobility, as defined by the Commission, should not in itself be a policy directive'.
183. They claim that 'the concept of 'grandfathered' rights, which lies at the core of the worldwide scheduling guidelines, is an essential element of a successful network operation, and is designed to ensure long-term stability'.
184. IATA could not be convinced that the benefits, 'if any could be persuasively demonstrated associated with slot mobility, would outweigh the clearly negative consequences they would bring to passengers and shippers, as well as to airlines'.

(iv) Governments

185. The discussions with member States were dominated by the subject of secondary slot trading and in-depth conversations on the subject of arbitrary slot withdrawals were few. However, the German DGCA made it clear that Germany could not vote for a proposal that might differentiate the EU from the rest of the world, and laying it open to possible future retaliation.

12.6.4 Analysis of Impact

186. This study has not been conducted to the same depth as the analysis of the impact of secondary slot trading, but the impacts are expected to be similar, with a more significant impact upon heavily congested airports compared to those that are less congested.
187. The number and detail of the proposed slot withdrawals for a subsequent season will probably need to be determined well in advance of the relevant IATA scheduling conference. As a guide, the FAA is proposing a minimum of three years' notice to airlines that are liable to have their slots withdrawn at New York-La Guardia. It may be considered that to overcome some of the arguments about de-stabilising schedules a long period of notice would need to be part of any withdrawal mechanism so as to allow the airlines affected to adjust their operations. (It does not follow however that airlines from which slots were withdrawn would not be able to regain some of them in the secondary trading process).
188. Also, it might be possible when withdrawing slots to allow airlines to receive the proceeds of their re-allocation through the secondary trading market. This might point to an alternative approach which would be to require airlines to offer a percentage of their slots in the secondary trading market rather than to forcibly withdraw them.
189. This would allow for the possibility that European airlines would only be required to hand back slots which were being used for intra-EU services; and to require the purchasers only to use them for intra-EU purposes. However, the obvious disadvantage of such a proposal could be that airlines will cease to operate intra-EU services in order to avoid being required to sell slots in this manner.
190. It should be noted that the actual mechanism for slot withdrawals proposed by the FAA at New York-La Guardia has yet to be fully worked through, although it is intended (by withdrawing 10% of slots each year as from 2010) to ensure that the expiration of slots is evenly distributed among all carriers so that no carrier loses a disproportionate number of slots at any one time.
191. The impact of the withdrawal of slots and the achievement of benefits from this will inevitably depend on the detail of the mechanism used, and the notice provided.
192. In general, depending upon the use made of the slot before withdrawal, and the use made of it by the replacement airline, the increase in slot utilisation might be less than what would be expected to be achieved by secondary slot trading. If only intra-EU slots are withdrawn, but after re-allocation could be used for any destination, the average increase in RPKs per slot will be high. However, if it is assumed that a category of 'intra-EU' slot is created, then when they are withdrawn, they would only be used for intra-EU services, and the increase in slot utilisation will be less than that expected from secondary trading.
193. If, instead of being auctioned, withdrawn slots are re-allocated according to the current administrative system, some peak slots withdrawn are likely to end up in the hands of airlines offering only relatively low RPKs per slot. As soon as they have been held for the minimum allowable period (if such is imposed), those slots will be targeted by other airlines seeking to purchase peak slots. Although this double transfer of slots could be seen as increasing slot mobility, the same result could have been obtained a year earlier without withdrawal, by secondary slot trading, although this would be reflected as a lower rate of mobility, with fewer trades.

12.6.5 Optimal Slot Withdrawal and Redistribution Mechanisms

194. The study was also asked to consider

‘an optimal form of withdrawal (e.g. withdrawal at random or from particular routes or types of routes) and subsequent redistribution of withdrawn slots to achieve the envisaged effects described’ above.

(i) Withdrawal Options

195. The Commission assumes that:

‘as a matter of principle only slots that are used for intra-EU operations (‘EU slots’) would be subject to such withdrawal as a wider application could provoke retaliatory action from the Community’s international partners’

196. This decision to take only intra-EU slots, while understandable, causes difficulties in administering a withdrawal programme. Several stakeholders were keen to learn more about which intra-EU slots might potentially be withdrawn and how they would be selected.

197. The question of airline ‘gaming’ was raised in the Staff Working Document. In order to avoid losing slots, airlines might replace as many of their intra-EU operations as possible by non-EU operations. The dominant hub carriers would be the airlines with the greatest ability to do this, as they operate to both EU and non-EU destinations. Non-EU airlines would not be affected, so the probable losers would be the smaller EU airlines, however efficiently they might be using their own slot allocation.

198. The other loser could be the consumer seeking intra-EU flights as it could not be guaranteed that the purchasers of such slots would use them for the same services going forward.

199. A variety of withdrawal options has been considered, but each has been found to suffer from drawbacks. Ideally, the mechanism should have the minimum effect on:

- the network of routes operated at an airport
- each individual air carrier
- vital year-round business routes
- service to peripheral regions and Member States

200. And yet be scrupulously ‘fair, non-discriminatory and transparent’. Seeking to minimise these effects would require a substantial amount of subjective judgment.

201. A particular drawback would be any selection mechanism which required a substantial analysis of the historical utilisation of slots based on aircraft capacity, frequency of operation, passenger carryings, destinations served and similar considerations. The use to which slots are put changes from season to season and in our view seeking to target slots on this basis would give rise to too many complexities.

202. There are in our view two choices which are sufficiently unproblematical. First, to set the percentage of slots to be withdrawn for each airline, and for each airline to decide which slots to give up. Second, to set the same percentage but to withdraw the slots evenly across time of day and days of week so that all airlines from which slots are withdrawn lose a similar pattern.

203. In this regard, it can be noted that, faced with the same problem, the FAA is developing a programming tool based on particular criteria, as yet unidentified. However, the general principle of withdrawing slots has been adopted by the FAA, with only the method of deciding which slots to withdraw yet to be identified. In the same way, our analysis has regard to the principle of withdrawal but has not identified the particular criteria which should apply.

(ii) Redistribution Options

204. An analysis is also called for options for the subsequent redistribution of withdrawn slots.

205. Para 4.2.3 of the Commission Staff Working Document made the assumption that:

‘the allocation of the pool slots, which includes the withdrawn slots, will have to take place on an equitable basis without application of the existing ‘50-50’ allocation rule while new entrants will not have priority over incumbents. Thus the distribution mechanism will not favour, or prejudice, any particular category of air carriers’.

206. It is accepted that any re-distribution by administrative allocation would have to take place on an equitable basis, that is, fair, non-discriminatory and transparent. It is recognised that retaining the new entrant criteria would not only complicate the re-allocation, but impose additional restrictions on such re-allocated slots in relation to subsequent secondary trading. It is also accepted that it would make more sense to allocate all slots according to the same criteria, whether they are residual pool slots or withdrawn slots. It is also considered that any chosen slot allocation system ought to be consistent across the EU for all airports at all times.

207. One main question is whether these withdrawn slots should be allocated by administrative allocation or by auction. It is acknowledged once again that allocation by auction is generally regarded as an efficient method of allocation of scarce public resources and in the case of slots will lead to much higher average ASKs per slot than if they are allocated administratively. Once again, it leads more quickly to optimum slot utilisation than the current administrative allocation system.

12.6.6 Analysis of Predicted Impact of Slot Withdrawals

208. In this section, the impact of the suggested withdrawal of slots is measured against the four main objectives set for this study.

(i) To ensure mobility of slots and efficient transport for passengers and cargo

209. The main objective of slot withdrawal is to ensure that a certain mobility of slots is achieved. However, it is not clear how far it will simultaneously reduce the mobility of slots resulting from secondary slot trading, as carriers may find that they can either obtain some of the necessary slots from the enhanced slot pool for free (under administrative slot re-allocation), or pay less for them under the auction option.

210. Slot withdrawal is expected to lead to a more efficient use of slots during peak periods at congested airports only if poorly used intra-EU slots are re-allocated to airlines operating larger aircraft on longer routes. However, the complications caused by creating a separate category of 'intra-EU slots' is likely to reduce the scope for increasing the efficient usage of slots.

(ii) To strengthen competition at Community airports

211. There is no real evidence to suggest that this process will strengthen competition, but there are some reasons for suggesting that it will weaken it. For example, if (as suggested by the Commission) the new entrant priority is to be denied at those airports where slot withdrawals may take place, this is likely to result in incumbent carriers facing less competition from new entrants.

212. In terms of intra-EU competition, the result is difficult to predict. Much would depend upon the proportions of flights taken away from each carrier, and this may depend upon the ability of carriers to switch their current intra-EU slots into non-EU slots before the decision to nominate slots is made. The expectation is that – under the proposed withdrawal scheme – infrequent charter and leisure flights from major airports would be a major casualty, with many being relegated to secondary airports. It is assumed that slots allocated to PSO routes would not be vulnerable to withdrawal.

(iii) To match secondary trading with the overall EU (air) transport policy

213. The proposal is generally in line with the overall EU (air) transport policy, in that the mobility proposed is expected to lead to a small increase in the average productivity of scarce airport slots. It would also protect intra-EU slots from the full effects of secondary trading, by protecting them from being converted to use for intercontinental routes.

(iv) To ensure compatibility of secondary slot trading with world-wide procedures

214. The proposal to withdraw slots would not be compatible with the current IATA Guidelines.

12.6.7 Assessment of Possible Economic Impact of Suggested Amendment

215. The economic case for slot withdrawal and re-allocation would be based on bringing forward the efficiency benefits of secondary trading, by auctioning grandfathered slots which are progressively withdrawn. But it is not yet clear whether the extent of benefits would be worthwhile in relation to the disruption and the transactions costs involved, and almost certainly would not be if the withdrawn slots were reallocated in the traditional administrative manner. Slot turnover as an objective in its own right does not provide a good rationale, since it is not clear (despite the Commission's concern which underlies its reasons for considering slot withdrawal) that secondary trading itself would not of itself provide sufficient turnover. On this basis slot withdrawal might be a mechanism only for consideration if in the light of experience the introduction of slot trading has not had the desired effect.

13 Glossary

AAGR	average annual growth rate (as a percentage)
ACI	Airports Council International
ACL	Airport Coordination Limited
AEA	Association of European Airlines
ANSP	air navigation service provider
ASK	available seat kilometre
AST	appraisal summary table
ATA	US Air Transport Association
ATM	air transport movement
BA	British Airways
BAA	British Airports Authority
bn	billion - 1,000,000,000
CAB	US Civil Aeronautics Board
CATM	cargo air transport movement
CO2	Carbon dioxide
DOT	US Department of Transport
ECAC	European Civil Aviation Conference
ELFAA	European Low Fare Airline Association
EPNdB	effective perceived noise in decibels
ERA	European Regional Airline Association
ETS	emissions trading scheme
EUACA	European Union Airport Coordinators Association
FAA	US Federal Aviation Administration
GA	general aviation
GAO	US General Accounting Office
IACA	International Association of Charter Airlines
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IFR	instrument flight rules
IMC	instrument meteorological conditions
ITT	Invitation to Tender
kg	kilogram
km	kilometre
LCC	low cost carrier
mn	million - 1,000,000
mt	million tonnes
NAIRU	non-accelerating inflation rate of unemployment
NO2	Nitrogen dioxide
NOX	Nitrogen oxides
O&D	origin and destination
OAG	Official Airline Guide
OfT	UK Office of Fair Trading
PANYNJ	Port Authority of New York and New Jersey
PATM	passenger air transport movement
PLF	passenger load factor
PSO	public service obligation
RPK	revenue passenger kilometre
TCAA	transatlantic common aviation area
VFR	visual flight rules
VMC	visual meteorological conditions