THE ECONOMIC IMPACT OF AN EU-US OPEN AVIATION AREA

DECEMBER 2002

Prepared for the European Commission

Directorate-General Energy and Transport

by

The Brattle Group

This report was prepared by

Boaz Moselle
James Reitzes
Dorothy Robyn
John Horn

with the assistance of

Richard Caldwell
Bryan Church
Carl Coscia
Stephen Gelband
Adam Schumacher

15 Berners Street
London W1T 3LJ
United Kingdom
office@brattle.co.uk
tel: +44-20-7907-1180
fax: +44-20-7907-1181

1133 20th Street, NW
Washington, DC 20036
USA
office@brattle.com
tel: 202-955-5050
fax: 202-955-5059

TABLE OF CONTENTS

Page

Executive Summary

I. Introduction

Despite the success of airline deregulation in their domestic markets, and the benefits from partial liberalisation of the transatlantic market, the United States and Europe still maintain substantial controls on transatlantic competition and investment in aviation. Bilateral "Open Skies" agreements, which govern competition between the United States (US) and eleven European Union (EU) Member States, stop short of complete liberalisation. Most important, they deny foreign entities the ability to own and control an existing domestic air carrier, or establish a new one ("right of establishment"); restrict important traffic rights, such as a foreign carrier's right to provide domestic service ("cabotage"); limit opportunities for leasing foreign aircraft and crew; and impose domestic content ("Fly America") requirements. Transatlantic competition between the United States and the four remaining EU Member States (Greece, Ireland, Spain, and the United Kingdom) is governed by bilateral agreements that are even more restrictive.

This patchwork system of bilateral agreements significantly distorts competition and constrains the ability of air carriers to adjust to market conditions, particularly within Europe and in the transatlantic market:

- EU carriers can fly directly to the United States only from their own country, which limits competition on transatlantic routes and within the European Union.
- EU carriers from Open Skies countries cannot merge with those from non-Open Skies countries without losing US traffic rights, which thwarts integration and liberalisation of the internal EU market, further limiting competition.
- Mergers of US and EU carriers are prohibited altogether, which puts many of the benefits of globalisation out of reach.
- Limits on cross-border investment mean that failing EU carriers have few options.
- US domestic passengers are denied the benefits of foreign competition.

To remove these distortions, the European Commission has endorsed the elimination of *all* commercial restrictions on EU-US aviation competition and investment. The goal is to create a single open market encompassing the provision of air transport services not only between, but also within, Europe and the United States. We refer to this as an "Open Aviation Area" because it would amount to a free trade area in air transport.

To inform the debate, the Commission asked *The Brattle Group* to analyse the effects of complete EU-US aviation liberalisation. This report summarises our analysis and findings:

- First, we identify in qualitative terms the different ways in which elimination of all commercial restrictions on EU-US aviation competition and investment could be expected to affect competition, economic efficiency, and consumer welfare.
- Next, we quantify where possible these economic effects. Our analysis focuses on the impact of liberalisation on airline costs and output (*i.e.*, traffic volumes), and the resulting effect on consumer welfare and aviation employment.

- Finally, we analyse concerns raised about the potential impact of EU-US liberalisation in three key areas—national security, airline labour, and aviation safety—and propose policy options to address these concerns.

II. Economic Impact of an Open Aviation Area: Qualitative Effects

Analysis of the economic effects of an Open Aviation Area begins with the theory of trade and investment. Trade theory predicts that fully liberalising international trade and investment in aviation services would increase efficiency and benefit consumers in multiple ways:

More Efficient Firms Replace Less Efficient Firms: In a liberalised market, more efficient airlines would replace less efficient ones, or less efficient airlines would adopt the practices of more efficient ones, leading to significant cost savings and an increase in industry efficiency. This substitution would occur through two mechanisms: industry restructuring (*e.g.*, mergers, acquisitions, joint ventures), and increased competition (*e.g.*, a carrier from one EU country could establish a transatlantic hub in another EU country).

Exploitation of Size-Related Economies over a Larger Market: This same process of expansion and consolidation would allow air carriers to exploit size-related economies, leading to further efficiency gains. For example, a merger or "deep" alliance might allow two carriers to spread certain fixed costs over more passengers (scale economy). The carriers might achieve added savings by reconfiguring their combined network to connect more flights to certain hub airports (scope economy). They might also achieve higher utilisation—*e.g.*, by combining traffic to raise load factors (density economy).

Closer Integration among Firms Leads to Pricing Synergies: By facilitating deeper forms of integration between US and EU carriers, liberalisation would allow improved price coordination on transatlantic interline routes (*i.e.*, routes that require passengers to fly on two or more airlines to reach their destination). Without coordination, each carrier will set the fare for its leg of the flight without considering how it will affect demand for the other legs. If the same carriers are allowed to coordinate, each will have an incentive to set *lower* fares so as to increase combined profits (a process known as "elimination of double marginalisation").

Output Expansion: At least three mechanisms would lead to expanded output in a liberalised market. First, cost savings from the first two efficiency effects described above would be passed through to consumers (at least in the long run) in the form of lower prices, leading to increased demand. Second, price reductions resulting from improved price coordination on transatlantic interline routes would increase demand. Third, US bilateral agreements with Greece, Ireland, Spain, and the United Kingdom all restrict output to varying degrees; an Open Aviation Area would eliminate these restrictions.

Cross-Border Flows of Capital: The liberalisation of aviation trade and investment likely would lead to significant cross-border flows of capital as airlines engage in consolidation and deeper integration and establish new operations in markets that are opened or made more accessible by liberalisation. Cross-border investment would in turn play a major role in driving many of the benefits described above.

Cross-Border Flows of Labour: In theory, liberalisation also may lead to cross-border flows of labour as workers seek higher wages. In this way, liberalisation could facilitate "labour substitution"—*i.e.*, the substitution of less expensive foreign workers for more expensive domestic workers—either directly or indirectly. Although labour substitution benefits consumers and lower-wage workers, it imposes costs on other workers.

III. Quantifying the Economic Impact of an Open Aviation Area

To quantify the benefits of an Open Aviation Area, we focus on three of the six efficiency effects described above. Using a variety of quantitative methods, we estimate the impact of each effect on prices, passenger traffic volume, and consumer welfare. *We present all of our estimates in euros. American readers can assume that €1 is equivalent to $1.*

The Economic Benefits of More Efficient Firms Replacing Less Efficient Firms

In Chapter 3, we use cost data for EU and US carriers to estimate the potential savings to the airline industry if more efficient airlines replace less efficient airlines, or if less efficient airlines adopt the business practices of more efficient airlines. First, we use these data, together with qualitative industry input, to identify five cost categories for which the variation in costs across airlines is the greatest. Second, we determine a "best practice benchmark" for these five cost categories. Third, we calculate the savings that would result if all of the airlines whose costs are currently above our estimated "best practice benchmark" were able to reduce their costs to that level.

Table 1

Estimated Impact of Cost Reductions

	Flight Type		
	Intra-EU	*Transatlantic*	*All Flights*
Current Costs (€ million/year)	39,531	28,578	68,110
Potential Savings (€ million/year)	2,268	621	2,888
Percent of Current Costs	5.7%	2.2%	4.2%

As of December 2, 2002, €1 = $0.9927. For convenience, we have assumed €1 = $1.

Table 1 shows our results. We estimate that the potential cost savings to the airline industry from greater "productive efficiency" are about €2.9 billion annually, or 4.2 percent of total costs. Nearly 80 percent of the savings would come from intra-EU, as opposed to transatlantic, operations. We further estimate the impact if these savings were passed through to consumers in price reductions. In addition to the direct benefit of €2.9 billion a year, they would produce an annual increase in consumer welfare of as much as €370 million due to the increase in passenger traffic that lower prices would generate.

The Economic Benefits of Pricing Synergies Due to Transatlantic Integration

In Chapter 4, we assess the impact of improved price coordination by interlining carriers. In particular, we rely on previous studies that examined the fare difference on transatlantic interline routes when the route is covered by an airline alliance, as opposed to no alliance. These studies find that existing alliances have produced substantially lower fares, with differences ranging from 18 percent to 28 percent.

Our analysis extrapolates from these studies to estimate the gains to consumers that would result if there were comparable fare reductions on transatlantic routes not currently subject to price coordination. Table 2 summarises our findings, showing an estimated annual benefit to consumers of between €630 million and €1,350 million, depending on passengers' responsiveness to changes in price (the "elasticity of demand").

Table 2

Annual Impact of Increased Interline Price Coordination

	Lower Bound Scenario	*Upper Bound Scenario*
Increased Passenger Volume ('000s/year)	975	5,654
Increase in Consumer Surplus (€ million/year)		
From Price Decreases for Existing Customers	571	888
From Increased Traffic	59	458
Total	***629***	***1,347***

The Lower Bound Scenario assumes an 18 percent price reduction and a price elasticity of demand of 1.0, while the Upper Bound Scenario assumes a 28 percent price reduction and a price elasticity of demand of 2.5.

Our approach is inherently conservative. First, under an Open Aviation Area, non-allied carriers could engage in "deep" alliances, up to and including mergers. Thus the impact could be greater than from the looser type of alliance that was the focus of the studies from which we extrapolated. Second, an Open Aviation Area would allow carriers that now are loosely allied to deepen their alliance or undertake a full-blown merger, which could produce additional fare reductions on interline routes that are already subject to price coordination.

The Economic Benefits of Eliminating Output Restrictions

In Chapter 5 we estimate the impact on airline industry output of liberalising the four "output-restricting" bilateral agreements (*i.e.*, the non-Open Skies agreements that govern aviation services between the United States and Greece, Ireland, Spain, and the United Kingdom). Our methodology involves estimating the impact of prior, "partial" transatlantic liberalisation—namely the Open Skies agreements of the 1990s. Specifically, we estimate the impact of Open Skies by using statistical techniques to analyse historical data on passenger traffic as well as market cost and demand variables. By controlling for these economic variables, we isolate the contribution of Open Skies agreements to changes in the volume of transatlantic passengers over time. We use this result as a lower-bound estimate of the output expansion that would accompany the replacement of the four output-restricting bilateral agreements with an Open Aviation Area.

Our analysis shows that partial aviation liberalisation through Open Skies agreements has led to a substantial increase—10 percent—in the number of transatlantic passengers overall. To estimate the impact of liberalising the four remaining output-restricting bilateral agreements, we extrapolate from that result, as shown in Table 3. By this conservative measure, we estimate that an Open Aviation Area would lead to an additional 2.2 million passengers travelling annually between the United States and Greece, Ireland, Spain, and the United Kingdom. As Table 4 shows, the corresponding impact on consumer welfare ranges from €0.6 billion to €1.5 billion a year.

Table 3

Estimated Volume Increases from Lifting of Output Restrictions for Non-Open Skies Countries

Country	*Actual Volume in 2000 ('000s) [1]*	*Predicted Percent Increase from Open Skies Agreement [2]*	*Predicted Volume in 2000 ('000s) [3] = (1 + [2]) x [1]*	*Change in Volume in 2000 ('000s) [4] = [3] - [1]*
Greece	342	10%	377	35
Ireland	1,587	10%	1,748	161
Spain	1,825	10%	2,011	185
United Kingdom	17,810	10%	19,617	1,807
Total	***21,564***	***10%***	***23,753***	***2,188***

Source:
DOT International T-100 Data

Table 4

Predicted Increase in Consumer Surplus Due to Lifting of Output Restrictions (€ million/year)

Country	*Lower Bound Scenario*			*Upper Bound Scenario*		
	Gain Due to Price Decreases for Existing Customers	*Gain Due to Increased Traffic*	*Total Gains*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gains*
Greece	18	1	19	8	0	8
Ireland	95	5	99	39	2	41
Spain	106	5	112	44	2	46
United Kingdom	1,181	58	1,239	486	24	510
Total	*1,401*	*69*	*1,469*	*577*	*29*	*605*

Source:
DOT International T-100 Data and BAe Database
Notes:
Calculated for routes where volume and bidirectional fares are both available.
Utilizes January 2001 fares.
The Lower Bound Scenario assumes an elasticity of 1.0, while the Upper Bound Scenario assumes an elasticity of 2.5.
For reasons explained in Chapter 5, the assumptions behind the two scenarios result in greater gains in the Lower Bound Scenario than in the Upper Bound Scenario.

Total Economic Impact

In Chapter 6, we combine the results from Chapters 3 through 5 to develop indicative estimates of the total economic impact of an Open Aviation Area on two key measures: passenger traffic volume and consumer welfare.

As Table 5 shows, we estimate that passenger traffic would increase annually by between 4.1 million and 11.0 million passengers on transatlantic routes, and between 13.6 million and 35.7 million on intra-EU routes, for a total increase of 17.7 million to 46.7 million passengers per year. *These are significant increases. They represent an increase of 9 percent to 24 percent in total transatlantic travel, and 5 percent to 14 percent in intra-EU travel.*

Table 5

Total Estimated Increase in Passenger Volume ('000s/year)

Effect	*Area*	*Lower Bound Scenario*	*Upper Bound Scenario*
Cost Savings	Transatlantic	968	3,169
Pricing Synergies	Transatlantic	975	5,654
No Output-Restricting Bilaterals	Transatlantic	2,188	2,188
Subtotal		*4,131*	*11,011*
Cost Savings	Intra-EU	13,527	35,720
Total		***17,658***	***46,731***

As Table 6 shows, we estimate that an Open Aviation Area would increase consumer surplus by a large amount—from €5.1 billion to €5.2 billion annually.* Transatlantic traffic accounts for €2.7 billion to €2.8 billion, or just over half, of that increase. As explained in Chapter 6, the lion's share (€3.1 billion to €3.8 billion annually) comes from gains to consumers that do not involve any reduction in airline profits.

Table 6

Total Estimated Increase in Consumer Surplus (€ million/year)

		Lower Bound Scenario			*Upper Bound Scenario*		
Effect	*Area*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gain*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gain*
Cost Savings	Transatlantic	621	41	662	621	158	778
Pricing Synergies	Transatlantic	571	59	629	888	458	1,347
No Output-Restricting Bilaterals	Transatlantic	1,401	69	1,469	577	29	605
Subtotal		*2,592*	*168*	*2,760*	*2,085*	*645*	*2,730*
Cost Savings	Intra-EU	2,268	83	2,351	2,268	216	2,483
Total		***4,860***	***251***	***5,111***	***4,353***	***860***	***5,213***

Chapter 6 also quantifies the impact of an Open Aviation Area on industries that supply direct inputs to aviation, such as aircraft and computer equipment. As Table 7 shows, we estimate that the increased airline revenue identified in Chapters 4 and 5 would lead to additional economic output in "directly related" industries ranging from €3.6 billion to €8.1 billion a year. Note that this figure excludes any of the potential impact on industries such as tourism and leisure that would be among the most significant beneficiaries of aviation liberalisation.

* For Table 5 through Table 7, the Lower Bound Scenario represents an assumed elasticity of 1.0, while the Upper Bound Scenario represents an assumed elasticity of 2.5. For the Pricing Synergies results, the Lower Bound Scenario also assumes an 18 percent price decrease, while the Upper Bound Scenario assumes a 28 percent price decrease. As explained in Chapter 5 and depicted in Table 6, the elasticity assumptions behind the two scenarios imply that the Lower Bound Scenario yields greater consumer surplus gains than the Upper Bound Scenario with respect to the effects of No Output-Restricting Bilaterals.

Table 7

Revenue Impact on Directly Related Industries (€ million/year)

	Lower Bound Scenario			*Upper Bound Scenario*		
Effect	*Revenue*	*Direct Economic Impacts*	*Direct-Plus-Indirect Economic Impacts*	*Revenue*	*Direct Economic Impacts*	*Direct-Plus-Indirect Economic Impacts*
Pricing Synergies	571	571	1,053	2,908	2,908	5,365
No Output-Restricting Bilaterals	1,401	1,401	2,584	1,484	1,484	2,738
Total	***1,971***	***1,971***	***3,637***	***4,392***	***4,392***	***8,103***

Additional Benefits We Could Not Measure

Our estimate of the benefits of an Open Aviation Area is conservative. We noted above several ways in which our methodology understates the benefits of complete liberalisation. In addition, we did not quantify three of the efficiency effects we identified (*i.e.*, size-related economies, capital flows, and labour flows), because of data limitations and/or to avoid "double counting".

Specifically, an Open Aviation Area could bring additional benefits in two areas that we were not able to measure. The first is the *cost savings from transatlantic mergers.* The analysis in Chapter 4 captures conservatively the *price* effects of transatlantic consolidation, and the Chapter 3 analysis captures some of the potential benefits of merger-related *cost* savings. But a transatlantic merger might enable additional cost savings not captured by our analysis, because it relies on comparisons among existing airlines, and no existing airline has access to the benefits of a transatlantic merger.

The second area is the consumer and producer benefits from *expansion of internal EU and US passenger networks that would accompany transatlantic liberalisation*. The expansion of the internal markets would occur as increased competition leads to lower prices and greater passenger volumes. Consumers would benefit from lower fares, while producers would benefit from the profits on the increased volumes. We could not measure (most of) these effects due to a lack of intra-EU and intra-US fare and volume data comparable to the transatlantic data used for the analysis in Chapters 3 through 5.

IV. Potential Impact of Liberalisation in Three Key Policy Areas

Would an Open Aviation Area Jeopardise US National Security?

Some in the US Department of Defense (DoD) are concerned that international aviation liberalisation could threaten the Civil Reserve Air Fleet (CRAF), a critical component of America's military readiness. Under the CRAF program, US commercial air carriers pledge to provide military airlift in a defence emergency in exchange for exclusive access to US government peacetime business. DoD officials fear that allowing foreign investors to acquire US air carriers would jeopardise the military's dependable access to this emergency capability. DoD concerns rest on three assumptions:

- US air carriers are more dependable than foreign air carriers.
- If a foreign entity bought a US air carrier, it would operate as a foreign carrier.
- If the US government changed its *statutory policy* to allow foreign ownership of US carriers, it would open itself up to problematic *transactions*.

The first assumption is generally valid. US carriers *are* more dependable because the US government has legal leverage over them (it could revoke the operating certificate of a non-compliant CRAF carrier, seize the aircraft and call up the carrier's reservist-pilots to fly them, etc.). The US government's leverage with foreign carriers is far more limited.

However, the second assumption is flawed. Legal requirements and business strategy almost certainly would compel the European buyer of a US carrier to operate it as a US subsidiary, giving the US government the identical leverage. The alternative—operating as a European carrier in US domestic commerce—would amount to stand-alone cabotage. Cabotage operations on that scale would be highly impractical from a commercial standpoint. In addition, most US aviation law experts believe that, even if the statutory restriction on stand-alone cabotage were eliminated under an Open Aviation Area, a foreign carrier operating in US domestic commerce would be subject to all of the laws and regulations that apply to other US-based companies.[*] In sum, because the European buyer of a US carrier would (by choice or mandate) exercise its right of establishment, DoD's dependable access to the aircraft would be preserved.

Only one scenario would put CRAF aircraft at risk—if a US carrier (whether US- or foreign-owned) re-flagged its international operations to Europe, presumably to substitute lower-wage EU pilots. But this scenario is highly unlikely, and there are ways to preclude it under an Open Aviation Area.

As evidence that this approach (*i.e.*, US-incorporation under a right of establishment) protects national security, DoD already allows participation by foreign-owned commercial vessels in its Voluntary Intermodal Sealift Agreement (VISA) program—the maritime equivalent of CRAF—and the closely linked Maritime Security Program (MSP). Much of VISA and MSP capacity comes from ships that meet US "citizenship" requirements and fly the US flag despite being foreign-owned. For example, Danish-owned, Norfolk-based Maersk Line, Limited has top-secret clearance and transports half of all DoD's peacetime maritime cargo.

---

[*] Presumably, the same logic would apply to a US carrier operating in European domestic commerce. The legal argument does not extend to the transport of domestic traffic as part of international service (*i.e.*, consecutive, or "fill-up", cabotage).

The third assumption also is flawed. Even if it were to allow foreign ownership of US carriers, the US government still could block or restrict individual transactions, using the Exon-Florio amendment to the Defense Production Act. Under Exon-Florio, an interagency executive-branch Committee on Foreign Investment in the United States (CFIUS) reviews foreign mergers solely to determine if they would harm US national security. Since 1988, CFIUS has imposed conditions on a number of transactions to protect US national security.

A second DoD concern is that elimination of market access restrictions (Fly America requirements and the ban on cabotage) would make the CRAF program more costly. Because CRAF is financed indirectly, by giving participating carriers exclusive access to the market for US government air transport services, it requires no direct funding. Economists have long criticised cabotage and Fly America restrictions: by excluding foreign carriers from the US government market, they impose direct and indirect costs on users. On balance, the US government would *save* money if it paid US carriers directly to participate in CRAF and opened the government market to all qualified carriers. However, as noted above, stand-alone cabotage is impractical for legal and business reasons. Moreover, elimination of Fly America requirements may be politically impractical in the near term, because it would require the US Congress to appropriate money for a program that is currently "free" in budgetary terms. If Fly America restrictions were maintained, it would diminish somewhat the benefits of an Open Aviation Area, but European carriers could get around that restriction by exercising their right of establishment.

We conclude that an EU-US Open Aviation Area would not jeopardise the CRAF program, and it might enhance it.

How Would an Open Aviation Area Affect Workers and Wages?

Economic theory tells us that by liberalising trade and investment in aviation, an Open Aviation Area could facilitate the substitution of less expensive foreign workers for more expensive domestic workers ("labour substitution"), either directly or indirectly. In fact, a major impediment to EU-US liberalisation is the concern by US labour groups that US pilots and flight attendants would be replaced by lower-wage EU flight crew on transatlantic flights. US pilots point to two scenarios that are of particular concern. The first is a US-EU merger: for example, if Delta were to buy Aer Lingus and substitute Irish pilots on transatlantic flights. Under the second scenario, a US carrier would re-flag some or all of its transatlantic operations to, say, Portugal—what labour groups refer to as flying a "flag of convenience"—so as to substitute lower-wage EU flight crew.

Based on a comparison of EU-US wage differences and an analysis of legal and institutional barriers to labour mobility, we draw three conclusions. First, *the potential for direct labour substitution appears to be very limited*. Under US immigration law, US carriers cannot avoid using US flight crew for their domestic operations, which account for nearly 75 percent of their total revenue. This gives US pilots significant bargaining leverage with which to prevent US carriers from engaging in direct labour substitution. US pilots have already negotiated protection against the comparable risk associated with international alliances and other international operations, and that process will only accelerate as the prospects for liberalisation improve. Moreover, pilots are organising themselves in parallel with the cross-border airline alliances, and these international pilot alliances will thwart airline efforts to introduce competition in aviation labour markets.

In addition, the lack of significant EU-US wage disparity would limit the appeal of direct labour substitution for US carriers under an Open Aviation Area. Pilots and flight

attendants at major EU airlines earn only about 15 percent less than their US counterparts. There is, however, a far wider wage gap between US flight crew and their counterparts in Central and Eastern Europe, and those countries are on track for accession to the European Union. But the accession countries have relatively few qualified pilots, and it is expensive to train new ones. Moreover, because accession-country pilots are scarce and well informed, their wages will converge with those of other pilots in a competitive market.

Second, *the potential for indirect labour substitution is greater*, by comparison—particularly over the long run. Under this scenario, relatively lower-wage transatlantic carriers such as Virgin Atlantic would take market share from high-wage US and EU carriers. *But, even here, any adverse impact on US labour would be limited* because EU and US wage levels, which are not that far apart to begin with, will converge in a competitive market.

Third, *the pejorative discussion of "flags of convenience" in the context of EU-US aviation liberalisation is fundamentally misleading.* The chequered history of open-registry vessels in the maritime industry, which opponents of liberalisation often cite, has limited relevance for an Open Aviation Area. US carriers are unlikely to re-flag for the reasons cited above, and high-wage EU carriers are equally unlikely to re-flag for a different reason: they can hire workers from lower-wage EU countries even without re-flagging. Finally, even if re-flagging were to occur under an Open Aviation Area, it would not pose a threat to airline safety or labour conditions, given the high standards in place in Europe and the United States.

Although our analysis suggests that airline workers would not be harmed seriously by liberalisation, it nevertheless may be desirable to cushion them against possible losses under an Open Aviation Area. Policymakers should avoid policies that distort competition (*e.g.*, mechanisms to preclude re-flagging). Far preferable are policies that directly compensate dislocated workers, although policymakers would have to make a credible commitment to honour such policies.

Would an Open Aviation Area Harm Airline Safety?

Western Europe and the United States have aviation safety records that are (in the words of safety expert Arnold Barnett) "astoundingly close to perfect". In part, these records reflect the strength of government regulatory systems that subject aviation to a higher level of safety scrutiny than that received by any other industry. US and European safety systems are part of a longstanding international regulatory regime that has proven highly effective in those parts of the world where it is fully implemented. Most important:

- The International Civil Aviation Organization (ICAO) develops and disseminates detailed international standards covering every aspect of aviation.

- Member countries, through their national or regional civil aviation authority (CAA), apply and enforce ICAO standards. Specifically, CAAs are responsible for the safe operation of air carriers that bear their nation's flag.

More recently, the United States and ICAO have begun formal programs to assess whether third-country CAAs comply with ICAO standards. Regulators in the United States and elsewhere use the results of these assessments to limit or deny access to their national airspace by carriers from non-compliant countries.

Although an EU-US Open Aviation Area would not alter the strong regulatory structure in place in Western Europe and the United States, proposals for international

liberalisation, generally, have raised concerns from labour groups and questions from aviation regulators at the US Federal Aviation Administration (FAA).

Labour groups warn that increased international competition could force air carriers to cut spending related to safety. US airline deregulation prompted similar concerns in the late 1970s and 1980s. However, extensive research found no evidence that deregulation had any adverse impact on safety, and the US accident rate improved during deregulation roughly in line with long-term trends. A second concern is that practices fostered by globalisation (*e.g.*, international code-sharing) make it easier for carriers to escape national regulatory oversight. While these practices do make safety regulation more complex, an Open Aviation Area would introduce no new or added risk.

Most FAA officials view international liberalisation as an issue that should be decided on the basis of economic policy considerations, not safety considerations. However, they urge that liberalisation be carried out in a way that preserves or enhances safety. One issue is how to handle operations by European carriers inside of the United States under an Open Aviation Area—primarily, fill-up cabotage flights and wet leasing (*i.e.*, leasing of a European aircraft and crew by a US carrier) that is cross-border in nature. Under international rules, those operations would be the regulatory responsibility of European authorities; but FAA officials worry that Congress would impose direct FAA oversight, subjecting the operator to two separate regulatory standards. As an alternative to having no oversight or direct oversight, the FAA might certify such operations using its Bilateral Aviation Safety Agreement, a mechanism currently used to facilitate reciprocal certification of aircraft and aeronautical products. A second FAA issue concerns international flights to and from the United States under an Open Aviation Area. The key is to preserve aviation authorities' ability to know precisely who has operational control of, and regulatory control over, individual flights.

Our analysis concludes that, although an Open Aviation Area would challenge regulators, it would not harm aviation safety, given the generally high level of regulatory oversight in Europe and the United States. Globalisation of aviation is itself a challenge, and one that is unavoidable. As a reflection of that, aviation authorities in the United States and Europe are devoting ever more time and resources to dealing with the international dimensions of regulatory oversight. EU-US aviation liberalisation would focus and accelerate this important effort. In the end, that could be one of the most valuable contributions of an Open Aviation Area.

Outline of Study

Chapter 1 reviews the progress to date in liberalising US and EU aviation, describes the distortions created by the current regulatory environment, and summarises the features of an Open Aviation Area. Chapter 2 describes in qualitative terms the likely economic impacts of aviation liberalisation from the perspective of the economic literature on international trade and investment. Chapters 3 through 5 estimate the economic benefits of an Open Aviation Area: Chapter 3 estimates the cost savings that could be realised through increased competition, Chapter 4 estimates the benefits to interlining transatlantic passengers of improved integration and price coordination among carriers, and Chapter 5 analyses the benefits of eliminating the remaining "output-restricting" bilateral agreements. Chapter 6 calculates the combined economic impacts of an Open Aviation Area, based on the preceding analyses. Chapters 7 through 9 analyse concerns raised about the potential impact of EU-US liberalisation in three key areas: US national security (Chapter 7), airline labour (Chapter 8), and aviation safety (Chapter 9).

1. EU-US Air Transport Market: Economic Controls and Their Distortive Effects on Competition

1.1 Introduction

Although aviation is an enabler of globalisation, paradoxically, the airline industry itself remains subject to highly restrictive national controls on cross-border competition and investment. Government-to-government bilateral agreements often limit the routes that international air carriers can fly, the number of flights they can schedule, and the fares they can charge. All but a few countries prohibit foreign competition in their internal markets, by banning both the operation of foreign air carriers between domestic points ("cabotage") and cross-border ownership of national airlines. Government signatories to bilateral agreements even restrict cross-border investment in *foreign* carriers through a so-called "nationality clause" that requires carriers to be "substantially owned and effectively controlled" by citizens of the country where they are based.

The European Union (EU) and the United States (US) have the largest and among the most deregulated domestic aviation markets in the world. However, despite the success of airline deregulation in their domestic markets, Europe and the United States still limit transatlantic competition and investment. To be sure, bilateral "Open Skies" agreements between the United States and individual EU Member States have eliminated most controls on the quality, quantity, and price of aviation services. However, such agreements stop short of full liberalisation, and major markets—including routes between the United Kingdom (UK) and the United States, which account for half of all transatlantic travel by value—are not covered. Moreover, the patchwork system of bilateral agreements itself creates significant market distortions within Europe and on transatlantic routes.

As a result of this system, the aviation industry lags in adapting to globalisation even as it drives other sectors to globalise.[1] As an editorial in the *Financial Times* put it, "In an era of supposedly borderless markets and global competition, the world airline industry remains stuck in a time warp."[2] This regulatory time warp imposes significant costs on consumers and efficient air carriers alike. And while archaic regulation is not the major cause of the financial crisis currently confronting major carriers in the United States and Europe, it impedes their long-term recovery.

EU-US Open Aviation Area

To remove the distortions created by remaining controls on the EU-US air transport market, the European Commission has endorsed the elimination of *all* commercial restrictions on EU-US aviation competition and investment. The goal is to create a single open market encompassing the provision of air transport services not only between, but also within, Europe and the United States. We refer to this as an EU-US "Open Aviation Area", because it would amount to a free trade area in air transport.

---

[1] See Daniel Yergin, Richard H. K. Vietor, and Peter C. Evans, *Fettered Flight: Globalisation and the Airline Industry*, Cambridge Energy Research Associates, Inc. (November 2000).

[2] "Lowering the Flag," *Financial Times* (June 8, 2000).

Contrary to what some people perceive, this Open Aviation Area (at least as envisioned by the Commission) would create no new institutional or regulatory structures, and would not seek to harmonise EU and US competition policy or regulation of aviation safety, security, and environmental impact. Although Commission officials hope it might raise the already high level of cooperation between EU competition and regulatory authorities and their US counterparts, nothing in the proposed concept would require that.

There is support for an Open Aviation Area on both sides of the Atlantic, particularly among flag carriers seeking greater commercial flexibility. While economists and aviation policy experts generally favour the proposal because it embraces market principles, specific groups, including some US Department of Defense officials and airline labour unions, express serious concerns about key provisions, and US carriers are reluctant to battle with their pilots on this issue in the current climate. Largely based on the position of these groups, the US government, despite having blazed the trail on aviation liberalisation for more than two decades, has not endorsed significant elements of an EU-US Open Aviation Area. US officials instead advocate an extension of their Open Skies template to remaining EU Member States.

To inform this debate, the Commission asked *The Brattle Group* to analyse the economic effects of complete liberalisation, or deregulation, of EU-US aviation competition and investment. Specifically, our terms of reference required us to:

- Identify in qualitative terms the different ways in which EU-US liberalisation could be expected to affect competition, economic efficiency, and consumer welfare.
- Quantify where possible the impact that EU-US liberalisation would have on airline costs and output, and the resulting effect on consumer welfare and aviation employment.
- Analyse the merits of concerns raised about the possible impact of EU-US liberalisation in three areas—national security, airline workers, and aviation safety—and propose policy options to address these concerns.

This report summarises our analysis and findings.

The current chapter sets the stage for this analysis. First, we briefly review the steps taken to date to liberalise aviation both within the United States and the European Union, and between the United States and EU Member States. Next, we describe the remaining economic restrictions on EU-US aviation competition and investment. Third, we discuss how these controls distort competition, impose costs on consumers, and contribute to the problems currently facing European and US airlines. Finally, we describe in more detail what an EU-US Open Aviation Area would—and would not—entail.

1.2 Liberalisation of EU and US Aviation Markets: Progress to Date

US Domestic Deregulation

The Airline Deregulation Act of 1978 put an end to 40 years of rigid, public-utility type regulation of the US domestic aviation market—the world's largest. Most economists believe that deregulation has been a resounding success, triggering an explosion of air travel and bringing inexpensive travel within the reach of people of relatively modest means.

According to the most widely cited study of airline deregulation, resulting changes in fares and service quality produce annual net benefits to travellers of more than $20 billion (1996 dollars).[3] Airline fares are 20 percent lower than they would have been if the industry still were regulated, and 80 percent of passengers (accounting for 85 percent of passenger miles) are paying less than they would have under regulation. A major source (59 percent) of the fare decline is heightened competition, particularly on routes served by new entrants. Whatever one makes of the current financial crisis in the US airline industry, deregulation has produced enormous and sustained benefits for US consumers.

By spurring competition and giving air carriers incentives to innovate, deregulation also has led to significant improvements in airline operating efficiency. Most important, it accelerated the shift from bureaucratically governed linear route structures to network structures based on hub-and-spoke operations. By funnelling traffic through large hub airports, network carriers have reaped economies of scope and density, and travellers have benefited from more frequent flights to many more destinations.[4] These and other operational efficiencies have allowed carriers to lower their costs by 25 percent since deregulation. Airline load factors, which were less than 55 percent in the decade before deregulation, have averaged more than 60 percent since decontrol, and they reached 70 percent in the late 1990s.[5]

Transatlantic Liberalisation

Although major impediments to competition remain, air transport between Europe and the United States has been significantly liberalised in the last 25 years. Inspired in part by the success of US domestic deregulation, in the late 1970s and 1980s, the United States negotiated liberal "open market" aviation agreements with various European governments, beginning with the Netherlands; Belgium, Germany, and Luxembourg followed.[6] (The United States negotiated similar agreements with countries in Asia and Latin America.) In exchange for access to more (but not all) US cities, European governments agreed to let US carriers fly from any point in the United States to specified points in their country. In addition, the agreements eliminated all restrictions on the frequency of flights and the seat capacity on those flights, provided greater opportunities for innovative and competitive pricing, removed restrictions on charter operations, and allowed for the designation of multiple airlines. The latter provision was of interest largely to the United States because most other countries had only one international carrier (its so-called "flag carrier"). (Table 1.1, based on information in Rigas Doganis'

---

[3] Steven A. Morrison and Clifford Winston, "The Remaining Role for Government Policy in the Deregulated Airline Industry," in *Deregulation of Network Industries: What's Next?* ed. Sam Peltzman and Clifford Winston (AEI-Brookings Joint Center for Regulatory Studies, 2000): 1-40. The net benefit figure is based on Steven A. Morrison and Clifford Winston, *The Evolution of the Airline Industry* (Brookings Institution, 1995).

[4] See Chapter 2 and Appendix III for a definition and detailed discussion of economies of scale, scope, and density in the airline industry.

[5] Steven A. Morrison and Clifford Winston, "Regulatory Reform of US Intercity Transportation," in *Essays in Transportation Economics and Policy: A Handbook in Honor of John Meyer,* ed. Jose Gomez-Ibanez, William B. Tye, and Clifford Winston (Brookings Institution, 1999): 481. The cited cost reduction is in terms of real US dollars per available ton mile.

[6] See Rigas Doganis, *The Airline Business in the 21st Century* (Routledge, 2001): 23-30. "Open market" is Doganis' term for these agreements.

The Airline Business in the 21st Century and *Flying Off Course,* provides a comparison of traditional bilateral agreements and open market agreements.)

Table 1.1

Key Features of US Bilateral Air Services Agreements

<table>
<tr><th></th><th rowspan="2">Pre-1978 Bilaterals</th><th colspan="2">1978-1991 Open Market Bilaterals</th><th rowspan="2">Post-1991 Open Skies Bilaterals</th></tr>
<tr><th>US Airlines</th><th>Foreign Airlines</th></tr>
<tr><td rowspan="6">Market Access</td><td>Only to points specified.</td><td>From any point in United States to specified points in foreign country.</td><td>Access to limited number of US points.</td><td>Unlimited.</td></tr>
<tr><td>Limited fifth freedom rights granted - more for US Carriers.</td><td colspan="2">Extensive fifth freedom rights granted, but generally more for US carriers.</td><td>Unlimited fifth freedom rights.</td></tr>
<tr><td>Charter rights not included.</td><td colspan="3">Unlimited charter rights.</td></tr>
<tr><td colspan="4">Seventh freedom rights (passenger) not granted.</td></tr>
<tr><td colspan="4">Domestic cabotage not allowed.</td></tr>
<tr><td rowspan="2">Designation</td><td>Single - some multiple for United States.</td><td colspan="3">Multiple.</td></tr>
<tr><td colspan="4">Airline must be "substantially owned and effectively controlled" by nationals of designating state.</td></tr>
<tr><td rowspan="2">Capacity</td><td>Capacity agreed or shared 50:50. No capacity/frequency controls in liberal bilaterals, but subject to review.</td><td colspan="3">No frequency or capacity controls.</td></tr>
<tr><td></td><td colspan="2">Break of gauge permitted in some agreements. [1]</td><td>Break-of-gauge rights granted.</td></tr>
<tr><td>Tariffs</td><td>Approval by both governments (i.e., double approval) required
or
To be agreed using IATA procedures.</td><td colspan="2">Double disapproval (i.e., filed tariffs become operative unless both governments disapprove)
or
Country-of-origin rules (less frequent). [2]</td><td>Free pricing.</td></tr>
<tr><td>Code-Sharing</td><td colspan="3">Not part of bilateral.</td><td>Code-sharing permitted.</td></tr>
</table>

Source:
Rigas Doganis, The Airline Business in the 21st Century (Routledge, 2001). Tables 2.2 and 2.4.
Rigas Doganis, Flying Off Course: The Economics of International Airlines, Third Edition (Routledge, 2002). Table 3.1.

Notes:
[1]: Allows airline to switch to smaller aircraft on flights beyond the other state.
[2]: Each government sets its own rules for tariffs on flights originating in own country.

Predictably, international traffic increased and fares dropped following liberalisation. As one indication, between 1987 and 1993, the number of passengers travelling on US airlines between the United States and foreign destinations increased by 47 percent, while domestic traffic increased by only six percent.[7] (Liberalisation had a similar impact within the European Union, where Member States had negotiated open market style agreements on a bilateral basis.[8])

By the early 1990s, as a result of structural changes in the airline industry, the limits of open market agreements were becoming more apparent. US airline deregulation and the industry consolidation that followed had produced several carriers with large national networks and a strong commercial orientation. These carriers saw greater opportunities for expansion in international markets than within the more mature US domestic market. And in Europe, where international traffic already constituted a substantial part of flag

[7] US General Accounting Office, *International Aviation: Airline Alliances Produce Benefits, but Effect on Competition is Uncertain*, GAO/RCED-95-99 (April 1995): 2.

[8] Doganis, *The Airline Business*, 27.

carriers' revenue, the trend toward privatisation and away from state aid was putting increased pressure on carriers to become self sufficient.[9]

In response to these factors, the United States and European governments in the 1990s negotiated a series of bilateral "Open Skies" agreements that went beyond the earlier open market agreements—in effect, deregulating international travel between the United States and the other country. A typical Open Skies agreement allows carriers from either signatory country to fly to any point in the other country with no restrictions on fares or frequency of service. In addition, carriers receive unlimited fifth freedom (also known as "intermediate" and "beyond") rights—*i.e.*, the right to carry traffic between the other country and a third country. Finally, carriers from the two countries can engage in code-share and other commercial arrangements. However, as discussed below, Open Skies agreements also preserve many of the anachronisms that distinguish aviation from other global industries. (See Table 1.1 for a comparison of Open Skies agreements with open market and traditional bilateral agreements.)

Beginning with the pioneering 1992 US-Netherlands agreement, the United States has signed bilateral Open Skies agreements with 11 of the 15 EU Member States—all but Greece, Ireland, Spain, and the United Kingdom—as well as Iceland, Norway, and Switzerland.[10] (See Appendix I for a list of Europe-US bilateral agreements.) Among other things, these agreements fostered the development of multinational alliances.[11] Although regulatory restrictions still impeded full and open competition, alliances provided a "second-best" way for European and US airlines to link their hub-and-spoke networks and provide seamless international connections. New services sprang up as code-sharing gave carriers the additional passenger feed necessary to expand their networks. According to two reports by the US Department of Transportation (DOT), the combined effect of liberalisation and network alliances was to fuel an increase in passenger travel in international city-pair markets and a resulting decrease in fares.[12] Not surprisingly, the biggest increase was in "behind" and "beyond" markets that require a gateway connection.

---

[9] Doganis, *The Airline Business*, 30-32.

[10] As in the late 1970s, the Netherlands was the first European country to sign up to more liberal trade in aviation services with the United States. The Dutch flag carrier KLM had done well under the 1978 US-Netherlands bilateral agreement, and the Netherlands felt it had much to gain from further liberalisation of international aviation, especially if it was the first European country to adopt Open Skies. In 1995, the United States signed Open Skies agreements with nine of the smaller Western European countries, six of them EU Member States. Similar agreements with other EU Member States followed, including one with Germany in 1996, Italy in 1998, Portugal in 1999, and France in late 2001 (the United States and France had signed a transitional agreement in 1998).

[11] For example, after the US-Netherlands Open Skies agreement was complete, KLM and Northwest Airlines received US antitrust immunity to coordinate schedules and prices in markets where they did not already compete.

[12] US Department of Transportation, Office of the Secretary, *International Aviation Developments: Global Deregulation Takes Off (First Report)* (December 1999) and US Department of Transportation, Office of the Secretary, *International Aviation Developments (Second Report): Transatlantic Deregulation—The Alliance Network Effect* (October 2000). Available at: http://ostpxweb.dot.gov/aviation/intav/globalrpt.pdf.

The Single European Aviation Market

The European Union has avoided the "piecemeal" bilateral approach to international aviation liberalisation pursued by the United States and its Open Skies partners, which would not have been compatible with the principles of the European Union's single market. Instead, the European Commission pursued a comprehensive multinational agreement, beginning in December 1987 with the introduction of the first of three sets of measures designed to fully liberalise aviation services and investment within the European Union. This process culminated in the "third package" of liberalisation measures, which took effect on January 1, 1993. By taking a multilateral approach, and by eliminating key restrictions that Open Skies agreements leave in place, the European Union has achieved a level of legal openness within its internal market that exceeds what exists in the transatlantic market.

The Commission's liberalisation measures removed essentially all commercial controls on aviation services and investment within the 15 EU Member States, as well as Iceland, Norway, and Switzerland, which adopted the measures without joining the European Union. As in an Open Skies regime, airlines have complete freedom to determine their fares and cargo tariffs. *In contrast to Open Skies, market access is completely open*: Airlines from Member States can operate with full traffic rights and no capacity restrictions on any route within the European Union. This includes cabotage routes within individual EU countries. Perhaps most significant, EU nationals or companies from any Member State can buy or set up an airline in any other Member State. This "right of establishment" has enabled, for example, British Airways to own and operate Deutsche BA as a German company in Germany.

1.3 Remaining Restrictions

Bilateral Open Skies Agreements

Although the bilateral Open Skies agreements are more liberal than the open market agreements they replaced, they embody a number of restrictive features either by omission or by explicit provision:

Nationality clause: Like traditional bilateral air services agreements, US-Europe Open Skies agreements allow a State to reject a foreign designated air carrier if the carrier is not "substantially owned and effectively controlled" by the designating State or its nationals. The nationality clause serves the same function as rules of origin in preferential trade agreements—namely, to prevent third countries from obtaining the negotiated privileges through the back door. As discussed below, its effect is to limit cross-border investment and competition.[13]

Limits on foreign ownership and control: Under US law, at least 75 percent of the voting stock of a US airline must be owned *or* controlled by US citizens, and the president and two-thirds of the board of directors of the carrier must be US citizens.

---

[13] In November 2000, the United States and four other members of the Asia Pacific Economic Cooperation (APEC) forum (Brunei, Chile, New Zealand, and Singapore) concluded the first multilateral Open Skies agreement. In an effort to enhance carriers' access to outside investment, that agreement eliminated the language in the nationality clause allowing States to refuse the designation of a carrier that is not "substantially owned" by the designating State or its nationals. (The agreement preserved the language in the clause regarding "effective control".) In May 2002, Peru became the sixth signatory to the so-called "APEC agreement".

Administrative decisions by the Civil Aeronautics Board, and later by DOT, have interpreted the law to require that the airline must be under the actual control of US citizens (*i.e.*, the airline must have US ownership *and* control), although administrative interpretations of what constitutes control have changed over the years.[14]

Similarly, EU law prohibits non-EU shareholders collectively from owning a majority of an EU carrier, or having the possibility directly or indirectly of exercising decisive influence over an EU carrier. In addition, some EU Member States have their own prohibitions on airline takeovers by non-EU investors.

No right of establishment: A right of establishment allows an airline or other investor from one country to establish an airline in another country, either by acquiring an existing carrier or starting up a new one. The newly established airline must be incorporated in, and operate under the laws and regulations of, the other country. Open Skies agreements do not provide a right of establishment.

No stand-alone cabotage: An airline from one Open Skies country cannot carry domestic traffic solely between two points within the territory of the other country. For example, under the US-Germany agreement, Lufthansa cannot carry US domestic passengers solely between any two airports inside the United States. Likewise, a US airline cannot carry German domestic passengers solely between any two airports in Germany.

No consecutive (or "fill-up") cabotage: Nor can an airline from one Open Skies country carry domestic traffic between two points within the territory of the other, even in the course of providing international service. For example, on a flight from Paris to Mexico City via New York and Chicago, Air France can drop off Paris-originating passengers, and pick up Mexico-bound passengers, in both New York and Chicago. But it cannot carry US domestic passengers solely between New York and Chicago.

No passenger seventh freedom rights: Open Skies agreements do not allow a passenger carrier from one country to offer stand-alone service between two foreign countries, neither of which is its home country. For example, under the US-Portugal agreement, Air Portugal cannot operate to the United States out of a hub in Frankfurt or Paris. Recent Open Skies agreements do provide this right for all-cargo carriers, however.

No wet leasing: "Wet leasing" involves the lease of aircraft and crew. It contrasts with "dry leasing", which involves the lease of aircraft without crew. US carriers can "lease-out" US aircraft and crew to foreign carriers, but US Federal Aviation Administration (FAA) regulations prohibit US carriers from "leasing-in" foreign aircraft and crew. EU carriers do not face such an absolute prohibition on wet leasing, although the relevant regulation limits leasing-in of third-country aircraft, wet or dry, to temporary needs and exceptional circumstances.

Fly America requirements: Most US government commercial air transport, domestic as well as international, must take place on US airlines. This includes the transport of US government personnel and cargo, as well as most items handled by the US Postal Service

---

[14] Most notable, in 1991, DOT allowed KLM to increase its non-voting equity in Northwest Airlines to 49 percent. Key to DOT's decision was the determination that US citizens remained in control of Northwest, as well as the liberalised relationship that the United States and the Netherlands enjoyed. See Appendix II for a legal analysis of the limitations on ownership and control of US airlines.

(the latter is covered by a separate statute). However, on international flights, foreign code-share partners of US-flag carriers can transport US government personnel, cargo, and mail under the US carrier's code on routes covered by their code-sharing agreement. (See Chapter 7 for a more detailed discussion of the Fly America requirement.)

Output-Restricting Bilaterals

Although only four EU Member States (Greece, Ireland, Spain, and the United Kingdom) have not signed Open Skies agreements with the United States, they account for half of the value of all EU-US traffic. We refer to the US bilateral agreements with these four countries as "output restricting", because they limit to some degree the volume of traffic to and from the United States.

US-UK: Bermuda 2

The most restrictive agreement is Bermuda 2, which governs US-UK aviation, the largest single transatlantic aviation market. For passenger services, the 1977 Bermuda 2 agreement:

- Restricts access to Heathrow, London's preferred airport, to two airlines each from the United States (currently, American and United) and the United Kingdom (currently, British Airways and Virgin Atlantic)
- Limits the number of US cities eligible for non-stop service to and from Heathrow and Gatwick Airports
- Effectively caps entry in most markets at one US and one UK airline

In addition, the British government has used Bermuda 2 to limit the number of flights US airlines can offer and to disallow pro-competitive pricing initiatives.

All-cargo services between the United States and the United Kingdom operate under a more liberal regime, with no limits on entry, capacity, pricing, or which cities can be served in either country. However, fifth freedom operations are restricted to three US airlines and only nine countries.[15]

Greece, Ireland, and Spain

The US bilateral agreements with Greece, Ireland, and Spain also restrict traffic, but to a lesser extent than Bermuda 2. Moreover, the markets they restrict are far smaller than the US-UK market.

- The US-Ireland agreement requires a separate non-stop US flight to or from Shannon for every US flight that operates to or from Dublin. It also gives US carriers only limited fifth freedom rights.
- The US-Greece agreement limits fifth freedom rights as well as the frequency of flights, the number of gateways to be served, the number of carriers on certain routes, and freedom of pricing.

---

[15] Under Bermuda 2, US cargo carriers have "beyond" rights only to Belgium, Germany, India, Iran, Jordan, Lebanon, the Netherlands, Syria, and Turkey. They cannot travel from the United Kingdom to many commercially important markets, including France, Italy, and Spain in Europe, as well as China, Hong Kong, and Japan in Asia.

- The US-Spain agreement imposes some official limits on gateways, pricing, and fifth freedom rights. In practice, however, the Spanish government does not enforce those limits.

1.4 Distortive Effects of the Current Regulatory Regime

The regulatory regime described above significantly distorts international airline competition in some of the world's largest markets. The biggest effect is in the internal EU market, where barriers to consolidation and competition thwart liberalisation and contribute to an artificially fragmented aviation sector.[16] Competition in the transatlantic market is also harmed, both directly and indirectly, and European and US consumers are denied the benefits of direct foreign investment and competition. Although airline alliances provide a way around some of these restrictions, they have their own serious limitations.

Restricted Competition on Transatlantic Routes and within the European Union

While US carriers can fly from any airport in the United States to a wide array of airports in the European Union, European carriers effectively can fly to the United States only from their own country.[17] This restriction, which is due to the absence of passenger seventh freedom rights in Open Skies agreements, limits competition between EU carriers in the transatlantic market. As discussed below, it also prevents European carriers from exploiting the entire EU market, thus thwarting liberalisation within Europe.

Restrictions on US-UK Competition Are Costly to Passengers and Shippers

Competition is most limited on the transatlantic routes covered by output-restricting bilaterals. Bermuda 2 in particular imposes huge costs on UK and US business travellers. According to the UK's Institute of Directors, business class airfares from Heathrow are more than 200 percent higher that those from Frankfurt, Amsterdam, and other leading European airports. As a result, UK business class passengers alone pay in excess of £2 billion a year more than their European counterparts for transatlantic fares.[18] Bermuda 2 also imposes major costs on US cargo carriers and the UK shippers they serve. Federal Express, which has its major European hub in Paris, operates daily service to Stansted Airport outside of London, where it delivers UK-bound express cargo and collects UK cargo outbound for the European continent. Because it does not have fifth freedom rights from the United Kingdom to France, Federal Express must transport the UK outbound cargo to Paris by truck or train, or hire an EU carrier to fly it to Paris. At the same time, Federal Express planes must fly empty from Stansted to Paris.

---

[16] Granted, some of Europe's past "wounds" were "self-inflicted"—a result of internal market barriers erected to keep one Member State's flag carrier from challenging another. But these internal restrictions have all but disappeared. See, for example, Daniel Michaels, "UAL Deal Could Spur Fare Reductions," *Wall Street Journal* (December 18, 2002).

[17] For example, while US carriers can compete with KLM on direct flights between the Netherlands and the United States, no EU carrier based outside the Netherlands is allowed to provide those services unless the flight also serves a point in the carrier's home country. Thus, for example, Air Portugal or Lufthansa could not operate a transatlantic hub out of Amsterdam in competition with KLM.

[18] Graeme Leach, "Air Warfare: IoD Policy Paper," Institute of Directors (London, December 2000): 15.

Barriers to EU Consolidation

Restructuring via mergers and acquisitions is one of the key drivers of change in most industries. However, while EU law allows European carriers to merge, in practice, cross-border airline mergers within Europe are largely precluded by the nationality clause, which limits the exercise of air transport rights to national airlines. The nationality clause is a particular concern with respect to bilateral agreements with the United States, because of EU carriers' dependence on the transatlantic market.

Despite the nationality clause, the United States might not oppose a cross-border merger between two European national airlines if it had Open Skies agreements with both nations.[19] However, if one of the merging airlines were from a non-Open Skies EU country (and several of the most likely merger candidates are), the United States would effectively block the transaction. For example, British Airways explored a possible acquisition of KLM in the summer of 2000. Because the United States had an Open Skies agreement with the Netherlands but not with the United Kingdom, US officials made clear that such an acquisition would not give British Airways additional access to the United States through the "back door" of the Netherlands. More significant, they cautioned that the merger would cost KLM its longstanding Open Skies rights to the United States.[20]

No Transatlantic Mergers

In addition to impeding consolidation within Europe, the current regulatory system precludes altogether the merger of an EU and a US airline. Although the European Union permits a higher level of foreign investment in a domestic carrier than does the United States, neither government allows a foreign citizen to exercise a controlling interest. This restriction represents a remarkable regulatory vestige, at a time when other US industries are experiencing what the *Washington Post* recently called a "transatlantic tidal wave of investment".[21] In 1997, the Organisation for Economic Co-operation and Development (OECD) recommended the relaxation of restrictions on foreign ownership of domestic airlines. Most economists would agree with the OECD's conclusion that "These

---

[19] As one indication, US aviation authorities did not object to Sabena Airlines operating to the United States during the period when it was arguably controlled by Swissair.

[20] A senior Clinton Administration official announced at the time that "if KLM comes under effective control of British Airways while Bermuda 2 still governs US-UK air services, KLM will immediately lose the benefits of the US-Netherlands Open Skies Agreement." Remarks to the International Aviation Club by Dorothy Robyn, Special Assistant to the President for Economic Policy, National Economic Council (July 18, 2000).

[21] T.R. Reid, "Buying American? Maybe Not: Many US Brands European-Owned," *Washington Post* (May 18, 2002). According to the *Washington Post* story, the following brands, all household names to US consumers, are the property of European companies: Holiday Inn, Mellon Bank, Shell, Kent cigarettes, Baby Ruth, Random House, Burger King, Mazola oil, Giant Food, Jeep, Snapple, Dr. Pepper, Universal Studios, Sci-Fi Channel, Casual Corner, Brooks Brothers, U.S. Shoe, Amoco, Pepsodent, Slim-Fast, Vaseline, Hellmann's mayonnaise, and Chicken Tonight.

According to the US Department of Commerce, in 2000, US direct investment in Europe reached $650 billion, while European direct investment in the United States was nearly $900 billion. Maria Borga and Raymond J. Mataloni, Jr., "Direct Investment Positions for 2000: Country and Industry Detail," *Survey of Current Business* (July 2001): 27 and "Foreign Direct Investment in the United States: Detail for Historical-Cost Position and Related Capital and Income Flows, 2000," *Survey of Current Business* (September 2001): 45. Available at: http://www.bea.doc.gov/bea/pubs.htm.

restrictions can impede the long-term restructuring of the sector, restrict adequate financing, and (thereby) adversely affect the efficiency of airline services."[22] American Airlines CEO Donald Carty recently made the same point in different words:

> There really is no reason to have flag airlines. We don't have flag shoe companies or flag chemical companies, so why should we have flag airlines? We want a transportation infrastructure that mirrors the market.[23]

Limited Options for Failing EU Carriers

The current regulatory system also impedes consolidation through its effect on failing firms in the European Union. Because of the barriers to cross-border investment, a failing EU-flag carrier may have only two options: bankruptcy or continued state subsidies. Despite EU Directives against state subsidies, a Member State government is likely to choose that option because of intense pressure to protect its flag carrier and the jobs it provides.

Fragmented EU Market

The factors described above contribute to excess fragmentation in the European aviation sector. Since transatlantic traffic constitutes a substantial part of the revenue of most European carriers, the system of bilateral agreements between the United States and EU Member States forces carriers to base their operations in their home countries. These agreements also make it difficult for a European carrier to challenge a competitor in another EU country, because it cannot fly directly to the United States from that country. Stated differently, by denying European airlines the right to serve US destinations from anywhere in the European Union, *existing bilateral agreements thwart internal European liberalisation and integration*. From an operational perspective, the current bilateral system leads to an "artificial" proliferation of hubs or mini-hubs in Europe to serve the transatlantic market. At the same time, transatlantic routes are effectively insulated from entry by more efficient competitors from different EU Member States. Thus, the current system impedes the evolution of an efficient network design in Europe.

---

[22] Cited in Kenneth J. Button, "Opening U.S. Skies to Global Airline Competition," *Trade Policy Analysis*, CATO Institute Center for Trade Policy Studies (November 24, 1998): 2. Available at: http://www.freetrade.org/pubs/pas/tpa-005.pdf.

[23] *Vancouver Sun* (June 28, 2002).

Absence of Foreign Competition in US Domestic Market

US restrictions on cabotage and foreign investment mean that EU and other foreign carriers cannot enter the US market in direct competition with US carriers. Given the size of the US market, some aviation experts consider this to be the principal remaining barrier to a free and integrated global air transportation system. According to economist Kenneth J. Button:

> One of the major distortions of the protected U.S. airline market is to deny foreign-owned carriers the full benefits of the hub-and-spoke system. Many of the benefits derived from [US] domestic deregulation have stemmed from the freedom carriers have to funnel traffic through their hub airports. . . .
>
> International services [also] depend on feeder services to and from major gateway airports. The inability of foreign carriers to transport U.S. passengers and cargo to and from U.S. gateways reduces their efficiency and, as a result, the efficiency of competing U.S. carriers.[24]

Like the United States, the European Union prohibits non-EU control of EU airlines, and EU Member States likewise prohibit cabotage by non-EU carriers. But US passenger carriers can use their fifth freedom rights to provide "beyond" service between EU gateways, although they rarely do so.[25]

Restrictions on cross-border investment also deny US consumers the benefits of foreign competition. For example, British entrepreneur Richard Branson, who operates the transatlantic carrier Virgin Atlantic Airways, makes no secret of his desire to launch a low-fare airline in the US domestic market. In fact, in 1998, Branson had reportedly arranged $200 million in initial capital for a new, low-fare carrier to be based at New York's John F. Kennedy International Airport. However, Branson eventually pulled out because he could not exercise a controlling interest in the carrier under US regulation.[26]

Alliances Are Only a Temporary Fix

The prevalence of airline alliances at both the intra-EU and the transatlantic levels is the most powerful evidence that airlines would undergo some consolidation if current restrictions were lifted. Although international airline alliances provide travellers and carriers with many of the benefits of global integration, they are notoriously unstable (the press frequently writes about carriers leaving one alliance or joining another) and bureaucratic (all of the affected airlines in an alliance must agree on a course of action).

---

[24] Button, "Opening U.S. Skies," 7-8.

[25] In practice, US passenger carriers generally leave the provision of fifth freedom, or "beyond", service to their European alliance partners. Nevertheless, Europeans view fifth freedom rights as a limited form of cabotage, and thus maintain that the United States follows a double standard in prohibiting cabotage in its own market. US officials strongly disagree, arguing that they made other concessions in exchange for their fifth freedom rights. US officials also point out that if the European Union wants to be treated as a single country in international aviation fora, it should have only one vote in the International Civil Aviation Organization instead of the multiple votes currently allocated to EU Member States.

[26] Button, "Opening U.S. Skies," 2. See also "Foreign Ownership and Control of US Airlines: Prospects for Change," Remarks of Jeffrey N. Shane before the 25th Annual FAA Aviation Forecast Conference (March 7, 2000).

As a result, service may be less seamless than it looks.[27] Moreover, international airline alliances are themselves subject to major restrictions.

Access to Capital

Restrictions on international airline competition and investment distort the allocation of capital within the airline industry, as well as between aviation and other sectors, for the reasons discussed above. Airlines located in relatively small Member States may have a genuine problem getting access to capital. Ownership restrictions limit the amount of equity that non-nationals can hold in such airlines, while the highly cyclical nature of the industry may restrict the use of debt finance. State-owned airlines, like other state-owned enterprises, may find that their access to capital is influenced by national budgetary and other political considerations. It is arguable that the current regulatory regime is a barrier to privatisation: again the pool of potential buyers is severely limited by ownership restrictions, and some airlines may be too small to be attractive as stand-alone enterprises.

However, we are sceptical that access to capital is an issue for airlines located in the United States or in large EU Member States, where capital markets are big enough to provide an adequate potential source of funding. Difficulties in accessing external sources of finance therefore may reflect concerns as to the ongoing viability of the industry. If so, an EU-US Open Aviation Area could improve access to finance *indirectly*, by securing a more sustainable long-term future for the aviation industry. If lingering fear of political control is a further disincentive to investment at present, then the "normalisation" provided by an Open Aviation Area might provide additional assurance.

1.5 EU-US Open Aviation Area

So as to remove these market distortions, the European Commission has endorsed the elimination of all commercial restrictions on EU-US competition and investment. The resulting EU-US Open Aviation Area would amount to a free trade zone in air transport encompassing not just transatlantic operations but operations within the European Union and the United States as well. Specifically, under an Open Aviation Area:

- There would be *no restrictions on ownership and control of US airlines by European investors* (including European airlines), and *no restrictions on ownership and control of European airlines by US investors* (including US airlines). EU and US restrictions on foreign ownership and control of domestic airlines would still apply to all other foreign investors.[28]

- Likewise, EU investors/airlines would have a *right of establishment* in the United States and US investors/airlines would have a *right of establishment* in the European Union.

---

[27] "Global Alliances Anything but Seamless, American Executive Tells CEO Conference," *Aviation Daily* (May 14, 2002).

[28] In other words, EU and US restrictions on foreign ownership and control of domestic airlines would be lifted selectively. Moreover, this selective change in policy only would create the potential for EU-US airline mergers and acquisitions. As discussed further in Chapter 7, individual transactions still would need to be approved by government authorities in Europe and the United States.

- EU and US air carriers would face *no restrictions on* the following: *fifth freedom rights, seventh freedom rights, stand-alone cabotage, fill-up cabotage,* and *wet leasing*.

- The government market for air transport services in Europe and the United States would be open to all EU and US carriers.

We note a possible caveat concerning stand-alone cabotage. Most US aviation law experts believe that, even if the statutory restriction on cabotage were eliminated, a foreign carrier operating in US domestic commerce would nevertheless be subject to all of the laws and regulations that apply to other US-based companies.[29] Stated differently, US law may require that a foreign-owned carrier qualify, and be regulated, as a US carrier in order to provide *purely* domestic air transport services. Presumably, by the same logic, a US airline operating in European domestic commerce would be subject to the laws and regulations of the European Union and the appropriate Member State.

Legal arguments alone do not normally decide the outcome of a debate about policy prescription: from a public policy standpoint, the law should conform to decisions about what represents good policy, rather than the reverse. However, in this case, aviation experts are divided over the policy merits of "true" cabotage—*i.e.*, foreign carriers operating *qua* foreign carriers in a domestic market. Moreover, those who favour true cabotage in principle also concede that it may not be legally practical, because it would require suspending or amending scores of federal, state, and local laws and regulations that govern any business entity that operates in domestic commerce.

Even if this view regarding stand-alone cabotage is correct, it may have little practical significance. For sound business reasons, most foreign-owned air carriers operating in purely domestic commerce would opt to do so as a domestic corporation. It is telling that in his efforts to access the US market, Virgin's Richard Branson has explicitly sought to establish a US-incorporated air carrier (either by acquiring an existing carrier or starting up a new one). Similarly, other foreign airline officials have said that they would never try to compete on any scale in the US market except as a US-incorporated carrier.

A second caveat follows from the first. If stand-alone cabotage is legally impractical, then the US government market for *purely domestic* air transport services also would remain limited to domestic carriers even under an Open Aviation Area. However, a foreign-owned but domestic-based carrier—for example, Virgin-US—would qualify.

Note that the caveat about stand-alone (*i.e.*, purely domestic) cabotage does not extend to fill-up cabotage and wet leasing that occur as part of an international operation. First, in contrast to stand-alone cabotage restrictions, it is easier as a procedural matter to eliminate statutory and regulatory restrictions on fill-up cabotage and wet leasing operations that are cross-border in nature. Moreover, as a policy matter, there is a strong case for eliminating such restrictions under an EU-US Open Aviation Area. Although the

---

[29] "Cross-Border Investment in International Airlines—Presenting the Issues," Preliminary Report by the American Bar Association's Air and Space Law Forum Special Committee on Cross-Border Investment and Right of Establishment in the International Airline Industry (October 19, 2000). See Separate Comments of Warren Dean. According to this view, a foreign carrier operating in US domestic commerce would have to: comply with the Immigration and Nationality Act, which generally requires the employment of US citizens; pay US federal and state taxes; withhold payroll and income taxes for US employees; and comply with US environmental laws and other statutes.

restrictions are sometimes defended on safety grounds, in fact, they appear designed to protect domestic jobs.

What an EU-US Open Aviation Area Would Not *Include*

As noted earlier, an EU-US Open Aviation Area would *not* create any new regulatory structures nor call for additional harmonisation of EU and US regulatory policy. This is widely misunderstood. In fact, a recent article by Kenneth J. Button, "Toward Truly Open Skies," reflects two common misperceptions.[30] First, in discussing regulation of aviation safety, security, and the environment, Button correctly notes that "the United States currently has in place a categorization procedure that it uses to limit access by foreign airlines to its international markets that do not meet ICAO standards." However, he then says "that unilateral power would be lost within an open transatlantic market." To the contrary, an Open Aviation Area would do nothing to reduce the autonomy or leverage of regulatory authorities in the United States or Europe. (See Chapter 9 for further discussion of this issue.)

Second, in discussing "conflict resolution" in a liberalised regime, Button says that "An open transatlantic market inevitably would require a common framework of antitrust policy . . . ." This statement is likewise off-base. Although some European and US airlines might like to see a harmonised antitrust policy, competition authorities in Europe and the United States have made clear that they will continue to apply their respective competition laws, although they will look for greater convergence in the application of such laws.

This parallel approach works well for every other industry. Competition authorities in the European Union (Directorate General for Competition, DG-Comp) and the United States (Department of Justice and Federal Trade Commission) have a close day-to-day working relationship. It is based on a formal cooperation agreement, their ability to share (non-confidential) information, and certain similarities in their approaches to key concepts.[31] As a result of this very cooperative relationship, EU and US competition authorities almost always are able to agree on the specifics of a case, even when they apply somewhat differing abstract principles.

In sum, despite the publicity that surrounds their occasional disagreement (*e.g.*, the GE-Honeywell merger), EU and US competition authorities reach the same conclusion in all but a very few cases. In other global industries such as pharmaceuticals, auto manufacturing, and telecommunications, large transactions must get approval from competition authorities on both sides of the Atlantic. The airline industry does not merit special treatment.

---

[30] Kenneth J. Button, "Toward Truly Open Skies," *Regulation* 25, no. 3 (Fall 2002): 12-16.

[31] The relationship between DG-Comp and DOT is not as developed. Although it retains control over certain key aspects of aviation competition policy, DOT is a regulatory agency rather than a competition agency. As a result, it is governed by statutory rules of procedure (*e.g.*, limits on *ex parte* communications) and cannot share the kinds of information that the Department of Justice and the Federal Trade Commission can exchange with their EU counterparts. However, DOT and DG-Comp are committed to furthering their relationship.

1.6 Conclusion

In sum, the current system of bilateral aviation agreements, based on government-to-government negotiations and predicated on a close identification between airlines and countries, significantly distorts competition and constrains the ability of European and US air carriers to adjust to market conditions. Competition is most harmed in the internal EU market and in the transatlantic market. In addition, US consumers are denied the benefits of direct foreign investment and additional competition in the US domestic market.

Our discussions with industry representatives revealed a widespread belief that an EU-US Open Aviation Area could benefit the airline industry by giving carriers the same commercial freedom that other industries enjoy.[32] Senior industry figures described to us a vision of an industry that, in a fully open aviation environment, could restructure according to commercial logic, access "normal" sources of finance, and expand commercial activity with greater freedom.

As economists our instinct is to expect benefits from trade liberalisation. As we explain below, economic theory identifies a wide variety of potential gains from the liberalisation of trade and investment. This report therefore uses the description above as a starting point to identify areas where trade theory suggests an Open Aviation Area is likely to provide significant benefits, and to quantify those gains wherever possible.

[32] We also heard that the process might be accelerated by the removal of other barriers to restructuring such as "golden shares" or other mechanisms that prevent mergers and acquisitions, and Public Service Obligations (*e.g.*, requirements to serve remote areas) implemented in ways that unnecessarily distort competition.

2. Analytical Framework: Trade and Investment Theory

An Open Aviation Area is a unique response to the regulatory environment surrounding international aviation. However, from an analytical perspective it is best understood as a package of reforms that would liberalise international trade and investment in aviation services. Analysis of the economic effects of an Open Aviation Area therefore begins from the perspective of the theory of trade and investment, one of the best-understood and least controversial areas of economics.[33]

Standard economics predicts that trade liberalisation produces greater efficiency, increased output, and social welfare gains that potentially accrue to both trading partners. These benefits arise from a number of different sources. This chapter provides a brief outline of the main sources of benefits expected to arise under an Open Aviation Area. Subsequent chapters expand on the argument, providing increased rigor of exposition, and where possible, offering quantitative estimates of the identified efficiencies.

2.1 Potential Sources of Economic Benefits from Aviation Liberalisation

More Efficient Firms Replace Less Efficient Firms

Liberalisation of trade and investment in the aviation industry would allow more efficient airlines to replace less efficient ones, leading to an increase in industry efficiency. This substitution is likely to take place through two mechanisms: industry restructuring and increased competition.

First, the elimination of restrictions on foreign ownership and control will make it possible for airlines to engage in mergers, acquisitions, and other forms of restructuring. In other industries these activities are one of the key mechanisms for removing inefficient practices and diffusing new technologies and industry best practices: efficient firms take control of less efficient ones through acquisition or merger, and introduce superior management and technologies. Under an Open Aviation Area we can expect the same in aviation.

Second, liberalisation will increase the level of competition between airlines. More intense competition will pressure less efficient firms to improve their operations. If they do not, they can expect to lose market share to their more efficient competitors (and in the long run are likely to be acquired or exit the industry). Either way, the effect will be increased efficiency in the industry.

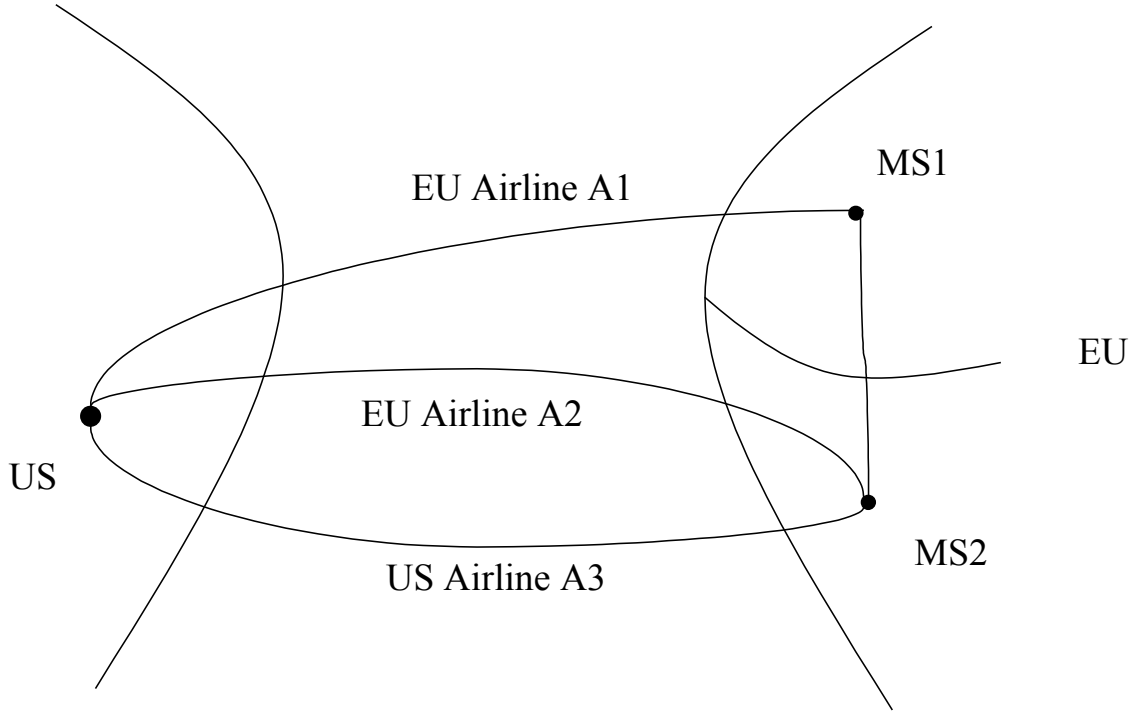
Figure 2.1 below provides a stylised example of how these effects might be seen in practice under an Open Aviation Area. Airline 1 and Airline 2 are flag carriers of Member State 1 and Member State 2 respectively. As the diagram indicates, prior to liberalisation under an Open Aviation Area, each carrier operates transatlantic and intra-EU routes from a base of operations in its home country. Airline 3 is a US airline that operates intra-US and transatlantic routes. It has a US hub at an airport that Airline 1 and Airline 2 also use to provide transatlantic service.

---

[33] The *theory* of trade is uncontroversial, at least among mainstream economists. However, specific measures in trade policy often give rise to controversy because of their actual or perceived impact on specific groups in society.

Figure 2.1

Sources of Increased Efficiency



Without an Open Aviation Area, Airline 1 cannot operate service directly between Member State 2 and the United States. The lack of transatlantic rights also makes it more difficult for Airline 1 to provide intra-EU service to or from Member State 2 for a number of reasons. For example, the provision of transatlantic service by Airline 2 will result in intra-EU feeder traffic into its hub. This will allow Airline 2 to achieve various economies of scale from operating out of its hub airport that Airline 1 could not achieve if it operated out of that airport. For example, Airline 2's transatlantic service may be enough to support a large maintenance facility at its domestic hub, lowering the cost of providing maintenance for its intra-EU flights. If Airline 1 attempted to operate out of Airline 2's domestic hub it would not be able to enjoy the same advantage.

Under an Open Aviation Area, if Airline 1 were more efficient than Airline 2 or Airline 3, it could compete effectively to provide service on the same routes, including both transatlantic (*i.e.*, between the United States and Member State 2) and intra-EU routes. This could produce increased efficiency through a number of different mechanisms:

- Airline 1 could merge with or acquire Airline 2 or Airline 3. It would have an incentive to do so since it could increase their profits over current levels.
- Airline 1 could enter the routes served by Airline 2 and Airline 3 and out-compete them due to its greater efficiency.
- The threat of acquisition or entry by Airline 1 could force the other airlines to increase their own efficiency.

We cannot predict which of these mechanisms would predominate under an Open Aviation Area. However, our analysis later in this report suggests that an Open Aviation Area could produce substantial cost reductions by reducing efficiency differences across airlines.

Exploitation of Size-related Economies over a Larger Market

The process of expansion and consolidation described above also would enable carriers to take advantage of size-related economies, leading to further cost savings and increased efficiency in the airline industry. Our analysis of these effects follows the academic literature in distinguishing between three types of size-related economies (*i.e.*, efficiencies that arise through increasing the size or scope of operation of a business). Again we can use the example in Figure 2.1 to illustrate some of the potential gains.

- *Economies of scale* arise when a firm's average cost decreases as its volume of output increases. For example, in Figure 2.1, scale economies could be achieved by merging Airline 1 with either Airline 2 or Airline 3, allowing the merged carrier to spread fixed costs in administration, sales, marketing, maintenance, and other functions over larger passenger volumes.

- *Economies of scope* arise when a firm's average cost decreases as new products or services are added. The most notable example of economies of scope in the airline industry is the hub-and-spoke system. As an airline connects more cities to its hub, it becomes progressively less expensive to add new city-pairs to its network. In Figure 2.1, these economies may arise from changing network operations in order to connect more flights to one of the hubs of the merged airline (*e.g.*, the hub airport in Member State 1 or Member State 2). One of the results of an Open Aviation Area therefore might be an expansion of operations at (some) EU hub airports.

- *Economies of density* arise in aviation (and other network industries) when a firm's average cost decreases as more customers use its network. In Figure 2.1, a merger between Airline 2 and Airline 3 would allow economies of density to be achieved over any routes served by both airlines. Combining traffic could allow for higher load factors, while additional savings could come from efficiencies in airplane deployment, maintenance, and ground-support services.[34]

Closer Integration among Firms Leads to Pricing Synergies

The relaxation of restrictions on trade and investment also would allow improved price coordination among air carriers (pricing synergies). In some circumstances, price coordination can be anti-competitive and lead to inefficiency and market abuse. However, in other cases, it can prevent certain types of inefficiency. In the airline industry, price coordination can lead to lower fares on interline routes (*i.e.*, routes where the passengers must use two or more airlines to reach their ultimate destination).

To see how price coordination can induce lower prices, consider the following example. Suppose that a passenger flies from Frankfurt to New York on one carrier, and then switches to another carrier in order to fly from New York to his ultimate destination in New Orleans. When the two carriers do not coordinate their pricing and scheduling activities, certain inefficiencies arise. Each airline will set the price and schedule of its flight without considering how that decision affects passenger demand for the "other leg" of the interline flight, or the profitability of the other airline participating in the interline flight.

---

[34] In contrast, two airlines that operate different routes would not see economies of density from a merger, although they might enjoy economies of scale and scope.

If the airline offering service from Frankfurt to New York were to lower its price, it would produce increased passenger volumes not only on the Frankfurt-New York route, but also on the New York-New Orleans route, leading to higher profits for the airline offering that flight. The same logic applies in reverse: by lowering fares on the New York-New Orleans route, the second airline would increase demand on the Frankfurt-New York route, leading to higher profits and lower per-passenger costs for the airline offering that flight. Thus, if the two airlines were allowed to coordinate their price-setting, both would provide lower fares and earn greater profits. This "win-win" outcome results from elimination of what economists call "double marginalisation".

An Open Aviation Area, by removing foreign ownership restrictions, would facilitate integration among carriers that are currently involved in transatlantic interline trips. This integration may take the form of mergers, acquisitions, joint ventures, or other types of integration, including more alliances or closer alliances. At present, effective price coordination requires an alliance with antitrust immunity, of which there are only a few covering EU-US routes. An Open Aviation Area would not only remove statutory limitations on consolidation, but also mitigate competition concerns that currently limit the ability of airlines to obtain antitrust immunity for alliances. The current bilateral arrangements create significant barriers to entry that make competition authorities wary of any reduction in the number of firms serving a market. An Open Aviation Area would significantly change this analysis, because any abuse of market power would be more likely to induce entry by competing airlines.

Output Expansion

Another source of benefits under an Open Aviation Area would be the likely expansion of output by air carriers (*i.e.*, a higher growth rate for the industry). At least three mechanisms would contribute to output expansion.

First, the cost reductions identified above would be passed through in the form of lower prices, leading to increased demand for air travel. Although firms may take advantage of cost reductions to increase profitability in the short run, competitive forces will in the long run cause them to pass these reductions on to consumers. The resulting lower fares would in turn lead to increased passenger volumes. The ability of new airlines to enter the market under an Open Aviation Area would only add to these competitive pressures.

Second, the price reductions on interline routes achieved through improved integration and price coordination would provide another source of increased passenger demand and corresponding output expansion.

Third, the US bilateral agreements with Greece, Ireland, Spain, and the United Kingdom all restrict output to varying degrees. The elimination of trade and investment barriers under an Open Aviation Area would be expected to increase output in these restricted markets by permitting new carriers to introduce service and existing carriers to expand service.

Cross-Border Flows of Capital

The lifting of ownership and other restrictions under an Open Aviation Area is likely to lead to significant cross-border investment as airlines engage in consolidation and greater integration and establish new operations in markets that are opened or made more accessible by liberalisation. Capital movements will in turn play a significant role in driving many of the benefits described above, including the expansion of output and

reduction in prices caused by new entry, as well as the reduced costs, lower prices, and increased output that arise as more efficient firms take ownership of less efficient firms.

In Chapter 1, we discussed with some scepticism the claim that airlines have difficulty in accessing capital markets. Our argument here is consistent with that scepticism—the primary claim is that an Open Aviation Area would create *new* investment opportunities by eliminating entry barriers and allowing for changes in airline operations. However, it is nevertheless possible that liberalisation would increase the flow of capital to airlines from smaller Member States that do have problems accessing capital markets under current ownership restrictions.

Cross-Border Flows of Labour

Just as capital may move abroad in search of higher returns, labour may move abroad to earn higher wages. In this way, aviation liberalisation could in theory facilitate "labour substitution" either directly or indirectly. Direct substitution would occur if airlines could reduce their wage bills by hiring labour from lower-wage countries, taking advantage of the inherently high mobility of certain occupations within the aviation industry (*e.g.*, pilots and cabin crew). Indirect substitution would occur if airlines from lower-wage countries were able to expand and take market share as a result of the competitive advantage of a low-cost labour force.

Labour substitution would provide significant benefits both to consumers, who would benefit from increased competition and lower fares, and to aviation industry workers from lower-wage countries, who would see their wages bid up by competing airlines. However, labour substitution also can impose real costs on workers who suffer dislocation. Unless they are compensated or "cushioned" through direct payments, re-training, or other transitional measures, some of these workers will be net losers from liberalisation. Economic theory suggests that the aggregate benefits of liberalisation outweigh its costs—implying *inter alia* that it is possible to fund protection against the social costs to certain groups while still providing a net benefit to firms and consumers.

2.2 Quantification of Economic Benefits

A key goal of this study is to quantify wherever possible the potential economic efficiencies of an Open Aviation Area. Each of the next three chapters focuses on one of the sources of efficiency described above, applying quantitative methods to estimate the impact of each source on costs, prices, passenger volumes, and consumer welfare.

More Efficient Firms Replace Less Efficient Firms

In Chapter 3, we use airline cost data to estimate the potential savings if more efficient airlines replace less efficient airlines, or if less efficient airlines adopt the business techniques and technologies of more efficient airlines. Together with qualitative industry input, we use these data to identify cost categories with the greatest potential for efficiency gains, and determine a "best practice benchmark" for costs in these areas. We then calculate the savings that would be produced if all airlines with costs currently above the benchmark level were to reduce their costs to that level. We also estimate the impact on consumer welfare if the cost reductions were passed through to consumers in the form of lower fares, thereby increasing passenger volumes.

Closer Integration among Firms Leads to Pricing Synergies

In Chapter 4, we assess the impact of improved price coordination by interlining airlines. In particular, we rely on studies that examine the fare difference on transatlantic

interline routes when the route is covered by an airline alliance, as opposed to no alliance. These studies find that alliances are associated with substantially lower interline airfares. We extrapolate from these findings to estimate the additional gains to consumers that could be achieved if these fare reductions were realised on transatlantic interline routes not currently subject to price coordination.

This analysis is conservative because it extrapolates from analyses of the pricing impact of EU-US carrier alliances to date, and carries that impact over to interline routes not covered by alliances. Our analysis does not estimate the additional price reductions, cost savings, and consumer gains that may be achieved if existing alliances are replaced by tighter forms of integration and coordination such as mergers, acquisitions, joint ventures, or stronger alliances.

Output Expansion

Chapter 5 describes our estimates of the output expansion that would arise from replacing the current output-restricting bilateral agreements with an Open Aviation Area. Our methodology involves estimating the impact of prior transatlantic liberalisation, namely the Open Skies agreements of the 1990s. We estimate the impact of this type of "partial" liberalisation by applying sophisticated statistical techniques (*i.e.*, regression analysis) to historical data on passenger volumes and market cost and demand variables. By controlling for these economic factors, we isolate the effect on passenger volumes associated with the Open Skies agreements. We use this result as a lower-bound estimate of the output expansion that would accompany the replacement of the four remaining output-restricting bilateral agreements with an Open Aviation Area.

Other Effects

We do not attempt to quantify directly the benefits from three other effects discussed above (*i.e.*, size-related economies, capital flows, and labour movements). Although data limitations and methodological issues would make quantification of these effects challenging under the best of circumstances, we refrained from a quantitative analysis primarily to avoid "double counting".

For example, our analysis of potential cost savings in Chapter 3 will capture part (but not all) of the efficiencies produced by greater exploitation of economies of scale, scope, and density. The analysis is based on examining existing cost differences among airlines, and the more efficient airlines may in part be more efficient because they already are exploiting such economies more effectively. Using these airlines as a benchmark, we therefore capture some of the economies of scale, scope, and density currently in evidence among carriers. However, our analysis does not capture economies that can be achieved through further growth and consolidation, for example through transatlantic mergers and acquisitions. In particular, we do not examine the potential benefits of large-scale network reconfiguration (changes in hub-and-spoke arrangements) that might arise as a result of transatlantic liberalisation.

Similarly, many of the benefits that we do quantify will be driven by shifts in capital in the form of new investment and industry consolidation. Therefore, the benefits of liberalised cross-border capital flows in the aviation industry are partially captured by our analyses. In addition, our analysis of potential cost savings includes current differences in labour costs across airlines, implying that some of the efficiency benefits provided by cross-border labour flows are already included.

Finally, although our analysis of cost savings as more efficient firms replace less efficient firms captures some of the potential impact of transatlantic mergers, it may

underestimate the potential gains. A transatlantic merger may enable additional cost savings through the realisation of increased economies of scale, scope, and density. These savings would not be captured by our analysis, because it relies on comparison with existing airlines—and no existing airline has access to the potential benefits of a transatlantic merger.

However, the smaller degree of overlap between the activities of two firms operating on opposite sides of the Atlantic means that these cost-saving opportunities may be smaller than in a merger of two EU airlines.[35] Although transatlantic aviation consolidation offers the prospect of significant potential cost savings in certain areas, such as maintenance and training costs and fleet deployment, we could not identify a reliable way of quantifying these benefits. We therefore did not attempt to estimate additional cost savings from transatlantic consolidation.

[35] For example, a merged transatlantic firm still has to reach audiences on both sides of the Atlantic, implying that there might be difficulty in realising significant reductions in advertising and marketing budgets. Other types of overhead, such as administrative costs, also may be difficult to reduce given the very different US and European environments. The recent Chrysler-Daimler merger is often cited as a cautionary tale of the difficulty of achieving cost efficiencies in a transatlantic merger.

We would not expect that the replacement of the current bilateral system with an Open Aviation Area would induce further consolidation within the US aviation industry. Since US carriers typically derive most of their revenues from the internal US market, one might presume that these carriers have configured themselves largely to serve that market efficiently (as well as to serve transatlantic traffic).

3. The Economic Benefits of More Efficient Firms Replacing Less Efficient Firms

In Chapter 2, we described the cost savings that would come from allowing more efficient airlines to replace less efficient airlines. We indicated that these cost savings would come about through the increased competition and industry restructuring that an Open Aviation Area would make possible. In this chapter, we quantify these cost savings and the resulting efficiency benefits. Specifically, we:

- Analyse available data to identify significant cost differences across European and US airlines, and argue that these represent *prima facie* evidence for potential efficiency improvements from aviation liberalisation.
- Use this analysis to *derive indicative estimates of the potential magnitude of cost savings* on intra-EU and transatlantic routes.
- Estimate the potential magnitude of benefits to consumers if these cost savings were passed through in the form of price reductions.

3.1 Cost Savings from the Elimination of Inefficiencies

As the first step in our analysis, we used available data on industry costs to identify cost differences across European and US airlines: if there is concrete evidence that one airline produces comparable services at lower cost than another, it would support the theoretical expectation that, in a liberalised regulatory environment, increased competition would lead to cost reductions. *We present all of our estimates in euros. American readers can assume that €1 is equivalent to $1.*

Quantitative Analysis: Methodology

Our primary source was a database of airline costs and revenues provided by DG Energy and Transport and originally commissioned from British Aerospace (BAe). The database estimates airline costs, broken down into essentially the same categories as those used by the International Air Transport Association (IATA). To preserve carrier anonymity and commercial confidentiality, it groups airlines into "low", "medium", and "high" cost categories and presents average costs for each category rather than cost figures for individual airlines. Logically, the effect of presenting average cost data must be to underestimate the extent of cost variance across airlines.

We supplemented the BAe database with additional data sources. The Association of European Airlines (AEA) gave us aggregate cost data on all of their member airlines, and some of its members provided their own company-specific data.[36] We used these data to verify the reliability of and, where appropriate, to adjust the BAe figures. Appendix IV provides details on these adjustments.

To further ensure the reliability of our conclusions, we implemented a number of qualitative checks. First, we identified those cost categories for which the data indicated

[36] We distributed a questionnaire requesting additional cost information to individual airlines and the AEA. While the level of response was somewhat disappointing, the answers that we did receive were of high value in enabling us to cross-check the BAe data. One response led us to extensively revise the cost estimates. See Appendix IV for details.

very large variation in costs across airlines. Second, through a questionnaire to, and informal discussions with, industry representatives, we reached a general consensus that the following categories are those for which cost differences are likely to be the largest and the potential for efficiency savings the greatest:

- flight deck crew
- cabin attendants
- passenger service
- ticketing, sales, and promotion
- general and administrative

Our subsequent analysis focused exclusively on these five categories, which constitute 27 percent of total costs for transatlantic flights and more than 37 percent of total costs for intra-EU flights. We ignored other cost categories for which the inter-airline cost differences are smaller.

Estimated Variation in Costs

Table 3.1 presents our results, showing clearly the large cost differences between airlines. For example, high-cost airlines spend an estimated 17.2 percent of revenues on "Ticketing, Sales, and Promotion", while medium-cost airlines spend only 13.7 percent and low-cost airlines spend 10.3 percent. The other cost categories show similarly dramatic differences across airlines—for example, high-cost airlines' cabin crew expenditure at €cent0.70/ask is 25 percent higher than medium-cost airlines'.

Table 3.1

Costs and Cost Differences Between Airlines

	Airline Cost Level		
	High	*Medium*	*Low*
Intra-EU Flights			
Flight Deck Crew (€cent/ask)	0.96	0.76	0.67
Cabin Crew (€cent/ask)	0.70	0.56	0.42
Passenger Service (€cent/ask)	1.89	1.51	1.13
Transatlantic Flights			
Flight Deck Crew (€/hour)	432	345	302
Cabin Crew (€cent/ask)	0.44	0.35	0.26
Passenger Service (€cent/ask)	0.37	0.30	0.22
All Flights			
Ticketing, Sales, and Promotions (Percent of Revenue)	17.2%	13.7%	10.3%
General and Administrative (Percent of Revenue)	2.5%	2.0%	1.5%

Source:
Airline cost level categorisation and data come from the BAe Database.
Notes:
We report Flight Deck Crew costs differently for intra-EU and transatlantic flights because of information provided by individual airlines. See Appendix IV for more details.
"ask" stands for available seat kilometre.

3.2 Estimate of Potential Cost Savings to European and US Carriers from an Open Aviation Area

As a second step in our analysis, we used the cost differences identified in Table 3.1 to estimate potential efficiency improvements for European and US carriers. Specifically, as shown in Table 3.2, we interpreted the estimated costs of "medium-cost" airlines as a benchmark for *industry best practice in the European and US aviation industry*.[37] We then estimated industry total savings in each category, if all airlines currently classified in our database as "high" cost were to reduce their costs to the benchmark level shown in Table 3.2.

Table 3.2

Industry Best Practice Benchmarks

	Industry Standard
Intra-EU Flights	
Flight Deck Crew (€cent/ask)	0.76
Cabin Crew (€cent/ask)	0.56
Passenger Service (€cent/ask)	1.51
Transatlantic Flights	
Flight Deck Crew (€/hour)	345
Cabin Crew (€cent/ask)	0.35
Passenger Service (€cent/ask)	0.30
All Flights	
Ticketing, Sales, and Promotions (Percent of Revenue)	13.7%
General and Administrative (Percent of Revenue)	2.0%

Note:
"ask" stands for available seat kilometre.

Our results are shown in Table 3.3. Moving toward this industry best practice benchmark could *reduce the total costs of current airline operations by as much as €2.9 billion per year (or 4.2 percent) on transatlantic and intra-EU routes*. The bulk of the savings (€2.3 billion from the estimated total of €2.9 billion, *i.e.*, almost 80 percent) comes from increased efficiency on intra-EU flights. This is consistent with the fact our five cost categories constitute a larger share of total costs for intra-EU than for transatlantic flights.

[37] As explained below, we did not use "low-cost" air carriers as our benchmark so as to avoid an apples-to-oranges comparison of "full service" and "no frills" carriers.

Table 3.3

Estimated Impact of Cost Reductions

	Flight Type		
	Intra-EU	*Transatlantic*	*All Flights*
Current Costs (€ million/year)	39,531	28,578	68,110
Potential Savings (€ million/year)	2,268	621	2,888
Percent of Current Costs	5.7%	2.2%	4.2%

Discussion of Cost Savings Analysis

Avoiding Overestimation

As with any quantitative study, our analysis of potential cost savings involved a number of methodological choices. In general, we applied a philosophy of "conservatism" so as to err on the side of underestimating rather than overestimating those savings. For example, our adjustments to the BAe data were consistently designed to avoid overestimation, so that their likely effect was to underestimate potential cost savings. (For example, one of our industry experts estimated that high-cost carriers might spend as much as 60 percent more than low-cost carriers on Ticketing, Sales, and Promotion, whereas our data implies a more modest difference of 40 percent.) As another example, we avoided identifying savings for cost categories that are specific to a particular market (*i.e.*, route), such as airport charges, en-route charges, and passenger charges. Some airlines may face higher operating costs than others purely because of the size of the markets they serve or other market-specific factors, and increased competition will not reduce those costs.

Quality Differences

For the same reason, we were careful not to interpret the higher cost associated with a higher quality product as evidence of the potential for cost reduction. It would be unreasonable to claim that traditional airlines could reduce their passenger service costs to those of Ryanair or easyJet, because traditional airlines provide a higher level of in-flight service.

So as not to compare apples and oranges, our analysis therefore distinguished between traditional "full service" airlines and their low-cost "no frills" competitors by using medium-cost carriers rather than low-cost carriers as our "best practice benchmark". Had we implicitly ignored quality differences and used low-cost carriers as our benchmark, then our estimated savings would have been about €4.5 billion per year higher than the figure shown in Table 3.3.

Although our use of medium-cost carriers as the benchmark avoids overestimating the potential for cost savings, it may well underestimate it. First, in some cost categories, the quality differences between full service and no frills carriers may be small enough to warrant direct comparison. For example, there is no apparent reason why other airlines cannot imitate low-cost carriers in reducing training and maintenance costs by keeping a more uniform fleet. More controversially, the flight deck crew of traditional airlines operating within the European Union fly many fewer hours per year than those of no frills carriers, suggesting another potential area of cost savings that may be unrelated to quality differences.

Second, it is unclear to what extent passengers value the "full service" approach. There is considerable current debate within the aviation industry regarding the extent to which consumers are willing to pay for any perceived quality differences between "no frills" and "full service" carriers. This topic has generated substantial interest, given the recent success of "no frills" carriers in attracting business travellers and other types of travellers. Some US carriers, for example, are now planning to create subsidiaries offering "low-cost" service.

We conclude that our analysis is unlikely to have overestimated cost savings by failing to take sufficient account of quality differences.

Social Impact of Cost Reductions

The social dimension is of particular importance in any discussion of restructuring and cost savings. The overall thrust of our analysis in this report suggests that an Open Aviation Area would lead to a stronger aviation sector in Europe, with the potential for job creation and increased employment security. However, even if an Open Aviation Area creates more "winners" than "losers", implementation must pay close attention to the social dimension and ensure appropriate levels of protection for those on whom liberalisation threatens to impose disproportionate costs.

We also note an important point in the interpretation of our results. Reductions in wage costs represent primarily a *transfer* from employees to consumers (and possibly shareholders). Although they are a source of cost savings, they do not represent an increase in efficiency *per se*. From a social welfare perspective, efficiencies arise when firms manage to produce the same output using fewer resources (including human resources), not when they manage to lower the price they pay for those resources. In turn, these efficiency gains imply that the same amount of resources can now produce greater amounts of output, which holds the prospect of offering welfare gains for society as a whole.

Consistent with this analysis, we believe that it is important to distinguish between cost savings that arise primarily through changes in wages, and those savings that represent increased efficiency through better use of resources. Data limitations imply that we can make no more than an indicative assessment on this front. To do so, we separate the cost categories where we have identified significant savings into two groups:

- categories where savings may be related primarily to wage differentials (*i.e.*, flight deck crew and cabin attendants)
- categories where savings are not related primarily to wage differentials (*i.e.*, passenger service; ticketing, sales, and promotion; and general and administrative)

This division creates two areas of cost savings, those related to aircraft crew and those *not* related to aircraft crew.

As can be seen in Table 3.4, cost reductions not related to aircraft crew account for more than €2.1 billion of the nearly €2.9 billion in estimated cost savings. Consequently, we have reason to believe that much of the attainable cost savings may be attributed purely to airline efficiency differences, rather than differences in wages and other labour costs.

Table 3.4

Cost Reductions Breakdown

			Flight Type		
			Intra-EU	*Transatlantic*	*All Flights*
Aircraft Crew Related Cost Reductions					
Current Costs (€ million/year)	[1]		4,001	2,243	6,244
Potential Savings (€ million/year)	[2]		603	175	778
Percent of Current Costs	[3]	[2]/[1]	15.1%	7.8%	12.5%
Non Aircraft Crew Related Cost Reductions					
Current Costs (€ million/year)	[4]		35,530	26,336	61,865
Potential Savings (€ million/year)	[5]		1,664	446	2,110
Percent of Current Costs	[6]	[5]/[4]	4.7%	1.7%	3.4%
Total Cost Reductions					
Current Costs (€ million/year)	[7]	[4]+[1]	39,531	28,578	68,110
Potential Savings (€ million/year)	[8]	[5]+[2]	2,268	621	2,888
Percent of Current Costs	[9]	[8]/[7]	5.7%	2.2%	4.2%

Note:
Aircraft crew related cost reductions are cost reductions in the categories "Flight Deck Crew" and "Cabin Attendants".

Finally, we note that as with other liberalisation measures, an Open Aviation Area may have social benefits in the form of job creation that lie outside of the airline industry. For example, increased passenger volumes under an Open Aviation Area potentially could lead to increased employment in industries that supply the airline industry (*e.g.*, aircraft). We present estimates of these direct and indirect economic impacts in Chapter 6, although we are not able to explicitly allocate these impacts to labour and capital.

3.3 Increased Efficiency and Output Expansion

As the third step in our analysis, we estimated the potential effects of the cost savings we identified above on prices and output. Lowered costs could lead to significant price reductions, especially if accompanied by increased competition. This has two distinct effects:

- First, the benefits of increased efficiency are passed on to consumers rather than remaining with producers.
- Second, lower prices lead to increased passenger volumes, which are a source of *additional benefits* for consumers and producers.

However, the pass-through of cost reductions in the form of lower airfares is by no means a foregone conclusion. Another possibility is that the European and US aviation industries now have *too many airlines*, making *inadequate profits*, but prevented from exiting the industry by some kind of *barrier to exit* (or implicit financial support from the government). In that case, deregulation could lead to increased consolidation that would still allow for efficiency improvement, but that would imply that a larger part of the cost savings stayed with airlines and their shareholders in the form of higher profits. Moreover, cost savings achieved through consolidation cannot be disentangled from the prospect of increased market power through consolidation. If so, deregulation could produce substantial producer benefits but limited consumer gains. Nonetheless, we might expect that the prospect of entry would constrain market power over the long term. In

addition, the ending of implicit financial support from the government would provide a benefit by allowing for lower taxes or increased public spending in other areas.

The extent to which any cost reductions are passed through to consumers therefore depends on the ultimate effects of liberalisation on airline industry structure and market behaviour. It would be unrealistic to attempt any precise forecast of these effects. Rather than provide potentially unreliable predictions concerning the pass-through of reduced costs into prices, we therefore restrict our analysis to estimating the potential impact on fares, passenger volumes, and consumer welfare should cost reductions lead to equal reductions in fares.

Analysis

Our analysis proceeds in two steps. We first estimate the impact on passenger volumes if cost reductions were passed through in the form of lower fares, and then examine the consequent benefits to consumers.

Impact on Passenger Volumes

Consumers respond to lower fares by flying more. To quantify this effect one needs to estimate both the size of the fare reduction and the quantitative relationship between lower fares and increased passenger volumes. To estimate the size of the fare reduction, we took the estimated cost savings shown in Table 3.4 and assumed that the entire savings were passed through in the form of lower fares.[38] This should not be viewed as a prediction—rather, this approach gives us an *upper bound* on the potential for increased output as a result of reduced costs.

To derive estimates of the increased passenger volumes resulting from these price reductions, we rely on existing estimates of the price responsiveness of demand. A number of statistical studies have attempted to estimate the price elasticity of demand for air transportation,[39] producing a range of estimates generally between 1.0 and 2.5.[40] We therefore have used "low" and "high" elasticity figures of 1.0 and 2.5, respectively.

The cost reductions shown in Table 3.4 imply fare reductions of between two percent and six percent. As shown in Table 3.5, the corresponding volume increase on transatlantic routes (based on our assumed demand elasticities) ranges from approximately 1.0 million to 3.2 million transatlantic passengers. Furthermore, the

---

[38] We reduced fares *pro rata*, applying a uniform percentage reduction to all fares so as to get a reduction in total revenues (before taking increased passenger volumes into account) equal to the total cost savings.

[39] The "price elasticity of demand" measures the percentage change in the quantity demanded that results from a one-percent change in the price of the product. For example, an elasticity of 1.0 implies that demand (*i.e.*, sales) increases by 1 percent when price falls by 1 percent, while an elasticity of 2.5 implies that demand increases by 2.5 percent when price falls by 1 percent. Since passenger demand increases by a larger amount, the consumer benefits associated with a given percentage decline in price become larger as the price elasticity of demand increases.

[40] "Under all specifications, the price elasticity of demand . . . lies between [2.50] and [2.25]" (Jan K. Brueckner and Pablo T. Spiller, "Economies of Traffic Density in the Deregulated Airline Industry," *Journal of Law and Economics* 37, no. 2 (October 1994): 405). See also James A. Brander and Anming Zhang, "Market Conduct in the Airline Industry: An Empirical Investigation," *RAND Journal of Economics* 21, no. 4 (Winter 1990): 567-583. Referring to prior literature, Brander and Zhang estimate the price elasticity of demand for airline services to be 1.6.

estimated increase in intra-EU passengers ranges from 13.5 million to 35.7 million passengers.

Table 3.5

Passenger Increases Created by Pass-Through of Cost Savings ('000 passengers/year)

	Elasticity = 1.0			*Elasticity = 2.5*		
Area	*Increase Due to Pass-Through of Non-Aircraft Crew Related Cost Reductions*	*Increases Due to Pass-Through of Aircraft Crew Related Cost Reductions*	*Total Increases*	*Increase Due to Pass-Through of Non-Aircraft Crew Related Cost Reductions*	*Increases Due to Pass-Through of Aircraft Crew Related Cost Reductions*	*Total Increases*
Intra-EU	9,772	3,755	13,527	25,415	10,306	35,720
Transatlantic	725	243	968	2,504	665	3,169
Total	10,497	3,998	14,495	27,918	10,971	38,889

Source:
Based on BAe Database.
Notes:
Aircraft crew related cost reductions are cost reductions in the categories "Flight Deck Crew" and "Cabin Attendants".

Benefits to Consumers

The second part of our analysis uses the same estimates of consumer demand responsiveness (summarised by the price elasticity) to estimate the total consumer surplus created by the drop in fares and the increase in passenger volumes. The definition of consumer surplus and the details of the calculation are shown in Appendix V. The results are summarised in Table 3.6 below.

Table 3.6

Consumer Surplus Created by Pass-Through of Cost Savings (€ million/year)

	Elasticity = 1.0			*Elasticity = 2.5*		
Area	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gain*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gain*
Intra-EU	2,268	83	2,351	2,268	216	2,483
Transatlantic	621	41	662	621	158	778
Total	2,888	124	3,012	2,888	373	3,261

Source:
Based on BAe Database.

We conclude that if all the cost savings arising from an Open Aviation Area were passed through in the form of reduced fares, the *total consumer benefits* would be very substantial, potentially on the order of some *€3 billion annually*. However, we note an important distinction between the consumer surplus to existing customers and that to new customers. Lower fares for existing passengers are to some extent a "zero sum game": the passenger's gain is the airline's loss and *vice versa*. The surplus produced by new flights is, however, a pure gain to both consumers and producers.

We note a caveat to the above results: increased airline traffic may have hidden costs to society not factored into our calculations, such as environmental costs. However, the need to address such problems arises whether or not an Open Aviation Area is in place. The most efficient approach therefore is to develop a policy framework for dealing with these hidden costs that is also consistent with an Open Aviation Area.

Employment Effects

The net effect on employment of increased efficiency from an Open Aviation Area could be positive or negative, depending on the volume response to the fare decreases.[41] The cost savings themselves would depress employment—a more efficient firm is often able to reduce labour costs because it needs fewer employees to produce the same amount of output. However, if the cost savings are passed on to consumers in the form of lower prices, the lower fares will lead to greater traffic volumes, requiring more capital *and more labour*. This effect would compensate for some or all of the employment losses as a direct result of a more efficient airline industry. The net impact could be an increase or decrease in employment.

Estimation of this net effect is beyond the scope of this report. Any serious attempt to quantify the impact of efficiency gains on employment would require detailed knowledge of airline operations and of labour demand and supply in the countries affected.

3.4 The US Experience with Deregulation

The US experience with deregulation can provide useful additional insight into the potential impact of an Open Aviation Area in enabling increased efficiency. We look to the United States' experience rather than to the European Union's internal liberalisation experience because, while the internal aviation market of the European Union is fully deregulated, it remains hampered overall by the bilateral restrictions on transatlantic traffic in a way that does not affect the United States.

Here, we provide a brief overview of the impact of US deregulation on fares and service quality, airline configuration (*e.g.*, "hub-and-spoke" networks), and industry structure.

Fares and Service Quality

Economists Morrison and Winston investigated the effects of deregulation on fares and service. They found that deregulation led to significant reductions in fares. "[D]uring 1998, 80 percent of passengers, accounting for 85 percent of passenger miles, paid fares that were lower than our estimate of regulated fares."[42] The emergence of low-cost carriers played a significant role in this phenomenon—for example, Southwest Airlines has accounted for nearly 40 percent of the fare savings in the United States (based on statistical analysis that compares fares in city-pair markets where Southwest offers service and city-pair markets where it does not compete).

Morrison and Winston also found that fare dispersion has grown since deregulation occurred, though most of the growth occurred in the 1990s. Fare dispersion can reflect cost-based differences, the proliferation of niche carriers, and partly the ability of carriers to align prices with customers' willingness-to-pay. This works in the customer's favour in some cases: discounted Internet fares allow certain passengers to travel more cheaply than if airlines were forced to charge all passengers the same fare.

---

[41] Here we consider only direct employment effects within the aviation industry (*i.e.*, primarily airlines and airports).

[42] Morrison and Winston, "Government Policy in the Deregulated Airline Industry," 1.

Service quality also has improved since deregulation. Raw numbers of complaints to the US Department of Transportation may suggest that service had deteriorated, but controlling for the number of revenue passenger miles, Morrison and Winston reached a different conclusion. Complaints increased immediately after deregulation and after the merger wave of the mid-eighties, but have decreased in other periods. Throughout the 1990s, passenger complaints were at the lowest levels since deregulation began.

Operational Changes

Deregulation in the United States led to significant operational changes, including most notably the reconfiguration of route systems to take advantage of network efficiencies, the so-called "hub-and-spoke" system. These operating (and marketing) changes have produced very large cost reductions. Economists Joskow and Rose note the "dramatic changes in airline route structures (hubbing), aircraft utilization, and labor productivity since deregulation."[43] Similarly, Morrison and Winston observe that:

> airlines have made marketing and operating innovations that have significantly increased their load factor. During the decade before deregulation, load factors averaged less than 55%. Since deregulation they have averaged more than 60%, reaching nearly 70% in 1996. More efficient use of inputs, lower labor costs and greater lengths of haul have enabled air carriers to lower real costs per available ton-mile more than 25% since deregulation.[44]

Industry Structure

The era of the deregulated US airline industry also has seen an increase in the number of mergers between carriers. Again, we point to Morrison and Winston:

> During the regulated era, airlines' merger requests were almost always denied except when the merger was designed to keep one of the carriers from going bankrupt. Since deregulation, antitrust authorities have blocked few mergers. . . .
>
> . . . mergers . . . can make it much easier for carriers to develop dominant hubs. But mergers can also enable carriers to develop more efficient networks and use their capital and labor more efficiently. Thus the social desirability of an airline merger rests on the trade-off between efficiency gains (including improved service) and potentially higher fares.[45]

One very significant consequence of an Open Aviation Area would be to facilitate mergers by removing barriers to entry. With significant barriers to entry, any merger of two players with significant market shares is likely to be viewed with suspicion by competition authorities. In contrast, the potential for entry provides a valuable safeguard against attempts to exert anti-competitive behaviour through merger and acquisition. As

---

[43] Paul L. Joskow and Nancy L. Rose, "The Effects of Economic Regulation," in *Handbook of Industrial Organization,* ed. R. Schmalensee and R. D. Willig (Elsevier Science Publishers B.V., 1989): 2:1481. For evidence of these changes, Joskow and Rose cite E. E. Bailey, D. R. Graham, and D. P. Kaplan, *Deregulating the Airlines* (MIT Press, 1985) (chs. 4, 5, and 8) and Steven A. Morrison and Clifford Winston, *The Economic Effects of Airline Deregulation* (Brookings Institution, 1986).

[44] Morrison and Winston, "Regulatory Reform of US Intercity Transportation", 481.

[45] Morrison and Winston, "Remaining Role for Government Policy," 9-10.

such, the lowering of entry barriers through an Open Aviation Area should favour mergers where significant efficiencies are realised.

Conclusions Regarding Deregulation

Extrapolation from the US experience is potentially misleading because of the highly detailed and prescriptive rules that existed prior to deregulation in the United States. It would be irresponsible to assume that the current level of inefficiency of EU and US carriers is directly comparable to that which prevailed in the United States prior to deregulation, when the underlying causes are so different. For example, when examining the impact of US deregulation, Joskow and Rose note that "[t]hese changes are convincingly attributed to airlines' ability to optimize their routes free from CAB certification restrictions, as well as to competition."[46] An Open Aviation Area might lead to enhanced route optimisation through industry restructuring. However, its direct impact on route optimisation would not be comparable to that of deregulation in the United States.

The constraints imposed by current transatlantic operating and ownership restrictions are different from the constraints facing US airlines prior to deregulation. Hence, the *quantitative* impacts of an Open Aviation Area on costs, fares, service quality, and industry structure may be quite different than those experienced under US deregulation.

Nonetheless, we believe that the US experience provides significant *qualitative* evidence of the potential efficiency benefits of liberalisation via an Open Aviation Area. Both the United States prior to deregulation and the current international regime affecting the EU and transatlantic markets are characterised by inefficient route structures and industry fragmentation resulting from restricted operating authority. In the United States before deregulation, airlines could operate only where they had route authority, while in the current transatlantic system, airlines can only fly direct transatlantic routes from their "home country".

In both cases, the restrictions appear to prevent airlines from exploiting potential scale, scope, or density economies. Moreover, some industry observers would claim that entry protection in the United States made airlines "fat". Our analysis suggests there may be similar effects for EU and US transatlantic carriers.

3.5 Conclusion

An Open Aviation Area would increase competition and facilitate potential industry restructuring by removing the restrictions in current bilateral agreements. In turn this could lead to significant increases in efficiency, producing large cost savings for the EU and US aviation industries.

Current variations in costs across airlines reflect the existence of possible inefficiency that could be reduced by an Open Aviation Area. We have identified a number of areas where available cost data and industry input suggest there may be significant potential for efficiency improvements. We use the data to establish an industry "best practice benchmark" for these costs.

Our analysis suggests that the potential for increased efficiency is very significant. If all the airlines whose costs are currently above our estimated "best practice

[46] Joskow and Rose, "Effects of Economic Regulation," 1481.

benchmark" were able to reduce their costs to that level, the total saving would be approximately €2.9 billion annually. Moreover, less than €1 billion of these savings are directly related to wage or compensation differences (*i.e.*, costs of flight deck crew and cabin attendants).

It would not be sensible to predict the proportion of these cost savings that would be passed through to consumers in the form of lower fares. However, as an upper bound on the potential benefit to consumers, we have analysed the impact if all cost savings were passed through. In addition to the direct benefit of €2.9 billion, we estimate an additional annual increase in consumer welfare of as much as €370 million arising from increased passenger traffic in response to the lower prices.

Finally, US experience provides significant evidence of the potential efficiency benefits that can be achieved through aviation liberalisation such as an Open Aviation Area. Both the United States prior to deregulation and the current international regime affecting the EU and transatlantic markets are characterised by inefficient route structures and industry fragmentation resulting from restricted operating authority. In both cases, the restrictions appear to have prevented airlines from achieving potential efficiencies, including economies of scale, scope, and density.

4. The Economic Benefits of Pricing Synergies Due to Transatlantic Integration

A second source of benefits under an EU-US Open Aviation Area is carriers' improved ability to coordinate prices and schedules on interline routes (*i.e.*, routes that require passengers to fly on two or more airlines to reach their destination). As described in Chapter 2, without coordination each airline will set the price for its leg of the interline flight without considering how it will affect traffic on the other leg of the flight. If the same carriers are allowed to coordinate in setting prices, they will take into account the fact that a lower fare on one leg will raise demand for, and thus lower the costs of providing service on, the other leg. That is, each carrier "internalises" the effect of its fare on demand for travel on the other carrier. As a result, fares are lower, benefiting passengers, and carriers earn higher profits due to increased volumes and resulting lower costs.

Evidence from previous economic studies indicates that price coordination by EU and US carriers on transatlantic routes can bring substantial benefits. Economists Brueckner and Whalen analysed fares on US international routes to assess whether alliances result in lower fares on interline routes as a result of improved price coordination.[47] The authors found that alliance partners charge interline fares that are between 18 percent and 28 percent below the prices charged by non-allied airlines on the same route. They concluded that when allied airlines are allowed to share revenues or profits and engage in coordinated fare-setting, consumers benefit from lower interline prices, largely because carriers internalise the effect of their segment price on the other carrier's demand. Moreover, they found that alliances increased consumer welfare overall, even though they may lessen competition, and thus raise prices somewhat, on gateway-to-gateway routes.

4.1 Increased Pricing Synergies as a Result of an Open Aviation Area

One might ask why carriers need an Open Aviation Area to achieve these pricing synergies, if they can already form transatlantic alliances.[48] The answer is that few alliances enjoy the broad "antitrust immunity" that allows carriers to engage in coordinated pricing, because of competition authorities' fears that such immunity might lead to anti-competitive behaviour.[49] However, concerns regarding competition are likely to be mitigated under an Open Aviation Area, since barriers to entry into transatlantic aviation markets would be lowered. As a result, liberalisation would significantly lessen the prospect that transatlantic alliances or mergers could produce long-term anti-

[47] See Jan K. Brueckner and W. Tom Whalen, "The Price Effects of International Airline Alliances", *Journal of Law & Economics* 43, no. 2 (October 2000): 503-545. The majority of the alliances examined in Brueckner and Whalen's analysis were subject to antitrust immunity.

[48] Currently, most of the largest US carriers are allied with one or more foreign airlines. Alliances include Northwest-KLM; the Star Alliance between United, Lufthansa, SAS, the Austrian Airlines Group (Austrian, Lauda, and Tyrolean), British Midland, ANA, Air Canada, and other smaller carriers; Delta's alliance with Air France, Alitalia, Korean Air, AeroMexico, and Czech Airlines; and American Airlines' alliance with British Airways, Iberia, Aer Lingus, Finnair, Quantas, Cathay Pacific, and LanChile.

[49] For example, the British Airways-American Airlines alliance currently cannot produce this type of benefit: as a result of anti-competitive concerns that stem from the restrictive UK-US bilateral agreement, this alliance does not have the requisite antitrust immunity to engage in price coordination.

competitive effects. Transatlantic liberalisation would therefore facilitate "deeper" alliances that would allow carriers to achieve the benefits of price coordination.

Moreover, to capture significant synergies, carriers may require yet deeper forms of integration than alliances allow—*e.g.*, joint ventures or full-blown mergers. Alliances are inherently less stable than mergers, and therefore do not facilitate long-term commitments. Although price coordination involves little long-term commitment in and of itself, when carriers decide to coordinate schedules or expand service on particular routes, their decisions have longer-term implications. Carriers may be better able to implement such decisions if they are more closely integrated.[50]

4.2 Estimated Consumer Benefits from Price Coordination

Methodology

The consumer benefit, or "consumer surplus", that an Open Aviation Area would bring as a result of improved pricing coordination has two components. First, existing passengers enjoy increased consumer surplus if the fare they pay is reduced as a result of price coordination. Second, the price reductions stimulate additional traffic, and each new passenger enjoys a surplus (the difference between what he or she values the flight at and the price paid for it).

To produce indicative estimates of these benefits, we made three calculations. First, we calculated fares and volumes for traffic on all transatlantic interline routes not currently subject to price coordination. (We excluded routes covered by the four output-restricting bilateral agreements, because we consider those in Chapter 5.) To determine fares, we used average passenger revenues for all transatlantic routes as derived from the revenue, volume, and load factor information in the BAe database (see Chapter 3 and Appendix IV for a description). With respect to traffic volume, we used an industry estimate that around 10 percent of total transatlantic traffic involves interlining carriers that do not engage in price coordination. We applied this figure to total EU-US transatlantic traffic volumes derived from the US Department of Transportation T-100 data.

Second, we estimated the size of the fare reductions that improved price coordination among transatlantic carriers would produce. We relied on the Brueckner and Whalen results showing that existing alliances have produced fare reductions on interline routes ranging from 18 percent to 28 percent.

Third, we calculated the increased traffic volume that would result from these price reductions. As in Chapter 3, we used two estimates of the price-responsiveness ("elasticity") of demand—a lower bound estimate of 1.0 and an upper bound estimate of 2.5.

Our analysis looks only at the benefits to consumers, not at increased airline profits. Although air carriers too would benefit from improved pricing coordination, any attempt to estimate the increase in airline profits would require detailed information on marginal costs on specific routes that we lacked.

---

[50] The economic benefits from coordination attributable to mergers and acquisitions would not be captured by the work of Brueckner and Whalen described above, which examines only the impact of alliances. Moreover, their quantification of the economic impacts of alliances focuses primarily on fare impacts arising from price coordination.

Results

Table 4.1 shows the results of our calculations. We estimate that under an Open Aviation Area improved pricing coordination on transatlantic interline flights would produce an increase in passenger volume ranging from 0.97 million to 5.65 million passengers a year, and a corresponding gain in consumer surplus ranging from €629 million to €1,347 million a year.

Table 4.1

Annual Impact of Increased Interline Price Coordination

	Lower Bound Scenario [1]	*Upper Bound Scenario [2]*
Increased Passenger Volume ('000s/year)	975	5,654
Increase in Consumer Surplus (€ million/year)		
From Price Decreases for Existing Customers	571	888
From Increased Traffic	59	458
Total	***629***	***1,347***

Notes:
Assumes 10 percent of interline flights are not coordinated.
[1]: Assumes volume growth from 18 percent price reduction following creation of Open Aviation Area, where price elasticity of demand is equal to 1.0.
[2]: Assumes volume growth from 28 percent price reduction following creation of Open Aviation Area, where price elasticity of demand is equal to 2.5.

In two respects, our results may overstate the benefits of improved pricing coordination under an Open Aviation Area. First, carriers may achieve some of the benefits of coordinated pricing even without liberalisation, as airlines develop more sophisticated alliance arrangements. Second, even under an Open Aviation Area, some passengers inevitably will utilise interline routes that are not subject to price coordination.

However, in other respects, our results understate the benefits of improved pricing coordination under an Open Aviation Area. The Brueckner and Whalen figures, which we used to estimate fare reductions, are based on an analysis of alliances that are subject to existing operating restrictions. By eliminating all commercial restrictions, an Open Aviation Area would allow non-allied firms to engage in "deep" alliances, up to and including mergers. The impact could therefore be greater than from the looser type of alliance studied by Brueckner and Whalen. An Open Aviation Area would also allow firms that are currently involved in a loosely configured alliance to deepen their alliance or undertake a full-blown merger. This may produce additional fare reductions on interline routes that are already subject to pricing coordination.

Additional price reductions could arise under an Open Aviation Area if mergers and acquisitions are more successful than alliances at producing coordinated investment in increased capacity. Moreover, our results do not reflect the consumer benefits from improved coordination of non-price attributes—such as scheduling. By coordinating gate proximity and flight schedules at connecting airports, alliance partners could offer greater convenience to passengers. A merged firm could offer still greater convenience.

Employment Effects

We used this analysis to estimate how much additional employment in the aviation sector (*i.e.*, airlines and airports) would result from improved pricing coordination. To examine the effect on airline employment we took our predicted increase in transatlantic passenger volumes, by country, and divided it by an estimate of the passengers-per-employee ratio for the national airline(s) of that country.[51] We assumed that the increased passenger volume would be shared equally by EU and US carriers, and accordingly allocated half of the projected increase in passenger volume to the relevant European country and half to the United States. To estimate the increase in airport employment, we relied on a World Bank study which indicated that, on average, airports employ one worker for every 2,000 to 5,000 passengers.[52]

Table 4.2 shows our results. Based on our conservative estimate of the increase in passenger volumes, where we assume an 18 percent price reduction on interline routes and a price elasticity of demand equal to 1.0, we predict that employment would go up by only a small amount: approximately 790 to 1,080 employees within the European Union, and by 600 to 900 employees in the United States.[53] If we use the most generous estimate of the passenger volume, based on a 28 percent price reduction and a price elasticity of demand equal to 2.5, the resulting increase in employment is approximately six times as large: 4,650 to 6,350 employees in the European Union, and 3,560 to 5,260 employees in the United States.

---

[51] We used data for Aer Lingus, Air France, Alitalia, Austrian Airlines, British Airways, British Midland, Finnair, Iberia, KLM, Lufthansa, Martinair, and SAS for Europe, and American, Delta, Northwest, and United Airlines for the United States. The data were obtained from Credit Suisse First Boston Equity Research, *Global Airlines: The Global Alliances* (Credit Suisse First Boston, May 24, 2002) and were either 2000 or 2001(estimated) figures. If there were more than one airline in a country, we aggregated the airlines within the country to get an estimate of passengers-per-employee. If the country had no airlines listed, the average over all the airlines was used.

[52] Ofelia Betanor and Roberto Rendeiro, "Regulating Privatized Infrastructures and Airport Services," working paper WPS 2180, World Bank Institute (1999): 55. It is unclear whether these estimates include employees of the airlines (*e.g.*, ticket agents and ground-support crews), but other industry data suggest they do not.

[53] The actual impact of employment may differ slightly from these numbers because we calculated an average passenger-per-employee figure. While there would be expected increases in flight crews and maintenance and check-in agents, employment would not need to expand incrementally with increased traffic volume. The increased efficiency produced by an Open Aviation Area might also change the employee-per-passenger ratios used in the calculation.

Table 4.2

Employment Impact of Pricing Synergies (Number of Employees)

Lower Bound Scenario

		High Ideal Airport Efficiency		*Low Ideal Airport Efficiency*	
Region	*Estimated Increase in Airline Employment [1]*	*Estimated Increase in Airport Employment [2]*	*Combined Increase in Employment [3]*	*Estimated Increase in Airport Employment [4]*	*Combined Increase in Employment [5]*
European Union	600	188	788	481	1,081
United States	415	194	609	487	902

Upper Bound Scenario

		High Ideal Airport Efficiency		*Low Ideal Airport Efficiency*	
Region	*Estimated Increase in Airline Employment [1]*	*Estimated Increase in Airport Employment [2]*	*Combined Increase in Employment [3]*	*Estimated Increase in Airport Employment [4]*	*Combined Increase in Employment [5]*
European Union	3,523	1,124	4,647	2,820	6,343
United States	2,433	1,130	3,563	2,826	5,259

Sources:

Passenger volume data is from the US DOT T-100 International Data.

Airline passenger and employee data from Credit Suisse First Boston Equity Research, Global Airlines: The Global Alliances (Credit Suisse First Boston, May 24, 2002).

High and low airport efficiency from Ofelia Betanor and Roberto Rendeiro, "Regulating Privatized Infrastructures and Airport Services," working paper WPS 2180, World Bank Institute (1999): 55.

Notes:

Assumes 10 percent of interline flights are not coordinated.

Lower Bound Scenario assumes volume growth from 18 percent price reduction following creation of Open Aviation Area, where price elasticity of demand is equal to 1.0.

Upper Bound Scenario assumes volume growth from 28 percent price reduction following creation of Open Aviation Area, where price elasticity of demand is equal to 2.5.

[1]: Includes only routes with both volume and fare data. Based on national carriers' average number of passengers-per-employee, except for Belgium, Greece, and Sweden, which use the average European ratio.

[2] & [4]: High Ideal Airport Efficiency assumes 5,000 passengers-per-employee.

Low Ideal Airport Efficiency assumes 2,000 passengers-per-employee.

[3] = [1] + [2]

[5] = [1] + [4]

5. The Economic Benefits of Eliminating Output Restrictions

Existing bilateral agreements limit the number of flights and the set of market participants eligible to operate between the United States and four EU Member States: Greece, Ireland, Spain, and the United Kingdom. In effect these agreements impose an "output restriction" on air traffic between the United States and these four countries. An Open Aviation Area would eliminate such restrictions, allowing any US or EU carrier to offer service on routes between the United States and these countries.

Chapter 2 described in qualitative terms the distortionary effects of such restrictions, and the potential for an Open Aviation Area to increase output and consumer welfare by removing them. To quantify these benefits, in this chapter we examine the impact of previous aviation liberalisation measures that have removed output restrictions—specifically, the Open Skies agreements that the United States and individual EU Member States agreed to over the last decade. We focus on Open Skies agreements because they provide the best available evidence on the impact of transatlantic aviation liberalisation. As should be clear from this report, the partial liberalisation achieved through Open Skies bilaterals still imposes significant distortions on the aviation industry, and an Open Aviation Area therefore would produce major consumer and industry benefits above and beyond anything that an extension of the bilateral system could effect.

We begin by estimating statistically the impact of Open Skies agreements on the number of transatlantic passengers (traffic volume) and the number of transatlantic routes served (route structure, or "connectivity"). We then extrapolate from these statistical estimates to forecast the potential effect of removing the remaining output restrictions, as would occur under an Open Aviation Area. This is an inherently conservative approach, because of the broader liberalisation implied by an Open Aviation Area relative to Open Skies.

Our analysis focuses chiefly on the volume effects of Open Skies. It might seem more intuitive to put at least equal weight on price effects. However, only very limited data is available on transatlantic airfares. Moreover, assessment of price effects in aviation is inherently difficult because of the extraordinary complexity of airline pricing.[54] We therefore believe that volume is a more reliable and robust measure of economic impact.

5.1 Evidence from Previous Liberalisations: Impact on Traffic Volume

It is useful to examine evidence on transatlantic passenger volumes before and after Open Skies liberalisation, as expressed in Table 5.1. The table also indicates the year in which the relevant EU Member State entered into an Open Skies agreement with the United States, and compares passenger volumes for EU countries with Open Skies agreements and those without Open Skies agreements. Although France's Open Skies agreement with the United States was not completed until October 2001, after the period covered by our data, we treat France as an Open Skies country, because the United States and France signed an agreement transitioning to Open Skies in April 1998.

---

[54] A 1999 US Department of Transportation study did find that fares fell by quite a bit more for Open Skies countries than non-Open Skies countries over the 1992-1998 period. US Department of Transportation, *International Aviation Developments (First Report)*, 13-16.

Table 5.1

Transatlantic Traffic with Selected EU States (Thousands of Passengers)

Country	*Date of Open Skies Agreement*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*Annual Percent Increase (Decrease) [1]* *Pre-Open Skies Agreement*	*Post-Open Skies Agreement*
Open Skies Countries [2]														
Austria	1995	119	114	145	104	130	121	218	305	294	321	360	2.2%	18.5%
Belgium	1995	857	644	651	775	718	734	801	1,035	1,253	1,414	1,492	-4.3%	13.0%
Denmark	1995	631	482	523	530	505	440	432	472	401	407	437	-5.4%	-2.4%
Finland	1995	179	193	177	234	262	264	211	211	226	203	175	10.0%	-6.5%
France	1998	3,390	3,119	3,696	3,528	3,760	3,776	4,111	4,355	4,650	4,940	6,124	3.6%	12.0%
Germany	1996	4,477	4,456	5,188	5,425	5,539	5,877	6,036	6,610	6,819	7,281	7,745	5.6%	5.7%
Italy	1999	1,417	1,300	1,705	1,713	1,793	1,868	1,948	2,060	2,064	2,366	2,982	4.8%	20.2%
Netherlands	1992	1,582	1,639	1,838	2,240	2,533	2,704	3,113	3,579	4,255	4,623	4,614	7.8%	12.2%
Portugal	2000	280	240	309	312	293	264	221	284	329	363	388	2.9%	6.7%
Sweden	1995	380	318	301	257	261	229	228	228	319	381	416	-9.0%	8.1%
Total for Group		***13,312***	***12,505***	***14,531***	***15,118***	***15,795***	***16,277***	***17,320***	***19,138***	***20,610***	***22,300***	***24,733***	***4.4%***	***7.8%***
Non-Open Skies Countries														
Greece		233	136	239	282	362	400	426	359	363	322	342	3.9%	-
Ireland		567	477	609	632	732	760	960	998	1,026	1,437	1,587	10.8%	-
Spain		1,074	922	1,185	1,157	1,171	1,192	1,252	1,370	1,509	1,686	1,825	5.4%	-
United Kingdom		9,407	8,444	9,885	10,489	10,859	11,780	12,592	13,966	15,573	16,774	17,810	6.6%	-
Total for Group		***11,282***	***9,979***	***11,918***	***12,561***	***13,123***	***14,132***	***15,230***	***16,693***	***18,471***	***20,219***	***21,564***	***6.7%***	

Source:
DOT International T-100 Data
[1]: For Open Skies country group totals, assumes agreement date of 1995.
For Non-Open Skies countries, reflects growth from 1990 to 2000.
[2]: Transatlantic flight data between the US and Luxembourg are unavailable.

For each of the ten "Open Skies countries" shown in Table 5.1, the last two columns in the table compare the annual growth rates of transatlantic passenger volumes before and after Open Skies agreements were completed. Note that, with the exception of Finland, every country increased its growth rate of transatlantic passenger traffic with the United States after completing its Open Skies agreement with the United States.

This pattern is consistent with the theoretical expectation that liberalisation would increase passenger traffic. However, before concluding that Open Skies agreements produced the observed increase, one must consider whether other factors—*e.g.*, shifts in demand and supply due to changing economic conditions—might be responsible. As a first step in controlling for this possibility, we looked at passenger growth rates before and after 1995 for the six EU countries that signed Open Skies agreements during 1995-96, and compared them to the growth rates of the four non-Open Skies countries over the same period. If the increased growth rates after 1995 were attributable to factors other than aviation liberalisation, we would expect to see similar increases in passenger growth rates for Open Skies and non-Open Skies countries.

Figure 5.1 below shows the results of this comparison. For the Open Skies countries, there is a notable increase in annual growth rates of transatlantic passenger traffic after 1995. For the non-Open Skies countries, there is little change. This finding provides some support for the conclusion that the Open Skies agreements, as opposed to other factors, were responsible for the increased growth of passenger traffic.

Figure 5.1

Annual Growth Rates of Transatlantic Traffic for Selected EU States

Countries with Open Skies Agreements

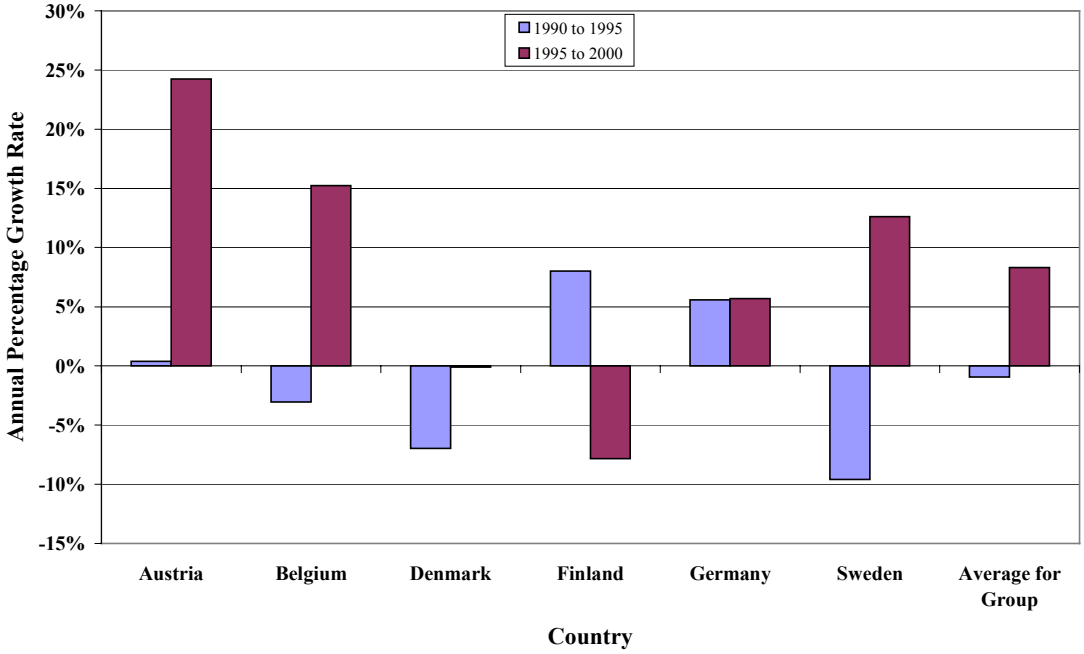
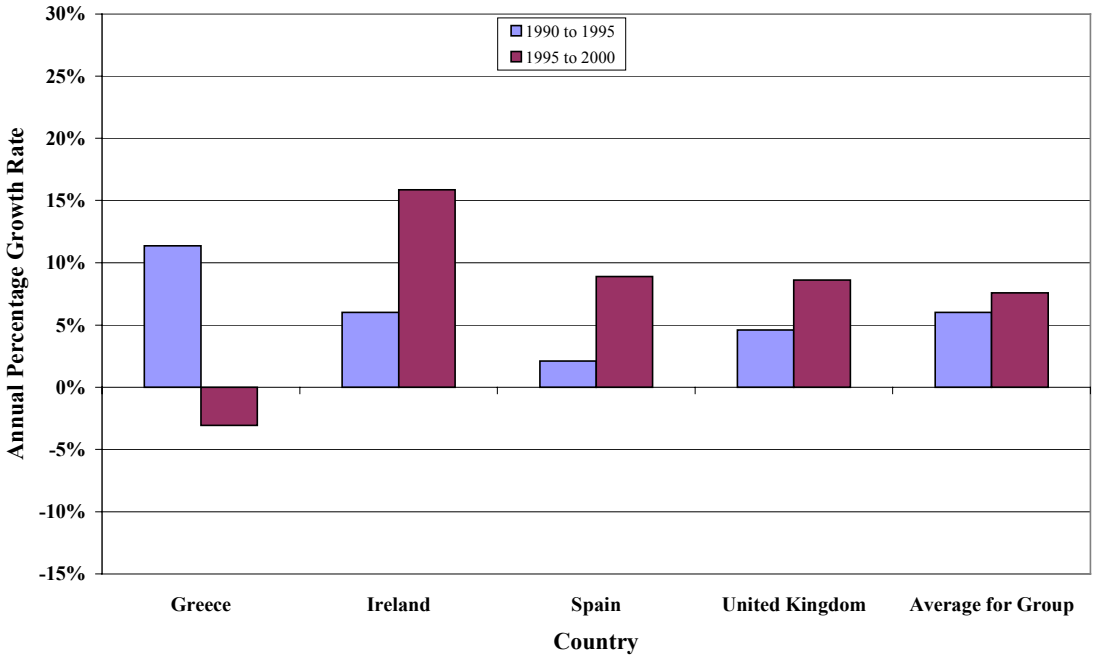


Figure 5.1, cont.

Countries without Open Skies Agreements



Regression Analysis

Figure 5.1 represents a first attempt to isolate the effect of changes in aviation policy from changes in other economic factors. We also implemented a more comprehensive and rigorous approach by applying the statistical technique of regression analysis. This technique was used to estimate how changes in demand and supply conditions affected transatlantic passenger volumes between the United States and specified EU countries. Any systematic change in passenger volumes after liberalisation that could not be associated with changes in market supply and demand conditions was attributed to the impact of liberalisation.

Specifically, we applied regression analysis to estimate the relationship between passenger volumes on a given EU-US route and relevant cost and demand factors, including airline costs, US disposable income, the EU country's gross domestic product (GDP), exchange rates, and route-specific effects.[55] For each EU country that entered into an Open Skies agreement with the United States, our analysis used data only from the period prior to the completion of the agreement.[56] This analysis allowed us to measure the relationship between passenger volumes and cost and demand factors, based on the economic behaviour observed in the period prior to Open Skies.

---

[55] Details of this analysis are provided in Appendix VI.

[56] Due to data availability and other issues surrounding the modelling of air transportation demand in northern European markets, our final analysis did not include Denmark, Finland, and Sweden. Initial analyses based on limited data for these countries indicated that our assessment of the aggregate impact of Open Skies liberalisation on passenger volumes is not substantively affected by their omission.

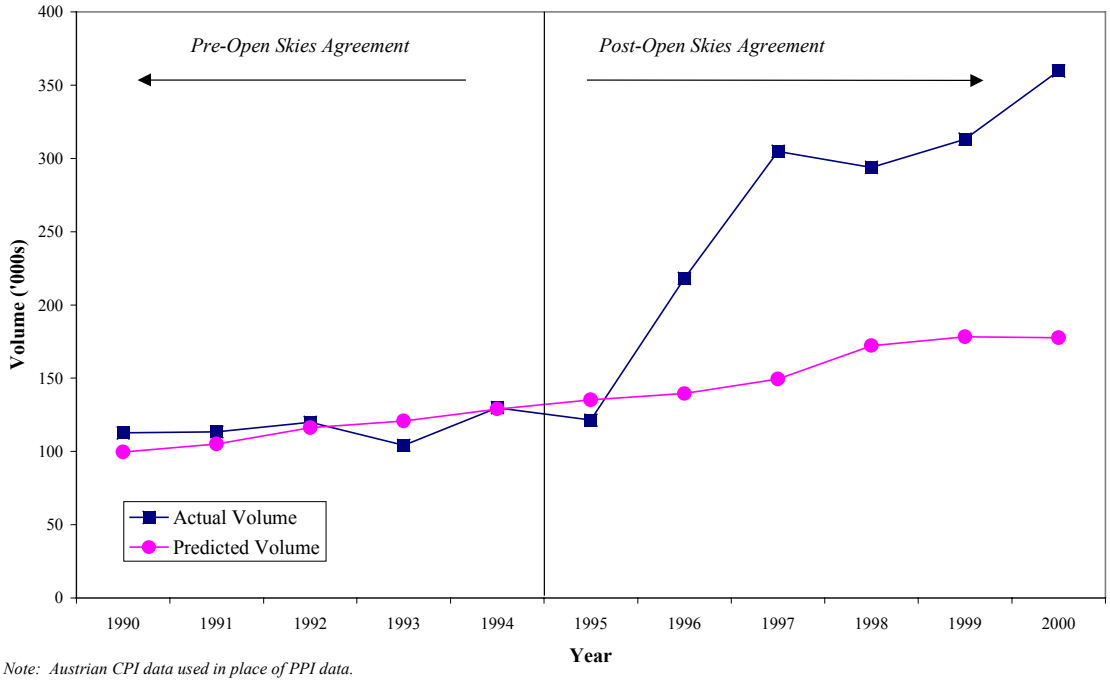
We then used this analysis to predict ("forecast") what passenger volumes would have been in the post-Open Skies years if the Open Skies agreement had not been signed. Comparison of actual passenger volumes with predicted passenger volumes provided an estimate of the impact of bilateral aviation liberalisation through Open Skies agreements.

Figure 5.2(a) through 5.2(g) illustrate the results of this analysis for Austria, Belgium, France, Germany, Italy, the Netherlands, and Portugal. Based on these figures, transatlantic passenger volumes between the United States and Austria were 102 percent higher in the year 2000 than they would have been in the absence of Open Skies. The results also indicate that the Netherlands experienced substantially greater passenger volumes under Open Skies than would have been predicted in the absence of Open Skies. All other countries in our analysis show much more modest impacts.

For Belgium and Germany, in particular, passenger volumes under Open Skies were often less than the volumes predicted in the absence of Open Skies. We offer an explanation for this behaviour below. Nevertheless, by the year 2000, every country except Germany showed higher passenger volumes under Open Skies than the volumes predicted in the absence of Open Skies.

Figure 5.2(a)

Predicted versus Actual Transatlantic Passenger Volume: Austria



Note: Austrian CPI data used in place of PPI data.

Figure 5.2(b)
Predicted versus Actual Transatlantic Passenger Volume: Belgium

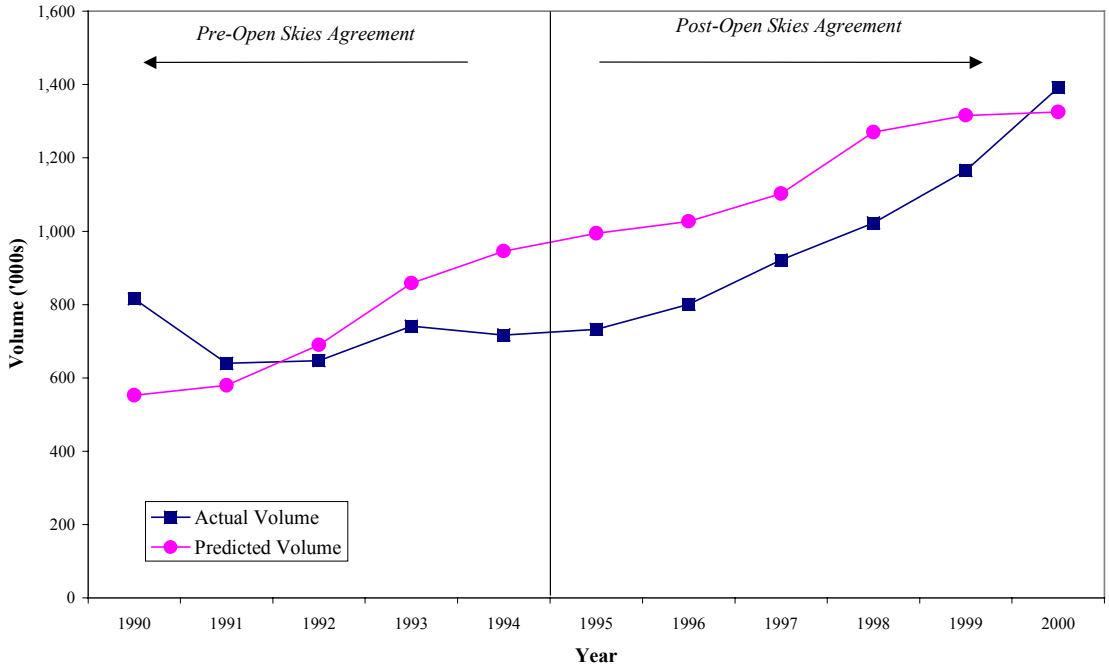


Figure 5.2(c)
Predicted versus Actual Transatlantic Passenger Volume: France

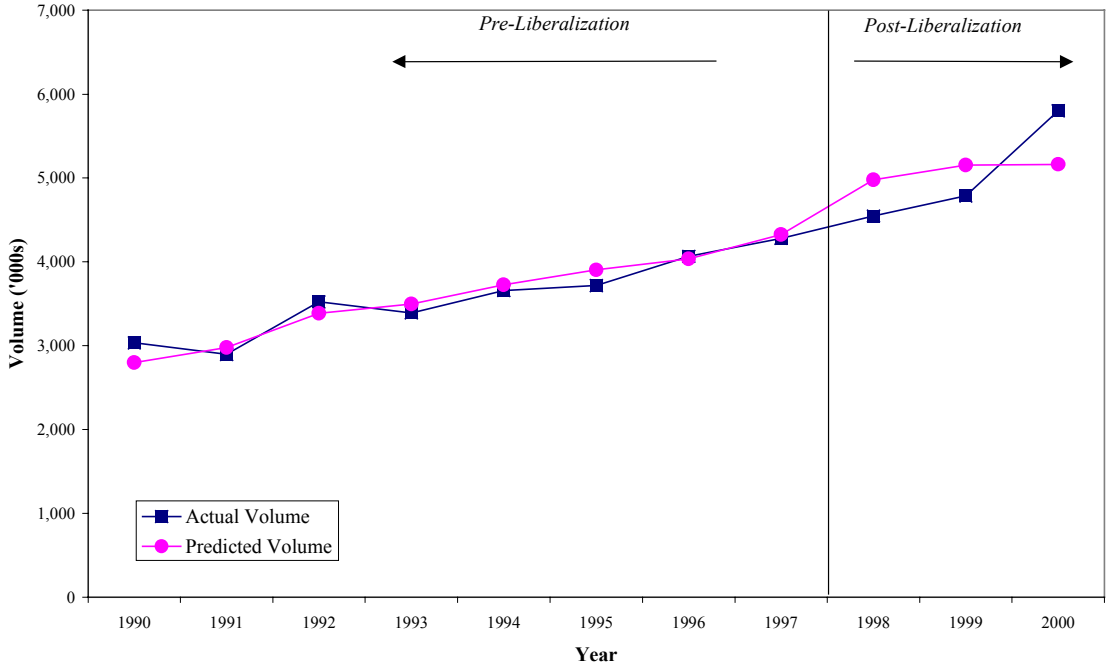
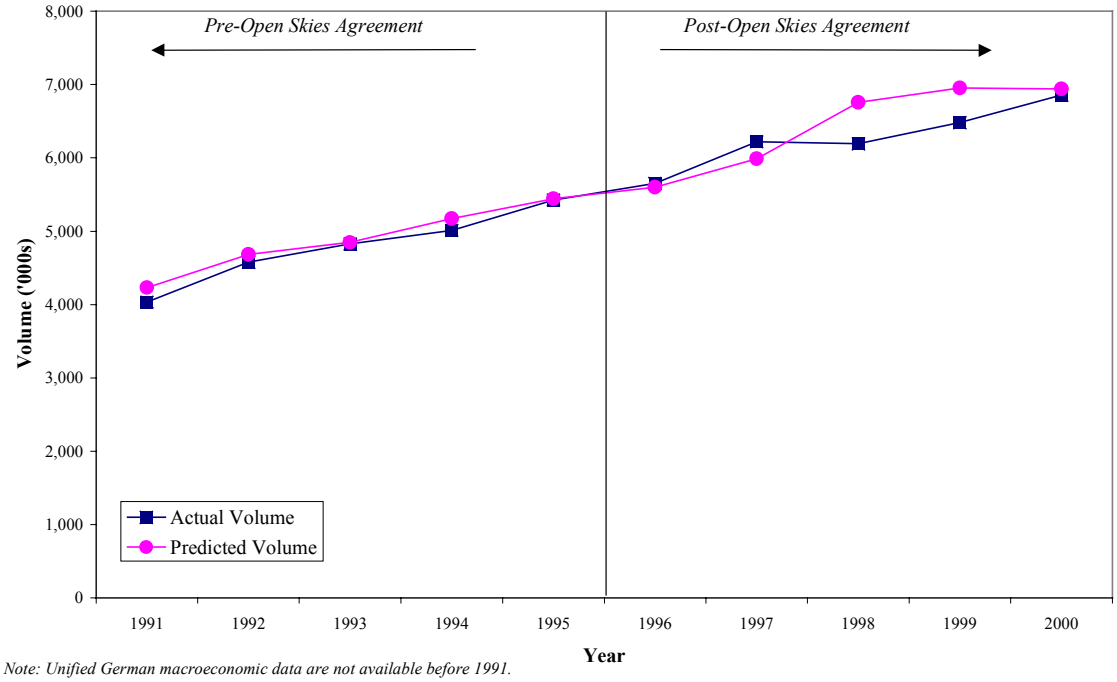


Figure 5.2(d)
Predicted versus Actual Transatlantic Passenger Volume: Germany



Note: Unified German macroeconomic data are not available before 1991.

Figure 5.2(e)
Predicted versus Actual Transatlantic Passenger Volume: Italy

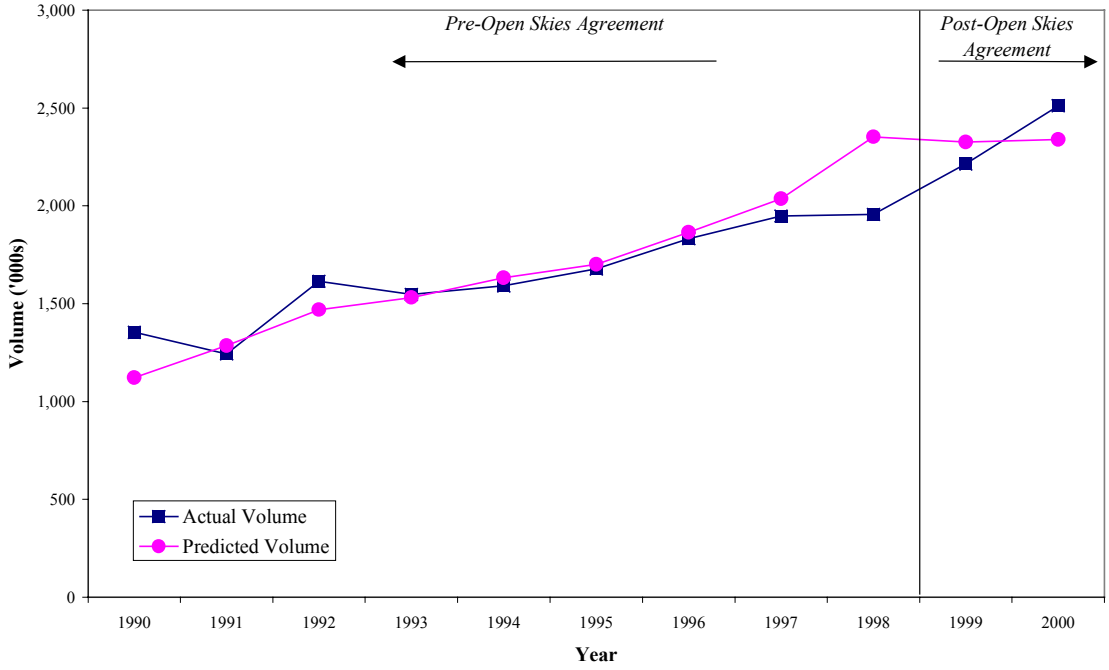


Figure 5.2(f)
Predicted versus Actual Transatlantic Passenger Volume: Netherlands

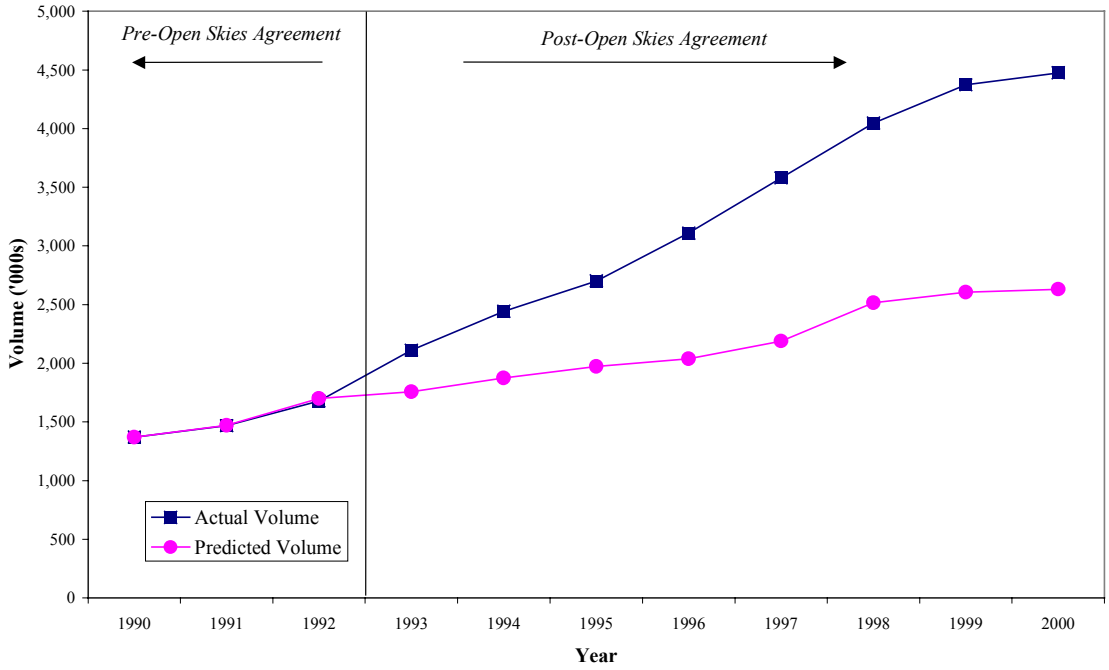


Figure 5.2(g)
Predicted versus Actual Transatlantic Passenger Volume: Portugal

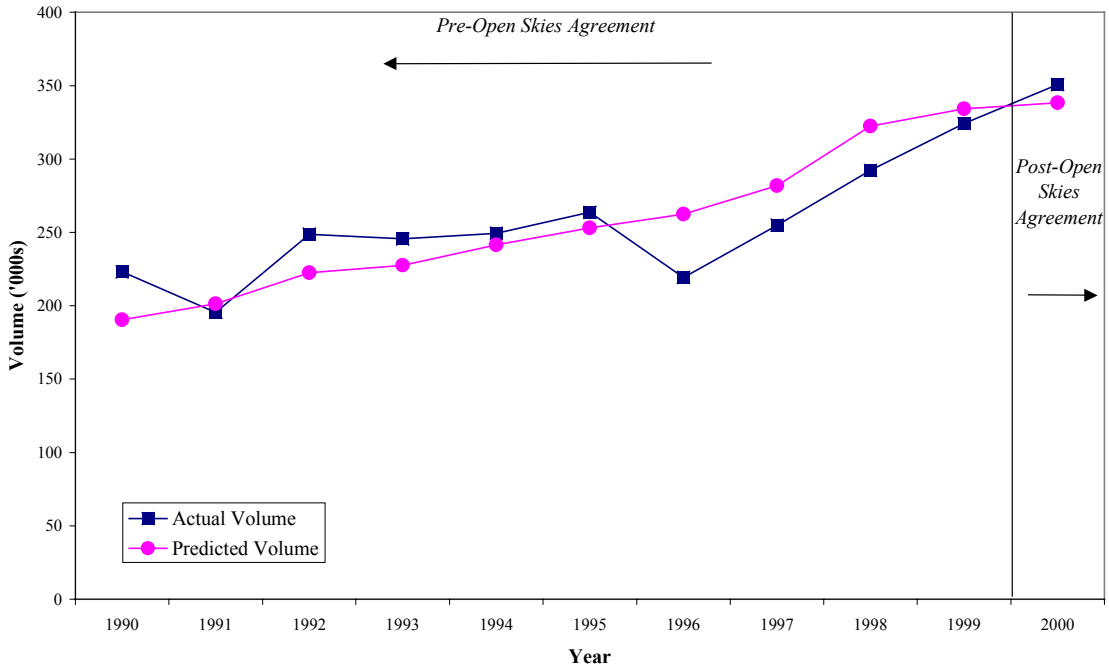


Table 5.2 provides estimates of the increased passenger volumes associated with the impact of liberalisation, as measured by the difference between the actual and predicted passenger volumes during the Open Skies period for each country.[57] Austria and the Netherlands experienced very large increases in passenger volumes attributed to Open Skies liberalisation, while the remaining countries except for Belgium showed either a modest increase or decrease under Open Skies. Belgium experienced a drop in passenger volumes of 14 percent over the Open Skies period, when comparing actual volumes with those predicted in the absence of Open Skies. In aggregate, however, we estimate that *partial aviation liberalisation through bilateral Open Skies agreements has produced a 10-percent increase in transatlantic passenger volumes.*

Table 5.2

Summary of Predicted versus Actual Transatlantic Passenger Volume ('000s)

Compares Predicted versus Actual for Countries with Open Skies Agreements over the Time Period

Country	*Actual Volume in Post-Open Skies Period* [1]	*Predicted Volume in Post-Open Skies Period* [2]	*Actual Less Predicted Volume*	
			Amount	*Percent of Predicted*
			[3] = [1] - [2]	[4] = [3] / [2]
Austria	1,586	926	660	71%
Belgium	5,896	6,845	-948	-14%
France	14,178	14,372	-194	-1%
Germany	31,404	32,239	-835	-3%
Italy	5,193	5,222	-28	-1%
Netherlands	27,232	17,984	9,248	51%
Portugal	429	415	14	3%
Total	***85,919***	***78,002***	***7,916***	***10%***

Source:
DOT International T-100 Data

The Timing of Liberalisation and Passenger Diversion

For purposes of this report, we are primarily interested in the aggregate impact of Open Skies agreements on EU Member States. That is so because the impact of Open Skies agreements on individual EU countries appears to be (in significant part) a function of timing—specifically, the order in which the agreements were signed—and the closely related issue of passenger diversion.

To elaborate, there is considerable economic evidence that a firm may gain a long-term competitive advantage if it is the first either to enter a market or to significantly expand its market presence ("first mover advantage"). Moreover, network industries often exhibit "path dependency" effects, where the first firm in a market that builds a network (*e.g.*, an airport hub) reaps an advantage over its rivals that continues to grow. These network advantages arise when consumers derive increased benefits from becoming part of a larger network, or the network owner finds it progressively less costly to expand the network as the network grows in size and coverage.

[57] If we examine passenger traffic only in the year 2000, actual passenger volumes are 15 percent higher in aggregate than volumes predicted in the absence of Open Skies.

First-mover and network advantages likely account for much of the 51 percent increase in transatlantic traffic to the Netherlands, the first EU Member State to sign an Open Skies agreement. Specifically, the first Open Skies agreement may have resulted in considerable diversion of passenger traffic to the Netherlands, especially as the KLM-Northwest alliance increased service frequency and expanded its connecting network through Amsterdam's Schiphol airport.[58] This diverted traffic may have come disproportionately from Belgium and Germany, which border the Netherlands.[59]

Because an Open Aviation Area would replace all existing US-EU bilateral agreements at the same time, individual EU Member States would not face "first-mover" concerns as to the timing of liberalisation (although the potential consolidation of European hubs in a liberalised market may raise other concerns). Thus, we use our estimate of the aggregate impact of Open Skies agreements on transatlantic traffic as a (lower bound) basis for calculating the impact of replacing current output-restricting bilateral agreements with an Open Aviation Area.

Conclusion

In our analysis, we estimate that the Open Skies liberalisation for all the countries under examination (including the transitional agreement between France and the United States) resulted in combined passenger volumes that were 10 percent higher than those predicted in the absence of Open Skies. This 10-percent figure is valid as an average for the entire period of Open Skies for these seven countries. Since we are treating these countries as a group, our results include any passenger diversion from one country to another within this group which stems from that country's Open Skies liberalisation.[60]

Our findings imply that *transatlantic aviation liberalisation leads to substantial increases in the volume of transatlantic traffic.* While the imperfect nature of the data and the difficulty in controlling for every economic influence on passenger volumes makes exact prediction with regression techniques difficult, our results are broadly consistent with the theoretical expectation that liberalisation should increase passenger traffic.[61]

---

[58] In addition, the eroding competitive position of Sabena in general may explain Belgium's losses of passenger traffic during the period of its Open Skies agreement with the United States.

[59] As we noted in Chapter 1, the Dutch government followed a conscious first-mover strategy. The Netherlands had been the first European country to sign an "open market" agreement with the United States in the late 1970s, and KLM was thought to have done well under that agreement. In the early 1990s, the Netherlands felt it had much to gain from further liberalisation, especially if it was the first European country to adopt Open Skies.

[60] Diversion would occur if, in the absence of Open Skies, the passenger still would have travelled between the European Union and the United States. For example, the passenger might have flown via a third country (*e.g.*, a Netherlands-US passenger connecting in Brussels instead of flying directly from Schiphol), or could have flown directly from a third country (*e.g.*, a Belgian passenger who would have flown directly from Belgium, rather than connecting through Schiphol). In addition, with tourist travellers, it is possible that lower airfares or more convenient flights could cause a US passenger to choose a different European destination (*e.g.*, the Netherlands instead of Belgium). This represents yet another form of diversion.

[61] We tried alternative specifications of our model, but the results did not change substantively.

Our findings are also consistent with the Department of Transportation studies we described in Chapter 1.[62] DOT found that Open Skies agreements and the alliances they fostered led to significant increases in transatlantic traffic. DOT also found that alliance members experienced greater increases in transatlantic traffic than non-allied airlines. This is broadly consistent with our findings regarding traffic diversion and the resulting advantage accrued by "first movers".

5.2 Evidence from Previous Liberalisation: Impact on Route Structure

Another expected result of transatlantic liberalisation would be increased "connectivity". Liberalisation should increase directly the number of transatlantic routes served, since it removes operating restrictions on those routes. It also should increase indirectly both transatlantic and intra-EU routings and flight frequencies by increasing the level of competition. Airlines are likely to introduce new transatlantic flights to win market share in a more competitive setting. When an EU Member State signs an Open Skies agreement, it also becomes more attractive as a connecting hub for passengers flying between the United States and other EU Member States, because of the increased transatlantic connections and lower fares. An increase in origin-to-destination transatlantic service is likely to entail an increase in capacity that feeds into European transatlantic gateways, leading to expansion of intra-EU city-pair service and possibly seat capacity.

To measure the impact of Open Skies on "connectivity", we examined the number of city-pairs served before and after Open Skies agreements were signed. Table 5.3 shows the number of city-pairs served between each EU Member State and the United States for the 1990-2000 period. Contrary to our expectations, the number of city-pairs served does not increase under Open Skies in any systematic way. Although some countries (notably Belgium and Germany) enjoyed significant increases in transatlantic connectivity after signing Open Skies agreements, these increases do not appear to have been entirely sustainable. Moreover, other countries (notably the Netherlands) did not immediately experience any significant increases in the city-pairs served under Open Skies, while Ireland and Greece increased their connectivity significantly without signing Open Skies agreements.

---

[62] US Department of Transportation, *International Aviation Developments (First Report)* and *(Second Report)*. Since alliances cannot obtain antitrust immunity without an Open Skies agreement in effect, we do not attempt to identify the impact of Open Skies absent the formation of alliances. Alliances with antitrust immunity are an endogenous feature of Open Skies agreements. As noted in Chapter 1, DOT also found that the biggest increase in transatlantic traffic occurred in "behind" and "beyond" markets that require a gateway connection. This is consistent with our prediction in Chapter 4 that increased transatlantic consolidation under an Open Aviation Area would lead to lower fares and more passenger traffic on EU-US interline routes.

Table 5.3

Summary of Transatlantic Routes over Time by Destination Country

Country	*Date of Open Skies Agreement*	*Transatlantic Routes in Year*											*Percent Increase Post-Open Skies Agreement [1]*
		1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	
Open Skies Countries													
Austria	1995	2	1	2	1	1	1	2	2	2	3	3	50%
Belgium	1995	5	3	5	6	5	5	5	10	11	10	7	63%
Denmark	1995	5	6	5	4	4	3	3	3	3	3	3	-31%
Finland	1995	2	2	1	2	2	2	2	2	1	1	1	0%
France	1998	22	18	18	18	16	15	15	15	15	16	18	13%
Germany	1996	29	30	33	32	30	31	33	37	39	37	35	22%
Italy	1998	7	9	10	11	11	11	11	10	10	11	15	22%
Netherlands	1992	10	10	10	11	11	11	11	12	19	17	15	10%
Portugal	1999	4	4	4	4	4	1	1	2	2	3	4	140%
Sweden	1995	5	4	2	2	2	2	2	2	2	2	2	0%
Total for Group		***91***	***87***	***90***	***91***	***86***	***82***	***85***	***95***	***104***	***103***	***103***	***6%***
Non-Open Skies Countries													*Percent Increase Pre-95 to Post-95 [2]*
Greece	N/A	1	1	1	2	2	2	3	2	2	2	3	40%
Ireland	N/A	3	3	4	4	6	7	7	7	7	11	10	50%
Spain	N/A	6	7	8	8	6	6	6	6	7	9	9	-14%
United Kingdom	N/A	29	29	28	32	34	32	34	34	33	35	37	7%
Total for Group		***39***	***40***	***41***	***46***	***48***	***47***	***50***	***49***	***49***	***57***	***59***	***10%***

Source:
DOT International T-100 Data
Notes:
Routes are identified as unique city pair combinations if scheduled passenger volume exists and the route is travelled upon at least six months out of the respective year.
[1]: Percentage increase reflects increase in routes between three years before and three years after Open Skies Agreement. For Open Skies country group totals, assumes agreement date of 1995.
[2]: For Non-Open Skies countries, compares three years prior to and after 1995.

We also examined intra-EU connectivity at EU cities serving as gateways for transatlantic travel to the United States. In particular, we examined the number of EU cities that connect with a given EU gateway city, as shown in Table 5.4. As with transatlantic connectivity, the results are inconclusive. With few exceptions, only modest growth occurs in the numbers of intra-EU city-pairs served, when comparing the three-year period before completion and the three-year period after completion of an Open Skies agreement. In addition, the growth rate in the number of intra-EU city-pairs served from transatlantic gateways in Open Skies countries does not differ substantially from the comparable growth rate for transatlantic gateways in non-Open Skies countries.

Table 5.4

Number of European City Pairs Served from Selected EU Gateways to the United States

Country	*Year of Open Skies Agreement*	*City Serving United States*	*Number of City Pairs*							*Percent Increase Post-Open Skies Agreement [1]*
			1992	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	
Open Skies Countries										
Austria	1995	Vienna	30	34	36	35	35	34	41	10%
Belgium	1995	Brussels	56	57	56	56	53	57	59	0%
Denmark	1995	Copenhagen	48	51	49	47	51	52	53	5%
Finland	1995	Helsinki	36	37	39	42	38	41	43	9%
Germany	1996	Berlin	34	40	44	40	43	45	49	14%
		Cologne	17	24	23	22	25	28	29	24%
		Dusseldorf	41	51	51	49	50	52	56	7%
		Frankfurt	63	66	68	67	67	70	72	6%
		Hamburg	31	37	42	38	42	40	42	5%
		Munich	48	57	56	56	61	65	68	18%
		Stuttgart	32	35	38	39	40	40	41	8%
		Total	*266*	*310*	*322*	*311*	*328*	*340*	*357*	*11%*
Netherlands	1992	Amsterdam	67	66	66	62	68	72	75	n/a
Sweden	1995	Stockholm	55	56	57	45	45	46	49	-17%
Total for Group			***558***	***611***	***625***	***598***	***618***	***642***	***677***	***8%***
Non-Open Skies Countries										*Percent Increase, Pre-95 to Post-95 [2]*
Greece	N/A	Athens	45	49	49	48	50	51	51	6%
Ireland	N/A	Dublin	29	29	32	30	33	33	36	13%
Spain	N/A	Barcelona	57	58	58	58	59	60	61	4%
		Madrid	55	57	58	59	61	61	61	8%
		Total	*112*	*115*	*116*	*117*	*120*	*121*	*122*	*6%*
United Kingdom	N/A	London	91	91	91	87	90	91	91	0%
Total for Group			***277***	***284***	***288***	***282***	***293***	***296***	***300***	***5%***

Sources:
DOT International T-100 Data and EU Published Fare Data
Notes:
Cities serving the United States were identified in the T-100 data set as any city having a route with scheduled passengers with a US city for at least six months during any given year between 1990 and 2000.
Intra-EU routes were identified in the Published Fare Data as any route with a European origin into the specified city.
[1]: Percentage increase reflects increase in routes between three years before and three years after Open Skies Agreement. For Open Skies country group totals, assumes agreement date of 1995.
[2]: For Non-Open Skies countries, compares three years prior to and after 1995.

The evidence as a whole therefore is at best inconclusive concerning the impact of Open Skies on connectivity. We suspect that the impact of liberalisation on connectivity might be seen more clearly if one examined alternative measures, rather than focusing purely on the number of city-pairs served. The latter is a crude measure that does not reflect changes in the frequency or capacity of flights serving a given city pair. Based on the increased passenger volumes associated with liberalisation, both frequency and capacity may have increased significantly. However, due to our lack of OAG flight schedule data before 1997, we were unable to investigate whether the scheduled transatlantic flights, or aircraft used on those flights, had changed with the implementation of Open Skies.

As mentioned previously, the US Department of Transportation report found evidence of increased connectivity as a result of Open Skies.[63] The report looked at the number of (indirect) markets served, total traffic through alliance hubs, and connecting traffic through alliance hubs. It found that all these measures of connectivity increased after Open Skies agreements were put in place (and alliances formed).

5.3 Implications for an Open Aviation Area

As we have shown above, past experience with aviation liberalisation suggests that a change from the existing regulatory environment to an Open Aviation Area would expand passenger volumes significantly on current output-restricted transatlantic routes. Below, we use the volume impact attributable to past Open Skies agreements to form a conservative estimate of the volume increase attainable on these routes under an Open Aviation Area.

Any expansion in passenger volumes would be generated primarily through a reduction in airfares (or improved service). The increase in passenger volume and decline in airfares generates two sources of increased consumer surplus:[64]

- Existing passengers enjoy increased surplus if the price they pay is reduced (or service is improved).[65]
- The price reductions stimulate additional traffic, and each new passenger enjoys a surplus.

Later in this section we estimate the size of this total increase in consumer surplus.

Volume Effects

To estimate the impact of eliminating output restrictions in the four non-Open Skies countries, we multiplied the volume of passenger traffic between the United States and these countries (in the year 2000) by our aggregate estimate of the passenger volume impact associated with Open Skies liberalisation (*i.e.*, 10 percent). Table 5.5 shows the associated results. By this conservative measure, we estimate that an Open Aviation Area would lead to an additional 2.2 million passengers annually travelling between the United States and these four countries.[66]

---

[63] US Department of Transportation, *International Aviation Developments (First Report)*, 8-12.

[64] See Appendix V for a definition of consumer surplus and the methodology used to calculate it.

[65] We recognise that, as a result of aviation liberalisation, consumers may benefit not only from lower fares, but also from improved service in the form of more frequent flights or flights between additional city pairs. Our consumer surplus analysis considers the value of improved service as equivalent to a price reduction that is the same for all consumers. This is an admittedly ambitious assumption, given that different consumers may attach different values to an improvement in service quality. However, to more reliably estimate gains in consumer surplus, one must perform an analysis that lies well beyond the scope of this study and depends on detailed information on the purchasing behaviour and personal attributes of individual consumers of transatlantic air transportation services.

[66] Our estimate assumes the availability of additional capacity to handle these volumes, which could be an issue in the United Kingdom.

Table 5.5

Estimated Volume Increases from Lifting of Output Restrictions for Non-Open Skies Countries

Country	*Actual Volume in 2000 ('000s) [1]*	*Predicted Percent Increase from Open Skies Agreement [2]*	*Predicted Volume in 2000 ('000s) [3] = (1 + [2]) x [1]*	*Change in Volume in 2000 ('000s) [4] = [3] - [1]*
Greece	342	10%	377	35
Ireland	1,587	10%	1,748	161
Spain	1,825	10%	2,011	185
United Kingdom	17,810	10%	19,617	1,807
Total	***21,564***	***10%***	***23,753***	***2,188***

Source:
DOT International T-100 Data

Consumer Welfare

Next, we analyse the impact on consumer welfare of the predicted volume increases arising from the lifting of output restrictions with liberalisation. We use the concept of consumer surplus discussed in Appendix V of this report (and previously applied in Chapters 3 and 4).

To estimate the change in consumer surplus, we must associate the predicted volume effects with corresponding changes in price. As in Chapters 3 and 4, we consider two potential estimates of the price elasticity of demand, specifically a "low" estimate of 1.0 and a "high" estimate of 2.5. Details of this calculation are presented in Appendix V. The results, summarised below in Table 5.6, show aggregate consumer benefits in the range of €0.6 billion to €1.5 billion annually.[67]

Some observers contend that the existing Spain-US bilateral agreement is, in practice, already as flexible as an Open Skies agreement. However, even if we exclude Spain from the above totals, the lifting of remaining output restrictions could produce annual consumer benefits of more than €1.3 billion.

Table 5.6

Predicted Increase in Consumer Surplus Due to Lifting of Output Restrictions (€ million/year)

Country	*Elasticity = 1.0*			*Elasticity = 2.5*		
	Gain Due to Price Decreases for Existing Customers	*Gain Due to Increased Traffic*	*Total Gains*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gains*
Greece	18	1	19	8	0	8
Ireland	95	5	99	39	2	41
Spain	106	5	112	44	2	46
United Kingdom	1,181	58	1,239	486	24	510
Total	*1,401*	*69*	*1,469*	*577*	*29*	*605*

Source:
DOT International T-100 Data and BAe Database
Notes:
Calculated for routes where volume and bidirectional fares are both available.
Utilizes January 2001 fares.

[67] A higher elasticity of demand implies that a smaller price reduction is needed to generate a given increase in sales volume. Therefore, consumer surplus is less in the high elasticity case. (See footnote 39.)

5.4 Employment Effects

To calculate the increase in employment from eliminating output restrictions, we used the same approach as that used in Chapter 4. Specifically, we applied the passenger-to-employee ratios for airlines and airports to the volume increases in each of the four EU countries and the United States.

Table 5.7 shows our results. We estimate that removing the remaining output restrictions will increase airline and airport employment in the four EU countries by a modest amount, only 2,000 to 2,700 additional jobs.[68] For the United States, the employment effect also would be modest, ranging from approximately 1,400 to 2,000 additional jobs.

Table 5.7

Employment Impact of Removing Output-Restricted Bilaterals (Number of Employees)

		High Ideal Airport Efficiency		*Low Ideal Airport Efficiency*	
Region	*Estimated Increase in Airline Employment [1]*	*Estimated Increase in Airport Employment [2]*	*Combined Increase in Employment [3]*	*Estimated Increase in Airport Employment [4]*	*Combined Increase in Employment [5]*
European Union	1,578	436	2,014	1,092	2,670
United States	942	437	1,379	1,094	2,036

Sources:
Passenger volume data is from the US DOT T-100 International Data.
Airline passenger and employee data from Credit Suisse First Boston Equity Research, Global Airlines: The Global Alliances (Credit Suisse First Boston, May 24, 2002).
High and low airport efficiency from Ofelia Betanor and Roberto Rendeiro, "Regulating Privatized Infrastructures and Airport Services," working paper WPS 2180, World Bank Institute (1999): 55.
Notes:
[1]: Assumes growth of 10 percent in traffic volume after implementation of Open Aviation Area. Based on national carrier's average number of passengers-per-employee for Ireland, Spain, and the United Kingdom. Estimates for Greece use the average European ratio.
[2] and [4]: Assumes growth of 10 percent in traffic volume after implementation of Open Aviation Area. High Ideal Airport Efficiency assumes 5,000 passengers-per-employee. Low Ideal Airport Efficiency assumes 2,000 passengers-per-employee.
[3] = [1] + [2]
[5] = [1] + [4]

5.5 Conclusions

Existing bilateral agreements limit the number of flights and the set of market participants eligible to operate between the United States and four EU Member States: Greece, Ireland, Spain, and the United Kingdom. An Open Aviation Area would remove these output restrictions, allowing any US or EU carrier to offer service between the United States and these countries.

Economic theory predicts that the removal of such restrictions can enhance competition and increase consumer welfare. Evidence from previous liberalisation of transatlantic aviation, namely the Open Skies agreements between the United States and EU Member States, confirms these predictions. Based on a statistical analysis that controlled for changes in cost and demand factors unrelated to liberalisation, we found that Open Skies agreements were associated with *significant increases in transatlantic passenger traffic—10 percent in aggregate for the countries examined.*

[68] The same caveats apply as in Section 4.2.

The benefits of an Open Aviation Area can be expected to be at least as great as those produced from Open Skies agreements, since an Open Aviation Area involves a more complete liberalisation. Extrapolation from our Open Skies analysis implies that an Open Aviation Area would produce *traffic increases of 10 percent between the United States and the four non-Open Skies countries—or about 2.2 million passengers annually*. The corresponding *impact on consumer welfare would be as high as €1.5 billion annually*, while the *increases in employment would range between 2,000 to 2,700 additional employees in the four European countries and 1,400 to 2,000 new employees in the United States*.

6. Total Economic Impact of an Open Aviation Area

The last three chapters quantified the economic benefits associated with allowing more efficient carriers to replace less efficient carriers, achieving pricing synergies on interline routes through transatlantic consolidation, and eliminating output restrictions on transatlantic routes between the United States and Greece, Ireland, Spain, and the United Kingdom. In this chapter, we aggregate our quantitative estimates of these benefits to produce indicative estimates of the total economic impact of an Open Aviation Area on three measures: passenger volume, consumer surplus, and industry employment. In addition, we estimate the impact of increased demand for air travel on output in other industries. Last, we consider the pitfalls involved in combining the estimates from prior chapters of this report, specifically the risk of "double counting" the gains from an Open Aviation Area.

6.1 Traffic Volume

Each of the last three chapters identified a major source of increased passenger volumes under an Open Aviation Area: cost savings (*i.e.*, efficiency gains) that are passed on to consumers in the form of lower airfares (Chapter 3), pricing synergies that produce lower prices on transatlantic interline routes (Chapter 4), and lower fares and increased output that result from eliminating restrictive bilateral agreements between the United States and non-Open Skies EU Member States (Chapter 5). In each chapter, we quantified the impact that the relevant source would have on passenger volumes.

Here, we combine our three quantitative estimates to calculate the combined impact of an Open Aviation Area on passenger volumes. As in the original analysis, we make these calculations using two alternative measures of price elasticity of demand. Table 6.1 summarises our results. We estimate that passenger volumes on transatlantic routes would increase by 4.1 million to 11.0 million passengers per year under an Open Aviation Area. For intra-EU routes, we estimate that passenger volumes would increase by 13.5 million to 35.7 million passengers per year.

Table 6.1

Total Estimated Increase in Passenger Volume ('000s/year)

Effect	*Area*	*Source*	*Elasticity=1.0*	*Elasticity=2.5*
Cost Savings	Transatlantic	Table 3.5	968	3,169
Pricing Synergies	Transatlantic	Table 4.1	975	5,654
No Output-Restricting Bilaterals	Transatlantic	Table 5.5	2,188	2,188
Subtotal			*4,131*	*11,011*
Cost Savings	Intra-EU	Table 3.5	13,527	35,720
Total			***17,658***	***46,731***

Notes:
Pricing Synergies entries for Elasticity = 1.0 case assumes 18 percent price decrease.
Pricing Synergies entries for Elasticity = 2.5 case assumes 28 percent price decrease.

These are significant increases. Total transatlantic traffic in 2000 was 46.3 million passengers (see Table 5.1), so our estimate represents an increase of somewhere between 9 percent and 24 percent. For intra-EU flights, where traffic in the same year was

264 million passengers, our estimate translates into an increase of 5 percent to 13.5 percent.

6.2 Consumer Surplus

The same three sources were the basis for our estimates in Chapters 3 through 5 of the impact of an Open Aviation Area on consumer surplus. Here, we aggregate these estimates to calculate the overall increase in consumer surplus, as shown in Table 6.2.

Table 6.2

Total Estimated Increase in Consumer Surplus (€ million/year)

			Elasticity = 1.0			*Elasticity = 2.5*		
Effect	*Area*	*Source*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gain*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gain*
Cost Savings	Transatlantic	Table 3.6	621	41	662	621	158	778
Pricing Synergies	Transatlantic	Table 4.1	571	59	629	888	458	1,347
No Output-Restricting Bilaterals	Transatlantic	Table 5.6	1,401	69	1,469	577	29	605
Subtotal			*2,592*	*168*	*2,760*	*2,085*	*645*	*2,730*
Cost Savings	Intra-EU	Table 3.6	2,268	83	2,351	2,268	216	2,483
Total			***4,860***	***251***	***5,111***	***4,353***	***860***	***5,213***

Notes:
Pricing Synergies entries for Elasticity = 1.0 case assumes 18 percent price decrease.
Pricing Synergies entries for Elasticity = 2.5 case assumes 28 percent price decrease.

We estimate that the gain to consumers from an Open Aviation Area would total approximately €5.1 billion to €5.2 billion per year. Just over half of this amount—€2.7 billion to €2.8 billion per year—would go to passengers on transatlantic flights, while the remaining €2.3 billion to €2.5 billion per year would benefit passengers inside Europe. Recall that an Open Aviation Area would generate consumer surplus both to existing passengers (who would enjoy lower fares because of liberalisation) and new passengers. Table 6.2 shows that most of the benefits of an Open Aviation Area would go to existing passengers, but that new passengers would get a meaningful share, particularly under the scenario in which passenger demand is highly responsive to price.

Of the overall increase in consumer surplus, the lion's share—between €3.1 billion and €3.8 billion annually—represents "combined efficiency improvement"—*i.e.*, gains to consumers that do not, by themselves, involve any reduction in airline profits.[69] There are two components of combined efficiency improvement under an Open Aviation Area. The first is the cost savings from increased efficiency (both transatlantic and intra-EU) that was analysed in Chapter 3. This is a source of combined efficiency improvement because airline profits are unaffected if a given cost reduction is passed on to consumers in full. Second, all of the benefits to new passengers represent combined efficiency improvement almost by definition, since a firm's profits generally improve if its business expands.[70]

[69] For example, in the low elasticity case, combined efficiency improvement equals cost savings of €2,889 million (*i.e.*, €621 million + €2,268 million) and gains due to increased traffic of €252 million (*i.e.*, €41 million + €59 million + €69 million + €83 million), totalling €3,141 million.

[70] Combined efficiency improvement is similar, but not exactly equivalent, to economists' notion of "social welfare". When viewed in this "partial-equilibrium" context, social welfare comprises the combined gains to both consumers and producers of air transportation services.

6.3 Direct Employment Effects

Table 6.3 summarises our estimates from Chapters 4 and 5 of the direct effects of an Open Aviation Area on airline and airport employment. Recall that in Chapter 3 we did not attempt to quantify the employment impact, because cost savings from increased efficiency, the focus of that chapter, could have either a positive or a negative effect on jobs. (Increased efficiency tends to depress employment because carriers need fewer resources to provide the same number of flights. But insofar as cost savings get transferred to consumers in the form of lower airfares, passenger volumes would increase leading to higher employment.)

Thus, without any associated change in passenger volumes, a reduction in *price*, by itself, represents a mere transfer from producers to consumers, leading to no change in total social welfare. However, a *cost* reduction represents a gain to producers that may be subsequently transferred to consumers in the form of lower prices. Increased passenger traffic is potentially beneficial to both consumers and producers: additional consumers receive value from air travel that is potentially higher than the price they pay for the travel (*i.e.*, consumer surplus) and producers potentially provide air transportation service to those additional passengers at a cost lower than the price that they receive (*i.e.*, producer surplus). Because we lack detailed cost information to measure the producer surplus earned from additional passenger traffic, we have attempted to measure only the increased consumer surplus from additional traffic. Thus, our estimate of combined efficiency improvement understates the social welfare gains from an Open Aviation Area.

Table 6.3

Total Estimated Increase in Direct Employment (Number of Employees)

Lower Bound Scenario

				High Ideal Airport Efficiency		*Low Ideal Airport Efficiency*	
Region	*Effect*	*Source*	*Estimated Increase in Airline Employment [1]*	*Estimated Increase in Airport Employment [2]*	*Combined Increase in Employment [3]*	*Estimated Increase in Airport Employment [4]*	*Combined Increase in Employment [5]*
European Union	Pricing Synergies	Table 4.2	600	188	788	481	1,081
	No Output-Restricting Bilaterals	Table 5.7	1,578	436	2,014	1,092	2,670
	Total		**2,178**	**624**	**2,802**	**1,573**	**3,751**
United States	Pricing Synergies	Table 4.2	415	194	609	487	902
	No Output-Restricting Bilaterals	Table 5.7	942	437	1,379	1,094	2,036
	Total		**1,357**	**631**	**1,988**	**1,581**	**2,938**

Upper Bound Scenario

				High Ideal Airport Efficiency		*Low Ideal Airport Efficiency*	
Region	*Effect*	*Source*	*Estimated Increase in Airline Employment [1]*	*Estimated Increase in Airport Employment [2]*	*Combined Increase in Employment [3]*	*Estimated Increase in Airport Employment [4]*	*Combined Increase in Employment [5]*
European Union	Pricing Synergies	Table 4.2	3,523	1,124	4,647	2,820	6,343
	No Output-Restricting Bilaterals	Table 5.7	1,578	436	2,014	1,092	2,670
	Total		**5,101**	**1,560**	**6,661**	**3,912**	**9,013**
United States	Pricing Synergies	Table 4.2	2,433	1,130	3,563	2,826	5,259
	No Output-Restricting Bilaterals	Table 5.7	942	437	1,379	1,094	2,036
	Total		**3,375**	**1,567**	**4,942**	**3,920**	**7,295**

Sources:
Passenger volume data is from the US DOT T-100 International Data.
Airline passenger and employee data from Credit Suisse First Boston Equity Research, Global Airlines: The Global Alliances (Credit Suisse First Boston, May 24, 2002).
High and low airport efficiency from Ofelia Betanor and Roberto Rendeiro, "Regulating Privatized Infrastructures and Airport Services," working paper WPS 2180, World Bank Institute (1999): 55.
Notes:
See notes to Tables 4.2 and 5.7.

As Table 6.3 shows, the combined employment increase attributable to improved pricing synergies and the elimination of output-restricting bilateral agreements is estimated to range from 2,800 to 9,000 employees in the EU aviation industry. The increased employment in the United States from both effects is estimated to range from 2,000 to 7,300 additional employees. *This would represent a one percent to three percent increase in total EU aviation industry employment, and a one percent to two and one-half percent increase in US aviation industry employment.*

6.4 Revenue Impact on Directly Related Industries

In addition to its impact on the aviation industry, an Open Aviation Area, by increasing air travel, would benefit a large number of other industries in Europe and the United States. In measuring these effects, we take a conservative approach, limiting our analysis to those industries that supply direct inputs to aviation, such as aircraft and aircraft parts, fuel, maintenance, advertising, and computer equipment. Hence, we ignore any impact of an Open Aviation Area on services that are purchased along with air transportation, such as hotels, restaurants, recreation, and other activities associated with business and tourist travel.

To estimate the impact of increased air travel on industries that supply the aviation sector, we use data that measure "input-output" relations in air transportation. These data

describe both "direct" and "direct-plus-indirect" shares of various inputs used to create one euro (or one dollar) of air transportation services.[71] The direct shares represent the cost of inputs into air transportation, expressed as a percentage of air transportation revenue. They also include the "value added" within the air transportation industry, which represents payments to labour and capital in the industry. In total, the direct input shares necessarily sum to one.

By contrast, the direct-plus-indirect input shares represent the total impact that increased demand for air transportation has on all industries, considering that increased demand for inputs into air transportation (*e.g.*, aircraft and parts) creates increased demand in other industries (and so on). As a result of these direct-plus-indirect effects, a €1 increase in air transportation demand creates more than €1 of additional output. The combined direct-plus-indirect shares represent the increase in output in each industry that arises from increased demand for air transportation after all economic interactions are considered. Each industry's share represents the increase in that industry's output, expressed as a percentage of the initial increase in air transportation revenue. Since a €1 increase in air transportation demand creates more than €1 of overall economic output, the shares add up to a number in excess of one. In fact, based on the input-output accounts for the United States, a €1 increase in air transportation demand generates an additional €1.84 in output across all industries.

We multiply our estimates of the increased demand for air transportation under an Open Aviation Area by the direct and direct-plus-indirect input shares, thereby obtaining estimates of the direct and direct-plus-indirect increases in output in each industry. Table 6.4 presents our estimates of the total increase in output across all industries, while details underlying our calculations are provided in Appendix VII.

Table 6.4

Revenue Impact on Directly Related Industries (€ million/year)

	Elasticity = 1.0			*Elasticity = 2.5*		
Effect	*Revenue*	*Direct Economic Impacts*	*Direct-Plus-Indirect Economic Impacts*	*Revenue*	*Direct Economic Impacts*	*Direct-Plus-Indirect Economic Impacts*
Pricing Synergies	571	571	1,053	2,908	2,908	5,365
No Output-Restricting Bilaterals	1,401	1,401	2,584	1,484	1,484	2,738
Total	***1,971***	***1,971***	***3,637***	***4,392***	***4,392***	***8,103***

Notes:
Pricing Synergies entry for Elasticity = 1.0 assumes 18 percent price decrease.
Pricing Synergies entry for Elasticity = 2.5 assumes 28 percent price decrease.

As can be seen from Table 6.4, we have calculated this effect only from increases in air transportation revenue (*i.e.*, final demand) identified in Chapters 4 and 5. We have not included effects from Chapter 3, where we calculated cost savings that might be achieved under an Open Aviation Area. If the airlines were to achieve cost savings through liberalisation, it is likely these gains would reduce the need for certain inputs. Improved efficiency implies the airlines would be able to provide the same services with fewer

[71] These estimates are based on the 1996 Annual Input-Output Accounts for the United States. Sumiye O. Okubo, Ann M. Lawson, and Mark A. Planting, "Annual Input-Output Accounts of the U.S. Economy, 1996," *Survey of Current Business* (January 2000): 37-86. Data for the European Union were not available, but the US figures provide a reasonably indicative estimate.

inputs. However, an opposite effect also may arise. If the cost savings were passed on to customers in the form of lower prices, it would lead to greater passenger volume, which would stimulate demand for inputs into air transportation. The net effect is once again uncertain, as it was in the case of the employment impact associated with cost savings under an Open Aviation Area. For this reason, we have not attempted to calculate any impact from cost savings on the output of industries that supply air transportation.

Table 6.4 indicates there would be approximately a €2.0 billion to €4.4 billion direct increase in demand due to improved pricing synergies and the elimination of output-restricting bilateral agreements. This would translate into a €3.6 billion to €8.1 billion per year direct-plus-indirect increase in output in all industries that supply the air transportation industry, once all economic interactions are considered.

We also have broken down these direct-plus-indirect effects by key industries that benefit from increased output. We have separated the impacts into the effects from improved pricing synergies and those from eliminating output-restricting bilateral agreements. These effects are described below in Table 6.5.

Table 6.5

Total Estimated Increase in Direct-Plus-Indirect Economic Activity (€ million/year)

	Elasticity = 1.0			*Elasticity = 2.5*		
Sector	*Pricing Synergies*	*No Output-Restricting Bilaterals*	*Total*	*Pricing Synergies*	*No Output-Restricting Bilaterals*	*Total*
Petroleum refining and related products	55	135	190	280	143	422
Aircraft and parts	20	48	67	99	51	150
Air transportation	578	1,419	1,997	2,946	1,504	4,449
Pipelines, freight forwarders, and related services	69	170	239	352	180	532
Computer and data processing services, including own-account software	22	54	76	112	57	169
Other business and professional services, except medical	24	59	83	122	62	184

Notes:
Pricing Synergies entry for Elasticity = 1.0 assumes 18 percent price decrease.
Pricing Synergies entry for Elasticity = 2.5 assumes 28 percent price decrease.

Based on the analysis contained in this study, these numbers represent a probable upper bound on direct-plus-indirect output effects associated with an Open Aviation Area. As mentioned above, the cost savings achieved by replacing less efficient airlines with more efficient airlines (or by less efficient airlines adopting industry "best practices") would likely be reflected in reduced demand for inputs of industries that supply the air transportation sector.

In addition, these numbers represent merely industry output increases associated with increased passenger volumes, and should *not* be construed as additions to our earlier estimates of consumer surplus or, more specifically, "combined efficiency improvement". Given that resources are likely taken from other industries in order to produce increased output of air transportation and its associated inputs, these estimates do not constitute an additional source of increased economic benefit. Instead, they merely represent a means of identifying the industries that are likely to benefit from increased demand for air transportation under an Open Aviation Area.

Note that we lack sufficient data to apportion the increases in industry output between producers in the European Union, the United States, and elsewhere. For example, the estimated output increase in "aircraft and parts" from an Open Aviation Area would be

between €67 million and €150 million per year. However, whether this increase accrues to Airbus, Boeing, or other manufacturers is inherently difficult to determine. Hence, we refrain from allocating these gains by country.

6.5 Risk of "Double Counting"

The three sources of benefits from an Open Aviation Area that we have aggregated in this chapter are largely but not entirely distinct. It is possible that a gain attributed to one of the three sources might also show up as a gain from another source. If so, we would be "double counting" the benefits of Open Aviation.[72]

We took several steps to avoid double counting. First and foremost, as noted above, we identified for quantification three sources of efficiency gain that are (primarily) distinct by definition: cost savings from increased efficiency (Chapter 3), pricing synergies on transatlantic interline routes (Chapter 4), and elimination of output restrictions on non-Open Skies routes (Chapter 5). Stated differently, we subdivided the effects of an Open Aviation Area into economic concepts that are, by and large, mutually exclusive.

Second, we constructed our analysis of individual sources so as to avoid double-counting. For example, in measuring the pricing synergies from improved price coordination on transatlantic interline routes (Chapter 4), we ignored routes covered by the output-restricted bilateral agreements, which are the focus of Chapter 5.

More broadly, we applied a philosophy of conservatism that extended well beyond the methodological issue of double counting. For example, we explicitly avoided quantifying key benefits because of difficulties in reliably estimating them. These benefits include:

- Cost savings from transatlantic mergers or other forms of consolidation
- Consumer benefits from improved service as a result of enhanced coordination among interlining carriers
- Expansion of routes and service frequency within the European Union and the United States as a result of increased transatlantic passenger volumes

The analysis presented in Chapters 3 through 5 also adhered to this principle of conservatism. For example, in Chapter 3, we used medium-cost, rather than low-cost, carriers as our benchmark, so as not to overstate the potential for airline cost savings. In Chapters 4 and 5, we used past gains from Open Skies agreements and the associated transatlantic alliances as our basis for estimating the benefits of an Open Aviation Area—

---

[72] For example, in Chapter 5 we estimated the increased passenger volumes associated with Open Skies agreements, and used them as a proxy for the volume increases that would be expected to arise if the remaining output-restricting bilateral agreements were replaced with an Open Aviation Area. However, some of the increased volumes under Open Skies may have resulted from airline cost savings (due to the increased competition). If so, we may have counted those increased passenger volumes in both Chapter 5 (removal of output-restricted agreements) *and* Chapter 3, where we calculated the gains from cost savings. However, most of the increase in passenger volumes attributed to Open Skies in Chapter 5 was a consequence of traffic on new city-pair routes associated with Open Skies, and therefore not a result of cost savings on existing routes. In addition, as we show in Chapter 3, large cost savings are still achievable in the airline industry even after liberalisation through Open Skies agreements, so cost savings cannot have been the cause of the entire 10 percent volume increase estimated in Chapter 5.

an inherently conservative approach because of the greater liberalisation that an Open Aviation Area would permit.

7. Would an Open Aviation Area Jeopardise US National Security?

7.1 Introduction

The primary goal of an EU-US Open Aviation Area is to enhance the economic efficiency of the international aviation sector. However, economic efficiency is not the only objective of public policy affecting aviation. Indeed, several of the remaining economic restrictions on international aviation were imposed at least partly to protect a separate and sometimes competing policy objective—namely, national security. These restrictions include limits on foreign ownership and control of national airlines, prohibitions on cabotage, and "fly national airline" requirements. Thus, it is important to consider whether liberalisation can be reconciled with the national security needs of US and European national governments.

Specifically, some in the US Department of Defense (DoD) are concerned that international aviation liberalisation could be a threat to the Civil Reserve Air Fleet (CRAF), a critical component of America's military readiness. CRAF consists of more than 900 US commercial aircraft that DoD can draw on to augment its military airlift capability in a defence emergency. American air carriers contractually pledge these aircraft, and the crew to operate them, in exchange for a share of the federal government's peacetime transportation business. Some DoD officials express concern that allowing foreign ownership and control of US air carriers could jeopardise the military's dependable access to this emergency capability. A second DoD concern is that elimination of market access restrictions would necessitate a change in the way CRAF is financed, making the program far more costly to the department's budget.

This chapter of the report analyses what international aviation liberalisation would mean for the CRAF program. First, we look in detail at the structure and operation of CRAF, including problems that the program currently faces or may face in the future. Second, we look at how elimination of statutory restrictions on foreign ownership of US airlines would affect CRAF, and identify several policy mechanisms that would help ensure DoD's access to commercial airlift. Third, we look at the importance of market access restrictions (*e.g.*, Fly America requirements) in financing the CRAF program, the impact of these restrictions on the cost of commercial aviation services to the US government, and the likely effect of eliminating the restrictions.

7.2 The CRAF Program

History and Purpose

DoD established CRAF in 1952, after experiences in World War II, the Berlin Airlift, and the Korean War demonstrated that US military airlift capability alone was not sufficient for all contingencies. Although US commercial air carriers played a major role in augmenting military airlift in all of those conflicts, their mobilisation was not without

problems.[73] CRAF was created to expedite the transition of commercial aircraft and their crews into military service in a future defence emergency.

Ironically, the military resisted relying on civil aircraft in the early years of CRAF. Ostensibly to keep military crews trained for war, the Navy and the Air Force effectively ran their own airlines during much of the 1950s, providing scheduled service between domestic and overseas military bases for military and civilian personnel and their families. For example, in the Atlantic, the "Blue Plate Special" operated between Paris and Andrews Air Force Base outside of Washington, DC, and featured full galley and cocktail service. However, defence officials gradually realised that closer cooperation with the airline industry would free up more money for military aircraft. In 1960, following congressional hearings and a directive from President Dwight Eisenhower, DoD agreed to a much-expanded role for commercial transport.[74]

Notwithstanding objections, discussed below, to the way CRAF is financed, it is a highly cost-effective program: CRAF provides more than half of the US military's strategic airlift capability without DoD having to buy, operate, or maintain a single aircraft. DoD pays for the use of CRAF aircraft and crew only if the program is activated (and, in peacetime, only if legitimate transportation needs arise). According to a 1994 study by the RAND Corporation, the cost to DoD of replacing CRAF capacity with military transport planes over the previous 30 years would have run $3 billion a year.[75]

Structure and Operation[76]

The CRAF program is managed by the Air Mobility Command (AMC), a component of both the US Air Force and the US Transportation Command (USTRANSCOM), which is also responsible for military sealift and other forms of defence transportation. During a CRAF call-up, carriers continue to operate their own aircraft, using their own crews, but AMC controls their missions from its headquarters at Scott Air Force Base, Illinois.

DoD planning calls for a fully activated CRAF to airlift up to 93 percent of the passengers and 37 percent of the cargo to a military operation. To meet this requirement, AMC seeks to enlist the equivalent of 120 Boeing 747-100 aircraft (known as wide-body equivalents, or WBEs) for cargo transport and 136 Boeing 747s for passenger transport.

---

[73] US air carriers flew more than 600 transatlantic flights in support of allied efforts during the Berlin Airlift. During the Korean War, US airlines flew nearly 2,200 missions and carried 29,000 passengers on a United States-to-Japan shuttle. *Forming a Partnership for National Defense: Commercial Airlines and the Air Force: An Oral History*, Interview of Edward J. Driscoll by Officials of the US Transportation Command and the Air Mobility Command, Scott Air Force Base, Illinois, (June 2001): 2-6.

[74] *Ibid.*, 7-22.

[75] Jean R. Gebman, Lois J. Batchelder, and Katherine M. Poehlmann, *Finding the Right Mix of Military and Civil Aircraft, Issues and Implications*, Volume 2: Analysis (RAND, 1994): 44.

[76] This description of CRAF draws on the following reports and articles; we have updated some of the figures from these sources based on information provided by AMC. Roger K. Coffee and F. Ronald Frola, *Civil Reserve Air Fleet: Trends and Selected Issues* (Logistics Management Institute, May 1996); John Daly and Paul Needham, "Air Transportation: Elements of a Changing Environment and What It Means to the Civil Reserve Air Fleet," *Defense Transportation Journal* (November/December 1999): 6-11; continued in (January/February 2000): 6-9; and Ira Lewis, "The Civil Reserve Air Fleet: Balancing Risks and Incentives," *Transportation Journal* (Winter 1998): 32-39.

At present, some 40 carriers participate in CRAF, including all of the major passenger airlines, the large integrated and smaller all-cargo carriers, and most charter operators. Participants' current commitment of more than 900 aircraft exceeds the CRAF requirement.

The AMC assigns participating aircraft to one of three CRAF "segments"—international, national, and aeromedical—depending largely on their size and range, and the international and national segments are each sub-divided into two "sections":

- The long-range international (LRI) section, the largest of CRAF's five divisions, consists of passenger and cargo aircraft with a range of 3,500 nautical miles and the ability to operate over water. LRI aircraft include the Boeing 747, 757, and 767; the McDonnell-Douglas MD-11; the Douglas DC-8 and DC-10; and the Airbus A-300.

- The short-range international section supports operations from the continental United States (CONUS) to the Caribbean, Central America, Greenland, and Iceland, and consists of aircraft such as the Boeing 727 and 737, the MD-80, and the DC-9.

- The national segment is made up of a domestic section, which supports operations within the CONUS, and a section supporting the unique requirements of the Alaskan region. Aircraft for this segment include the Boeing 727 and 737, the MD-80, and the Lockheed L-100.

- Finally, the newest segment, aeromedical, uses specially modified Boeing 767 aircraft to carry medical personnel and supplies to the battle area and transport patients back to the United States.

AMC maintains a three-stage activation plan. Stage I corresponds to a minor regional crisis and requires 30 passenger and 20 cargo WBEs—all from the LRI section. Stage II represents a major regional crisis and activates four of the five divisions of CRAF (all but the domestic section of the national segment), totalling 87 passenger and 75 cargo WBEs. Stage III, reserved for a presidentially declared national emergency, activates all CRAF aircraft. Although the large passenger and cargo carriers dominate Stage III, smaller charter-oriented carriers supply a significant share of the aircraft for Stages I and II.

Air carriers have 24 to 48 hours to respond to a CRAF call-up, depending on the stage and program segment. In preparation, carriers must maintain at least four full cockpit crews for each aircraft they commit. Crew members pledged to CRAF must be US citizens and have security clearances. Moreover, carriers' four-crew minimum cannot include members of a National Guard or Reserve unit, since they would be subject to military call-up themselves.

In the 50-year history of CRAF, there has never been a Stage III call-up, and Stages I and II have been activated only one time—for the Persian Gulf War.[77] However, on a number of occasions (most recently, Fall 2001, in support of the war in Afghanistan), CRAF participants have responded voluntarily, precluding the need for a Stage I call-up.

---

[77] AMC activated Stage I in August 1990, after Iraq's invasion of Kuwait. (Even before the call-up, participants had volunteered 60 percent of the cargo aircraft and 50 percent of the passenger aircraft required for Stage I.) The Secretary of Defense activated the cargo portion of Stage II in January 1991, after the United States began raids on Iraq, and about half of the passenger portion of Stage II in March 1991. Coffee and Frola, *Civil Reserve Air Fleet,* 2:2.

Incentives to Join CRAF

In exchange for committing their aircraft and crew to the CRAF program, carriers are awarded a share of AMC's peacetime charter business. Shares are determined by a point system that reflects the "mobilisation value" (MV) of each carrier's commitment.[78] In practice, charter operators are far more interested in this business than the major carriers, which operate scheduled service and historically have had little slack capacity. To accommodate these differences, AMC in 1995 began allowing CRAF carriers both to buy and sell MV points and to pool MV points in a joint venture.

Contrary to expectations, AMC has continued to purchase a significant amount of charter airlift service from CRAF carriers since the end of the Cold War. AMC's largest contract is for International Airlift Services. This contract has averaged about $500 million a year over the last decade, including roughly equal amounts of "fixed" buys (missions that are known at the time AMC issues its annual solicitation) and "expansion" buys (additional, unplanned missions that arise after the solicitation is issued).[79]

In addition to a share of AMC's peacetime business, CRAF participants get the opportunity to bid on the government's civil passenger air travel contracts, managed by the General Services Administration (GSA). These "City Pairs" contracts, worth about $1.13 billion a year, are a prime incentive for major carriers to participate in CRAF.[80] Although government fares are typically very low and carry no rescheduling penalties, carriers nevertheless value the business because it allows them to put additional passengers on already-scheduled flights.[81] GSA contracts make up about 1.5 percent of annual passenger revenue for the major carriers.

Finally, CRAF participants can compete for the government's Domestic Small Package Delivery Services contract, which is also managed by GSA. GSA traditionally awarded the contract to one cargo carrier that provided a low fixed rate for any small package (less than 150 pounds) shipped by a federal agency within the continental United States. Federal Express held the contract until recently. To win the contract, Federal Express had to commit 30 percent of its fleet to CRAF, instead of the normal 15 percent required of all cargo carriers.

Gulf War Activation Experience

CRAF's incentive system is a direct result of the Gulf War activation experience. The activation was successful: CRAF carriers transported two-thirds of the personnel and one-

---

[78] A carrier's base score is tied to the number of WBEs it commits. In addition, MD-11 and Boeing 747 aircraft receive a 20 percent bonus, because long-range, wide-body aircraft provide greater utility. Aircraft committed to Stage I receive double points, because they face a greater risk of call-up. The (modified) Boeing 767 aircraft committed to the aeromedical segment of CRAF also receive double MV points.

[79] Coffee and Frola, *Civil Reserve Air Fleet*, 3:15,16; Briefing chart, Institute for Defense Analyses (November 2002).

[80] GSA news releases available at: http://www.gsa.gov. Under its City Pairs program, GSA solicits competitive bids from CRAF participants for reduced-fare service between specific origins and destinations. Government employees are expected to use the GSA-designated carrier when flying between those city pairs on official business.

[81] Coffee and Frola, *Civil Reserve Air Fleet*, 2:5; 3:17,18.

quarter of the cargo airlifted during the Gulf War.[82] Moreover, participants volunteered many of the aircraft even before CRAF was activated, and some participants (particularly the smaller charter and cargo carriers) provided additional aircraft beyond their CRAF commitments.[83] However, activation created economic hardship for some CRAF participants.

Most problematic, certain carriers reportedly lost commercial business to foreign and non-CRAF carriers after transferring their civil aircraft to military missions. (Because the conflict occurred during a recession, it is difficult to know how much of the loss in business was due to competition from foreign carriers as opposed to broader economic conditions.) Large cargo and passenger carriers were hurt the most, because they lacked the capacity to meet the holiday-related surge in international cargo shipments and domestic passenger travel. (Foreign cargo carriers reportedly required some customers to sign long-term contracts, so as to lock in their advantage over absent CRAF carriers.[84]) The business challenges that CRAF participants faced were compounded by other problems, ranging from the incomplete coverage of war risk insurance to a lack of chemical-warfare protective gear for CRAF crews. As a result of the experience, the two largest US passenger carriers, United and American Airlines, temporarily withdrew from CRAF in 1994, when their contracts expired, and other participants lowered their level of participation.

To coax carriers back into CRAF, the federal government expanded war risk insurance coverage and addressed other specific problems that had surfaced during activation. DoD also sweetened the pot by letting CRAF carriers list selected military airfields as alternate landing sites for use in the event of bad weather, thus reducing the amount of reserve fuel they would need to carry.

However, the federal government's primary response was a stick, not a carrot: It announced that any carrier wanting to bid on GSA contracts would henceforth be obliged to participate in CRAF. AMC simultaneously raised the minimum participation level—to 30 percent of a carrier's passenger fleet (twice the previous level) or 15 percent of its cargo fleet. American and United had little choice but to renew their commitment to CRAF, but participating airlines resented the new requirement as coercive.

Potential Problems Facing CRAF

DoD views CRAF as an essential program that, by and large, is working well. As one indication, DoD's Mobility Requirements Study 2005, issued in January 2001, pronounced CRAF to be healthy. Most of the specific problems that arose during the Gulf War activation have been resolved. And the program is heavily oversubscribed at present.

Nevertheless, AMC faces several potential problems. First, a number of the smaller, unscheduled charter operators on which CRAF is dependent are in poor financial

---

[82] Congressional Budget Office, US Congress, *Moving U.S. Forces: Options for Strategic Mobility* (February 1997) Chapter 2: 6. Available at: http://www.cbo.gov/showdoc.cfm?index=11&sequence=3.

[83] Ira Lewis, "Civil Reserve Air Fleet," 34-35. As with the recent war in Afghanistan, the Gulf War conflict began during an economic recession and coincided with a drop in international travel linked to the perceived threat of terrorism. Thus, some air carriers—particularly the smaller charter operators—were grateful for the business.

[84] Coffee and Frola, *Civil Reserve Air Fleet*, 2:2-2:4.

condition. These firms specialise in providing supplemental airlift to commercial air carriers; this is an inherently cyclical business, because commercial carriers do not need extra capacity when the economy is weak. In addition to cyclical downturns, charter companies face increasing competition from the cargo integrators. For example, the US Postal Service, which once was a major customer of Emery Worldwide Airlines, recently awarded Federal Express a seven-year, $6.4 billion sole-source contract.[85] As a result of financial problems, four of the charter carriers that participate in CRAF—American Trans Air, Evergreen International Airlines, Gemini Air Cargo, and World Airways—have requested loan guarantees from the Air Transportation Stabilisation Board that Congress created following the September 11 terrorist attacks. Moreover, a number of the charter operators have stayed afloat largely because of the increased AMC business related to the conflict in Afghanistan.

To compound the problems facing struggling charter carriers, AMC's long-term budget envisions a significant decline in fixed-buy spending on commercial airlift by the end of this decade. The Air Force and the Transportation Command are currently scheduled to acquire 180 C-17s (they have 90 now), and they hope to increase that figure to 222. As the C-17 fleet grows, cost considerations and the need to provide training opportunities for C-17 pilots and crew will dictate that AMC rely less on CRAF participants and more on the organic fleet. Similar predictions of a decrease in AMC business have proved wrong in the past. But DoD officials worry that the military's budget for peacetime cargo transport may be insufficient to keep charter carriers in CRAF.

Third, the large passenger carriers are facing their own very serious financial problems. Moreover, even before these problems arose the carriers were reluctant to make commitments that would result in the interruption of their schedules. Support for CRAF by the large passenger carriers has always been soft: it affords them only modest profit opportunities and conflicts with the nature of their business—namely, scheduled service in a highly competitive industry with limited slack capacity.[86] During the Gulf War, the major scheduled airlines (in contrast to the smaller charter and cargo carriers) declined to volunteer additional aircraft beyond their CRAF commitment, for fear of losing market share. The (temporary) withdrawal from CRAF of United and American Airlines underscored this fear. The 1994 RAND report cautioned that participants whose support for CRAF is extremely soft should not be considered dependable.[87]

Fourth, CRAF activation could disrupt the broader economy, not just individual carriers, particularly given AMC's heavy reliance on integrated air cargo carriers such as Federal Express. More and more firms have adjusted their inventories and business practices to take advantage of integrated carriers, which not only provide time-critical delivery of components and finished products, but also manage customers' entire supply chain (including warehousing and distribution, order processing, and customer service). According to a recent analysis by two military logistics experts, a Stage II call-up would require 22.8 percent of the total commercial capacity of CRAF cargo carriers, and a Stage

---

[85] *USA Today* (January 11, 2001).

[86] Gebman, Batchelder, and Poehlmann, *Finding the Right Mix*, 45-55.

[87] *Ibid.*, 55.

III call-up would require 56.3 percent of their commercial capacity.[88] The analysts concluded that a Stage III activation could adversely affect the market, with carriers unable to meet their commitments to CRAF and still maintain a high level of service to their commercial customers.

Like many private firms, DoD is itself becoming increasingly dependent on commercial cargo integrators as it adopts a more businesslike logistics strategy. DoD's goal is to reduce peacetime logistics costs by cutting its vast inventories and outsourcing more functions in its supply chain. Thus a fifth potential problem is the adverse impact that CRAF activation of significant commercial cargo capacity could have on DoD's own internal logistics operation. As one analysis observes, "military planners need to stop and ask if they are double-counting the commercial air carriers."[89]

These and other concerns are the focus of an ongoing study of CRAF that the Institute for Defense Analyses is conducting at the request of the Office of the Secretary of Defense.[90] The overarching question is whether the military's longstanding approach to operating CRAF is still viable. Because the program is viewed as generally healthy, the study likely will focus largely on incremental improvements. However, it will look as well at more fundamental changes, such as abandoning the Fly America requirement and opening CRAF to foreign carriers.

7.3 Would Foreign Ownership Threaten CRAF Dependability?

Proposals to allow foreign ownership and control of US airlines raise DoD concerns about whether CRAF would still provide dependable access to supplemental airlift in an emergency. DoD officials worry that, if a foreign entity took control of a major US airline, the airline could not be trusted to make good on its commitment to CRAF under all circumstances. An American Bar Association paper on cross-border investment poses the kinds of questions that DoD officials invariably ask:[91]

- If the United States launched a controversial or even unpopular military campaign, could a foreign-controlled board of directors be counted upon to maintain the carrier's aircraft in the CRAF fleet?
- Would their crews balk at flying into hostile regions?

---

[88] Daly and Needham, "Air Transportation," (January/February 2000): 8-9. Daly and Needham note CRAF's heavy reliance on a single carrier, Federal Express, which has committed 100 percent of its wide-body aircraft. In FY97, Federal Express aircraft represented 31 percent of CRAF's Stage II wide-body cargo capacity, and 45 percent of the comparable Stage III capacity. These figures would be lower based on the current, high levels of CRAF participation, but current participation levels may not continue indefinitely.

[89] Daly and Needham, "Air Transportation," (January/February 2000): 6.

[90] In addition, the US General Accounting Office (GAO) recently completed a study of CRAF, "Military Readiness: Civil Reserve Air Fleet Can Respond as Planned, but Incentives May Need Revamping," GAO-03-278 (December 2002).

[91] "Cross-Border Investment in International Airlines—Presenting the Issues," Preliminary Report by the American Bar Association's Air and Space Law Forum Special Committee on Cross-Border Investment and Right of Establishment in the International Airline Industry (October 19, 2000). See Separate Comments of Jeffrey N. Shane.

- Would foreign citizens who own/control US airlines be subject to pressure from their governments to refuse support for military actions opposed by those governments?

Above all, AMC officials worry about their ability to get sheer physical control over the assets of a foreign-owned airline, given that aircraft are inherently mobile. "When Daimler bought Chrysler, that was okay because the assets are fixed and can't be moved," one former defence official told us. "But aircraft are portable." Moreover, the assets of greatest value to CRAF—long-range international aircraft—would be the most difficult to control.

DoD officials acknowledge the close US-EU security partnership within the North Atlantic Treaty Organisation (NATO) and more broadly. But some officials cite cases in which one or more European governments failed to support US military action. For example, during the 1973 Arab-Israeli war, American military planes supporting Israel had to fly from the United States to an island in the Azores, because no NATO ally would let the United States use its airspace. (From the Azores, military transport planes had to refuel in flight to reach Israel—something only the Air Force's C-5 aircraft could do.) And in 1986, when the United States bombed Libya in retaliation for a terrorist attack in Berlin, France and Spain would not let American military planes cross their airspace.[92]

The concerns expressed by DoD officials about foreign ownership and control of US airlines rest on three widely held beliefs or assumptions:

- From a CRAF perspective, US airlines are more dependable than foreign airlines.
- If a foreign entity purchased a US airline, it would operate as a foreign airline.
- If the US government changed its *statutory policy* so as to allow foreign ownership and control of US airlines, it would open itself up to problematic *transactions.*

The next three sections analyse these assumptions individually. We conclude that the first assumption is valid, but that the second and third assumptions are flawed. Key to our analysis of the second assumption is the recognition that ownership of a US-based airline in this context is not binary (*i.e.*, US-owned and -controlled versus foreign-owned and -controlled). Rather, it can fall into one of three categories:

- US-owned and -controlled
- US-incorporated but foreign-owned
- Foreign-owned and -controlled

---

[92] During the Persian Gulf War, European governments supported US action against Iraq, but European commercial air carriers played a limited role in supplying strategic airlift. In part, this was a function of geography: European carriers participate in the NATO Allied Precommitted Civil Aviation Program (NAPCAP), a CRAF-like program created to support NATO operations. However, at that time, NATO activated NAPCAP only for conflicts that took place within the boundaries of NATO member countries. The US government appealed to European air carriers to provide airlift for the Gulf War outside of NAPCAP, but the large carriers all declined, citing their crew members' refusal to fly. However, several smaller European carriers did supply airlift in support of the US military effort, although it was largely confined to the redeployment of troops and supplies (*i.e.*, transportation home from the battlefield following the conflict). Interviews with Ron Priddy, President of the National Air Carrier Association (March and September 2002). Priddy, a former Air Force colonel, was director of CRAF and oversaw the Gulf War call-up.

Dependability of Foreign versus US Airlines

Notwithstanding Europe's central role in maintaining global security, DoD concerns about the dependability of foreign airlines (assumption #1) are not frivolous. Realistically, US airlines have no choice but to carry out their CRAF commitments, given the legal, economic, and political environment in which they operate. Foreign airlines (category three in the ownership typology noted above), including European airlines, would have less incentive to comply with their CRAF obligations, and they might face legal and political pressure not to comply.[93]

As a legal and regulatory matter, a US airline that tried to defy its contract with CRAF in a defence crisis would face quick action by the US government. Granted, the federal government would not want to have to take a US carrier to court in the middle of a war. But precisely because the government has strong legal remedies, it is very unlikely that it would have to use them.

To elaborate, if a US airline breached its CRAF contract, the Department of Transportation (DOT) could act on an emergency basis using its authority to regulate commercial air transport to meet national security needs. DOT could first require that, as a condition for holding an operating certificate, all US airlines must comply with voluntarily assumed contractual obligations to CRAF. DOT could then issue an order revoking the non-compliant airline's operating certificate. Although the airline could request an oral hearing to challenge the order, US courts generally defer to the expert judgement of the government agency. At the same time that DOT was shutting the carrier down, DoD could use the powers of the Defense Production Act to seize its aircraft. Although DoD would not have authority over a non-compliant carrier's non-military pilots, it could call up the carrier's National Guard and Reserve pilots and order them to fly the seized aircraft.

The US government's legal authority extends even further. The government could sue corporate officers and members of the board of directors individually for supporting company actions that are in defiance of a government order. Under some circumstances, it could invoke the "Trading with the Enemies Act" to confiscate all corporate assets.

In sharp contrast, the US government's leverage over a European carrier would be limited to suspension of the permit authorising service to the United States. Although this would be a non-trivial penalty, it would be far less onerous than suspension of a US airline's operating certificate, which amounts to putting the airline out of business. Moreover, the European carrier might be in a position to invoke the defence—well-established under international law—that actions to breach its contract with CRAF were taken under the compulsion of its national government (*i.e.*, "sovereign compulsion").

In short, DOT and DoD have the legal and regulatory leverage to compel a US airline to comply with its CRAF contract. Their leverage over a European carrier is quite limited by comparison. As one aviation lawyer observed with respect to the CRAF program, ". . . in a game of poker, the US government has all the cards when playing with a US carrier. The game is entirely different when [there is a] foreign airline aligned with its government . . ."[94]

---

[93] This section draws heavily on postings on the "Mifnet" email network by Susan B. Jollie and Daniel Kasper (June 24 and June 26, 2002). Cited with permission.

[94] Susan B. Jollie, *op. cit.*

In addition to legal and regulatory sanctions, US airlines face potential political and economic pressure to comply with CRAF. If a US airline breached its contract to help DoD in a defence emergency, the carrier would face the ire of Congress—a major liability—and it might even invite consumer boycotts and employee strikes that would cause financial harm. By contrast, a European airline might conceivably face boycotts and strikes if it *complied* with its CRAF contract—at least in the situation where the national government and public in the airline's home country opposed the DoD military action.

In sum, from a CRAF planning perspective, European carriers are genuinely different from US carriers. For a US carrier, non-compliance with CRAF contractual commitments is not an option. A European carrier, by contrast, could be compelled by its national government to not comply, and that "sovereign compulsion" could then provide a legal defence for the carrier's conduct.

This fundamental difference does not mean that liberalisation of foreign ownership and control limitations is at odds with US national security. But it does mean that liberalisation should occur in a way that gives the US government the same legal and regulatory authority over a European CRAF participant that it has over a US participant. In particular, DoD would need to be able to readily claim the strategic assets (aircraft and crew) of the European carrier.

European Carriers Would Create US Subsidiaries by Choice or Mandate

DoD officials who oppose aviation liberalisation typically assume that if a foreign entity were to buy a controlling stake in a US airline, the airline would then operate in the US market as a foreign-owned and -controlled carrier (assumption #2). In fact, in most cases, a European or other foreign owner would want to maintain the airline's status as a US corporation for sound business reasons. That is, a European buyer of any US airline that is a major CRAF participant would almost certainly choose to exercise his or her "right of establishment" in the United States rather than operate as a foreign carrier in US domestic commerce. Under a right of establishment, a European-owned airline would incorporate in the United States, operate under a DOT domestic US carrier certificate, and comply with all US laws and regulations, including US tax, labour, immigration, national security, and environmental laws and regulations. US immigration law would effectively require a US-incorporated air carrier to employ US workers.

To elaborate, the potential appeal of a US air carrier to an EU buyer is the carrier's network in, and access to, the huge US domestic market. From a business standpoint, it would be impractical to try to operate that US network, in competition with other US carriers, as a foreign carrier. Among other things, that approach would involve bringing EU-based crew across the Atlantic, operating large numbers of cabotage flights, and potentially complying with US as well as EU regulatory standards.

Moreover, even if a European carrier wanted to, it probably could not perform "true" cabotage operations under US law. As discussed in Chapter 1, the prevailing view among US aviation law experts is that, in a liberalised environment, a foreign carrier that operated in US domestic commerce would nevertheless be subject to all the US federal

and state laws that apply to US domestic air carriers.[95] In sum, by choice or by legal mandate, a European owner would operate in the US market as a US corporation.

However, one scenario could cause DoD officials legitimate concern. Under an EU-US Open Aviation Area, some or all of the transatlantic operations of a US-based air carrier (together with any associated aircraft previously committed to CRAF) could be re-flagged to the European Union. As we discuss in Chapter 8, an airline owner might conceivably do this in order to replace high-wage US pilots and flight attendants with low-wage European substitutes. Moreover, this scenario could occur whether the owner was European or American. That is, the US owners of a US carrier could conceivably re-flag the carrier's international operations to the European Union in an effort to cut costs.

We examine the potential for such a scenario at length in Chapter 8 and conclude that it is very limited for a variety of reasons. Most important, US airlines have no choice but to use US pilots on their domestic routes, which account for nearly three-quarters of their total revenues, and that gives US pilots enormous leverage to block any re-flagging. If DoD needed greater assurance, one approach would be to use the Exon-Florio mechanism discussed below to make approval of the foreign acquisition of a US carrier conditional on the carrier's continued US incorporation. Another approach, designed to prevent re-flagging by US as well foreign owners, would be to require domestic incorporation as a condition for carrying USG traffic (essentially preserving Fly America). Yet another approach would be for an Open Aviation Area agreement to allow signatories to require domestic incorporation of certain operations for compelling national security reasons.

US incorporation—*i.e.*, exercise by a European owner of its right of establishment—would protect the CRAF program by giving the US government the same legal control over a European-owned airline that it has over a US-owned airline. For example, if the airline opted to participate in CRAF (or if DoD required participation, as discussed below), the aircraft committed to CRAF would be registered under the Defense Production Act, allowing DoD to seize the aircraft and order the carrier's National Guard and Reserve pilots to fly them. Likewise, just as with a US-owned carrier, DOT could threaten to revoke the European-owned carrier's US domestic certificate, without which it could not operate. Finally, as a US corporation, the carrier would not be legally subject to compulsion by a foreign government, nor could such compulsion provide a legal defence for the carrier's conduct. Stated differently, a right of establishment would circumvent the "sovereign compulsion" defence by making the US government the relevant sovereign authority.

In short, by allowing (and, if necessary, requiring) a European-owned carrier to operate in the United States as a US company, a right of establishment would ensure that "the US government has all the cards" with respect to CRAF compliance. As with US carriers, this lopsided distribution of legal and regulatory leverage would make it highly unlikely that a European-owned CRAF participant would breach its contractual obligations to DoD.

---

[95] The same is true in other industries. When a foreign-owned manufacturing firm sets up a plant in the United States (*e.g.*, BMW's facility in South Carolina), it operates as a US company. As such, it employs American workers, pays US taxes, and complies with all US laws and regulations. The same is true for a foreign-owned service firm (*e.g.*, Deutsche Telekom). Similarly, a US manufacturing or service firm that operates physically in an EU Member State does so as a domestic company subject to the domestic laws of that Member State, including relevant EU law.

DoD's VISA Program

As one indication that this "US incorporation" approach is workable, DoD's Transportation Command already allows participation by *de facto* foreign-owned commercial vessels in its Voluntary Intermodal Sealift Agreement (VISA) program, which is the maritime equivalent of CRAF. Much of VISA's emergency sealift capability consists of ships that fly the US flag and qualify as "US citizens" under US maritime law, even though they are effectively owned and controlled by foreign companies.[96]

VISA was established in 1997 and is jointly administered by DoD and DOT's Maritime Administration (MARAD). Like CRAF, VISA is designed to augment DoD's organic fleet in a defence emergency by leveraging the US-flag commercial fleet and the related infrastructure (terminals, equipment, and intermodal cargo tracking and transport services used to provide door-to-door delivery).[97] In exchange for making some portion of the capacity of their US-flag vessels and related infrastructure available for emergency activation, VISA participants get preference over other US-flag shipping firms for transport of peacetime government cargoes.

VISA is closely linked to the Maritime Security Program (MSP), which was created by the Maritime Security Act of 1996 and is administered by MARAD. MSP provides subsidies to offset the higher cost of operating US-flag vessels, which must be US-owned and US-crewed. In exchange for a yearly subsidy of up to $2.1 million per ship, MSP enrollees agree to maintain some number of vessels—currently 47—under US registry. More than 70 percent of VISA's Stage III capacity comes from MSP enrollees.[98]

The 1996 Maritime Security Act provided that MSP contracts to operate US-flag vessels could go to corporate entities that qualified as either a "Section 2 citizen" or a "documentation citizen". The statutory criteria for a Section 2 citizen (named for Section 2 of the Shipping Act of 1916) are:

- Incorporation in the United States
- Board of directors can include no greater number of non-US citizens than would constitute a minority of a quorum
- Chairman and CEO must be US citizens
- US citizens must hold majority ownership

---

[96] For an overview of VISA, see Ira Lewis and Daniel Y. Coulter, "The Voluntary Intermodal Sealift Agreement: Strategic Transportation for National Defense," *Defense Transportation Journal* (Fall 2000): 26-34.

[97] According to recent testimony by the head of the Transportation Command, DoD's organic fleet has only one-third of the vessels that might be needed in a military emergency. Statement of General John W. Handy, Commander in Chief, US Transportation Command, before the House Armed Services Committee, Merchant Marine Panel (October 8, 2002): 1. Available at: http://armedservices.house.gov/openingstatementsandpressreleases/107thcongress/02-10-08handy.html.

[98] Lewis and Coulter, "Voluntary Intermodal Sealift Agreement," 28-31. All of the capacity of MSP enrolled vessels must be made available in the event that VISA is activated. VISA participants that do not receive an MSP subsidy must make only half of their US-flag fleet capacity available for activation.

The criteria for a Documentation Citizen (*i.e.*, an entity that meets the requirements for documenting a vessel under the US flag) are the same as those for a Section 2 Citizen except that there is *no requirement for US majority ownership*. Thus a company can be 100 percent foreign owned and still qualify as a Documentation Citizen.[99]

Despite the availability of MSP subsidies, most of the remaining US maritime shipping firms were sold to foreign owners in the late 1990s.[100] Thus these MSP operators no longer qualified as Section 2 Citizens. To comply with the Section 2 citizenship requirement of majority US ownership, and to keep the ships under US registry, the owners developed an artificial legal structure involving the creation of new, independent Section 2 citizen companies. The former MSP operators transferred ownership of their MSP vessels to these new Section 2 entities and then time-chartered (*i.e.*, wet leased) the vessels and crew back for daily operation as part of the international liner fleets of their foreign parents. Of the 47 US-flag vessels currently receiving MSP subsidies, 31 have foreign owners but nevertheless meet the MSP qualifications for US citizenship.[101]

For example, Sealand—formerly the largest US shipping firm, with 180 containerships and 200,000 containers—was purchased in 1999 by Maersk/A. P. Moller Group of Denmark, one of the world's largest liner shipping companies. DoD has had a longstanding relationship with Maersk Line, Limited (MLL), a Norfolk-based subsidiary of Maersk. MLL has a top-secret clearance, and under a Special Security Agreement signed with DoD in the 1980s, MLL can perform classified contracts despite its 100 percent foreign ownership. Maersk/MLL transports almost half of DoD's total maritime cargo in peacetime, using Maersk's integrated intermodal network, which includes terminals in five continents and provides door-to-door service in more than 100 countries. In addition to providing peacetime support, MLL also supports DoD through its involvement in MSP and VISA. Since 1996, MLL has operated four MSP vessels under the Maritime Security Act's limited "first priority" exemption for a Documentation Citizen. Following its 1999 purchase of Sealand, Maersk/MLL transferred Sealand's 15 MSP vessels to US Ship Management Inc. (USSM), a newly created Section 2 corporate citizen, and then time-chartered the vessels back from USSM.

This arrangement has become increasingly unsatisfactory to the foreign-owned MSP operators, because of the added cost of dealing with Section 2 intermediaries. Maersk was the first to complain, threatening to withdraw its 19 ships from MSP and VISA unless it got a statutory exemption to operate all of them as a Documentation Citizen.[102] In response to initial opposition to Maersk's request from some US maritime groups, DoD sought to convince Congress that an expanded waiver for ships operated by a Documentation Citizen would not compromise VISA's access to the vessels.

---

[99] There is yet a third level of citizenship under US maritime law, and it is the most demanding of all. Specifically, vessels that want to engage in US coastal trade (known as Jones Act trade) must belong to a company that is at least 75 percent US-owned and -controlled, among other requirements.

[100] Sealand was purchased by the A.P. Moller Group of Denmark. APL was acquired by NOL (Neptune Orient Lines), a Singapore company. Lykes Brothers is now owned by CP Ships, a Canadian firm. And Farrell Lines was acquired by P&O Nedlloyd, a UK-Dutch joint venture.

[101] Lewis and Coulter, "Voluntary Intermodal Sealift Agreement," 32.

[102] US Transportation Command, Information Paper, undated. Following an April 2001 Senate hearing at which he testified, General Charles T. Robertson, who was then in charge of the Transportation Command, sent this paper to one or more Members of Congress.

> Some are concerned as to whether an expanded waiver would impair USTRANSCOM's access to the vessels in a time of crisis. In fact, our review of the appropriate statutes suggests that the United States would retain significant powers to obtain access to the vessels during a contingency, even if the Maritime Security Act was amended to permit more MLL vessels, or vessels operated by all "documentation" citizens, to be eligible for the top tier of vessels competing for MSP payments.
>
> First, a "documentation" citizen would be required to execute the same VISA contingency contracts with DOD that "Section 2" citizens now must execute in order to receive MSP payments. A contractually binding requirement to deliver vessel capacity for DOD would remain.
>
> Second, in the unlikely event that a VISA participant would refuse to honor its contractual commitment, a "documentation" citizen could be just as subject to contract remedies under U.S. law and requisitioning (under 46 App. USC 1242) as would a "Section 2" citizen.
>
> Third, current law restricting the re-flagging of U.S. flag vessels is applicable to both "documentation" citizens and "Section 2" citizens.
>
> Fourth, if new laws were considered necessary to assure DOD access to U.S. flag vessel capacity, new laws could be applied to "documentation" citizens in the same manner as to "Section 2" citizens. [103]

Other foreign-owned MSP operators eventually joined Maersk's effort to amend the 1996 Act to allow Documentation Citizens to operate MSP vessels directly (ownership would remain with the Section 2 Citizens). Collectively, they are working with Congress to develop contractual terms that will ensure compliance if VISA/MSP is activated (*e.g.*, the US government might have the right to approve the board of directors). In recent testimony, General John W. Handy, Commander in Chief of the US Transportation Command, signalled DoD's support for their position:

> . . . MSP . . . provides the security we, as a nation, must have to "go it alone." While foreign companies dominate the world maritime market, MSP ships sail under the U.S. flag, are crewed by U.S. mariners, are operated by U.S. companies, and are subject to U.S. laws. . . . Currently, MSP comprises both Section 2 and Documentation Citizens. Both . . . must execute the same contingency contracts with DOD committing vessels to VISA Stage III and thereby assuring us we will have access to their vessels. . . . As a warfighter, my requirements are met by both Section 2 and Documentation Citizens.[104]

In other ways as well, DoD's operation of VISA accommodates the increasing globalisation of the maritime shipping industry. For example, VISA participants are allowed to meet their capacity commitments by entering agreements with other shipping firms, including foreign-flag firms. Such agreements must be approved in advance by DoD and MARAD, and the VISA participant must demonstrate that it would have

---

[103] *Ibid*.

[104] Statement of General John W. Handy, House Armed Services Committee, Merchant Marine Panel: 2.

adequate control over its partner's shipping capacity during the period of utilisation.[105] This feature of VISA gives participants greater flexibility and thereby increases the odds that they will remain in the program.

To be sure, there are enormous differences between the US maritime and aviation industries. And some people would say that the plight of the US maritime sector—with the US government subsidising foreign shipping companies in order to maintain US-flag vessels—is no model for aviation. Nevertheless, VISA offers an important lesson for CRAF: properly designed, DoD's strategic mobility programs can go hand in hand with globalisation.

Exon-Florio/CFIUS Process Reviews Individual Transactions on National Security Grounds

Many US government officials are under the impression that, if the federal government were to change US *policy* so as to allow foreign ownership and control of US airlines, any proposed *transaction* covered by the law would have to be approved (assumption #3). Based on this impression, these officials are understandably concerned about changing current policy.

But, in fact, even if the current restrictions on foreign ownership and control of US airlines were eliminated, the federal government would be able to block or restrict individual airline transactions, just as it can block or restrict any other foreign acquisitions of US companies. The mechanism for altering specific transactions is the Exon-Florio amendment to the Defense Production Act, which requires foreign acquisitions to be approved on national security grounds.

To elaborate, Exon-Florio gives the President of the United States the authority to block foreign mergers, acquisitions, or takeovers of US companies if they threaten to impair national security. Exon-Florio is administered by the Committee on Foreign Investment in the United States (CFIUS), a interagency executive-branch committee chaired by the Treasury Department with active participation by the Departments of Defense, Justice, Commerce, State, and other agencies. Under Exon-Florio, parties to a merger or takeover notify CFIUS of the pending transaction. Any decision to restrict or block a foreign acquisition under Exon-Florio must be made within 90 days of CFIUS notification.[106]

Exon-Florio was enacted in 1988 to reconcile the United States' open investment policy with potential national security concerns. Of the more than 1,200 transactions that have been reported under Exon-Florio, CFIUS has investigated only a few dozen, and the President has intervened only once. However, several transactions have been withdrawn in the face of likely disapproval, and a number of deals have been approved subject to conditions.

For example, in August 2000, CFIUS cleared the acquisition of the US internet service provider Verio by Japan's state-controlled NTT Communications only after the company

---

[105] Lewis and Coulter, "Voluntary Intermodal Sealift Agreement," 29.

[106] CFIUS has 30 days to decide whether to conduct an investigation. (An investigation is automatic if the transaction involves a foreign-government-owned company.) If CFIUS decides to investigate the transaction, it must complete the investigation in 45 days and report its results to the President. The President has 15 days to block the merger.

agreed to create a separate division of Verio—staffed and managed only by US citizens—to handle any law-enforcement requests for electronic surveillance. This allayed concerns that the deal might give NTT knowledge of US wiretap targets and activities.[107]

More recently, CFIUS investigated the plan by the Dutch semiconductor equipment manufacturer, ASML, to acquire Silicon Valley Group Lithography, the sole producer of technology and equipment critical to producing high-end defence electronics.[108] CFIUS eventually cleared the $1.2 billion takeover after getting a commitment that ASML would leave certain technology and production in the United States.

The CFIUS process would allow AMC to ensure that any foreign acquisition of a US airline would not undermine CRAF's mission. For example, AMC might well want to make an acquisition conditional on getting an up-front commitment that the acquired carrier would continue to participate in the CRAF program. If necessary to facilitate that commitment, the foreign acquirer could be required to maintain the airline's status as a US corporation. At the extreme, DoD might even seek to block the acquisition of a carrier that is deemed critical to the CRAF program.

Risk-Reward Tradeoff

Although US incorporation and the Exon-Florio/CFIUS process should protect CRAF's dependable access to US aircraft, some in DoD may nevertheless oppose foreign ownership and control of US airlines on the grounds that it would create some degree of risk, however small, to the CRAF program. That presumption of risk may or may not be merited. But even assuming that it is, the potential rewards of liberalising foreign ownership and control restrictions almost certainly would outweigh the risks.[109]

As a major customer for commercial air transport, the US military should benefit, generally, from liberalisation of international aviation. As the analysis in other sections of this report demonstrates, heightened international competition would force US and foreign airlines to be more efficient and innovative. The result would be lower prices and more service options.

Because US carriers are highly efficient, they would acquire foreign airlines as well as be acquired by them. Moreover, the vast size of the US domestic aviation market ensures that many large airlines would base operations in the United States, whether or not they

---

[107] Jennifer M. Hampton, "Clinton OKs $5.5B Internet Deal," *E-Commerce Times* (August 24, 2000).

[108] Tinsley Laboratories, a subsidiary of Silicon Valley Group Lithography, makes optical lens technology used for spy satellites, among other products. One DoD concern was that Tinsley's technology would be sold to unfriendly countries that would use it for military purposes. To get CFIUS clearance, ASML agreed to make a good faith effort to spin off Tinsley Laboratories or, in the absence of a sale, to operate it under a set of CFIUS-mandated restrictions. See Stan Crock, "No Foreign Policy Issue Is Too Small to Botch," *BusinessWeek Online* (May 29, 2001); "ASML and SVG Finally Receive CFIUS Approval to Proceed with Merger," *Semiconductor Fabtech* (May 4, 2001).

[109] It is beyond the scope of this paper to consider in detail how CRAF might be structured to take account of any increased risk that some carriers might not (fully) comply with their contracts. Nevertheless, one obvious approach would be to "overbook"—*i.e.*, to raise the level of CRAF participation slightly to take account of the possibility that some aircraft might not be made available in an emergency.

were US-owned. These US-based airlines would have global scale and reach, thus extending their capability to provide emergency airlift around the world.

DoD could benefit in particular from the globalisation of the large US cargo integrators that are so critical to CRAF. UPS and Federal Express currently rely on European and other foreign cargo carriers to provide seamless worldwide networks that nevertheless conform to local aviation restrictions, including restrictions on foreign ownership. UPS and Federal Express exercise considerable *de facto* control over the carriers that are key to their operation; liberalisation of foreign ownership restrictions would allow them to take formal control of these carriers. Since these carriers collectively account for a large number of aircraft, such acquisitions would add to the stock of strategic assets on which CRAF could draw.[110]

7.4 Market Access Restrictions and CRAF

Proposals to jettison Fly America requirements and restrictions on cabotage raise DoD concerns about the continued affordability of the CRAF program. If the US government market were opened to European carriers, DoD could no longer make access to that market an incentive for CRAF participation. Without that incentive, DoD would have to pay US carriers directly to participate in CRAF, substantially increasing the on-budget cost of CRAF.

Market Access Restrictions

CRAF is financed not through a congressional appropriation, as with most government programs, but by giving CRAF participants exclusive access to the federal government's market for commercial air transport. As a result, the CRAF program has no budgetary cost to the federal government. Three federal policies make possible this indirect financing of CRAF.

First, commercial transport of military traffic within the United States must take place on US carriers because of the cabotage restriction at 49 U.S.C. 41703 (c). More generally, Title 49 restricts the right to engage in air transportation to certified air carriers, which must in turn be citizens of the United States.

Second, under the *"Fly America"* statute (49 U.S.C. Sec. 40118), commercial movements of *military traffic in international markets* must be on a US airline if the itinerary begins or ends in the United States. If such air transportation is between foreign points, it must be on a US carrier if "reasonably available". In 1991, in response to complaints from foreign airlines and others, the US Comptroller General determined that international code-share flights would satisfy Fly America requirements. As a result, foreign code-share partners of US-flag airlines can transport US government personnel and cargo on routes covered by their code-sharing agreement.

Fly America was enacted in 1958 both to provide a payback for carriers that participated in CRAF and to rectify a perceived imbalance in international aviation due to

[110] Of course, UPS and Federal Express might well choose to incorporate the acquired company in the country in which it is based. If so, the US-owned entity would still be a foreign company from a DoD/CRAF perspective.

government ownership of foreign airlines.[111] Absent the CRAF program (and strong support from the smaller carriers that get the bulk of AMC's peacetime business), the Fly America policy would have little justification and almost certainly would not survive.

Third, several federal policies go beyond cabotage and Fly America laws to require that *all government commercial transport, domestic as well as international*, take place on *CRAF-participating airlines*. DoD is mandated by statute to use CRAF carriers for domestic and—as of recently—international transportation.[112] And civilian agencies must do the same as a matter of GSA policy. The General Services Administration has long required civilian agencies to use CRAF carriers on international flights, and it adopted the same policy for domestic transport in 1995, when the City Pairs program was restricted to CRAF participants.

Why CRAF Financing Is Inefficient

Economists have long been critical of Buy America-type restrictions in US procurement law because they lead to economic inefficiency. Specifically, by excluding foreign air carriers (and US carriers that do not participate in CRAF) from the market for government air transportation services, Fly America/Fly CRAF policies impose direct and indirect costs on users of those services.

The direct costs are equal to the increase in price that the federal government pays for air transportation services as the result of reduced competition. In practice, GSA's City Pair fares are competitive on domestic routes, because all major US carriers participate in CRAF and thus are able to bid. On international routes, GSA fares are less competitive because foreign carriers cannot bid. However, the 1991 decision allowing foreign airlines to carry US government traffic on international code-share flights reduced somewhat the direct costs of Fly America. The effect of that decision was to add foreign capacity to the Fly America network, putting indirect pressure on prices.

In addition to the direct costs, Fly America/Fly CRAF restrictions impose indirect costs—inconvenience and lost productivity—on travellers and shippers throughout the federal government. An article in *Government Executive* makes the point:

> John Wasielewski, who's on the road one-quarter of his time for the Agency for International Development, finds that flying only U.S. carriers sharply reduces his choices of routing and departure and arrival times. The bottom line: It costs his department more, he has to take longer flights with more stops, and sometimes he misses a weekend he could have had at home. "It's just inconvenient," he says.
>
> Other frequent overseas travellers at the State Department, AID and the Defense Department go further: "It's a nightmare—it's insanity," says a federal lawyer who

---

[111] According to the General Accounting Office's Civilian Personnel Law Manual, the purpose of the Fly America act "was to counterbalance the dominance that foreign carriers enjoyed with respect to business and government air traffic originating abroad, while rectifying an imbalance in the international air transportation market favorable to foreign air carriers, many of which are subsidized or otherwise assisted by their respective countries, and, therefore, able to offer reduced fares or more attractive routings."

[112] In the FY2001 defence bill, Congress extended the longstanding requirement that DoD use CRAF carriers for domestic commercial transportation to include DoD's international commercial transportation. The statute, in effect, codified existing GSA practice, but in doing so it eliminated DoD administrative discretion and precluded executive branch use of a narrow waiver authority contained in the law. Congress enacted the provision despite objections from DoD and the White House.

> makes two to four overseas trips a year for two weeks at a time. "A bust," says a Navy civilian. "A real pain in the butt," says a DoD official. "A rip-off of U.S. taxpayers, and an inconvenience to those flying on the federal dime," says a Capitol Hill staffer who watches the issue closely.[113]

Because every federal agency buys commercial air transport, most of the costs of Fly America/Fly CRAF policies are borne by people and programs outside of AMC. DoD accounts for 70 percent of all GSA transportation contracts; thus, to a considerable extent, the costs of CRAF are "internalised" by the military. But as the comments above reflect, some of the harshest critics of Fly America are inside of DoD.

Finally, because CRAF is financed indirectly, with most of the cost borne by people and programs outside of AMC, the true cost of the program is hidden. This prevents federal policymakers—both inside and outside of DoD—from comparing CRAF to other programs and making appropriate tradeoffs as part of the federal budget process.

Options for Treatment of Fly America under an Open Aviation Area

Option 1: Repeal Fly America and Compensate CRAF Participants Directly

The federal government, on balance, would benefit if it paid US carriers directly to participate in CRAF and opened the market for government transport services to all qualified carriers. Put simply, free trade is more efficient than barter with a limited number of counter-parties. Government procurement of aviation services currently suffers from unnecessarily high prices and inappropriate service quality as a result of the element of barter inherent in the Fly America/CRAF policy nexus. Repeal of Fly America/Fly CRAF provisions would reduce the price that the federal government pays for commercial air transport and eliminate the inconvenience and lost productivity caused by the restriction on market access. Direct financing also would make the true cost of CRAF transparent, allowing Congress and the executive branch to evaluate the program as part of the broader federal budget process.

In its 1994 report, RAND looked at several options for direct financing of CRAF. One option would involve direct annual payments for an entitlement to activate particular aircraft and associated air crews. This approach could be implemented, say, in the form of periodic sealed bids from carriers in response to government requests for specific services (*e.g.*, 747 freighters). Another option would avoid voluntary pre-commitments altogether in favour of exploiting market conditions. That is, the government would seek bids for specific services at the time of a crisis.[114]

Although the direct compensation of CRAF participants makes economic sense, it is politically challenging. Most significant, it would require Congress to appropriate money to pay for a program that is currently "free"—*i.e.*, it does not appear as a line item in the federal budget nor require congressional appropriations. For this reason, among others, it is unlikely to happen—at least in the near term. But if DoD's peacetime business

---

[113] Lauren R. Taylor, "Patriotism Wanes for Fly America Act," *Government Executive* (July 2000).

[114] Gebman, Batchelder, and Poehlmann, *Finding the Right Mix*, 64-67. Even if DoD were to fund CRAF participants directly, AMC officials would likely resist an approach that involved bidding for services at the time of the crisis, because of the uncertainty regarding both supply availability and price.

declines, CRAF may need to supplement the current compensation system with direct payments in order to keep carriers in the program.

Option 2: Indirect Foreign Participation in CRAF

- *Indirect Foreign Participation in CRAF a la VISA***.** Borrowing a page from VISA, option two would allow CRAF participants to use agreements with foreign air carriers to meet their capacity commitments to AMC. As with VISA, CRAF participants would have to demonstrate adequate control over their partners' capacity during the period of utilisation. And any agreements would have to be approved in advance by the Transportation Command—another VISA requirement. These foreign carriers in turn would get access to the international component of the US government's market for commercial transport.

  For example, Northwest could use an agreement with its alliance partner KLM to meet its capacity commitment to AMC, and KLM would get access to international government traffic. Alternatively, Virgin-US, a foreign-owned but US-incorporated carrier and CRAF participant, could partner with Virgin Atlantic.

- *Maintain but Reinterpret Fly America/Fly CRAF***.** To allow foreign carriers to get access to the international component of the US government's air transport market, option two would preserve Fly America/Fly CRAF policies but "reinterpret" them to include foreign "capacity-sharing partners" of CRAF participants.[115]

By allowing indirect participation in CRAF by selected foreign air carriers, the federal government would gain both added capacity for CRAF and increased competition for (some) government transport business. This approach also would give US carriers greater flexibility to meet their CRAF commitments, making it more likely that large scheduled carriers would continue to participate in the program.

Because DoD lacks direct authority over foreign air carriers, it would manage them indirectly by making CRAF participants responsible for their foreign partners. One advantage of this indirect management approach is that a US airline would have better information about its partner than DoD. In addition, a US air carrier would have a strong incentive to monitor its partner's compliance, because the US participant would have to make up any shortfall in capacity.

VISA is not the only relevant model for DoD reliance on "indirect management". DoD also requires US air carriers to ensure that their foreign code-share partners are sufficiently safe to transport DoD personnel. The Federal Aviation Administration has adopted a similar approach to protect all passengers on international code-share flights. (See Chapter 9 for further discussion of these aviation safety programs.)

From a US political perspective, the drawback to Option 2 is that it would reduce the amount of government business going to US carriers. This might be a particular problem for charter carriers that count on a share of AMC's International Airlift Services contract. To hold harmless these charter carriers, DoD might need to expand its contract to include some air transport currently carried out by DoD's organic fleet, or provide direct payments to offset the decline in defence business.

---

[115] This might require modification of the Fly America statute but likely could be done through a determination by the US Comptroller General, similar to the 1991 ruling that international code-share flights would satisfy Fly America requirements.

Option 3: Preserve Fly America

- *Keep Fly America/Fly CRAF Policies in Place.* Under this option, the current Fly America/Fly CRAF policies would remain in place.

By maintaining Fly America/Fly CRAF, this option keeps CRAF "off-budget". The drawback to this option is that Fly America/Fly CRAF policies would continue to impose direct and indirect costs on federal users that exceed the benefits. However, the right of establishment—by allowing the US subsidiary of a European airline to compete for government traffic—would reduce those costs somewhat.

7.5 Conclusion

Liberalisation of EU-US aviation trade and investment would not jeopardise US national security and it might enhance it. With respect to DoD concerns about foreign ownership of US carriers, two policy mechanisms would ensure that CRAF maintained its dependable access to US commercial aircraft. The first, which an Open Aviation Area would create, is the right of establishment. For business and legal reasons, a European purchaser of a US air carrier would have no choice but to incorporate in the United States, just like any other foreign entity that operates in US domestic commerce. US incorporation (*i.e.,* exercise of the European purchaser's right of establishment) would automatically guarantee that the US-based air carrier remained subject to all US laws and regulations, including US immigration laws requiring the carrier to employ US workers. It would also ensure that DoD retained the same legal and economic leverage over the European-owned, US-based carrier that it has over a US-owned carrier.

The second mechanism, already in place, is the 1988 Exon-Florio amendment to the US Defense Production Act, which allows the President to block or restrict any foreign acquisition of a US company if the transaction threatens to impair national security. Because of Exon-Florio, and the interagency CFIUS review process it put in place, DoD can rest assured that a change in *policy* to allow European ownership of US carriers would not open the door to any unwanted *transactions*.

One scenario under an Open Aviation Area could put CRAF aircraft at risk: if a US-based air carrier, whether US- or foreign-owned, opted to re-flag some or all of its transatlantic operations to the European Union, presumably to take advantage of lower-wage European flight crews. However, this scenario is very unlikely, given the enormous bargaining power of US pilots and the limited potential for US carriers to reduce their labour costs by substituting EU flight crews. Moreover, there are policy mechanisms to preclude re-flagging of CRAF-participating aircraft under an Open Aviation Area.

In addition to foreign ownership, DoD's other main concern is the impact on CRAF of eliminating Fly America restrictions. Although these restrictions allow DoD to finance the CRAF program without a direct congressional appropriation, they impose direct and indirect costs on US government users of commercial transport services. On balance, the US government would save money if—instead of giving CRAF participants exclusive access to the US government market—it paid US-incorporated carriers directly to participate in CRAF and opened the government market to all qualified carriers. As the major government user of commercial transport, DoD would reap most of those savings. But Congress would have to appropriate funds directly for CRAF, which may be a political challenge.

8. How Would an Open Aviation Area Affect Airline Workers and Wages?

8.1 Introduction and Overview

While an EU-US Open Aviation Area would bring unalloyed benefits to consumers, it poses risks as well as opportunities for the thousands of airline workers in the United States and Europe. In opposing liberalisation, key US and European labour groups understandably emphasise the risks rather than the opportunities.

First, labour groups are concerned that EU-US liberalisation may reduce total airline employment by allowing carriers to achieve increased economies of scale, scope, and density. This employment effect is possible in theory. However, the analysis in Chapters 3 through 5 indicates that, in practice, an Open Aviation Area is just as likely to have a positive impact on airline employment overall, because the expanded output resulting from lower fares and increased passenger demand could more than offset any efficiency-related downsizing.[116]

Second, by liberalising aviation trade and investment, an EU-US Open Aviation Area may lead to "labour substitution"—that is, the substitution by US and European carriers of less expensive foreign workers for more expensive domestic workers. Purely from the standpoint of economic efficiency, labour substitution is a healthy process (although, as discussed in Chapter 3, from a social welfare perspective, reductions in labour costs represent a transfer from workers to consumers rather than a more efficient use of resources *per se*). Moreover, it contributes to overall income equality, by bidding up the wages of low-wage workers. However, efficiency can impose a heavy social cost, causing dedicated workers to experience severe dislocation and lost income through no fault of their own. Unless they are compensated or "cushioned" through direct payments, retraining, or other transitional measures, some workers will be net losers from liberalisation.

To help inform the debate over EU-US liberalisation, this chapter looks at the potential for an Open Aviation Area to lead to labour substitution. Specifically, we focus on the substitution of low-wage EU workers for high-wage US workers on transatlantic flights—labour's primary (but by no means only) concern in this debate.[117] First, we summarise the economic theory related to labour substitution. Second, as the empirical basis for our analysis, we examine wage differences between airline workers in the United States and the European Union, as well as several Central and Eastern European countries that are likely to join the European Union. Third, we look at institutional and legal mechanisms

---

[116] US airline workers experienced considerable dislocation in the aftermath of domestic deregulation, but over the long term, deregulation has led to tremendous job growth in the airline industry.

[117] Although some EU labour groups are concerned about the potential for labour substitution *within* the European Union, we do not look at that issue for two reasons. First, under Europe's single aviation market, European air carriers can already hire workers from any EU country. Indeed, freedom of movement for labour within the European Union is a fundamental element of the single internal market. Second, in part for that reason, the concerns of EU labour groups are not a major obstacle to liberalisation. Nor do we look at prospects for labour substitution on US domestic routes, because it is likely that EU-owned airlines that operate in US domestic commerce would employ US workers either by choice or by legal mandate, as discussed in Chapters 1 and 7.

that would limit labour mobility even under an Open Aviation Area. Based on this evidence, we draw some general conclusions about the likely nature and impact of labour substitution. Finally, we identify alternative policy mechanisms to protect labour, should social policy and/or political necessity call for such protection.

8.2 Labour Substitution: A Framework for Analysis

Trade theory tells us that the liberalisation of international trade and investment leads producers of goods and services to move from one country to another to take advantage of lower factor (labour and capital) costs. In addition, labour and/or capital themselves move from one country to another to take advantage of higher factor payments. The result is an increase in employment of labour from low-cost countries and a corresponding decrease in employment of labour from high-cost countries. At the same time, wage rates tend to converge, as the change in demand increases the wages of lower-cost workers and decreases (or slows the increase in) the wages of higher-cost workers.

EU-US aviation liberalisation could contribute to just such a process, as airline workers in low-wage EU countries seek markets that pay higher wages, and high-wage US carriers seek labour from relatively low-wage foreign areas in order to reduce their costs.[118] The rising cost of labour as a share of US airlines' total costs can only make the prospect more likely.

Labour substitution could take two forms under an EU-US Open Aviation Area. First, a US carrier could buy or establish an overseas affiliate, which in principle would allow the carrier to use low-wage EU workers as a direct substitute for its high-wage US workers on transatlantic flights—*i.e.*, *direct* labour substitution. Second, under an Open Aviation Area, any EU carrier could enter any transatlantic market. Having lower-wage workers would represent one potential source of competitive advantage. If the resulting competition allowed an EU carrier to win market share from a US carrier because its workers were cheaper, that would represent *indirect* labour substitution.

The potential for international worker mobility—*i.e.*, the substitutability of foreign for domestic labour—varies significantly by type of worker. Pilots and flight attendants have relatively high international mobility, because they need not reside where they work (even though they must return to their residence when they are not working). By contrast, baggage handlers and other ground-support personnel are less internationally mobile, because they must reside where they work. Thus, pilots and flight attendants in the United States are the most vulnerable to direct replacement by their counterparts in lower-wage EU countries under an Open Aviation Area. Conversely, pilots and flight attendants in low-wage EU countries have the most to gain from liberalisation.

8.3 Labour Perspective

Although many labour organisations have participated in the debate over EU-US aviation liberalisation, US and European pilots have been the most vocal. The US Air Line Pilots Association (ALPA) strongly opposes an EU-US Open Aviation Area because

---

[118] In our analysis, "high wage" refers to all US transatlantic carriers and their employees. "Low wage" refers to transatlantic carriers and airline workers from lower-cost EU Member States (*e.g.*, Greece, Ireland, and Portugal). Where indicated, we also use "low wage" to include flag carriers and airline workers from countries that are scheduled to accede to the European Union (*e.g.*, Poland and the Czech Republic).

of the potential for labour substitution. The European Cockpit Association (ECA) supports the proposed Open Aviation Area in the abstract, as a way to achieve what it views as reciprocal access to the US market. However, like ALPA, ECA opposes elimination of (most) commercial restrictions.

US pilots point to several scenarios for labour substitution:

- Absent restrictions on foreign investment, a US carrier could merge with a low-wage EU carrier and engage in direct labour substitution: for example, if Delta Air Lines were to buy Aer Lingus, it could substitute Irish pilots on transatlantic flights.

- Alternatively, absent the nationality clause, a US airline could re-flag some or all of its transatlantic operations to a low-wage EU country in order to substitute EU flight crew. For example, Northwest could re-flag to, say, Portugal. Labour groups refer pejoratively to this scenario as flying a "flag of convenience" or "flagging out".

- Absent restrictions on seventh freedom rights, low-wage European-flag carriers (*e.g.*, Air Portugal) could operate transatlantic services out of high-wage EU hubs such as Paris or Frankfurt. Pilots worry that low-wage carriers' labour cost advantage would allow them to out-compete the high-wage EU carriers and their US alliance partners that now dominate those routes (indirect labour substitution).

8.4 EU-US Wage Differences

To assess the potential for labour substitution under an Open Aviation Area, it is useful to compare wage rates for airline workers in the United States and the European Union. The greater the gap between the wages of US workers and their counterparts at low-wage EU airlines, the more likely it is that liberalisation would lead to labour substitution.

Table 8.1 shows the average annual remuneration for pilots and cabin attendants of selected European and US international air carriers, based on figures published by the International Civil Aviation Organization (ICAO). The table presents ICAO figures for the three most recent years available—1998, 1999, and 2000. We have included as well a three-year "average of averages", so as to reduce the effect, some of it due to currency fluctuations, of year-to-year variations in EU airline wages as reported in US dollars.

Table 8.1

Average Annual Remuneration for Pilots and Cabin Attendants of Selected Airlines

	Pilots and Co-Pilots				*Cabin Attendants*			
Airline	*1998*	*1999*	*2000*	*Average*	*1998*	*1999*	*2000*	*Average*
Major EU Transatlantic Airlines								
Air France [1]	193,578	n/a	155,076	174,327	58,305	n/a	47,152	52,728
Alitalia	201,630	n/a	n/a	201,630	58,487	n/a	n/a	58,487
British Airways	125,178	121,153	112,431	119,587	29,563	30,815	29,454	29,944
Iberia [2]	190,904	188,091	160,222	179,739	61,828	59,340	52,887	58,018
KLM	n/a	n/a	159,542	159,542	n/a	n/a	40,157	40,157
Lufthansa [2]	155,129	141,646	153,334	150,036	51,934	50,017	45,939	49,297
SAS	161,472	129,445	148,510	146,476	67,657	58,441	61,480	62,526
Smaller EU Transatlantic Airlines								
British Midland	93,363	94,995	91,764	93,374	28,373	28,721	27,247	28,114
Finnair	104,623	99,732	80,459	94,938	28,582	28,094	24,268	26,981
Olympic	91,706	n/a	62,328	77,017	43,321	n/a	25,104	34,213
Tap Air Portugal [2]	143,959	144,570	131,253	139,927	45,872	44,215	41,207	43,765
Virgin Atlantic	80,819	85,048	91,179	85,682	19,772	18,810	19,787	19,456
Airlines in EU Accession Countries								
Czech Airlines	15,401	17,489	18,280	17,057	5,985	6,105	7,126	6,405
Estonian Air	n/a	n/a	28,704	28,704	n/a	n/a	9,851	9,851
Lot (Poland)	n/a	n/a	54,078	54,078	n/a	n/a	14,857	14,857
Lithuanian Airlines	16,191	13,928	14,106	14,742	7,570	6,806	6,715	7,030
US Airlines [3]								
American	191,296	183,755	188,305	187,785	49,896	44,018	46,687	46,867
Continental	206,310	188,090	197,941	197,447	46,290	41,903	49,833	46,009
Delta	160,737	185,473	190,503	178,904	46,271	49,145	24,699	40,038
Northwest	186,630	172,516	178,587	179,244	40,204	43,642	42,722	42,189
United	187,716	165,380	198,928	184,008	44,441	42,190	47,825	44,819
US Airways	193,940	186,189	171,210	183,780	50,962	50,709	48,975	50,215

Source:
Part D1, Personnel Statistics by Airline. ICAO, Digest of Statistics, Fleet - Personnel, Commercial Air Carriers, 1998; 1999; and 2000.

Notes:
[1]: The 1998 US Dollar (USD) remuneration figures that ICAO reports for Air France are based on an incorrect USD/FRF exchange rate (0.22). The figures shown here are based on a 0.17 USD/FRF exchange rate.
[2]: Remuneration for Pilots and Co-Pilots includes Other Cockpit Personnel.
[3]: For US airlines, ICAO includes payments for employee benefits, payroll taxes, and pensions (additional payments) in the "total personnel" expenditure only, whereas for all other airlines, ICAO includes additional payments in the remuneration figures for individual staff categories. To take account of that difference, for each US airline, we have increased the ICAO-reported remuneration figure for "Pilots and Co-Pilots" and "Cabin Attendants" by an amount equal to the value of the additional payments as a fraction of the airline's total personnel expenditures.

Looking first at three-year average wage rates for flight crew at US carriers versus major EU carriers, what is striking is their similarity. Pilots at the six major US carriers were paid more than their counterparts at major EU-flag carriers, but not by a significant amount—roughly 15 percent. For US pilots, average wages were very homogeneous, ranging from $179,244 at Northwest to $197,447 at Continental for the period 1998-2000. For pilots at the seven major EU carriers, the range in three-year average wages was considerably broader—from $119,587 at British Airways to $201,630 at Alitalia. But, except for British Airways, the EU carriers paid their pilots more than $146,000, and three of them (Iberia and Air France, in addition to Alitalia) paid pilots more than $170,000.

The differences in flight attendant wages at US versus major EU-flag carriers are likewise small. The three-year average pay for flight attendants at the six US carriers was very homogeneous—ranging from $40,038 at Delta to $50,215 at US Airways. Flight attendants at the major EU carriers earned about 10 percent more, but the range was also wider—from $29,944 at British Airways to $62,526 at SAS.

We note two significant caveats concerning the ICAO summary statistics. First, they do not reflect the "social charges" that European airlines must pay in their home country. (Social charges include employer contributions to employees' pension schemes and state social security funds, as well as payroll taxes and other employee-related charges.) These charges vary greatly within Europe. According to Rigas Doganis, social charges add 30 to 50 percent to airline labour costs in high-wage EU countries (*e.g.*, France, Germany, and Netherlands), compared to only about 15 percent in the United Kingdom and Ireland.[119]

Second the ICAO data do not take account of differences in fleet composition, which significantly affect pilot wages. (The more long-range, wide-body aircraft in a carrier's fleet, the higher the wages its pilots can command.) However, even making some allowance for these factors, the overall differences in pilot wages at US carriers versus major EU-flag carriers appear to be relatively small.

A second conclusion based on the ICAO data is that flight crew at most smaller EU transatlantic carriers were paid significantly lower wages than their counterparts at major US carriers and most major EU carriers. For example, pilots at British Midland, Finnair, Virgin Atlantic, and Olympic earned less than $95,000 a year. The gap in flight attendant wages is not quite as great. TAP Air Portugal paid flight attendants in line with major EU carriers ($43,765), and Olympic paid a surprisingly high $34,213. But flight attendants received less than $30,000 a year on average at British Midland and Finnair, and less than $20,000 at Virgin Atlantic. In part, the wage gap between smaller EU-flag carriers and large EU and US carriers reflects the lower prevailing wage rates and social charges in the United Kingdom, Greece, and Portugal. However, it also may reflect differences in fleet composition.

Third, pilots and flight attendants at flag carriers in EU accession countries received wages that were just a fraction of what their counterparts in the United States (or the European Union) received. Table 8.1 shows the average annual remuneration for pilots and cabin attendants for four of the accession country airlines. In 2000, Poland's flag carrier, Lot Airlines, paid average annual wages of $54,078 to pilots and $14,857 to cabin attendants. The next highest was Estonian Air, which paid pilots $28,704 and cabin attendants $9,851 in 2000. Czech Airlines and Lithuanian Airlines paid pilots $18,280 and $14,106, respectively, in 2000; for flight attendants, the comparable figures were $7,126 and $1,538.

Given the magnitude of the wage dispersion between the United States and the accession countries, it is fair to say that the incentive for labour substitution under an EU-US Open Aviation Area will increase when the accession countries join the European Union. Under the agreed timetable, ten new countries will accede in 2004: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.[120]

However, opportunities for labour mobility from these countries may be limited, at least in the near term. Most important, Central and Eastern Europe are home to only 3,000 to 4,000 fully licensed pilots who were trained on Western aircraft, according to the

---

[119] Doganis, *The Airline Business*, 105-106.

[120] Judy Dempsey, "European Union Set for Historic Expansion," *FT.com* (Oct. 9, 2002). The Commission also suggested that Bulgaria and Romania could join by 2007. The Commission left unclear the status of Turkey, a candidate for membership since 1999.

European Cockpit Association.[121] This is a mere 10 percent of the 35,000 to 40,000 licensed pilots in the European Union. Moreover, it is far more expensive to train pilots in Europe than the United States, according to the ECA.[122] Thus, the supply of low-cost pilots in accession countries might not expand quickly. Finally, the European Union may keep safeguards in place until 2011 to prevent economic disruption to the labour markets of Member States.[123] If those safeguards apply to aviation, they would delay any labour substitution (at least of the direct variety).

In sum, based solely on a comparison of the wages of those workers who would be most affected, it appears that the economic incentive for labour substitution under an EU-US Open Aviation Area is fairly limited. There is no significant wage difference between US international carriers and any major EU-flag carrier except British Airways: US pilots earn only about 15 percent more than EU pilots, while US flight attendants earn about 10 percent less than their EU counterparts. The wage gap is greater with respect to smaller EU transatlantic carriers, but some of that is probably due to differences in fleet composition. By comparison, the wage difference between carriers in accession countries and those in both the United States and the European Union is quite large. But the supply of pilots from accession countries may not be large enough in the near term to allow for significant labour substitution under an EU-US Open Aviation Area.

8.5 Legal and Institutional Barriers to Labour Mobility

Although aviation liberalisation would remove specific regulations that impede labour mobility between Europe and the United States, other US laws and institutions designed to reduce labour substitution would remain. Understanding the role of these legal and institutional barriers is important to an analysis of the potential for labour substitution under an Open Aviation Area.

US Immigration Law

Under US immigration law, a US airline is effectively precluded from hiring foreign flight crew. The US Immigration and Naturalisation Service (INS) requires an employer who wants to hire a foreign worker to show that no US workers are available to perform the job. The INS does not even have a visa for domestic pilot work, because a US airline would not be able to meet that test. There *is* a visa for international pilot work; for example, pilots on non-US airlines who fly to the United States obtain it. But, a US airline would have an equally difficult time showing that no US pilots are available for international flying.[124]

---

[121] Interview with Giancarlo Crivellaro, General Secretary, European Cockpit Association (February 12, 2002).

[122] *Ibid.*

[123] Dempsey, "European Union Set for Historic Expansion," *FT.com*.

[124] Moreover, according to a senior ALPA official, if a US airline tried to hire a pilot holding such a visa to fly one of its international flights, the action would violate rules regarding seniority lists and create a major labour-management dispute.

US Labour Law

Railway Labour Act and Collective Bargaining

In the US airline industry, labour-management relations are governed by the Railway Labour Act (RLA) of 1926, the oldest US labour law that provides for collective bargaining. Like other US labour laws, the RLA gives employees who are in a particular class or craft (*e.g.*, Northwest pilots) the right to a single bargaining representative.[125] The RLA also gives parties to a dispute the right to seek "self help" (*i.e.*, an employee strike or an employer lock-out) after mediation has failed. In the United States some 65 percent of scheduled airline employees—and more than 90 percent of pilots—belong to a labour union, compared to nine percent of the private workforce overall.

Unlike some US airline employees, pilots have held their ground financially despite the increased competition ushered in by airline deregulation, and they have prevailed over airline management in nearly all recent wage and contract disputes. Their success reflects the fact that pilots have a valuable and narrowly defined skill, and it is not easy to find qualified people to perform the job. Moreover, airlines are highly vulnerable to strikes or other events that significantly reduce or eliminate revenue, because of their high fixed costs (airlines have to pay for pilots and planes whether or not they fly). Thus, pilots' ability to stage a strike or work slowdown gives them significant market power.[126]

As discussed below, pilots have already used their leverage to negotiate contract scope-of-work provisions that limit certain forms of labour substitution. As the prospects for international liberalisation increase, there is little to prevent pilots securing additional job protection.

Scope Clause

The primary contractual impediment to direct labour substitution is the so-called "scope clause". Although the scope clause is generally thought of as the provision that limits the ability of a network ("mainline") air carrier to transfer routes to regional partners, or that locks these partners into smaller aircraft, it is actually much broader:

> Depending on the strength of the scope clause, it normally encompasses all present and future flying performed by an airline, either on its own or by any wholly or partially owned subsidiary. Most clauses . . . define what type of flying will be performed by pilots on the airline's seniority list. This can be broken down into city-pairs, international flying, or even as a percentage of total system flight hours. In

---

[125] Pilots at most major airlines are represented by ALPA; American Airline pilots, represented by the Allied Pilots Association, are the exception. The Association of Flight Attendants represents 50,000 flight attendants at 26 US airlines.

[126] Nothing better reflects pilots' bargaining power than a statement that Rick Dubinsky, the longtime head of the Air Line Pilots Association at United Airlines, made to United's then-CEO James Goodwin at the start of a wage negotiation. "We don't want to kill the golden goose," Dubinsky told Goodwin. "We just want to choke it by the neck until it gives us every last egg." Roger Lowenstein, "Into Thin Air," *New York Times* (February 17, 2002). Available at: http://www.nwtm.com/ClientGateway/newsIndustryNews/IndustryNewsArchive/2002/03-02IndustryNews/03-02NewsIndArticles/03-02IntoThinAir.htm.

addition . . . the agreement will normally depict what size and/or type of aircraft will be flown by mainline pilots.[127]

Moreover, scope clauses can even protect pilots in the event of a sale or takeover of their airline:

> Some scope clauses restrict the sale of routes or other assets without management guaranteeing furlough protection. Some clauses even protect pilots in the event of a merger or partial sale of the airline.[128]

With the globalisation of aviation, US pilot groups have made it a bargaining priority to limit the potential risk of competition from foreign pilots. For example the contract that Northwest and its pilots reached in Fall 1998 assures that they will get half of all block hours in the Northwest-KLM joint venture. In addition, with respect to international code-share flights, Northwest pilots are guaranteed at least half of all hub-to-hub flights and 100 percent of all flights from a Northwest hub to a non-hub airport of an alliance partner.[129] More generally, according to a senior ALPA official:

> Enormous amounts of bargaining capital are now being spent on obtaining significant controls and restrictions on international operations. At major carriers, scope clauses have been expanded to cover a multitude of circumstances, such as limitations on the level and type of international code-sharing relationships, the allocation of flying between international airline partners, prohibitions against cabotage operations or establishing foreign domiciles, and guarantees concerning future international flying opportunities.[130]

Single Carrier Doctrine

In addition to scope clauses, the "single carrier" doctrine under the RLA limits opportunities for a US airline to transfer flying opportunities to a lower-wage affiliate—what labour refers to as an "alter ego" carrier. If the National Mediation Board (NMB) determines that two air carriers are in fact being operated as a single transportation system, employees of a particular class or craft of that single transportation system (*i.e.*, the pilots or mechanics from the two carriers) may then elect a single representative.

To date, disputes over alter ego carriers have been limited to US domestic affiliates. For example, ALPA recently opposed Mesaba Airlines' purchase of Big Sky Airlines, because it believed the purpose was to divert work to Big Sky as a form of leverage

---

[127] Douglas S. Carmody, "The Scope Clause," *Airline Pilot Careers* (August 1997): 13, 34. Available at: http://www.aviationwriter.com/careers_scope.pdf.

[128] *Ibid.* For example, in 1985, when United bought Pan American Airline's Pacific routes, it was required to add the 412 Pan Am pilots flying those routes to the United seniority list.

[129] Duane E. Woerth, "Looking at Alliances," Opening Statement to the Transportation Research Board, National Research Council (January 11, 1999). Available at: http://www.alpa.org/internet/speech/sp011199.htm.

[130] Captain Dennis Dolan, ALPA First Vice President, "Challenge 2: ALPA Must Effectively Deal with Industry Globalisation," 2000. Available at: http://cf.alpa.org/internet/prescorner/hup_1-2000/challenge_2.htm.

during negotiations with Mesaba pilots.[131] However, in a liberalised aviation environment, pilots might be able to use the single carrier doctrine to prevent direct substitution of low-wage foreign pilots. Specifically, if a US airline moved some or all of its international operations to the European Union in order to take advantage of low-wage European pilots, US pilots might challenge the affiliate as an alter ego carrier subject to the single carrier doctrine.

It is an open question whether US courts would accept such an application of the doctrine. The NMB has recently held that the Railway Labour Act does not cover foreign-based ground employees of US airlines, and some courts have applied the same rule to foreign-based flight attendants who work on flights wholly outside the United States.[132] If those rulings prevail, US pilots would not be able to use the single carrier doctrine to challenge a US carrier's offshore operation. However, US pilots are challenging those rulings in the courts and seeking legislative relief in Congress.

International Pilot Alliances

In recent years, pilots have organised themselves in parallel with the cross-border airline alliances. These international pilot alliances provide another potential tool to thwart efforts by airlines to introduce competition in aviation labour markets. For example, in 1995 and 1997, when KLM pilots were contemplating a strike over collective bargaining issues, Northwest pilots offered the Dutch Airline Pilots Association technical and financial support and pledged not to take up KLM flying in the event of a strike. When Northwest pilots struck in 1998, Dutch pilots provided similar support.[133]

Although pilot alliances are largely untested (the cooperation between Northwest and KLM pilots is the exception), the idea has spread quickly. In May, representatives of the SkyTeam Pilot Alliance agreed to a pact aimed at mutual protection.[134] Among other things, the alliance, chaired by Captain Sung Jae Lee of Korean Air, will establish a database to monitor the flying performed by the SkyTeam airlines.[135]

The European Cockpit Association recently approved a change in its constitution to allow pilot associations from accession countries to become full members of ECA. This will facilitate pilot alliances and other forms of cross-border cooperation. In addition, ALPA has formed a consulting unit, the International Pilot Services Corporation, to advise foreign pilot groups. ALPA's goal is to enhance pilot compensation and negotiating standards internationally.

---

[131] For example, see "ALPA Leaders Strongly Oppose Mesaba Holdings' Formation of Big Sky Airlines as an Alter-Ego Carrier," ALPA News Release (September 27, 2002).

[132] Duane Woerth, "Airline Labor Law in the Era of Globalization: The Need to Correct a Misreading of the Railway Labor Act," *Issues in Aviation Law and Policy* (October 10, 2001).

[133] Chris Dodd, "Rewriting the 'Rules of Engagement'," *Air Line Pilot* (May 2000): 4-5. Available at: http://www.alpa.org/internet/alp/2000/mayrules.htm.

[134] SPA includes pilots from the major SkyTeam airlines, including AeroMexico, Air France, Alitalia, CSA Czech Airlines, Delta Air Lines, and Korean Air, with associate members from Air Jamaica, El Al, and South African Airways.

[135] ALPA-Delta press release (May 6, 2002). Available at: http://www.dalpa.com/public/releases/2002/020506.htm.

8.6 Potential Impact of Liberalisation on Workers and Wages

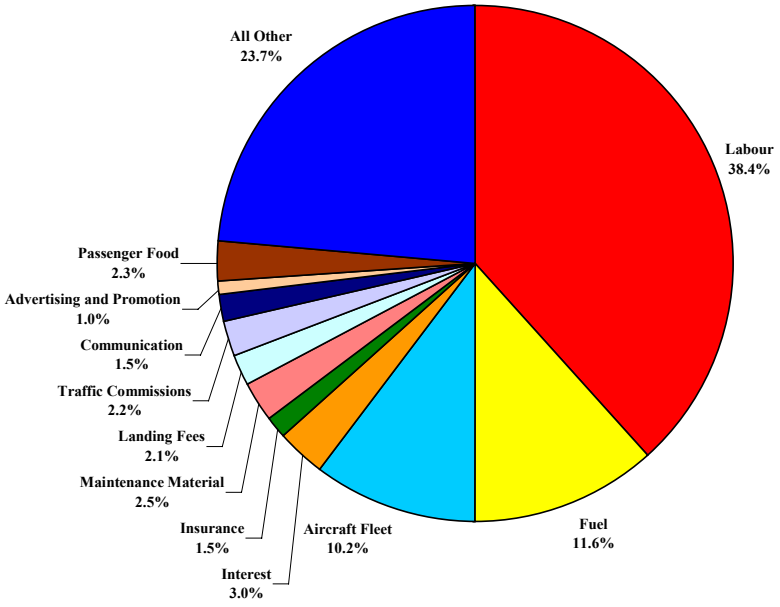
The complexity of labour markets makes it difficult to predict with precision the extent of any shifts in labour that might occur under an EU-US Open Aviation Area. However, our examination of wages differences and legal and institutional mechanisms affecting labour mobility points to several broad conclusions.

First, US airlines, which have made no secret of their desire to lower labour costs, have ample financial motivation to seek to engage in labour substitution.

Figure 8.1 shows the breakdown of total operating expenses for the 21 largest US passenger and all-cargo airlines in the second quarter of 2002. Labour accounted for fully 38.4 percent of US airlines' operating expenses. That was slightly more than the combined cost of fuel, aircraft lease and purchase costs, insurance, maintenance material, landing fees, travel commissions, communication, advertising, and food.

Figure 8.1

Operating Costs by Expenditure Type for US Airlines
Second Quarter 2002



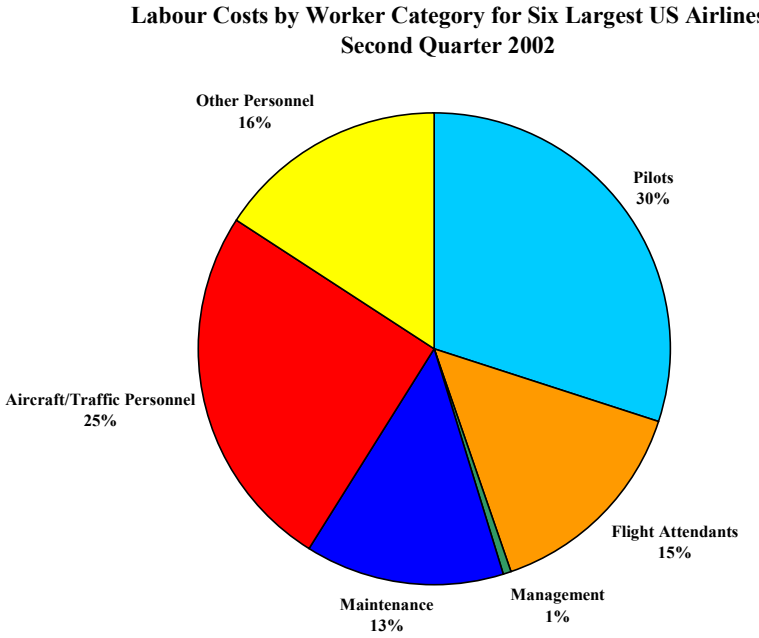
Source: Air Transport Association of America, "Airline Cost Index: Second Quarter 2002," Airline Cost Index (Majors and Nationals). Based on data from 21 major and national US airlines.

Labour costs as a fraction of airlines' total operating costs are nearly back to what they were prior to deregulation. In 1978, when Congress enacted the Airline Deregulation Act, labour accounted for 40.8 percent of airline operating expenses. Following deregulation, labour costs as a share of total costs steadily dropped until 1990, when they were 31.5 percent of total operating costs. Labour costs have been rising gradually as a share of total costs since that time, and they jumped significantly in the first quarter of 2002.[136]

[136] Air Transport Association of America, "Airline Cost Index: Second Quarter 2002," Labor Cost Index – Combined Carriers (Majors and Nationals). Available at: http://www.air-transport.org/public/industry/bin/cost.pdf.

Figure 8.2 shows the breakdown of labour costs among different employee groups for the six major US airlines. Overall, pilots account for 30 percent of total labour costs for the big six carriers. Flight attendants account for another 15 percent of total labour costs, on average, and mechanics and maintenance personnel for another 13 percent.

Figure 8.2



Source: Form 41 Filings for June 30, 2002 by American, Continental, Delta, Northwest, United, and US Airways.

Second, airlines' motivation notwithstanding, the actual potential for direct *labour substitution under an EU-US Open Aviation Area is rather limited.*

Theoretically, under an EU-US Open Aviation Area, a US airline could accomplish direct labour substitution in several ways, as the pilot scenarios described earlier reflect. One, the airline could buy a low-wage EU carrier (*e.g.*, Delta could buy Aer Lingus) and substitute EU flight crew on transatlantic flights. The purchase of a US carrier by an EU carrier could produce the same result. Alternatively, the US airline could "move" some or all of its international operations offshore using a so-called "flag of convenience". For example, Northwest Airlines could create a Portuguese-flag entity to operate some of its transatlantic flights using low-wage flight crew from Portugal and elsewhere in Europe. To do that, Northwest need not move its US hubs, and it would continue to employ US-based ground crew, as well as US flight crew on all domestic flights.

In reality, however, these labour substitution scenarios are highly unlikely. The major impediments are legal and institutional. Pilot scope clauses at some major US carriers already prohibit the first scenario (merger). The second scenario (re-flagging) is not yet prohibited, but would appear unrealistic given the extraordinary bargaining power of US pilots.

To elaborate, under US immigration law, major carriers cannot avoid using US pilots for domestic operations, which account for nearly three-quarters of their revenue. Because of this dependency, US pilots have significant bargaining leverage to prohibit

flags of convenience under an EU-US Open Aviation Area. As one former airline executive said to us:

> If a US airline set up an offshore entity [under a transatlantic open aviation area] it would be a declaration of war on pilots. Pilots have a lot of ways to punish you [the airline], and they're hard to replace.

Wage considerations also will limit direct labour substitution under an EU-US Open Aviation Area. As discussed above, there is no significant wage difference between EU and US transatlantic carriers. And although the wage difference between US and accession country carriers *is* significant, those countries have relatively few qualified pilots and it is expensive to train new ones.

Moreover, the wide gap in wages between accession country airlines and EU and US carriers will be short lived once EU enlargement takes place. Unlike, say, textile workers in low-wage countries, pilots are relatively scarce. They are also well-educated and well-informed. If Polish pilots earning $60,000 a year see that their German and US counterparts are earning three times that much, they will quickly raise their "reservation" price.[137] More generally, given the limited supply of pilots in Europe and the United States, and the high costs of training (at least in Europe), wages under an Open Aviation Area will converge over time.

Pilots stress that wage differences are not the only driver of labour substitution. Regulatory advantages can also be a factor. (The regulatory environment differs from country to country even within the European Union—something that ECA and ALPA believe may encourage European carriers to re-flag in the future.) But with respect to work rules, the European Union is no less restrictive than the United States, overall, and in some respects European flight duty requirements and other work rules are more restrictive (*i.e.*, more pro-labour) than those in the United States.

Finally, labour substitution is an issue largely because pilots and flight attendants are an internationally mobile work force that is organised nationally. If workers organise themselves internationally—pilot alliances and ALPA's international consulting arm are a major step in that direction—the cross-border structure of trade unions will itself reduce the potential for labour substitution.

---

[137] The scarcity is key. Even the best-educated textile worker in Indonesia could not demand higher wages, because he or she is competing with millions of others. But given that the pilots are scarce, being educated and informed means they know they have leverage, and are better able to exploit it.

In sum, an EU-US Open Aviation Area is likely to see little if any direct labour substitution by US carriers either through a merger or a flag of convenience.[138] (See Box A for more analysis of "flags of convenience".) Pilots are best positioned to avoid adverse effects, given their bargaining leverage and sophistication at cross-airline organisation. Flight attendants may be more vulnerable in that they lack pilots' bargaining leverage. But for the same reason, flight attendants are a less inviting target for cost-conscious airlines.

The potential for indirect labour substitution is greater, by comparison, particularly over the long run—conclusion three.

The most likely scenario is that some of the lower-wage EU transatlantic carriers such as Virgin Atlantic or long-haul EU charter carriers would thrive in an Open Aviation Area, taking market share from US carriers and their high-wage EU alliance partners. Because of the greater mobility of (low-wage) flight crews, high-wage pilots and flight attendants would be the employees most likely to suffer losses. But even here, the impact on labour would be limited because of the tendency for wage levels, which are not that far apart to begin with, to converge in a competitive market.

Box A
Flags of Convenience

The term "flag of convenience" has come to be used pejoratively by people on all sides in the debate over liberalisation of international aviation. Labour groups routinely point to sub-standard safety and labour conditions on flag-of-convenience ocean vessels as proof of what airlines will resort to absent restrictions on cross-border competition and investment. And many aviation experts in government and international organisations who vigorously disagree with labour on the merits of liberalisation nevertheless embrace labour's view that flags of convenience are inherently bad. However, *much of this debate is fundamentally misleading.*

The maritime experience has limited relevance for aviation, at least in the context of an EU-US Open Aviation Area. For somewhat different reasons, major air carriers from the United States and Europe are not likely to re-flag their operations. And even if they did, such operations would not pose a threat to safety or the environment.

[138] Additional support for this view comes from Europe's single aviation market, where carriers are free to hire workers from, or move their operations to, any EU country. Given the variation in airline labour costs among EU Member States, one would expect to see labour mobility within the Single Market. In practice, however, there has been relatively little sign of direct labour substitution. The fact that no EU-flag carrier has moved its operations to a lower-cost EU country is predictable, because nationality clauses in bilateral aviation agreements effectively preclude such relocation. More striking, however, is the absence of cases in which high-wage flag carriers have hired workers from low-wage EU countries. ECA argues that this is a temporary phenomenon, which reflects flag carriers' longstanding ties to their home countries. Once EU airlines begin to consolidate, ECA cautions, high-wage carriers will try to substitute flight crew from the low-wage carriers they acquire. Whether or not ECA is right about the future, the fact that high-wage EU carriers have not yet recruited low-wage substitutes, despite the cost pressure they face, is an indication that the impediments to direct labour substitution are large.

Box A, continued

Flags of Convenience in Maritime Industry

In an effort to lower their costs, many ocean shipping companies register their vessels in nationally sponsored "open registries" that allow for relatively low tax rates, crew costs, and vessel registration fees. Vessels that fly the flag of the United States or another advanced maritime country typically must be owned and operated, as well as crewed by, nationals of that country. By contrast, a ship that flies the flag of an open registry (often called a "flag of convenience") need not have any link to the sponsoring country. As a floating domicile, such a vessel can employ workers from anywhere in the world.

There is considerable variation among open registries. For example, Liberia's registry has an international reputation for quality. However, other open registries do not enforce minimum standards for the design and safe operation of vessels. In some cases, crews live in squalid conditions and have little recourse if they are abused or mistreated.[139] While open-registry vessels may violate safety and environmental standards set by the International Maritime Organisation (IMO), the IMO has no real powers to inspect such vessels or enforce its standards.

Between 1980 and 1998, advanced industrial nations lost about half of their general cargo vessel tonnage to the major open-registry countries (Liberia, the Bahamas, Panama, Cyprus, and Malta, among others). In 2000, four of the world's top five maritime registries were open registries (the United States was ranked a distant 13), and such registries now account for 60 percent of the capacity of the world merchant fleet.[140]

Aviation Is Not Like Maritime

The aviation industry is fundamentally different from maritime in ways that make it unlikely that an EU-US Open Aviation Area would lead to flags of convenience. First, the US domestic aviation market is huge, accounting for about three times as much of US-flag carriers' revenue as the international market. Thus, in aviation, domestic rather than international considerations drive US carriers' strategy—just the opposite of maritime. Moreover, immigration law ensures that US carriers will remain dependent on US pilots to fly their domestic operations. As a result, US pilots will have the leverage to enforce a prohibition on flags of convenience. (See Section 8.6 above for additional analysis of why US airlines are unlikely to fly flags of convenience under an EU-US Open Aviation Area.)

---

[139] "Vessels Operations under 'Flags of Convenience' and National Security Implications," Statement of William G. Schubert, Administrator, Maritime Administration, Department of Transportation, Before the House Armed Services Committee, Special Oversight Panel on the Merchant Marine (June 13, 2002). Available at: http://armedservices.house.gov/openingstatementsandpressreleases/107thcongress/02-06-13schubert.html.

[140] *Ibid.*

Box A, continued

EU carriers also are unlikely to fly flags of convenience but largely for a different reason. Under the European Union's single aviation market, a high-wage EU-flag carrier can *already* hire pilots and flight attendants from a low-wage EU country even without re-flagging.[141]

Even if a US or EU airline were to re-flag to a low-wage EU country, it would not pose a threat to aviation safety or the environment, as the comparison to maritime implies. That is so because of the effectiveness of the international regulatory regime in aviation—another key difference from maritime. The International Civil Aviation Organization (ICAO), a specialised agency of the United Nations, sets demanding standards with respect to safety, security, and environmental impact. National aviation authorities in turn apply and enforce these international standards, and—in contrast to IMO—ICAO technical experts audit national regulators' compliance. Among other things, national aviation authorities deny landing rights to foreign carriers that fail to meet international standards themselves or that carry the flag of a country whose civil aviation regulators are not ICAO-compliant.

Granted, not all aviation regulatory regimes comply with ICAO standards. Thus, if an open aviation area were to include regions with substandard regulatory regimes, the prospect of a carrier flagging out to such a country might raise legitimate safety and environmental concerns. But the United States and Europe, with the notable exception of Greece, have the toughest aviation regulatory regimes in the world. In fact, regulatory authorities in the United States and Europe require their own air carriers to meet standards that are even stricter than ICAO's. Moreover, all 10 accession countries had to meet those standards before the European Commission recommended them for EU membership.

Nor would labour conditions on any EU flag of convenience air carrier resemble those on substandard ocean vessels. Unlike merchant mariners, pilots are expensive to train and hard to replace. Moreover, pilots and flight attendants are highly visible and interact extensively with customers. Although flight crew in low-wage EU and accession countries earn significantly less than their counterparts in the United States, they are well paid relative to other workers in the same country.

In sum, the term "flag of convenience" has become a pejorative in maritime because a flawed regulatory system allows some open-registry vessels to create genuine problems. But, unlike maritime, aviation has a credible international regulatory system, and national aviation authorities have a strong incentive to enforce international standards. Aviation experts in government and international organisations may well want to take steps to strengthen the international regulatory regime for aviation. But it is a fundamental misunderstanding to believe that flying a flag of convenience is "inherently bad". In essence, re-flagging is a form of foreign outsourcing, comparable to the foreign outsourcing of software development or computer chip production. Although labour unions may oppose such outsourcing, it is a widespread practice that contributes to economic efficiency.

[141] The ECA counters that flagging out would reduce an EU carrier's tax and fiscal costs, as well as labour costs. Thus, according to ECA, if existing impediments to relocation were eliminated, high-wage EU carriers would flag out in order to get the tax and fiscal benefits that are not otherwise available. But most companies could reap tax and fiscal benefits by relocating. The fact that they choose not to relocate implies that the costs of doing so outweigh the benefits.

8.7 Options for Protecting or Compensating Labour

Although our analysis suggests that airline workers would not be seriously harmed by an EU-US Open Aviation Area, policymakers nevertheless may want to ensure that aviation liberalisation does not result in significant losses to labour. Justified or not, some airline workers are genuinely concerned about the "downside" of liberalisation, and adoption of a policy to prevent significant losses could alleviate their concerns. In doing so, such a policy also might make liberalisation more feasible politically. Moreover, because the economic benefits of trade liberalisation outweigh its costs, the price of compensating airline workers who suffer losses would necessarily be less than the gain to consumers and airlines.

Policies to buffer labour against major losses can be distinguished on the basis of their efficiency. Efficient mechanisms do not interfere with competition and so are neutral from an economic point of view. Stated differently, they reallocate the economic "pie" in a way that is more favourable to labour, but they do nothing to reduce the size of the pie. By contrast, inefficient mechanisms benefit labour by retaining or introducing new competitive distortions. By restricting the growth of the economic pie, such policies limit the benefits of trade liberalisation for others.

Below we describe three options for preventing significant losses to labour. The first two—common labour standards and mechanisms to prevent flags of convenience—are comparatively inefficient because they would maintain competitive distortions. The third option—a safety-net program—is comparatively efficient because it would help workers without reducing the benefits of trade liberalisation to consumers.

Common Labour Standards

To address the perceived threat to international jobs, pilot groups have proposed that the United States and the European Union adopt common labour standards as an element of liberalisation. According to pilots, adoption of a common, EU-US labour framework—the Railway Labour Act or something like it—would eliminate the disparity that exists when US and European carriers compete head to head. It also would address what labour groups perceive as the potential problem of disparate treatment of American and European workers by the same multinational airline employer.[142]

However, airlines doubt the practicality of pilots' proposal for common labour standards. Most US carriers are highly critical of the RLA; in fact, several of them are currently seeking to amend it. Thus, the prospect of extending the RLA or anything like it as part of an international agreement is a non-starter. As further evidence that the option of common labour standards is not feasible, it is worth noting that even within Europe,

---

[142] For example, consider if Air France were to buy Delta Air Lines and continue to operate it as a US corporation—*i.e.*, a US subsidiary of Air France. Although Delta's domestic workers would retain their jobs, they would remain subject to US law while others workers within Air France would be subject to French and EU law. Labour fears that under that arrangement, Air France could "whipsaw" US and European pilots and cabin attendants who fly on international routes.

Ironically, US workers fear that such whipsawing would favour European workers and vice versa. For example, US pilots maintain that if Air France bought Delta, they would be laid off first in an economic downturn, because French redundancy laws are more favourable to labour than comparable US laws. However, US pilots downplay the fact that, by the same logic, a multinational airline would hire American over French workers in an expanding economy. Not surprisingly, the latter is a concern to European pilots.

EU Member States have not yet established an RLA-type common labour law, despite the creation of a single market and a single currency.

Mechanisms to Prevent "Flags of Convenience"

"Principal Place of Business" Requirement

ICAO has been actively looking at alternatives to the nationality clause that would promote liberalisation but nevertheless preserve the function that the clause serves in deterring flags of convenience. In a recent paper prepared for discussion at an upcoming conference, ICAO proposes a draft model clause for States to use at their discretion in air services agreements. In place of the traditional nationality clause, the ICAO clause would have States accept designation and authorisation of another Party's airline, provided in part that "the designated airline has its principal place of business [and permanent residence] in the territory of the designating Party".[143]

Labour officials caution that the term "principal place of business" must be carefully defined in order to prevent carriers from getting around it.[144] According to the ICAO paper:

> . . . evidence of principal place of business includes such factors as: the airline is established and incorporated in the territory of the designating Party in accordance with relevant national laws and regulations, has a substantial amount of its operations and capital investment in physical facilities in the territory of the designating Party, pays income tax, registers and bases its aircraft there, and employs a significant number of nationals in managerial, technical and operational positions.[145]

An alternative is to require an airline to incorporate and maintain its principal place of business in whichever country designates it to fly international routes.

However, both alternatives would be largely unworkable in the context of an EU-US Open Aviation Area. European airlines, or their holding companies, already have the freedom to own different airline subsidiaries within the European Union, each with its own principal place of business. Similarly, in the United States, airlines often have regional carriers that are stand-alone subsidiaries with their own operating certificates. For a large international airline, especially one formed through a transatlantic merger, it would be virtually impossible to identify a "principal place of business".

Extend Railway Labour Act to Transatlantic Operations

Another way to discourage US air carriers from flying flags of convenience would be to apply the single carrier doctrine of the Railway Labour Act to US carriers' offshore

---

[143] ICAO Secretariat, "Liberalizing Air Carrier Ownership and Control," Paper Prepared for the March 2003 Worldwide Air Transport Conference: Challenges and Opportunities of Liberalization, ATConf/5-WP/7 (October 21, 2002): 5. Available at: http://www.icao.int/icao/en/atb/atconf5/docs/ATConf5_wp007_en.pdf. The ICAO clause also includes a condition regarding regulatory control of safety and security.

[144] For example, according to labour, Northwest could keep its principal place of business in the United States, and continue to serve domestic routes from its US hubs. But the carrier could set up a smaller affiliate in, say, Greece or Portugal, to fly international routes using low-wage EU flight crew.

[145] ICAO Secretariat, "Liberalizing Air Carrier Ownership and Control," 6.

operations. Although ALPA maintains that the RLA already applies to such operations, recent NMB and court rulings cast doubt on that, as noted above. Thus, Congress could amend the RLA to clarify that it applies to some or all offshore operations of US carriers.

Efficient Labour Protection—A Credible Safety-Net Program

A more efficient approach to labour protection would be to create a safety net for airline employees who are laid off as a result of EU-US aviation liberalisation. It could take the form of direct compensation and/or a hiring preference for new jobs that open up.

A safety-net program has two advantages. First, unlike the options described above, it would avoid distorting airline competition and thereby reducing benefits to consumers.[146] In addition to being more efficient, a safety-net program is more equitable. Workers who are laid off as a result of direct labour substitution would benefit, just as they would benefit from the market-distorting labour protection policies described above. However, in addition, airline workers who lost their jobs because of indirect labour substitution—that is, from normal market forces—would benefit as well from this approach. By contrast, those workers would not benefit from the market-distorting policies that protect labour (solely) by preventing direct labour substitution (*e.g.*, mechanisms to prevent flags of convenience).

The 1978 Airline Deregulation Act included an "employee protection program" that had a similar intent. It called for giving airline employees who lost their jobs following deregulation the right of first hire by other carriers. It also provided for payments for laid-off employees who could not find another job. However, the program was never fully implemented, despite years of litigation, and many workers are bitter as a result. While this problem may not be prohibitive, the US government would have to overcome a major credibility gap if it were to propose another safety-net program.

8.8 Conclusion

An EU-US Open Aviation Area would in theory allow US air carriers to replace US pilots and flight attendants with lower-wage EU substitutes on transatlantic flights. This prospect largely explains the opposition of US labour groups to EU-US liberalisation. However, in practice, the potential for *direct* labour substitution—for example, through re-flagging—is extremely low, in part because of the US pilots' bargaining power, and the limited cost savings that US carriers would realise from substituting European flight crews. For this reason among others, the pejorative discussion of "flags of convenience" in the context of EU-US aviation liberalisation is fundamentally misleading. The potential for *indirect* labour substitution—loss of market share by high-wage US carriers to lower-wage EU transatlantic carriers—is greater, by comparison, particularly over the long run. But even here, the potential impact on labour would be limited because the relatively small differences between EU and US flight crew costs would quickly disappear. If policymakers opt to cushion workers against possible losses under an Open Aviation Area, they should avoid approaches that distort international competition, such as policies to preclude flags of convenience. Far preferable would be policies to compensate dislocated workers directly, though policymakers would have to make a credible commitment that such policies would be honoured.

---

[146] Any compensation program would need to be carefully designed to avoid the creation of new distortions.

9. Would an Open Aviation Area Harm Airline Safety?

9.1 Introduction

Western Europe and the United States have the world's most effective regulatory systems to protect aviation safety, security, and environmental impact. Even as they have ended economic regulation of the airline industry, governments on both sides of the Atlantic have maintained strict regulatory control over these "non-economic" aviation impacts.

There is no contradiction. The competitive market can best determine which routes airlines should serve and at what price. But absent government regulation, carriers might spend too little to protect safety, security, and the environment, because of imperfect information, "externalities", and other market failures.

In no small part because of their tough regulatory systems, Western Europe and the United States have accident rates that are a fraction of those in most other regions of the world. As Table 9.1 shows, from 1992 through 2001, the rate of major accidents per million departures was 0.5 in the United States and Canada, and 0.8 in European states that belong to the Joint Aviation Authorities (JAA), compared to: 2.6 in Asia, 3.0 in non-JAA European states, 3.2 in Latin America, 3.4 in the Middle East, and 12.1 in Africa.

Moreover, accident rates in Western Europe and North America have followed a long-term downward trend, as shown in Figure 9.1.[147] In the United States, the biggest improvement occurred during the 1960s and (to a lesser extent) the 1970s, following the introduction of jet aircraft and technological improvements in air traffic control. Since then, the accident rate has remained very low, and as a result the rate of decline has slowed. Europe has experienced a similar trend.

Although an EU-US Open Aviation Area would not alter the strong regulatory structures in place in Western Europe and the United States, proposals for international liberalisation, generally, raise safety issues in two quarters. First, labour and other groups warn that increased international competition could force air carriers to cut spending related to safety, at the same time that business practices fostered by globalisation (*e.g.,* international code-sharing) make it easier for carriers to escape national regulatory oversight. Second, FAA officials, while viewing aviation liberalisation as an economic policy issue, stress the importance of implementing it in a way that preserves regulators' ability to oversee safety.

[147] The number of aircraft departures is perhaps the best statistical measure of exposure to risk, because most serious crashes occur during take-off or landing. Alternatively, if aircraft mileage or revenue passenger miles (RPMs) were used instead as the measure of risk exposure, the US accident rate would show a sharper decline post-1978, because of the trend under deregulation toward longer trip lengths and increased load factors. For the same reason—*i.e.*, the significant increase in the average trip length—the fatality rate (fatalities per billion passenger miles) has fallen much faster than the accident rate since deregulation.

Table 9.1

Accident Rates by World Region

Hull Loss Accidents, Western-Built Transports, 1992 through 2001

Region	*Departures (millions, estimated)*	*Percent of Total*	*Accidents*	*Percent of Total*	*Accident Rates [1]*
Africa	3.2	(2%)	39	(19%)	12.1
Asia (Excluding China)	15.4	(10%)	40	(19%)	2.6
China	5.6	(4%)	6	(3%)	1.1
CIS	0.3	(0%)	4	(2%)	--- **[3]**
Europe	39.3	(25%)	36	(17%)	0.9
JAA	36.3	(23%)	28	(13%)	0.8
Non JAA	3.0	(2%)	9	(4%)	3.0
Latin America and Caribbean	11.9	(7%)	38	(18%)	3.2
Middle East	2.9	(2%)	10	(5%)	3.4
Oceania **[2]**	5.2	(3%)	0	(0%)	0.0
United States and Canada	76.7	(48%)	36	(17%)	0.5
Total	**160.5**		**210**		**1.3**

Source:
Boeing

Notes:
Excludes sabotage and hijack.
[1]: Accidents per million departures.
[2]: Australia, New Zealand, Micronesia, Polynesia, etc.
[3]: Insufficient fleet experience to generate reliable rate.

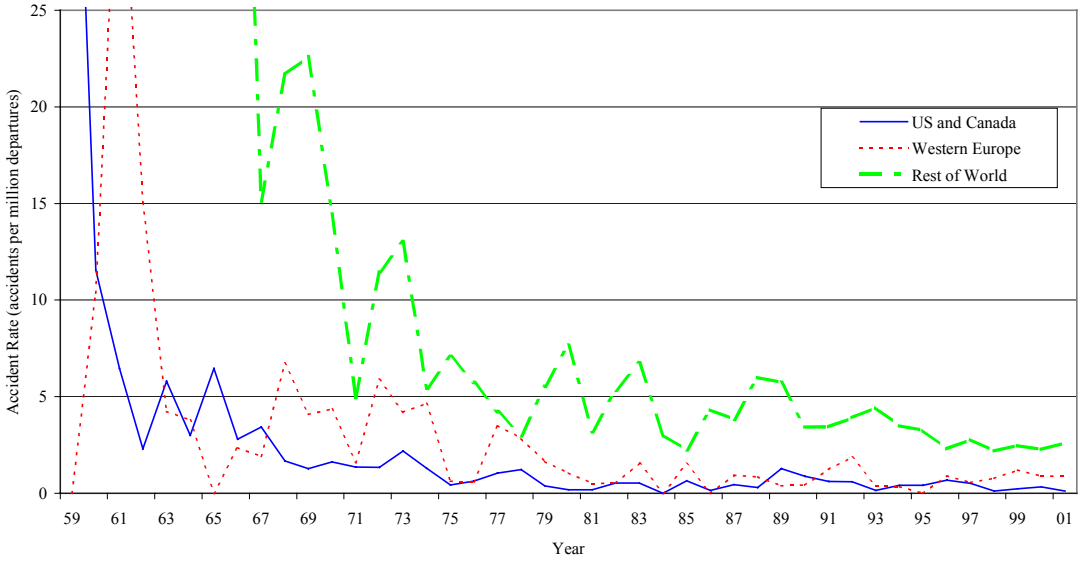
This chapter looks at these issues in the context of the debate over an EU-US Open Aviation Area. Although we focus largely on aviation safety, the issues related to aviation security and environmental impact are very similar.

First, we describe key features of the international regulatory regime for aviation safety, in which the United States and Europe play a prominent role. (A background note at the end of the chapter provides more detail on how the United States and Europe regulate aviation safety, security, and environmental impact.) Next, to assess concerns about the safety implications of increased international competition, we look at the empirical evidence on the effect of US domestic airline deregulation on air carrier safety. We also look at safety concerns about globalisation and flags of convenience, and consider the impact of EU-US liberalisation on relevant industry practices. Finally, we look at regulatory challenges for FAA under an Open Aviation Area, and discuss possible options to enhance regulatory oversight and accountability.

Figure 9.1

US, Canadian, and European Operators' Accident Rates

Hull Loss and/or Fatal Accidents - Worldwide Commercial Jet Fleet - 1959 through 2001



Sources:
[1]: Accident data is from Boeing's Airline Safety Engineering Database.
[2]: Departure data is from Boeing and AvSoft.

9.2 International Regulatory Regime for Aviation Safety

The Chicago Convention of 1944 not only established an international framework for the operation of civil aviation, it also set up the International Civil Aviation Organization (ICAO) to ensure the safe and orderly growth of the industry. ICAO accomplishes this primarily through the development and dissemination of technical standards and recommended practices (SARPs). In its nearly 60 year history, ICAO has developed and adopted 18 technical annexes to the original convention. These periodically updated annexes cover every aspect of civil aviation, including aircraft operations, air traffic control, airworthiness, meteorology, accident investigation, aeronautical charts, airports, aircraft noise, and aviation security.

ICAO standards, which signatory states in principle agree to follow, are one of the hallmarks of international aviation regulation. [148] By providing a common framework for global regulation of the aviation industry, ICAO standards help to ensure a minimum level of aviation safety, security, and environmental compatibility.

Although ICAO is responsible for setting international standards, the job of applying and enforcing them falls to individual states. ICAO has 188 members—nearly every nation that offers air service. Under the Chicago Convention, each state, through its national or regional civil aviation authority (CAA), is responsible for the safe operation of air carriers ("operators") that bear its flag. *This "flag state regulation" is the other hallmark of the international regulatory system for aviation.*

---

[148] ICAO standards are presumptively binding on signatories to the Chicago Convention. A signatory that "finds it impracticable to comply" must notify ICAO by filing a so-called "difference". Other signatories need not recognise differences.

In practice, the level of compliance with ICAO standards varies widely. In the two largest aviation markets in the world—the United States and Europe—civil aviation authorities impose comprehensive regulatory systems that build on, and in many areas exceed, ICAO standards. The FAA's Federal Aviation Regulations (FARs) total 1900 pages and govern every facet of aviation, from the maintenance of aircraft to pilot rest requirements. Europe's counterpart to the FARs are the Joint Aviation Regulations (JARs), developed by the Joint Aviation Authorities (JAA), a consortium representing the civil aviation regulatory authorities of some 25 European countries.

However, outside of the United States and Europe, many countries do not fully comply with ICAO standards. As a result, a few leading aviation authorities supplement flag state regulation with what is referred to in maritime as *"port state regulation"*. This strategy—another feature of the international regulatory system—*is aimed at verifying that third countries actually apply ICAO standards and, where appropriate, at helping them do so.*

For example, the FAA issues operating authority to every foreign carrier that flies into the United States, based on documentation of its compliance with safety standards and occasional ramp inspections at US airports.[149] More important, for each foreign carrier that flies to, or seeks to fly to, the United States, the FAA carries out a detailed formal assessment of the relevant CAA through its International Aviation Safety Assessment (IASA) program. Depending on whether the foreign CAA provides adequate international aviation oversight, as defined by ICAO standards, the FAA assigns it to "Category 1" (ICAO-compliant) or "Category 2" (not ICAO-compliant). In the case of a carrier seeking to fly to the United States, if the FAA notifies DOT that the CAA is non-compliant, DOT denies the carrier the necessary commercial authority. And if a country whose carrier is already serving the United States is downgraded from Category 1 to Category 2, the FAA freezes the carrier's operations at their existing level, steps up spot inspections, and explores ways to help the CAA remedy its deficiencies. In December 2000, the FAA downgraded Greece to Category 2, making it the only JAA member to have that status.

The FAA established IASA in 1991, after a series of safety incidents involving foreign carriers flying to or from the United States. Initial evaluations indicated that two-thirds of the CAAs examined were not fully compliant with ICAO standards. As one FAA official said, "If we didn't have this program, we would have to invent it, or something like it."

> The [FAA] Administrator has an obligation to ensure that carriers that operate in the United States are fit, willing and able to carry out transportation safely. Because we have [limited] authority to exercise safety oversight over foreign carriers, we insist that foreign governments do so.[150]

In 1999, ICAO expanded its own CAA oversight program to make it universal, mandatory, and transparent. The Universal Safety Oversight Audit Program (USOAP) assesses the level of CAA compliance with ICAO SARPs related to aircrew licensing,

---

[149] Under the Chicago Convention, the most that a CAA can require is that foreign carriers operating in its airspace meet ICAO standards for safety. However, a signatory can prescribe *operating rules* that exceed ICAO standards. In an effort to raise the safety bar, the FAA has managed to incorporate safety requirements that exceed ICAO standards into its operating rules—*e.g.*, foreign carriers operating in US airspace must be equipped with traffic alert and collision avoidance systems (TCAS).

[150] Email communication from Michael Jennison, Assistant Chief Counsel, FAA (November 2002).

aircraft airworthiness, and the technical operation of planes. *The use of formal programs such as IASA and USOAP to assess the adequacy of oversight provided by national and regional CAAs* is yet another key feature of international aviation regulation.[151]

Like IASA, USOAP has found that many CAAs are deficient in fulfilling their safety obligations.[152] In contrast to IASA, USOAP does not assign a failing grade to non-compliant authorities, but other countries can read between the lines of the audits, according to FAA officials. As a sign of the success of the audit program, ICAO is expanding its scope to include air traffic control and airports. And following the September 11 terrorist attacks, member states directed ICAO to consider creating a Universal *Security* Oversight Audit Program, modelled after USOAP, to assess the implementation of security-related SARPs.

Another feature of international aviation regulation—one that has expanded in recent years—is *the network of cooperation, coordination, and harmonisation among national and regional CAAs.* Regulatory cooperation allows aviation authorities with a basis for mutual trust to make maximum use of one another's work, while still reserving the right to withhold approval of individual rules and certifications. The expansion of cooperation among national and regional safety authorities is a response to the increasing globalisation of aviation. It also reflects the growing importance of regulatory efficiency. Resources available to improve aviation safety and security are necessarily finite. Cooperation among CAAs frees up scarce government regulatory resources for higher priorities, at the same time that it reduces the regulatory burden on industry.

The US government's building block for regulatory cooperation is the Bilateral Aviation Safety Agreement (BASA) and its predecessor, the Bilateral Airworthiness Agreement. A BASA is an executive agreement negotiated by the Department of State and its foreign counterpart. It authorises bilateral cooperation among aviation authorities in a variety of technical areas, including airworthiness certification, aircraft maintenance, flight operations, and environmental certification. The emphasis thus far has been on developing Implementation Procedures for Airworthiness (IPAs), which facilitate the reciprocal certification of aircraft and other civil aeronautical products. To date, the United States has concluded at least 27 Bilateral Airworthiness Agreements and five BASAs with Implementation Procedures for Airworthiness.[153] Work on Implementation Procedures in a few other areas is also underway.

---

[151] For an excellent analysis of the origins and evolution of IASA and USOAP, see: Anthony J. Broderick and James Loos, "Government Aviation Safety Oversight—Trust, but Verify," *Journal of Air Law and Commerce* (forthcoming).

[152] Deficiencies fall into four broad categories: (1) Primary aviation legislation does not exist, is out of date, or fails to provide for adequate enforcement; (2) institutions responsible for regulating aviation safety lack the necessary authority and independence; (3) there are too few qualified personnel; and (4) financial resources are inadequate. European Commission, "Communication from the Commission: A European Community Contribution to World Aviation Safety Improvement," (Brussels, March 8, 2001). Available at: http://europa.eu.int/comm/transport/themes/air/english/press/safety/world_safety_improvement_en.pdf. ICAO also provides technical assistance to remedy deficiencies identified through its USOAP audits, although the funding of such assistance is a continuing challenge.

[153] FAA.Gov, "Bilateral Agreements." Available at: http://www1.faa.gov/certification/aircraft/bilateral_agreements.stm. See also National Civil Aviation Review Commission (NCARC), *Avoiding Aviation Gridlock and Reducing the Accident Rate: A Consensus for Change* (December 1997): III-27-28. Available at: http://www.faa.gov/ncarc.

FAA-JAA harmonisation is another important example of regulatory cooperation. In the 1980s, the FAA and the JAA began a major effort to harmonise the FARs and JARs related to the design and manufacture, operation, and maintenance (airworthiness) of civil aircraft and related products; noise and emissions from aircraft and aircraft engines; and flight crew licensing. The technical process of harmonising airworthiness regulations—with the goal of a joint certification process for aircraft and aircraft products—is nearly complete. Although the effort has required far more time and resources than government and industry participants anticipated, they regard it as a major success. At the 2002 annual FAA/JAA international conference, a US aerospace official summed up the logic of FAR/JAR harmonisation (*i.e.*, replacing two "codes" with just one) in three bullets:

- Aviation safety levels in Europe and North America are equivalent.
- The safety of a product certified to FAR, JAR, or both codes is the same.
- Certifying to both codes increases cost with no measurable effect on safety of the product.[154]

The JAA, which has been harmonising standards among European CAAs since 1970, itself is an example of regulatory cooperation. Because the JAA is a voluntary organisation, its regulations (unlike the FARs) do not have the force of law, except where the European Union has adopted them as EU law (largely in the less controversial area of aircraft certification). In part because JAA lacks "teeth", the level of safety oversight among EU Member States is uneven, as evidenced by (among other things) Greece's Category 2 status.

In an effort to go beyond voluntary cooperation, the European Commission is moving to replace the Member States' CAAs, as well as the JAA, with a single European Aviation Safety Agency (EASA) that will be legally empowered to develop common standards for aviation safety, security, and environmental impact. (Unlike the CAAs, EASA will have no role in economic regulation.) EASA will become operational in the Fall of 2003. Initially, its mandate will be limited to aircraft and aeronautical products, with national authorities continuing to oversee air carrier operations and flight crew licensing. Over time, the Commission plans to have EASA assume the full array of regulatory activities currently covered by the JAA.

In contrast to the FAA, EASA will be unable to issue binding regulations directly, because EU law requires all such policies to be approved by the European Parliament and the Council of Ministers from the Member States (*i.e.*, the "co-decision process"). This was initially a serious concern to FAA officials, who worried that EASA would lack sufficient autonomy and transparency, and that its technical decisions would be compromised by the political process. However, the original proposal was amended to allow EASA to take advantage of the "comitology" procedure—a simplified, expert-dominated process provided for under the Treaty of Rome. As a result of these and other changes, FAA officials appear satisfied for now that the European Commission is moving to address their concerns.

A final feature of aviation safety oversight is the *CAAs' extensive reliance on self-inspection by their "designees" in the regulated industry*. Given the sheer volume of

---

[154] Bob Robeson, Vice President, Civil Aviation, Aerospace Industries Association, "Raising the Safety Bar Globally: Setting Priorities for Scarce Resources," 19th Annual FAA/JAA International Conference (June 3-7, 2002).

regulatory approval required, aviation authorities necessarily must depend on aircraft manufacturers and airlines to perform most of the day-to-day inspections and reviews. This system works well because it is in designees' own interest to place a high priority on safety. In fact, airlines and manufacturers in the United States and Europe often exceed national or regional regulatory standards in daily practice.

9.3 Concerns about International Competition and Safety

Despite the overall effectiveness of regulatory oversight, some groups are concerned that the economic pressures imposed by increased international competition could jeopardise aviation safety and security. In a recent white paper prepared for ICAO, the International Transport Workers' Federation (ITF) challenged the suggestion that competing airlines will always act to protect passengers:

> The airline industry argues vigorously that safety and security is never compromised by commercial considerations. The reality of course is that safety involves significant operational costs, including passenger screening costs, the thoroughness and efficiency of maintenance checks, the age of aircraft, the training level of employees, the working hours and fatigue levels of both ground staff and aircrew. All of these come under fierce pressure in a climate of competition.[155]

Debate over US Airline Deregulation

The current debate over the impact of international competition on airline safety has an historical parallel in the controversy that surrounded the 1978 deregulation of the US domestic airline industry. Prior to 1978, economists and other advocates of decontrol were quick to point out that safety oversight of the flying public would *not* be deregulated. Congress underscored that point in the opening lines of the Airline Deregulation Act of 1978, calling for "the assignment and maintenance of safety as the highest priority in air commerce."[156] Nevertheless, the intensified competition and traffic growth that airline deregulation promised to bring—and subsequently delivered—raised questions about the possible risk to passengers.

Much like ITF today, opponents of US airline deregulation argued that carriers under the extreme economic pressures caused by heightened domestic competition would be forced to cut expenses that might affect safety. According to this line of argument, regulated carriers had systematically achieved a higher level of safety than required by FAA requirements, because their protected markets and cash flow allowed them to spend more on aircraft maintenance, personnel training, and engineering expertise.[157]

Critics of deregulation made two additional points that are relevant to today's debate. First, they cautioned that the relatively open entry permitted by deregulation, together

---

[155] International Transport Workers' Federation (ITF), "The Orderly Evolution of Air Transport Services: Secure and Safe Economic Regulation in an Era of Globalisation," Presentation to the 33rd Session of the ICAO General Assembly, Economic Commission, Agenda Item 26: Regulation of International Air Transport Services (October 3, 2001): paragraph 5. Available at: http://www.itf.org.uk/civil_aviation/news/icao_economics.htm.

[156] Public Law 95-504, Sec. 102, October 24, 1978.

[157] Transportation Research Board, National Research Council, *Winds of Change: Domestic Air Transport Since Deregulation,* Special Report 230 (Washington, DC, 1991).

with increased growth in air travel, would raise the demand for pilots, resulting in a less experienced pilot work force. Second, they questioned whether new entrant airlines would be as safe, given their lack of experience and the pressures they would face to limit spending on maintenance and other safety-related activities.

Blue Ribbon NRC Panel Studied Deregulation and Accidents

A decade after the 1978 Act, the prestigious National Research Council (NRC) initiated a two-year study to address issues related to airline deregulation, among them safety, that were still being hotly debated in the media and in Congress. To carry out the study, the NRC appointed a blue-ribbon panel of experts in aviation, economics, safety, airline and airport operations, and public policy. The NRC's 1991 report, *Winds of Change: Domestic Air Transport Since Deregulation*, devoted a chapter to summarising the trends in airline safety and reviewing the extensive empirical research that had been done on the impact of airline deregulation on safety. *Winds of Change* remains the most objective and comprehensive analysis there is of the deregulation-safety issue.

Highlights of NRC Report

With respect to safety trends, the NRC emphasised two points:

- Commercial air travel on major airlines had become progressively safer over time for a variety of reasons, including advances in aircraft design, air traffic control, and pilot experience, training, and certification.
- *Commercial aviation safety had improved during deregulation, roughly in line with long-term trends*. From 1978 to 1990, accident rates (fatal and non-fatal accidents per 100,000 departures) for major jet carriers fluctuated from year to year at a very low level and (with the exception of 1989) generally moved downward.[158]

To identify any link between deregulation and airline accidents, the NRC reviewed the empirical research on four possible intervening factors: carrier finances, expenditures on maintenance, the prevalence of new entrants versus established carriers, and pilot experience. The NRC panel acknowledged that "it is plausible that firms under extreme economic pressure caused by intense competition could cut expenses that might affect safety." However, the group found no evidence that airlines had done so:

> . . . no study has established an empirical link between carrier operating practices that might have been affected by deregulation and safety. Specifically, there is no empirical evidence linking carrier financial difficulty or cost cutting as a result of deregulation to accidents and no evidence that new entrants spend less on maintenance. The role of pilot experience in crashes is indeterminate with available data.[159]

Nor has any subsequent study shown that airline deregulation has had an adverse impact on aviation safety. In fact, the issue became moot in the United States by the early

---

[158] Transportation Research Board, *Winds of Change*, 170. The NRC underscored the fact that, in 1980 and again in 1984, for the first time in modern aviation history, a full year had transpired with no fatal accidents involving a US jet carrier in regularly scheduled service. Moreover, 1986 had been a near-perfect year, when only one person was killed.

[159] *Ibid*., 197.

1990s, because of the absence of any credible empirical evidence showing a link between the two. In 1997, two separate national commissions issued reports on aviation safety, and neither report mentioned deregulation or increased competition as a safety concern.

This is not to say that ITF's concerns are frivolous. An increase in competitive pressures on carriers does make safety oversight more critical.[160] But international liberalisation has been an ongoing process for decades, and the effects of an EU-US Open Aviation Area would be felt gradually. Thus, at the margin, any adverse impact would be limited. Moreover, European and US aviation authorities—who are among the most demanding regulators in the world—have been adapting their safety oversight to accommodate global competition and will continue to do so.

International Code-Sharing and Contracting-Out

Labour groups are also concerned about the impact on safety of organisational practices linked to globalisation. In its recent white paper, ITF urged caution regarding the increase in international code-sharing and other collaborative arrangements among airlines that belong to the same global alliance. A related concern is that, as airlines contract out operations that they used to perform in-house, they are becoming core businesses that "simply organise people to travel . . . under a global airline brand, whose services are often in practice, supplied by contractors, franchisees and alliance partners."[161] The ITF cautioned that this dispersal of functions "diffuses the central mechanism of safety and security control" and makes regulatory oversight more difficult.[162]

To be sure, code-sharing and contracting-out make it more difficult for CAAs to regulate aviation safety and security. The challenge for national regulators is still greater when these activities occur on an international scale, because of physical distance, language differences, and concerns over national sovereignty, as well as the significant regional differences in ICAO compliance and accident rates.

But, inter-firm collaboration and outsourcing are growing trends in many industries, not just airlines. Their prevalence suggests that they are a logical response to competition and globalisation. While these practices may present additional challenges to regulators, the solution is to bolster regulatory oversight rather than to stifle competition.

Indeed, improved oversight of maintenance outsourcing was one result of the investigation into the cause of the 1996 ValuJet crash. And in 1999, in response to concerns about the safety of international code-share flights, the US government instituted two new programs. Lacking the ability to regulate foreign air carriers directly, US agencies in effect made US carriers responsible for ensuring the safety of their foreign code-share partners. See Box B for more detail.

---

[160] For example, the same year that Congress deregulated the airline industry, the FAA imposed new safety regulations on commuter airlines, which had a significantly higher rate of accidents than large airlines. Because deregulation led to a major shift in traffic to commuter airlines, this regulation contributed to maintaining a good safety record. See, for example, Ian Savage, "The Economics of Commercial Transportation Safety," in Gomez-Ibanez, Tye, and Winston, *Essays in Transportation Economics*, 536, 553-554.

[161] ITF, "Orderly Evolution of Air Transport Services," paragraph 8.

[162] *Ibid*., paragraph 10.

Box B
International Code-Sharing

In September 1998, when Swissair Flight 111 crashed off the shores of Nova Scotia, it was carrying 53 US passengers who had purchased tickets from Swissair's alliance partner, Delta Air Lines, on Delta Flight 111. At the time, DOT approved US carriers' applications to code-share based solely on economic grounds (*i.e.*, impact on competition). Although Swissair was regarded as one of the world's safest airlines, James Oberstar, Congress' leading aviation safety expert, decried the absence of a mechanism to ensure that foreign code-share partners, generally, operated under standards similar to those governing US airlines. He cautioned that "economic policy [in aviation] may have gotten ahead of our safety policy."[163]

A year later, the federal government instituted two new programs to reduce the risks to US passengers from international code-sharing. Lacking the ability to regulate foreign air carriers directly, federal agencies in effect made US carriers (along with the relevant civil aviation authority) responsible for overseeing the safety of their international code-share partner.

DoD, a major user of foreign commercial air service (200,000 military and DoD civilian passengers travel on foreign carriers each year), had begun auditing the safety of airlines that fly military personnel following a 1985 charter airline crash in Gander, Newfoundland, that killed 248 soldiers. Two years before the Swissair crash, DoD broached the idea of extending audits to foreign code-share airlines, but the State Department and DOT warned that such audits would violate international treaties and tread on national sovereignty.[164]

Despite resistance from inside and outside of government even after the Swissair crash, DoD told US airlines they would have to certify that they had reviewed their code-share partners' operations and maintenance and determined that it provides a "substantially equivalent level of quality and safety" as their own. In January 1999, in a meeting with DoD and DOT, US carriers agreed to work together, using ICAO safety and operational standards, to ensure the safety of their code-share partners.[165]

In August 1999, DoD and the Air Transport Association (ATA) entered into a Memorandum of Understanding (MoU) that committed ATA carriers to assess the safety of existing and proposed foreign code-share carriers within one year using an ICAO-based process developed by DoD and the carriers. Under the MoU, DoD reviews the results of each assessment and periodically evaluates the actual assessment process used by each US carrier. If an assessment reveals a problem, the US carrier must work to solve it or risk losing DoD's business.[166]

---

[163] Congressman James L. Oberstar, "Beyond Open Skies – The Next Generation of Aviation Challenges," Speech to the International Aviation Club (April 13, 1999): 11. Available at: http://www.iacwashington.org/oberstar.pdf.

[164] Don Phillips, "US Airlines' 'Handoffs' Raise Safety Concerns," *Washington Post* (March 7, 1999).

[165] *Ibid.*

[166] US Department of Defense, "DoD and Air Transport Association Sign Safety Agreement," (August 5, 1999). Available at: http://www.defenselink.mil/news/Aug1999/b08051999_bt366-99.html

Box B, continued

Later that year, DOT and the FAA announced a similar program requiring US carriers to perform on-site safety audits of each of their foreign code-share partners, and submit signed statements confirming that the foreign carriers comply with applicable ICAO standards. DOT also announced that airlines with Category 2 ratings from the FAA would not be allowed to code-share with US carriers. [167] If a foreign airline is from a country that does not operate to the United States, and therefore has no FAA rating, the US carrier must ensure that the foreign airline gets adequate oversight *from its government.*

US government and industry officials are pleased with the results of the programs. Even before the federal announcements, a few US carriers had begun auditing their code-share partners, largely in response to insurers' demands. However, under pressure from DoD, the lead carriers refined the assessments to meet the military's high standards, and expanded them industry-wide. The DOT/FAA effort further expanded and standardised the audit programs. The US government is now working with the International Air Transport Association (IATA) to expand the programs world wide.

Ironically, as a regulator, the FAA was initially reluctant to participate in a code-share safety program that relied on one carrier's audit of another. FAA officials felt the agency would be giving a blessing to information that it could not verify directly. Eventually, however, FAA officials found language to describe the program that they felt would not mislead the public.

Moreover, while ITF's concerns about the safety implications of international code-sharing and contracting-out merit attention, they have limited relevance for the current debate. *Creation of an Open Aviation Area would impose no new or added risk* in terms of these practices. US and European airlines can already code-share and collaborate with one another. *If anything, liberalisation would lead to a reduction in international code-sharing and collaboration* by allowing US and European air carriers to merge outright.

Nor would an Open Aviation Area do anything to reduce the level of regulatory oversight of aviation safety and security. Although liberalisation may encourage even closer regulatory cooperation between the United States and Europe, US and European aviation authorities would retain their respective unilateral powers. For example, the FAA's IASA program would remain fully functional.

Flags of Convenience

Labour groups on both sides of the Atlantic caution that elimination of nationality restrictions on ownership and control would encourage airlines to fly foreign "flags of convenience". They argue that, in addition to facilitating labour substitution, flags of convenience could undermine aviation safety. However, as discussed in Chapter 8, these arguments do not hold water, at least in the context of an EU-US Open Aviation Area.

---

[167] Office of the Secretary, Department of Transportation, and Federal Aviation Administration, "Code-Share Safety Program Guidelines," (February 29, 2000). Available at: http://ostpxweb.dot.gov/aviation/intav/codeshr.pdf.
See also DOT press releases from December 6, 1999, and February 29, 2000:
http://www.dot.gov/affairs/1999/dot20299.htm.
http://www.dot.gov/affairs/2000/dot4200.htm.

To restate our conclusions, US and European air carriers are unlikely to re-flag under an Open Aviation Area. The potential cost savings to US carriers from re-flagging to a low-cost EU country are not significant, and US pilots have the leverage to block such an action. And under the Single Market, European carriers can hire low-wage EU workers even without re-flagging.

Moreover, even if a carrier were to re-flag, it should not harm aviation safety. Compared to maritime, which is the basis for labour's safety concerns, aviation has tougher standards and better enforcement, including programs that regulate the regulators. Western Europe and the United States maintain a particularly high level of regulatory oversight overall. Although some EU Member States lag others in that regard (and Greece is Category 2), an international carrier would be unlikely to jeopardise its safety image by re-flagging to a country with questionable oversight. And, over time, EASA will be able to enforce the application of uniformly high standards.

9.4 FAA Concerns about Liberalisation

Cabotage and Wet Leasing

Most FAA officials view international liberalisation as an issue that should be decided on the basis of considerations having to do with economic policy rather than safety. However, FAA officials urge that any economic liberalisation be carried out in a way that preserves and even enhances the ability of the relevant flag states to maintain safety oversight. From that perspective, cabotage operations—both domestic (stand-alone) and international (fill-up)—would pose some challenges in their view. (Wet leasing, which we treat here as a form of cabotage, would pose the same challenges.) International operations to and from the United States would pose other challenges.

Stand-Alone Cabotage

First, under the Chicago Convention principle of flag state regulation, stand-alone cabotage operations in a given country normally would be the regulatory responsibility of the foreign airline's home country rather than the country where the operations occur. FAA officials point out the obvious: it would be more difficult for a CAA to oversee operations that take place entirely on another state's soil.

A second concern is that cabotage operations would be subject to a different safety standard from traditional domestic operations, and the standard could be lower, depending on the operator's flag country. This is an issue now with foreign operations to and from the United States, say FAA officials: under the Chicago Convention, the FAA can hold foreign carriers only to ICAO standards, not to its own, more demanding FARs. That problem would increase exponentially with domestic cabotage networks.

Third, if US law were changed to allow for stand-alone cabotage operations, many Americans would assume that they had the FAA's blessing. For that reason, FAA officials believe that the US Congress would try to require the agency to regulate cabotage operations directly. Because that would be contrary to the flag state enforcement principle, FAA officials fear it could provoke an outcry from the cabotage operator's home country, not to mention other signatories to the Chicago Convention.

One might quibble with some of these arguments, at least in the context of EU-US liberalisation. For example, a European carrier providing stand-alone operations in the United States in fact might not object to direct FAA safety oversight. However, for reasons discussed in Chapters 1 and 7, stand-alone cabotage is probably a non-issue. For sound business reasons, a foreign carrier that wanted to provide stand-alone domestic

operations in the United States would likely establish a US subsidiary. Alternatively, even if the carrier wanted to operate as a foreign entity in US domestic commerce, the law would probably require US incorporation. In either case, as a foreign-owned but US-incorporated carrier, its operations would come under the direct oversight of the FAA.

Fill-Up Cabotage

The prospect of fill-up cabotage as part of an international operation poses a different challenge to FAA safety regulators. As we described in Chapter 1, a European air carrier flight from Paris to Mexico City by way of New York and Chicago, can today transport US passengers from Paris to New York or Chicago, and from New York or Chicago to Mexico City. Under an EU-US Open Aviation Agreement, the carrier would be able to transport US passengers solely from New York to Chicago.

FAA officials acknowledge that there is no new safety risk under this scenario, since European carriers already transport US passengers within the United States. Granted, the number of flights that fit this scenario might increase if European carriers were allowed to operate them more efficiently. But such operations would be limited in scale, for the same reasons that the use of fifth freedom rights within Europe by US carriers is limited.

Nevertheless, some FAA officials worry that fill-up cabotage on any scale might create an "expectations" problem. According to this view, at present, US passengers on the Paris-Mexico City flight perceive that the safety risk is slightly higher because they know that the carrier cannot sell New York-Chicago tickets. If the European carrier were allowed to sell New York-Chicago tickets, US passengers would mistakenly conclude that the carrier was subject to the same safety oversight system as a US carrier.

Options

One option for handling fill-up cabotage operations under an Open Aviation Area is *information disclosure*. That is, passengers could be explicitly told that, although the European carrier is providing domestic service, it is subject to a different regulatory system than the one that oversees US carriers. This would be similar to the US requirement that carriers list the identity of any foreign code-share partners that will provide service along any segment of a passenger's itinerary.

Another option would be for the FAA to *use the BASA mechanism to certify fill-up cabotage operations* to the appropriate standard. The BASA executive agreements envision technical cooperation on flight operations, even though no Implementation Procedures have been developed. Such procedures would allow the FAA to assess the safety of foreign flight operations proposed for sale in the United States, just as it assesses the safety of foreign aeronautical products for export to the United States. This is a creative compromise between direct FAA oversight of fill-up cabotage operations, which would subject the foreign carrier to two separate national standards, and no FAA oversight, which might not satisfy Congress.

Re-flagging and Other Scenarios

International operations to and from the United States under an Open Aviation Area could create other challenges for the FAA. Unlike labour groups, most FAA officials do not think flags of convenience are a necessary outcome of liberalisation, but they do not rule out the possibility. If a US carrier were to re-flag to the EU, Greece would be off-limits because of its Category 2 status. But even among Category 1 countries in the EU, the adequacy of safety oversight is uneven, and FAA officials are more comfortable with, and have far more experience working with, some CAAs than others.

The treatment of carriers from Category 2 countries would be another challenge under an EU-US Open Aviation Area. Currently, the FAA's regulatory leverage with respect to such carriers comes from DOT's ability to withhold commercial authority under the terms of US bilateral air services agreements. If those bilaterals are replaced by an agreement that treats all EU Member States as one, the FAA would need to ensure that it still has the necessary leverage with respect to individual carriers.

More generally, FAA officials stress their need to know who has operational control and regulatory oversight of EU operations to and from the United States under an Open Aviation Area. Eventually, when EASA is fully in charge, nationality differences will not be an issue. But in the meantime, it is critical to preserve that aspect of the system that allows the FAA to know, for every international operation, who in the European Union is accountable.

Options

With respect to the prospect of re-flagging, one option is to *rely on existing oversight mechanisms*, including IASA and FAA procedures that target the carrier directly. This option would maintain the current level of safety oversight while not preventing carriers from re-flagging for efficiency reasons.

Alternatively, policymakers may want to *deter re-flagging with the type of mechanisms discussed in Chapter 8*. ICAO's proposed "principal place of business" provision has support in the aviation community, but it is ill-suited to an EU-US Open Aviation Area. Moreover, an across-the-board ban on flags of convenience would preclude carriers with a strong safety record and culture from re-flagging purely for efficiency reasons.

A longer-term option—one that builds on the BASA mechanism described above—would be to *establish an EU-US entity to jointly inspect and certify some or all international operations* under an Open Aviation Area. The focus would be on technical tasks. Thus, the organisation would supplement but not replace existing CAAs, allowing them to do their jobs with fewer people.

One "model" is the Central American Aviation Safety Agency, an "inspectorate" that serves as a technical resource for CAAs in six countries, five of which are rated Category 2 by the FAA. Although these countries are driven far more by resource constraints than would be the case elsewhere, their approach is applicable to other regions. The key is the focus on tasks on which technical experts can and do agree, despite differences in national law and policy.

9.5 Conclusion

Our analysis suggests that the answer to the question posed in the title of this chapter—Would an Open Aviation Area Harm Aviation Safety?—is a decided "No". Western Europe and the United States have superb safety records, which reflect their generally high level of regulatory oversight. EU-US liberalisation, while eliminating commercial restrictions, would preserve all of the regulatory standards and institutions on both sides of the Atlantic. (A "Background Note" below provides more detail on the US and European systems for regulating aviation security and environmental impact, as well as aviation safety. While we have not looked in detail at aviation security and environmental impact, there is no reason to believe they would be harmed either by EU-US aviation liberalisation.)

The strong national systems for regulating aviation safety in Western Europe and the United States are part and parcel of the international regulatory regime whose basic structure was put in place by the Chicago Convention. Although it is impossible to isolate its contribution to aviation safety, this international regulatory regime appears to be extremely effective in those parts of the world where it is fully implemented. It is in part responsible for the advances in technology, training, and procedures that MIT economist Arnold Barnett credits with making the aviation safety record in "First World" countries "astoundingly close to perfect".[168]

Conversely, slack regulatory oversight appears to be a key factor in airline accidents. Accident statistics show a strong *correlation* between inadequate regulatory oversight (as measured by non-compliance with ICAO standards) and accident rates, but not necessarily a *causal link*. However, First World regulators, who turn away foreign airlines based solely on the results of IASA and USOAP audits, clearly believe the link is causal.

The effectiveness of international regulatory oversight distinguishes aviation from maritime. The international standards for aviation are themselves more demanding than their maritime counterparts, FAA officials believe. In addition, flag state enforcement is tougher in aviation. Finally, there is no maritime counterpart to programs like IASA and USOAP that, in effect, regulate the regulators.

Moreover, the market reinforces safety regulation in aviation to a degree that may not be the case in maritime. The fact that airlines and aircraft manufacturers often exceed regulatory standards is one indication that "safety sells". The rapid demise that Air Florida and ValuJet each suffered following a major crash is yet another indication. Even in developing countries, FAA officials say it is not unusual to see a carrier that has a good safety record despite the fact that the national CAA is seriously deficient.

To be sure, an Open Aviation Area would present aviation regulators with difficult challenges. But globalisation of the aerospace and aviation industries is itself a challenge, and one that it unavoidable. It is not unusual to hear senior aviation regulators, both current and former, express the view that national safety agencies may no longer make sense in aviation, if they ever did. As one FAA official told us:

> Everything [we do as regulators] is based on nationality – aircraft certification, pilot licensing, airline [oversight]. The regulatory system hasn't caught up with the industry. We should be thinking about a global regulatory system.

In fact, aviation authorities in the United States and Europe *are* devoting ever more time and resources to international issues. EU-US liberalisation would focus and accelerate that effort. In the end, that could be one of the most significant contributions of an Open Aviation Area to consumers and airlines alike.

---

[168] Arnold Barnett, "Air Safety: End of the Golden Age?" Year 2000 Blackett Memorial Lecture, Royal Aeronautical Society (November 27, 2000). Available at: http://web.mit.edu/urban_or/www/notes/JORS1.doc_1.pdf.

Background Note: Regulation of Aviation Safety, Security, and Environmental Impact in the United States and Europe

United States

Safety

Aviation safety is the responsibility of the Federal Aviation Administration (FAA) in the US Department of Transportation (DOT). According to a recent commission, aviation is subject to a higher level of safety regulation than any other sector of the US economy, including food, medicine, and nuclear power.[169] In addition to airline operations, the FAA regulates aircraft and engine manufacture, aircraft repair and maintenance, airport operations, and air traffic control.[170] Strict national standards and detailed certification criteria govern every facet of aviation—from the maintenance of aircraft components to pilot rest requirements—and critical equipment throughout the system must build in double, triple, or quadruple redundancy.[171]

Although the FAA has ultimate responsibility for aviation safety, the aircraft manufacturers, airlines, and airports perform most of the day-to-day inspections, sign-offs, and reviews.[172] The sheer volume of regulatory approval required is so great that the FAA has to depend on self-inspection by its designees. This system has worked well for many years in part because it is in designees' self-interest to place a high priority on safety. In fact, airlines and manufacturers typically exceed FAA standards in daily practice.[173]

In 1997, at the recommendation of two national commissions, the FAA adopted the ambitious goal of reducing the already low fatal accident rate by 80 percent by 2007.[174] The FAA's Commercial Aviation Safer Skies initiative, a collaborative effort with airlines and manufacturers, focuses on those areas responsible for the greatest loss of life,

---

[169] NCARC, *Avoiding Aviation Gridlock*, III-5.

[170] The FAA both operates and regulates air traffic control—an arrangement that some people have criticised on safety as well as efficiency grounds. For a recent critique by an economist and aviation safety expert, see Clinton V. Oster, Jr., "Air Traffic Control and Aviation Safety: Ending Self-Regulation at the FAA," Testimony before the Subcommittee on Aviation of the House Committee on Transportation and Infrastructure (July 16, 2002). Available at: http://www.house.gov/transportation/aviation/07-16-02/oster.html.

[171] Alexander T. Wells, *Commercial Aviation Safety* (McGraw Hill, 2001): 14.

[172] *Ibid*., 209-210.

[173] NCARC, *Avoiding Aviation Gridlock*, III-5.

[174] White House Commission on Aviation Safety and Security, *Final Report to President Clinton,* (February 1997); and NCARC, *Avoiding Aviation Gridlock*. Commissioners, some of them from industry, were concerned that, absent a drop in the rate of fatal accidents, the rapid growth in US air travel would lead to an increase in the actual number of accidents. The recommendation was well received, but some economists cautioned that the goal might be unachievable or achievable only at enormous cost. Statement of Robert W. Hahn, American Enterprise Institute, before the Senate Committee on Commerce, Science and Transportation, Subcommittee on Aviation (March 5, 1997). Available at: http://www.aei.org/ct/cthahn3.htm.

such as controlled flight into terrain, approach and landing, runway incursions, uncontained engine failures, and weather/turbulence. Procedurally, the initiative seeks to raise government-stakeholder cooperation to a new level, and to identify needed government interventions based on objective data (much of it in industry's hands) and a rigorous approach to priority-setting.

International Safety Oversight. In addition to regulating US airlines, the FAA authorises foreign carriers that operate into the United States. Because carriers must be licensed in their flag state, the FAA does not subject them to the same scrutiny that US airlines receive, instead relying on the oversight of flag state regulators. But the FAA requires detailed documentation of an airline's compliance with safety oversight standards, and it conducts occasional ramp inspections at US airports.

To supplement these carrier-focused efforts, the FAA set up the International Aviation Safety Assessment (IASA) program in 1991.[175] IASA focuses on the foreign carrier's national aviation authority rather than the carrier itself. Specifically, the FAA determines whether a foreign aviation authority has adequate aviation safety oversight, as defined by ICAO standards.[176]

IASA's binary rating system assigns foreign countries to either "Category 1" (ICAO-compliant) or "Category 2" (not ICAO-compliant). For example, in July, following its reassessment of the Argentine Republic civil aviation authority, the FAA downgraded the country from Category 1 to Category 2. Greece was downgraded to Category 2 in December 2000, making it the only JAA country to be non-compliant. Assessments to date indicate that many foreign countries whose air carriers have or seek landing rights are not fully compliant with ICAO standards.[177] In such cases, the FAA freezes the carrier's operations at their existing level, steps up spot inspections at US airports, and works with other multilateral institutions to help the country attain ICAO compliance.

Security

Until recently, the FAA was responsible for the security, as well as the safety, of US aviation. However, following the September 11 terrorist attacks, Congress created the Transportation Security Administration (TSA), whose mission is to ensure the security of all modes of transportation. TSA is currently part of DOT, but on March 1, 2003, it will transfer to the newly created Department of Homeland Security.[178]

---

[175] At present, there are nearly 600 such carriers, from 103 countries and regional alliances of countries (including countries/alliances with airlines that have applied to operate into the United States). FAA, "Overview of the FAA Flight Standards Service International Aviation Safety Assessment (IASA) Program." Available at: http://www.faa.gov/avr/iasa/iasabr15.htm.

[176] Safety oversight must include: (1) laws enabling the appropriate government office to adopt regulations necessary to meet the minimum requirements of ICAO; (2) current regulations that meet those requirements; (3) procedures to carry out the regulatory requirements; (4) air carrier certification, routine inspection, and surveillance programs; and (5) organisational and personnel resources to implement and enforce the above. See FAA Office of Public Affairs, "Argentine Republic International Aviation Safety Assessment Rating of Category 2," (July 15, 2002).

[177] FAA, "Argentine Assessment Rating."

[178] John Mintz, "Homeland Agency Launched," *Washington Post* (November 26, 2002).

TSA oversees the exchange of intelligence information, coordinates federal and state activities, and sets policy on transportation security issues (*e.g.*, whether to let pilots have guns in the cockpit). In addition, TSA assumed FAA's responsibilities for airport security, including research, development, and deployment of security equipment and programs. TSA will itself perform the day-to-day security screening of passengers and baggage at airports, in keeping with Congress' controversial decision to "federalise" an activity previously handled by US airlines. Toward that end, TSA has hired and trained 44,000 federal security screeners, who are now working checkpoints at all 429 commercial airports in the United States.[179] The agency also has hired most of the 158 Federal Security Directors (FSDs) who will be deployed to the largest airports. Another 105 Deputy FSDs will help manage security at some of the smaller airports.[180]

The FAA retains responsibility for the security of air traffic control facilities and personnel, as well as the oversight of technical programs aimed at designing a more secure aircraft (*e.g.*, cockpit doors and transponders). The FAA also will manage the implementation of TSA policy decisions affecting aircraft or aviation personnel (*e.g.*, guns in the cockpit).[181]

Environmental Protection

ICAO takes the lead in setting international standards for aircraft noise and emissions, and the United States, like many nations, adopts these as national standards. The FAA, working in close coordination with the Environmental Protection Agency, is responsible for translating these standards into concrete federal regulations.

In addition to its regulatory role, the FAA administers funds to reduce the impact of aircraft noise and emissions. These funds, raised from taxes on airline tickets, go largely to soundproof homes and schools in high-noise areas, and to purchase land in such areas so as to prevent development. The FAA has spent billions of dollars in recent years on noise abatement alone.

---

[179] Joe Sharkey, "The Lull Before the Storm For the Nation's Airports, *New York Times* (November 19, 2002).

[180] Nick Sabatini, FAA Associate Administrator for Regulation and Certification, "Transitioning Certain Security Roles from the FAA to the Transportation Security Administration," 19th Annual FAA/JAA International Conference (Phoenix, Arizona, June 3-7, 2002). Statement of Admiral James Loy, Acting Under Secretary of Transportation for Security Before the Senate Commerce, Science and Transportation Committee (September 10, 2002).

[181] *Ibid*.

European Union

Safety

CAAs. The FAA's counterparts in the EU are the civil aviation authorities (CAAs) of the 15 Member States. (Unlike the FAA, most foreign aviation authorities conduct economic, as well as safety, regulation.) For example, the UK's independent Civil Aviation Authority provides the full range of aviation regulatory functions, and its British Civil Airworthiness Requirements (BCARs) are used as a model by CAAs around the world.

JAA. Although the national authorities retain responsibility for granting licenses and certificates, European authorities work cooperatively through the Joint Aviation Authorities (JAA) to develop and implement common regulatory standards and procedures. The goal is both to provide high, uniform standards of safety and to create a level playing field for competition in Europe. In addition to harmonising standards within Europe, the JAA has devoted considerable effort to harmonising its joint aviation regulations (JARs) with the FAA's FARs. Currently, the JAA has 25 full members and 11 candidates for membership.[182]

Originally known as the Joint Airworthiness Authorities, JAA began work in 1970 to produce Europe-wide design/certification standards for large aircraft and engines, in keeping with the needs of the Airbus consortium.[183] JAA focused primarily on technical issues, where it was easiest to get agreement among member states (*e.g.*, the maximum wing-load on a new aircraft design, or the minimum width for aircraft aisles). In 1987, JAA's focus expanded to include operations, maintenance, and licensing standards as well for all classes of aircraft. That has required JAA to tackle more complex issues on which it is harder to get agreement (*e.g.*, pilot training requirements, crew rest and flight time limitations, and requirements for fuel and equipment on long-range flights).[184]

Because the JAA is merely an association of national authorities, its regulations do not automatically have the force of law. Except where the European Union has adopted JAA regulations as EU law, Member States can decide individually not to adopt them as part of their national law, or to adopt them only with changes. Thus, despite JAA's good work, the requirements imposed on airline operators still vary from one Member State to another, which can create disparities between competing airlines. Similarly, it is not unusual for a manufacturer to have to produce different versions of the same aircraft or aircraft equipment to comply with varying national requirements.[185]

---

[182] Joint Aviation Authorities, "What is the JAA," (June 2002). Available at: http://www.jaa.nl/whatisthejaa/jaainfo.html. JAA comprises the 15 EU Member States plus the Czech Republic, Hungary, Iceland, Malta, Monaco, Norway, Romania, Slovenia, Switzerland, and Turkey. The candidates for membership are: Bulgaria, Croatia, Cyprus, Estonia, Latvia, Lithuania, Former Yugoslav Republic of Macedonia, Republic of Moldova, Poland, Slovak Republic, and Ukraine.

[183] *Ibid.*

[184] See statements by JAA Secretary General Klaus Koplin in "Europeans Seek to Replace JAA with EASA," *AviationNow.com* (December 4, 2002). Available at: http://www.aviationnow.com/content/publication/om/200011/easa.htm.

[185] European Commission, "The Creation of a European Agency for Aviation Safety," (April 23, 2002). Available at: http://europa.eu.int/comm/transport/themes/air/english/air_safety.htm.

EASA. To address this problem, the European Commission is moving to replace Member States' civil aviation authorities with a new European Aviation Safety Agency (EASA) that will be legally empowered to develop common safety and environmental standards, enforce their uniform application across Europe, and promote them internationally. (In contrast to the CAAs, EASA will have no role in economic regulation.)

The legislation creating the EASA has received a green light from both the European Parliament and the Council of Transport Ministers representing the 15 Member States, and it entered into force in Fall 2002. Following a one-year transition, this new agency will become operational in 2003.[186] The creation of EASA represents an important next step in the shift of "competence"—*i.e.*, authority—over aviation safety from the Member States to the European Union.

Initially, the EASA's mandate will be limited to aeronautical products. EASA will provide the regulatory equivalent of "one-stop shopping" for manufacturers of aircraft, engines, and components—a major improvement. Next year, the Commission plans to ask the Parliament and the Council to amend the EASA legislation to include the full array of aviation safety regulation currently covered by the JAA—a process that may take a number of years. In the meantime, national authorities will continue to oversee air operations and flight crew licensing.[187]

Security

Aviation security is currently the responsibility of EU Member States, although the organisational locus of that responsibility varies from country to country (*e.g.*, in some countries the CAA handles aviation security, whereas in others it is the justice department, the department of home affairs, or the national police). Member State security officials collaborate through an ICAO-affiliated organisation known as the European Civil Aviation Conference (ECAC).

As with aviation safety, the European Union is seeking to gain competence for aviation security, and the September 11 terrorist attacks gave that effort a major boost. The Commission has submitted the "framework" legislation, which the Parliament is now considering. The major point of debate (as in the United States) is over the appropriate distribution of costs between industry and government. If the European Union succeeds in getting competence over aviation security, Member States will still be responsible for enforcement, but the Commission rather than the States will develop the implementing legislation.

---

[186] EASA will be structured around three "pillars". The first is a Management Board composed of one representative from each Member State and one for the Commission. The Board will appoint the Executive Director, adopt the work program and budget, etc. The second pillar is the Executive Director and Agency staff, who alone will make technical decisions. The last is the Appeal Board, whose task is to exercise internal judicial control over the acts of the Executive Director.

[187] The Chicago Convention does not provide for membership by regional organisations. Thus, EU Member States can only transfer the execution of their rights and obligations under the Convention to EASA. In practice, the EU will for some time rely on the personnel of the relevant national authorities to continue to carry out most functions on behalf of EASA. For the same reason, EASA will not be able to negotiate BASAs or other international agreements on its own behalf.

Environmental Protection

Competence for issues involving the environmental impact of aviation is divided between Member States and the European Union. The European Union has responsibility for aircraft noise, even though it is the Member States that participate in ICAO. Thus, the Commission is responsible for converting ICAO aircraft noise standards into EU-wide standards. However, Member States have responsibility for regulating noise around airports, although the Commission tries to get the States to adopt common positions. Similarly, Member States retain authority over aircraft emissions, although the Commission works to get them to adopt a common approach.

Appendix I: Bilateral Air Services Agreements between the United States and EU Member States and Accession Countries

Country	Type of Agreement	Date	Restrictions
Member States			
Austria	Open Skies	May-95	
Belgium	Open Skies	May-95	
Denmark	Open Skies	May-95	
Finland	Open Skies	May-95	
France	Open Skies, 7th freedom for cargo	Oct-01	
Germany	Open Skies, 7th freedom for cargo	Feb-96	
Greece	Restrictive	Jul-02	Gateway, capacity, designation, pricing
Ireland	Restrictive	Oct-93	Gateway, pricing
Italy	Open Skies	Nov-98	
Luxembourg	Open Skies	May-95	
Netherlands	Open Skies	Sep-92	
Portugal	Open Skies, 7th freedom for cargo	Dec-99	
Spain	Restrictive	Mar-93	Gateway, route, pricing
Sweden	Open Skies	May-95	
United Kingdom	Restrictive	Jun-95	Gateway, designation, route, airport, pricing
Accession Countries			
Bulgaria	No bilateral agreement		
Cyprus	No bilateral agreement		
Czech Republic	Open Skies	Dec-95	
Estonia	No bilateral agreement		
Hungary	Restrictive	Jul-02	Gateway, route, pricing
Latvia	No bilateral agreement		
Lithuania	No bilateral agreement		
Malta	Open Skies, 7th freedom for cargo	Oct-00	
Poland	Open Skies, 7th freedom for cargo	May-01	
Romania	Open Skies	Dec-97	
Slovak Republic	Open Skies, 7th freedom for cargo	Jan-00	
Slovenia	No bilateral agreement		
Turkey	Open Skies	Mar-00	
Other European Countries			
Iceland	Open Skies	May-95	
Norway	Open Skies	May-95	
Switzerland	Open Skies	May-95	

Notes and Sources:

[1]: For Portugal, restrictions apply until 12/31/02 on the 5th freedom to certain African countries and on the 7th freedom cargo.

[2]: Cyprus is covered by UK agreement.

[3]: For Malta, restrictions apply until 9/30/04 on 5th freedom and 7th freedom cargo.

[4]: For Poland, restrictions apply until 12/31/03 on gateways and routes.

[5]: For Turkey, restrictions apply until 3/31/03 on gateways, routes, capacity, and designations.

[6]: Initial agreement with Greece took effect on 5/15/92, and the agreement was last amended on 7/31/02.

[7]: Initial agreement with Spain took effect on 8/3/73, and the last amended agreement took effect on 3/8/93.

[8]: Initial agreement with Hungary took effect on 2/8/90, and the agreement was last amended on 7/10/02.

[9]: Data is from Aviation and International Affairs of the US Department of Transportation. For Open Skies dates, see http://ostpxweb.dot.gov/aviation/intav/agmts.htm.

Appendix II: Limitations on Foreign Ownership of US Airlines

The requirement that US airlines be owned *and* controlled primarily by citizens of the United States derives from federal statute and regulatory interpretation. The statute says US airlines must be "owned or controlled" by US citizens; however, regulatory decisions have interpreted the "or" to mean "and". Although it takes an act of Congress to change a statute, the US Department of Transportation (DOT) could modify the regulatory policy administratively, so long as it stays within the bounds of the statutory language.

Present and Past Statutes and Policy

The current statutory provisions governing this issue are:

- 49 U.S.C. 1102(a), which limits the issuance of authority to perform "air transportation" as an "air carrier" to a "citizen of the United States"
- 49 U.S.C. 40102(a)(2), which defines "air carrier" as a "citizen of the United States undertaking . . . to provide "air transportation"
- 49 U.S.C. 40102(a)(15), which defines "citizen of the United States" in the case of a corporation as "a corporation organized under the laws of the United States, or a State . . ., of which the president and at least two-thirds of the board of directors and other managing officers are citizens of the United States, and in which at least 75 percent of the voting interest is owned or controlled by persons that are citizens of the United States."

The US Congress first enacted citizenship requirements for US carriers in the Air Commerce Act of 1926, which stated that US citizens must control a minimum of 51 percent of the voting interest of the carrier. The Civil Aeronautics Act of 1938 increased the minimum US citizen equity ownership requirement to 75 percent, which was the same level as required for ocean vessels by the Shipping Act of 1916. The 75 percent requirement was carried forward through subsequent revisions of the aviation laws to the present time.

Administrative rulings by the Civil Aeronautics Board (CAB) and its successor, the DOT, however, have modified the literal meaning of the statutory language "owned *or* controlled by persons that are citizens of the United States" by interpreting it to mean "owned *and* controlled", and by applying the control criterion not only to the company's voting interest, but also to the operation of the airline itself (emphasis added). As a consequence, both agencies ruled in a series of cases that literal compliance with the statute's numerical voting stock ownership requirements was not sufficient to warrant a

finding of US citizenship where actual control of the carrier rested with non-citizen interests.[188]

The term "control", however, is not defined in the statute and, as a consequence, has been the subject of administrative interpretation by the CAB, and subsequently, the DOT. For many years, these interpretations expressed an expansive concept of "control" and resulted in decisions that found control in such things as the ownership by non-US citizens of non-voting preferred stock where such stockholders had the right to approve a merger, acquisition, consolidation, dissolution, or liquidation of the corporation. The theory expressed for this decision was that the officers and directors and voting stockholders of the company could be expected to follow the wishes of the preferred stockholders because the latter could vote for dissolution of the company if they disapproved of the way its affairs were being conducted.[189] In another case, it was found that the US citizen holders of 82 percent of the outstanding stock of all classes were not independent of foreign control because the foreign non-voting interests would receive most of the financial reward if the carrier were profitable, the bylaws of the company allowed the foreign interests to force the company to buy them out, and two of the carrier's directors were also directors of a foreign carrier.[190] In a further case, the DOT found foreign control where several of the carrier's principals were former employees of the foreign-carrier investor and the two airlines shared office space and the same telephone number.[191]

More recently, however, the DOT has narrowed its interpretation of what foreign investments constitute "foreign control" of an airline resulting in the allowance of substantially larger foreign non-voting stock holdings. This change came about in 1991 when the DOT permitted KLM, through its subsidiary, Wings Holdings, to increase its non-voting equity in Northwest Airlines to 49 percent.[192] In doing so, the DOT stated that this decision to modify its long-standing investment control test was made "in order to reflect more accurately today's complex, global corporate and financial environment, consistent with the requirement for US citizen control." It also said that it would not treat debt as a foreign control issue absent a default, or unless the loan documents provided

---

[188] Almost from the time of its inception in 1938, the CAB decided that it had a duty under the citizenship provisions of the aviation laws to make certain that "the shadow of substantial foreign influence" did not exist and that applicants for air carrier certificates were, in fact, under the control of US citizens. *Uraba, Medellin & Cent. Airways, Inc., 2 C.A.B. 334, 337-8 (1040)*. The key decision in this vein was *Willye Peter Daetwyler, 58 CAB 118 (1971)* where the CAB concluded that the statutory definition of US citizen did not encompass "a corporation meeting the bare minimum percent of ownership and directorships held by United States citizens, where control in fact lies in foreign citizens", and it found that Daetwyler was in "a position of control" (at 120) thereby precluding US citizenship.

[189] *In re Page Avjet Corp.*, CAB Order 83-7-5 (July 1, 1983). There, the CAB explained "We have found control to embrace every form of control and to include negative as well as positive influence; we have recognized that a dominating influence may be exercised in ways other than through a vote" (at 337).

[190] *Intera Arctic Services, Inc.*, DOT Order No. 87-8-43 (1987).

[191] *Executive Air Fleet, Inc.*, DOT Order No. 92-9-46 (1992).

[192] *In the Matter of the Acquisition of Northwest Airlines, Inc. by Wings Holdings, Inc.*, DOT Order No. 91-1-41 (1991).

special rights to the foreign debt holder that implied control.[193] A US foreign aviation policy consideration also was a key factor in the DOT's approval of the basic KLM/Northwest transaction: a "liberalized aviation relationship" existed between the US and the Netherlands and the two countries were, at the time, considering entering into an Open Skies bilateral agreement allowing unrestricted access to each other's country.[194]

The conclusion one can draw from this series of administrative decisions, first by the CAB and subsequently by the DOT, is that (a) US aviation laws require ownership and control by US citizens of at least 75 percent of the voting stock of a US airline, (b) US citizens must also have actual control of the airline itself, (c) the interpretation of what constitutes control—being an administrative decision—has been subject to change over the years, and (d) aviation foreign policy considerations also play a role in the determination of whether specific foreign investments constitute violations of the citizenship requirements.

It is interesting to note, however, that not all agencies of the DOT construe the US citizenship laws in the same way. In fact, two different agencies within the DOT, the Federal Aviation Administration (FAA) and the Maritime Administration, apply more liberal definitions of US citizenship than does the DOT itself.

The same laws govern the operations of both the DOT and the FAA. Yet, for several decades the FAA has been interpreting the citizenship provisions of 49 U.S.C. 40102(a)(15) quite differently from the DOT. The FAA has the responsibility for maintaining the registry of US aircraft and for ensuring that only eligible aircraft are recorded in that registry. 49 U.S.C. 44102 provides that for operations primarily outside the US "an aircraft may be registered . . . only when the aircraft is . . . owned by a citizen of the United States . . ." or a resident alien. The FAA, however, interprets these provisions to allow an individual non-citizen or resident alien or a corporation to obtain registration of aircraft in the US by establishing a separate corporation under US laws in which the president and two-thirds of the directors and other managing officers are US citizens, placing title to the aircraft in that corporation, and transferring 75 percent of the voting stock of that corporation to a voting trust in which the trustee is also a US citizen. Under such a trust arrangement, the foreign owner of the aircraft who is the beneficiary would continue to receive all of the financial benefits of the use or lease of the aircraft, which presumably would be enhanced by it now being a US registered aircraft, and would also regain title to the aircraft when the voting trust arrangement is terminated.

---

[193] In reaching its decision, the DOT also indicated that, as a general rule, it would consider an indication of foreign control to be the naming of a foreign citizen to chairman of the carrier or a disproportionate number of foreign director representatives to important committees, such as the executive committee, the nominating committee, or the finance committee. (*Ibid.*, 7.)

[194] "We reached these decisions in the context of the liberalized aviation relationship that prevails between the United States and KLM's homeland". (*Ibid.*, 4). Aviation policy considerations, however, caused the opposite result in the subsequent case of British Airways' planned acquisition of 44 percent of USAir's total equity, consisting of 21 percent of voting stock and 23 percent of non-voting stock. The primary consideration in that case was the fact that US carrier access to the London market would remain tightly restricted since bilateral negotiations between the United Kingdom and the United States were stalemated, while BA would obtain wide access to the US market through USAir if the transaction was approved. BA withdrew its proposal before a formal decision was issued when it was reported and widely believed that the DOT would not approve the arrangement on a foreign-ownership basis.

Although different statutory provisions govern the operations of the Maritime Administration, those laws also contain similar US citizenship requirements. Under the Maritime Security Act of 1996, owners of ships having US documentation are eligible to receive financial subsidies in return for which they must make such ships available for use by the US Department of Defense (DoD) in the event of war or national emergency. US maritime law and Maritime Administration rulings allow vessels to be documented for US registration if they are owned by trusts having only US citizen trustees and where the foreign beneficiaries of such trusts do not hold more than 25 percent of the aggregate power to influence the trustees' authority regarding ownership or operation of the vessels that may adversely affect the interests of the United States. 46 U.S.C.12102. These provisions have been interpreted by the Maritime Administration to allow both the sale of US documented vessels to foreign individuals or companies and the transfer of the subsidies for such vessels to the new owners on the theory that the creation of trust arrangements is sufficient to keep ownership and control in US hands even though the vessels may be chartered exclusively to their foreign owners who direct where, when, and how the vessels operate. Authorisation of such transactions is considered justified on the policy grounds that they will strengthen the US Merchant Marine by maintaining jobs for US mariners and maintaining the vessels under the US flag, and that they will preserve the availability of the vessels for use by the DoD in time of war or national emergency.[195]

Suggested Ways to Liberalise US Aviation Citizenship Requirements

If the US government wanted to ease or eliminate restrictions on ownership and control of airlines, as a legal matter, this could be done several ways.

- Congress can change the present statutory provisions limiting foreign ownership and control of US airlines.
- DOT can liberalise its administrative interpretation of the existing statutory provisions.
- DOT can make an administrative decision not to enforce the citizenship provisions of the statute that require US citizenship for US airlines.

To elaborate, the most direct way to accomplish these results would be for Congress to amend the aviation statute by either very substantially raising the threshold of foreign ownership and control in 49 U.S.C. 40102(a)(15) or by entirely eliminating the citizenship requirements in 49 U.S.C. 40102(a)(2)—the definition of "air carrier"; 49 U.S.C. 41102(a) and (b)—the provisions authorising issuance of certificates of public convenience and necessity; and 49 U.S.C. 44102(a)—the eligibility requirements for aircraft registration. These changes would permit the marketplace to regulate the level of foreign investment in US airlines and enable foreign investors to protect their interests by controlling the companies in which they invest.

Another less certain way of allowing greater (but not unlimited) foreign investment in US airlines, would be to leave the statute unchanged, but to have the DOT further

[195] See, for example, Action of Maritime Administrator on December 8, 1999, authorising transfer of Sea-Land Service, Inc. vessels to a US qualified trust for the benefit of the Danish A.P. Moller Group, parent of the Maersk Line.

liberalise its interpretation of its governing statute.[196] Even a reversion to the literal wording of 49 U.S.C. 40102(a)(15)(C) that 75 percent of the voting interest must be "owned *or* controlled" would be helpful since, if the numerical limit is maintained, the question of control of the airline would no longer be an issue.

As discussed above, the DOT has changed its interpretation of the statutory definition of "citizen of the United States" over the years, and the FAA, with the DOT's full knowledge, has permitted the same statutory citizenship requirement to be liberalised through the use of nominee ownership voting trusts which function for the benefit of foreign owners. There is, thus, precedent for the DOT to further modify its interpretation of "ownership and control" to permit greater foreign investment on the grounds of changed circumstances and national policy.

Another potential avenue to investment reform would be to retain the existing statutory language and have the DOT issue a policy statement that it is in the national interest to refrain from enforcing the statutory limitations on ownership and control except in unusual circumstances. Again, there is a precedent for the DOT taking such action. 49 U.S.C. 41504 requires all US and foreign airlines to file tariffs for international travel. 49 U.S.C. 41510 forbids all such carriers from charging or receiving any compensation different from that specified in its tariffs. 49 U.S.C. 46301(a)(1)(A) imposes a civil penalty of $10,000 for giving or receiving a rebate from the price stated in a carrier's tariff and, in addition, 49 U.S.C. 46309 makes it a punishable crime for anyone to knowingly and willingly grant or receive such a rebate.

Nevertheless, despite this clear language of the statute, these explicit requirements have not been enforced for the past 23 years by decisions of the CAB and the DOT made with the consent of US Department of Justice. Initially, these anti-rebating provisions and penalties were ignored on a case-by-case basis; since 1987 they have not been enforced on the basis of official written policy.[197] The justification for these decisions was that the anti-rebating laws contradicted the government's policy goals of encouraging competition and low fares for consumers. Henceforth, the DOT said, only instances of rebating that evidenced "a clear pattern of direct consumer fraud or deception", a "pattern of invidious discrimination", or "violations of the antitrust laws" would be prosecuted. Technical rebating, without more, would not trigger enforcement action.

By analogy, the DOT could similarly decide on a policy of not enforcing the citizenship requirements of the statute, either under all circumstances, or except where national defence or other extreme circumstances warranted.

---

[196] Modifying pre-existing interpretations of statutory language could open the door to lawsuits that would place interpretative decisions in the hands of judges rather than regulators.

[197] See Civil Aeronautics Board Order 80-5-215 (1978), letter dated January 22, 1987, from the DOT Acting General Counsel to the President of the American Society of Travel Agents, and also Statement of Enforcement Policy contained in the Notice of Proposed Rulemaking issued by the DOT on October 21, 1988, 53 F.R. 41353. While this proposal was never officially published as a final rule, it, nevertheless, remains the policy of the United States on this subject.

Appendix III: Economies of Scale, Scope, and Density in the Aviation Industry

Economists often refer to cost savings that can be achieved through various business structures or practices with terms such as “economies of scale”, “economies of scope”, and “economies of density”. Each of these terms refers to a different means through which firms can reduce their average cost of producing output (or add additional products or services at progressively lower cost). The aviation industry is characterised by all three types of economies.

Identifying Economies of Scale, Scope, and Density

A firm is said to enjoy “economies of scale” when its average cost of production declines with increases in its output. If two firms in the same industry combine through a merger or acquisition, the merged firm’s output level will be greater than the output level of each of the participants. The increased output often makes it possible for the merged firm to realise cost savings through more efficient use of physical assets or labour. This is an example of an economy of scale.

Without any changes in network structure, one might expect that the combination of two airlines would still lead to savings in sales, marketing, administrative, maintenance, and other costs. These represent the types of cost savings airlines identify when explaining the benefits of past mergers. Currently, we see some of these savings realised through the formation of alliances, although most alliances do not engage in substantial coordination of investment or other cost-reducing activities. Hence, the airline industry appears to exhibit some economies of scale.

A firm is said to enjoy “economies of scope” when it is possible for the firm to reduce its average cost of production as new products or services are added. The most notable example of economies of scope in the airline industry is the hub-and-spoke system. As an airline connects more cities to its hub, it becomes progressively less expensive to add new city-pairs to its network.

For example, assume that an airline’s hub airport is connected to ten other cities. By connecting another city to its hub, the airline has expanded its city-pair network by eleven city-pair combinations (where eleven represents connections from the new city to the hub and the ten other cities). However, if the airline is connected to twenty cities through its hub, the addition of one more city that connects to the hub increases the airline’s city-pair network by twenty-one city-pair combinations. Thus, it is less expensive to add additional city-pairs to a hub-and-spoke network as that network increases in size. This represents an economy of scope that arises in transportation and other network industries. Hence, these types of cost savings also are referred to as “network economies”. Besides reducing the average cost of offering trips to multiple destinations, network economies also bring convenience to consumers by allowing “one-stop shopping” for travel to a variety of destinations. Hence, the airline industry appears to exhibit economies of scope as well.

A firm operating a network is said to enjoy “economies of density” when it is possible for the firm to reduce its average costs as more customers use that network. In the airline industry, economies of density are realised when the number of passengers on a particular route increases and the average cost per passenger declines on that route. Reasons for this decline in costs may include more efficient use of maintenance and ground-support

personnel, airplanes, and gate space.[198] Hence, the airline industry also appears to exhibit economies of density.

The distinction between economies of scale and density can be seen with the example of maintenance costs. Imagine an airline adds one additional plane to its network and serves one additional city-pair route with that plane. If the airline does not need to hire additional maintenance workers to service that plane, the average cost of the maintenance workers is spread over more flights, and thus the average cost of producing those flights decreases. This is an example of a scale economy.

To continue the example, economies of density may arise when airlines increase their seat capacity on a given route. Imagine that an airline increases the number of seats available on a route by using larger aircraft to service the same number of flights on the route. Since the same number of maintenance workers are needed to service the same number of planes (albeit larger ones), the same maintenance costs are spread over more available seats, and therefore the average cost per seat decreases. Another example arises if an airline adds more flights on a given city-pair route. In this case, it may be possible to accommodate those added flights without increasing the number of ground-support staff. If so, then the average cost per seat on the route declines as the number of flights increases. As such, this defines another source of economies of density.

Empirical Evidence Regarding Economies of Scale, Scope, and Density

Economists have examined whether larger airlines or airlines with larger networks achieve cost advantages over their rivals.[199] In particular, the economics literature has analysed whether the incremental cost of transporting passengers declines with increased passenger volumes (*i.e.*, economies of scale and density). Attention also has focused on the extent that hub-and-spoke networks produce lower costs (*i.e.*, economies of scope). These include analyses of whether carriers have cost advantages in serving city-pairs that include their operating hub. The analyses have been performed controlling for other factors that may cause cost differences among carriers, including differences in factor costs (*e.g.*, wages).

In general, the evidence supports the existence of economies of scale, scope, and density. Among other results, economic studies have indicated that the cost of handling additional passengers are lower for an airline operating from its hub than for other airlines operating from the same location and serving the identical city-pair. In addition, evidence exists that the cost of handling additional passengers declines with increased traffic density, particularly for flights that are of at least moderate distance.

The recent American-TWA merger provides an illustration of the cost savings that can be achieved through the realisation of scale, scope, and density economies. Despite the anomalous industry behaviour that arose after September 11th of 2001, the merger between American and TWA nonetheless showed sources of cost savings that potentially

---

[198] For further exposition of economies of density in air transportation, see Brueckner and Spiller, "Economies of Traffic Density," 379-415.

[199] For further reference, see, among others, Brueckner and Spiller, "Economies of Traffic Density," 379-415; Brueckner and Whalen, "International Airline Alliances," 503-545; and Steven Berry, Michael Carnall, and Pablo T. Spiller, "Airline Hubs: Costs, Markups and the Implications of Customer Heterogeneity," NBER Working Paper No. w5561, National Bureau of Economic Research (May 1996).

could be realised by other airlines as well. The merger immediately resulted in cost savings achieved through the elimination of TWA's advertising budget, which industry sources estimated to be around $50 million per year. Further savings accrued through operational synergies, as the combined company reduced costs in almost every major category when compared to the total costs incurred by both companies prior to merger. Significant saving occurred in the area of sales commissions, aircraft leasing charges, fuel costs, and other expenses. According to financial statements, the combined company has reduced its costs by more than $1 billion since the merger.

The American-TWA merger represented the combination of two US carriers with passenger bases located in the United States. One might expect that the merger of two European carriers may achieve cost savings in some of the same areas: advertising, sales, administrative, and aircraft leasing costs. Such consolidation could eliminate the need to establish two airline brands, reduce duplicative customer-support and maintenance resources, and combine customer bases in a manner that would allow load factors to increase due to more efficient aircraft deployment and network design.

Admittedly, some of these cost savings may be more difficult to achieve if consolidation occurred between EU and US transatlantic carriers. Each carrier would have their customer bases located in distinctly different geographic areas. It may be harder therefore to reduce certain sales and marketing costs. On the other hand, a consolidation of air carriers could lead to savings in administrative and maintenance costs and induce network reconfiguration to achieve greater load factors (particularly on transatlantic routes) and other sources of efficiency.

Appendix IV: Details on Cost Data

Below we describe the BAe database that is the primary data source for our cost analysis, and the checks and adjustments made to that data on the basis of other sources available to us.

The BAe Database

The BAe database contains:

- OAG schedule data for intra-European and transatlantic airline routes[200]
- ATP fare data: high, low, and average fares for each of business, economy, and promotional classes[201]
- Fare mix data; controlling the relationship of business, economy, promotional, and freight revenues on an airline route
- IATA cost data

The database categorises costs under eight direct and five indirect headings.

Direct Operating Costs:

- flight deck crew
- fuel
- insurance
- maintenance
- leasing
- airport charges
- passenger charges
- en-route charges

Indirect Operating Costs:

- station and ground
- cabin attendants
- passenger service
- ticketing, sales, and promotion
- general and administrative

---

[200] OAG Worldwide Limited provides travel information to corporations and agents.

[201] ATP collects and reports airline fare data.

BAe's Cost Estimates from BAe Database

BAe combines the schedule, fare, and cost data to estimate carriers' operating costs and revenues on any existing intra-European or transatlantic airline route.

Direct Operating Costs

Flight Deck Crew – IATA reports high, medium, and low flight crew costs. It expresses the costs as values per seat kilometre.[202] If BAe considers a carrier to be high cost, it uses the high flight deck crew rate in its calculations.[203] Similarly, if it considers a carrier to be medium cost, it uses the medium flight deck crew rate in its calculations. BAe estimates weekly flight deck crew costs by multiplying the relevant rate by the number of seat kilometres that a carrier flies on a route in one week.

Fuel – Aircraft manufacturers gave BAe a formula that links the quantity of fuel consumed with the flight time for each aircraft type. Using schedule information and the price of jet fuel, which the database reports for EU countries, BAe estimates the weekly fuel costs. For example, Lufthansa flies 14 times a week from Frankfurt to New York's John F. Kennedy International Airport (JFK). Lufthansa uses Boeing 747s on the route with a flight time of approximately 8.5 hours. Therefore, BAe estimates the quantity of fuel that Lufthansa's Boeing 747s would consume in 14, 8.5 hour flights, and multiplies it by the cost of jet fuel to obtain Lufthansa's weekly fuel bill for Frankfurt to New York.

Insurance – Depending on aircraft type, the database classifies insurance costs as high, medium, or low. It expresses each of the high, medium, and low insurance costs as a value per seat kilometre.

Maintenance – Aircraft manufacturers gave BAe maintenance costs by aircraft type and flight time. BAe estimates weekly maintenance costs using schedule information.

Leasing – IATA reports monthly rental of each aircraft type. It also reports their utilisation rates. That is, the total hours each day a particular type of aircraft stays in the air. We illustrate BAe's leasing cost calculation using our Lufthansa example. To recap, Lufthansa flies twice a day from Frankfurt to New York JFK. It uses Boeing 747s on the route with a flight time of approximately 8.5 hours. BAe reports that the utilisation rate of a Boeing 747 is 12.3 hours. Ignoring scheduling affects then, the number of Boeing 747s required on the route is 1.4 (17 hour daily flight time divided by 12.3). Therefore Lufthansa's weekly leasing bill is 1.4 times the weekly rental of a single Boeing 747-400.

Airport Charges – These are landing charges levied by the airport on the carrier. Airport landing charges depend on whether the flight landing is domestic or international, the weight of the landing aircraft, and the noise category of the landing aircraft.[204] BAe combines the relevant airport specific landing charges to calculate airport charges on a particular route.

---

[202] Even if empty, a 100 seat plane flying 100km would have *travelled* 10,000 (100x100) seat kilometres.

[203] The database classifies each airline as being low, medium, or high cost (distinguishing also between southern and northern Europe).

[204] BAe classifies aircraft 1 to 5 for noise.

Passenger Charges – Airports also charge carriers depending on whether passengers complete their journeys on arrival, transfer to another flight, or transit to another destination. Transfer passengers disembark the aircraft on arrival and transfer to connecting flights through the airport, whereas transit passengers do not disembark the aircraft, waiting instead for the next leg of their journey. IATA reports the relevant charges per passenger by airport. Using these IATA charges we can replicate BAe's results, noting that the number of passengers completing, transferring, or transiting on a given route is based on BAe's fare mix.

En-route Charges – These charges go towards finance of the air traffic control system and depend on departure country, distance travelled, and aircraft type. We can replicate BAe's results, however the relevant factors seem to be embedded within the database.

Indirect Operating Costs

BAe calculates all five indirect operating cost components in exactly the same way as it calculates flight deck crew costs. IATA reports high, medium, and low values per seat kilometre for each indirect cost. So for example, if BAe classifies an airline as high cost then it applies the high rate when calculating that airline's costs.

Alternative Data Sources and Adjustments Made to BAe Data

For each of the cost categories where we identified significant cost variation, we explain how we checked the BAe data using input from other airlines and the AEA, and the nature and logic of any adjustments made.

Flight Deck Crew

For intra-EU flights, the BAe data is largely consistent with other sources, and at most 10 percent higher. We therefore conservatively reduce intra-EU figures by 10 percent. For transatlantic flights however, the BAe data appears massively overstated (by a factor of about seven) by comparison with other sources. We suspect this is because BAe assumes that this cost can be viewed as constant on a per available seat kilometre (ASK) basis. However, this logic is flawed in a way that will tend to overestimate costs on long-distance flights.

We believe that flight deck costs are approximately proportionate to flying time, because of the limited number of hours per year that a pilot or engineer can fly under safety rules and negotiated contracts. For a simple example, suppose a pilot has 400 hours flying time per year. Then the opportunity cost using the pilot for an eight hour flight on January 1 is to reduce the remaining number of hours he/she can fly in the year to 392.

However, flying time is not directly proportionate to distance. If we compare a 200km flight with a 5000km one, then the distance is 25 times as great but the ratio of flying times will be closer to 10.

Consequently, if one estimates flight deck costs for both flights by multiplying the same per ASK figure by distance (and number of seats), the effect will be to hugely overstate the costs.

Instead we therefore used an indirect approach by estimating a flight deck crew cost per hour from the intra-EU data, which as noted above is consistent with other data sources, and then multiplying this by the number of hours flying time for transatlantic flights. This provided a good match with data on transatlantic costs from the other sources.

Cabin Attendants

For intra-EU flights, once we adjusted to ensure an "apples for apples" comparison, the BAe costs are consistent with some of our other data, and significantly (about 25 percent) lower than others. We therefore have been conservative in using the BAe data without adjustments.

For transatlantic flights, data from individual airlines implied that the BAe figures are overestimated by 40 percent to 60 percent. Because the individual airlines are from countries that might be expected to have rather lower than EU-average wage costs, there is an argument for using the lower end of this range, and reducing the BAe data by a factor of 1.4. However, because of our wish for conservatism we reduce the BAe data by a factor of 1.6.

Passenger Service

The BAe data understates passenger service for intra-EU flights, but overstates it for transatlantic flights. Overall, we believe that BAe's estimates are reasonable but that it allocates costs between routes inappropriately.

For a large airline network, BAe underestimates intra-EU route passenger service costs by exactly the same amount which it overestimates transatlantic passenger service costs.

Consequently, we modify BAe's estimates by increasing its estimates for intra-EU flights and decreasing its estimates for transatlantic flights. Overall, we modify BAe's estimates such that the aggregate passenger cost estimate remains relatively constant over each airline's network. Based on data we received in our questionnaire, we increased BAe's intra-EU passenger service estimates per ASK by approximately 75 percent, and reduced BAe's transatlantic passenger service estimate per ASK by approximately 60 percent.

Ticketing, Sales, and Promotion

Like passenger service costs, BAe overestimates ticketing, sales, and promotion costs on transatlantic routes and underestimates them on intra-EU routes. However, we believe that BAe's method for estimating ticketing, sales, and promotion costs to be flawed. Even though it seems to have no clear reason, BAe views ticketing, sales, and promotion costs to be constant on a per ASK basis. In contrast, we believe that ticketing, sales, and promotion costs are related to revenue. The greater the revenue generated on a particular route, the greater the airline's ticketing, sales, and promotion costs on that route. From data we received in our questionnaire, we estimate that an industry standard airline incurs ticketing, sales, and promotion costs equal to 13.7 percent of its revenues on any given route.

General and Administrative

We suspect that airlines allocate general and administrative overheads to different routes with reference to the revenues they generate on each route. From data we received in our questionnaire, we estimate that an industry standard airline allocated general and administrative overheads equal to 2.0 percent of its revenues on any given route.

Appendix V: Consumer Surplus Calculation

Concept of Consumer Surplus

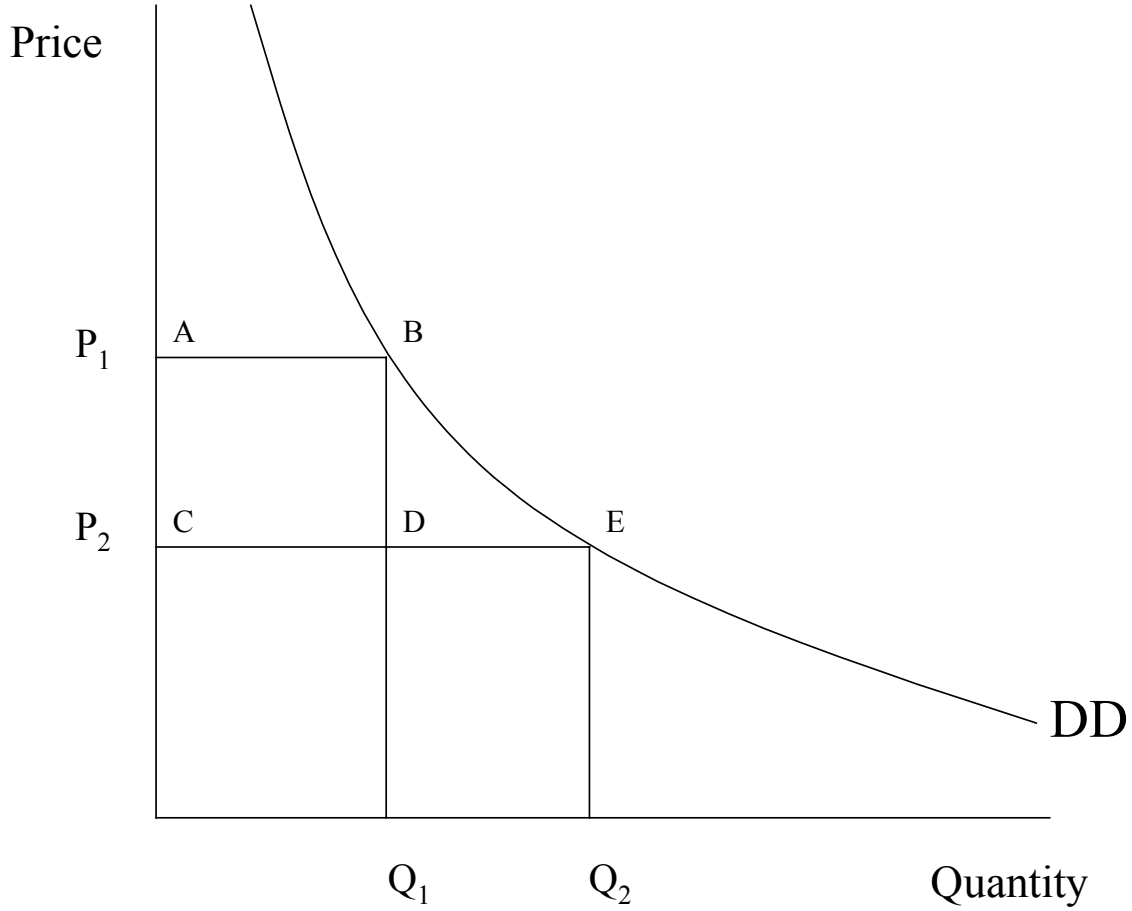
Consumer surplus is a common measure of the economic benefits to consumers from purchasing a particular product above and beyond the price they pay for the product. To define it, one assumes that consumers place a value on each product that they buy. For example, a consumer may decide that a flight from New York to London is worth €1,500. If the flight only costs the consumer €1,000, then the consumer is said to realise a "surplus" of €500. This represents the difference between the amount the consumer was willing to pay for the product and the amount that was actually paid. Different consumers on the plane will place different valuations on the flight (and have paid different prices for it), and will realise different consumer surplus values. The total consumer surplus associated with the flight is simply the sum of the consumer surplus values of all the passengers.

The concept of consumer surplus is most often used to measure how much a consumer benefits or loses when the price in a market changes. Continuing the example from above, if a consumer only had to pay €800 for the flight from New York to London, the consumer "gains" an additional €200 of surplus.

Calculations

To measure the change in consumer surplus, a graphical representation is easiest to follow. In Figure Appendix V.1, the demand curve for fares and volumes on a given route is represented by the curve *DD*. The initial price and quantity are represented by (P_1, Q_1). If the price falls to P_2, the new quantity is Q_2. The area above *AB* represents the original consumer surplus, while the new consumer surplus is the area above *CE*. The change in consumer surplus is therefore *ABEC*.

Figure Appendix V.1



The change in consumer surplus has two components. First, existing passengers enjoy increased surplus if the price they pay is reduced. The area *ABDC* represents the consumer surplus to existing passengers. Second, the price reductions stimulate additional traffic, and each new passenger enjoys a surplus, which is the area *BED*.

In order to calculate the change in consumer surplus, we need to first know the functional form of the demand curve. For the purposes of the study, we have assumed a "constant elasticity of demand" function of the form

$$Q(P) = kP^{-\varepsilon},$$

where P is the price, Q is the quantity, ε is the elasticity of demand, and k is a constant.

To "calibrate" this functional form, we use prices and quantities from the BAe and the T-100 data. The economic literature provides estimates of the elasticity of demand for air transportation.[205] Using the observed values of P and Q, and the assumed value of ε, we then calibrate to the data to derive an estimate for k. Once the value of k is obtained, it is then possible to calculate the change in consumer surplus associated with a specified change in quantity (*i.e.*, passenger volumes).

---

[205] See footnote 40. Note that the results we present throughout the text for the case where the elasticity is 2.5 are not two and one-half times the results when the elasticity equals 1.0 because we are exponentiating to get the results.

Consumer Surplus from Chapter 3

In Chapter 3 we estimated the change in consumer surplus assuming the cost savings from an Open Aviation Area were passed through completely to consumers. We start with observed prices and quantities (P_1, Q_1), and the assumed elasticity ε, which allows us to derive k. We assume there is complete pass-through of the cost savings, so we apply the estimated reduction in costs to P_1 to get P_2. Once we have P_2, we can use the demand curve (and ε and k) to calculate Q_2. Once we have (P_2, Q_2), then the change in consumer surplus is simply *ABEC* from Figure Appendix V.1.

Consumer Surplus from Chapter 4

In Chapter 4 we estimated the change in consumer surplus from fare decreases due to increased price coordination on interline flights. We again start with observed prices and quantities (P_1, Q_1), and the assumed elasticity ε, which allows us to derive k. We apply the interline price decrease of 18 percent or 28 percent to P_1 to get P_2. Once we have P_2, we can use the demand curve (and ε and k) to calculate Q_2. Once we have (P_2, Q_2), then the change in consumer surplus is simply 10 percent (the proportion of all flights that have the potential for fare reductions as a result of increased price coordination) of *ABEC* from Figure Appendix V.1.

Consumer Surplus from Chapter 5

In Chapter 5 we have calculated the change in consumer surplus by starting with the observed prices and quantities (P_1, Q_1) and applying the estimated increase in volume from an Open Aviation Area to Q_1. This provides us with an estimate of Q_2. With Q_2, ε, and k, we can estimate P_2 from the demand curve. Again, we calculate the change in consumer surplus as *ABEC* in Figure Appendix V.1.

Actual Calculations

In practice, what we have done is taken the integral of the demand (or inverse demand) curve between P_1 and P_2. This is the precise way of calculating the area of *ABEC*. Once we have this value, we can calculate *ABDC* by multiplying Q_1 times the change in price P_1-P_2. This is the change in consumer surplus to pre-existing consumers, and subtracting this value from total consumer surplus gives us the consumer surplus to the new travellers on the route.

We have calculated the consumer surplus for each route separately and then summed the consumer surplus for each route to get the total market change in consumer surplus resulting from an Open Aviation Area. These are the estimates we present in the text in Chapters 3 through 5.

The example below shows how we calculated the consumer surplus on the route from New York to the capitals of the four output-restricted bilateral countries in the European Union in Chapter 5. The fares we had were uni-directional, while the volume figures were bi-directional. We took the fares in both directions between New York and the European city (*i.e.*, from the two possible origin points of the city pair) and averaged them to obtain a single fare. That fare was matched with the volume for the route.[206] Then, we applied the estimated increase in traffic to the volume to get the new value of Q_2. We calculated k, used this to calculate P_2, and then calculated the change in consumer surplus using the

[206] We would obtain the same final estimate of consumer surplus by taking the total volume on the city-pair route and assuming half the volume originated at each city.

formulae derived below. Table Appendix V.1 shows the values used in the calculation on the New York-Europe routes, assuming an elasticity of 1.0.

Table Appendix V.1

Example of Predicted Increase in Consumer Surplus
Due to Lifting of Output Restrictions
Only Calculated for Routes Where Volume Is Available and Bidirectional Fares Are Available

Route	*2000 Average Fare (P_1)*	*2000 Allocated Volume (Q_1)*	*Post-Open Skies Volume (Q_2)*	*Calculated "k" Factor (k)*	*Post-Open Skies Fare (P_2)*	*Gain in Consumer Surplus*
New York - Athens	645	276	304	178,095,370	585	17
New York - Dublin	618	341	375	210,383,855	561	20
New York - London	621	4,264	4,697	2,647,673,018	564	256
New York - Madrid	677	511	563	346,068,339	615	33

Notes:
Assumes elasticity = 1.0.
2000 Average Fare is actually the January 2001 fare from the BAe Database.

Formulae for Calculating Consumer Surplus

In this section, we present the calculations for the change in consumer surplus assuming a change in price from P_1 to P_2. The change in P can be calculated either directly from applying the cost savings pass-through or the interline price reductions, or by determining the price change needed to generate the volume changes estimated in Chapter 5.

$$CS = \int_{P}^{\infty} kz^{-\varepsilon}\,dz$$
$$= \frac{1}{-\varepsilon+1} kz^{-\varepsilon+1}\Big|_{P}^{\infty}$$

If ε>1, then

$$CS = -\frac{1}{-\varepsilon+1} kP^{-\varepsilon+1}$$
$$= \frac{k}{\varepsilon-1} P^{-\varepsilon+1}$$

The change in consumer surplus can be calculated by evaluating the consumer surplus at the two different price levels and then subtracting the two values:

$$\Delta CS = CS\Big|_{P_2} - CS\Big|_{P_1}$$

If ε>1, then

$$\Delta CS = \frac{k}{\varepsilon - 1} P_2^{-\varepsilon+1} - \frac{k}{\varepsilon - 1} P_1^{-\varepsilon+1}$$
$$= \frac{k}{\varepsilon - 1}\left(P_2^{-\varepsilon+1} - P_1^{-\varepsilon+1}\right)$$

If ε=1, then

$$Q(P) = \frac{k}{P}$$
$$\Delta CS = \int_{P_2}^{P_1} \frac{k}{z} dz$$
$$= k \ln(z)\Big|_{P_2}^{P_1}$$
$$= k\left(\ln(P_1) - \ln(P_2)\right)$$

By using these formulae, and the values for k, ε, and P, we are able to calculate the change in consumer surplus.

Sensitivity Test

In Chapter 5, we presented the results of our consumer surplus estimates using January 2001 prices from the BAe data set and 2000 total volumes from the T-100 data set. To test the sensitivity of our results, we obtained a separate estimate of consumer surplus using the 1998 prices from the ATP fare data and the 1998 volumes from the T-100 data. In theory, if demand had not shifted between the two years, we should get similar estimates of consumer surplus regardless of the starting point, as long as the prices remain relatively constant. Recall the estimates of the change in consumer surplus above only rely on the prices and the constants. In this sensitivity test, we calculate a new k, since we have a new (P_1, Q_1) based on the 1998 data.

As can be seen from the table below, the consumer surplus estimates are higher than those reported in Chapter 5. If the elasticity of demand is 1.0, the total change in consumer surplus increases from €1.5 billion to €1.6 billion, or a 10 percent difference. If the elasticity of demand is 2.5, the total change in consumer surplus increases from €605 million to €667 million, also a 10 percent increase in consumer surplus. The estimates for the case using the 1998 values are included in Table Appendix V.2 below.

Table Appendix V.2

Predicted Increase in Consumer Surplus Due to Lifting of Output Restrictions (€ million/year)

Country	*Elasticity = 1.0*			*Elasticity = 2.5*		
	Gain Due to Price Decreases for Existing Customers	*Gain Due to Increased Traffic*	*Total Gain*	*Gain Due to Price Decreases for Existing Customers*	*Gain Due to Increased Traffic*	*Total Gain*
Greece	32	2	34	13	1	14
Ireland	84	4	88	35	2	36
Spain	113	6	119	47	2	49
United Kingdom	1,315	65	1,380	541	27	568
Total	*1,544*	*76*	*1,620*	*636*	*32*	*667*

Source:
DOT International T-100 Data and EU Published Fare Data
Notes:
Calculated for routes where volume and bidirectional fares are both available.
Utilizes 1998 fares and volumes as baseline.

Appendix VI: Open Skies Impact Evaluation Methodology

Our Methodology and Data

To reasonably assess the impact on output-restricted transatlantic routes that would arise under an Open Aviation Area, we performed a regression analysis to estimate the passenger volume effects that accompanied prior liberalisation on EU-US routes in the form of Open Skies agreements. We estimated a statistical relationship between passenger volumes on each route and various explanatory (demand and supply) variables, using data from the period prior to each EU country's Open Skies agreement with the United States. We then used the estimated relationship to predict what passenger volumes would have been in the absence of an Open Skies agreement. The difference between the actual and predicted volumes was attributed to the impact of partial aviation liberalisation in the form of Open Skies agreements.

This appendix discusses our data sources, methodological approach, model specification, and results.

Data

The countries included in our analysis were Austria, Belgium, France, Germany, Italy, the Netherlands, and Portugal. The analysis of passenger volumes relied primarily on T-100 international flight segment data from the US Department of Transportation, which provides monthly volumes for transatlantic city pairs. We aggregated the T-100 passenger volumes for each EU-US city pair by quarter, since other variables described below were available only on a quarterly basis.

We estimated the relationship between passenger volumes and cost and demand factors. The principal cost variable was a portion of the constructed cost index for airlines that is reported by the US Department of Transportation. We used the fuel and labour cost components of this index to represent "near term" costs affecting airline operation. We controlled for demand conditions in part by using data on real US disposable income. Other cost and demand factors included the relevant EU country's real gross domestic product and the real exchange rate between that country and the United States (which expresses the ratio of the relevant EU country's price level, converted to US dollars, relative to the US price level). Table Appendix VI.1 describes the independent variables used in our estimation, the source for each variable, and the mean and standard deviation of each variable.

Table Appendix VI.1

Summary Statistics for Independent Variables

Variables in Second Quarter 1998 US Dollars

	Variable	*Statistic*	*Country*						
			Austria	*Belgium*	*France*	*Germany*	*Italy*	*Netherlands*	*Portugal*
[1]	Real GDP of Country	Mean	8.55	2.95	17.95	60.11	0.07	54.47	0.01
		Std. Dev.	0.91	0.30	1.76	6.95	0.01	5.19	0.00
[2]	Real Exchange Rate	Mean	8.57	2.99	18.04	60.44	0.06	55.34	0.62
		Std. Dev.	0.88	0.33	2.05	7.51	0.01	5.42	0.06
[3]	Real ATA Cost Index	Mean	123.32	123.32	123.32	123.59	123.32	123.32	123.32
		Std. Dev.	4.35	4.35	4.35	4.44	4.35	4.35	4.35
[4]	Real US Disposable Income	Mean	5631.85	5631.85	5631.85	5721.33	5631.85	5631.85	5631.85
		Std. Dev.	635.28	635.28	635.28	595.37	635.28	635.28	635.28

Notes and Sources:
Data reflect quarterly observations from 1990:1 - 2000:4, except for Germany's statistics, which reflect an average from 1991:1 - 2000:4.
[1]: Eurostat. For Portugal, Portuguese Central Bank and the OECD.
[2]: Eurostat. For Austria, Consumer Price Index from IMF's International Financial Statistics database is used.
[3]: Derived from the labour and fuel components of the Air Transport Association's Airline Cost Index, Fourth Quarter 2001.
[4]: US Department of Commerce, Bureau of Economic Analysis.

Methodology

To examine the impact of Open Skies aviation liberalisation on passenger volumes between the United States and individual EU Member States, we used regression analysis to identify the relationship between passenger volumes and relevant economic factors using data only for the period prior to the relevant Open Skies agreement. We then used the coefficient estimates from our regression analysis to predict passenger volumes during the Open Skies period, based on the cost and demand conditions prevailing during that period.

These predictions represent the passenger volumes that would have been expected if the market continued to behave as it did during the period before Open Skies. The percentage difference between the actual passenger volumes and the predicted passenger volumes was attributed to the impact of liberalisation through Open Skies. This technique of measuring the impact of a policy change, commonly used by economists, is known as an "out-of-sample" prediction method.

Note again that our coefficient estimates are based only on data for those periods where there is no Open Skies agreement in place between the United States and the EU country relevant to that city-pair route. For example, we included data from US-Belgium routes before the third quarter of 1995 and data from US-Netherlands routes before the fourth quarter of 1992.

Rather than comparing volumes across city-pair routes that are subject to different local demand conditions, our principal methodology instead uses a "fixed-effects" approach to isolate underlying route-specific volume differences. This approach involves the use of "dummy" (*i.e.*, indicator) variables that identify each route, effectively separating route-specific conditions that account for differences in passenger volumes. This approach avoids the need to explicitly account for the various demand (and supply) factors that explain differences in passenger volumes across city pairs.

The Model

Our regression analysis was performed on one basic model specification:

$$\log(volume) = \alpha + \beta_1 routeFE + \beta_2 qtrFE + \beta_3 Age(a) * NewRoute + \beta_4 Age(b) * NewRoute + \beta_5 Age(c) * NewRoute + \beta_4 \log(Yd) + \beta_5 \log(cstindex) + \beta_6 \log(GDP_{foreign}) + \beta_7 \log(RXR_{foreign}) + \varepsilon,$$

where

- log(*volume*) is the natural log of the quarterly passenger volume on a given EU-US city-pair route
- *routeFE* are dummy (*i.e.*, indicator) variables for each route
- *qtrFE* are dummy variables for each quarter (except the fourth quarter)
- *Age(a)* equals the age of the route if the route is less than three quarters old; otherwise, it equals two
- *Age(b)* equals zero if the route is less than three quarters old; the age of the route minus two if the route is less than five quarters old; otherwise, it equals two
- *Age(c)* equals zero if the route is less than five quarters old; otherwise, it equals the age of the route minus four[207]
- *NewRoute* is a dummy variable set equal to one if the route was not in existence during the first quarter of available data
- log(*Yd*) is the natural log of real US disposable income
- log(*cstindex*) is the natural log of the fuel and labour portions of the real airline constructed cost index, expressed in US dollars
- log($GDP_{foreign}$) is the log of real GDP for the EU country relevant to the city-pair route, converted to US dollars using the exchange rate
- log($RXR_{foreign}$) is the "real exchange rate"—the ratio of prices for the relevant EU country (*i.e.*, the EU country's PPI) to US prices (*i.e.*, US PPI), where the relevant EU country's prices are converted to US dollars using the exchange rate
- ε is a random error term

We report results for a two-stage weighted least squares regression. The weight used for the observations on each route was the inverse of the variance of the residuals for that observation's route, where those residuals were obtained from an initial regression of the same specification. An application of "iterative" weighted least squares did not change our results substantively.

---

[207] Based on this construction, the sum of the age variables (*i.e.*, *Age(a) + Age(b) + Age(c))* equals the age of the route for routes that come into existence during the period covered by our data. For pre-existing routes, the *New Route* dummy variable equals zero, implying that the age variables do not affect the estimation of passenger volumes on these routes.

Results

The results from the basic regressions are presented below in Table Appendix VI.2. The signs of the coefficient estimates for US disposal income and airline costs are consistent with the expectations of economic theory, although only the coefficient for US disposal income is statistically significant. Increases in disposable income should increase passenger demand for air transportation, while increases in airline costs should lead to increased fares and reduced passenger volumes. The magnitude of the US disposable income coefficient is greater than one, implying that a one-percent increase in US disposable income increases transatlantic passenger volumes on a given route by more than one percent.

The coefficients for foreign GDP and the real exchange rate are small in magnitude and statistically insignificant. The coefficients for the age variables suggest that passenger volumes increase rapidly on new routes for the first two quarters, but then drop to a more modest growth rate.

Finally, the R-squared of the regression is 0.96, which implies that our coefficient estimates explain 96 percent of the variation in passenger volumes on city-pair routes. This includes variation in passenger volumes across routes and over time.

Table Appendix VI.2

Weighted Least Squares Results

Independent Variable	*Coefficient (t-statistic)*
Intercept	-3.93 (-1.54)
Q1 Dummy	-0.16* (-11.02)
Q2 Dummy	0.17* (11.83)
Q3 Dummy	0.31* (21.56)
Age(a) * New Route Dummy	0.60* (5.27)
Age(b) * New Route Dummy	0.08 (1.77)
Age(c) * New Route Dummy	0.01 (1.74)
Log(Real US Disposable Income)	1.88* (10.84)
Log(Real ATA Cost Index)	-0.30 (-0.51)
Log(Real Foreign GDP)	0.00 (0.02)
Log(Real Exchange Rate)	0.12 (0.57)
Route Fixed Effects	Yes
Observations	**1371**
R-Squared	**0.96**

Notes:
** denotes statistical significance at the 5% level.*
Dependent variable is the log of scheduled passenger volume.

Out-of-Sample

Although certain economic variables, such as airline costs, foreign GDP, and the exchange rate are not statistically significant, leaving these variables out of our regression specification for prediction purposes would raise the potential problem of "omitted-variable bias".[208] Hence, we have included these variables in predicting passenger

[208] If there is a factor affecting traffic volumes, and we do not explicitly control for it in the model specification, the regression will assign some of the effect of the omitted variable to the variables included in the model (based on their correlation with the omitted variables). This potentially leads to biased coefficient estimates and predictions.

volumes that would have occurred in the Open Skies period, had there been no Open Skies agreements.

We believe that the above regressions results are useful for predicting the levels of passenger traffic that would have resulted in the absence of Open Skies agreements. The clearest indication is that, with the variables presently contained in the model, our regression has explained 96 percent of the variation in passenger volumes on city-pair routes. This suggests that although certain variables may not appear statistically significant, the model specification as a whole explains much of the variation in passenger volumes across routes and over time.

As explained above, our out-of-sample predictions use the regression coefficients to estimate passenger volumes under the cost and demand conditions prevailing during the Open Skies agreements.[209] However, the predictions are based on the behaviour of passenger volumes on a given EU-US route before the relevant EU country entered into an Open Skies agreement.

[209] Since the log-linear nature of our regression specification implies that we are predicting the logarithm of the passenger volume level rather than the level itself, our predictions were adjusted to form unbiased estimates of expected volume levels. The adjustment factor was equal to exponent((prediction variance)/2).

Appendix VII: Direct and Indirect Economic Effects

Total Direct and Direct-Plus-Indirect Shares per Dollar of Air Transportation

Industry Number	Input Industry	Direct Shares	Direct-Plus-Indirect Shares
12	Maintenance and repair construction, including own-account construction	0.00203	0.01885
26B	Other printing and publishing	0.00116	0.01005
31	Petroleum refining and related products	0.08735	0.09614
43	Engines and turbines	-	0.00049
51	Computer and office equipment	0.00003	0.00411
60	Aircraft and parts	0.02850	0.03421
65D	Air transportation	0.56218	1.01307
65E	Pipelines, freight forwarders, and related services	0.08535	0.12105
66	Communications, except radio and TV	0.01045	0.02266
69A	Wholesale trade	0.01550	0.03521
73A	Computer and data processing services, including own-account software	0.02072	0.03852
73C	Other business and professional services, except medical	0.01613	0.04190
73D	Advertising	0.01259	0.00490
80	Noncomparable imports	0.07415	-
	Total Multiplier	1.00000	1.84498

Sources:
Table 3.-Commodity-by-Industry Direct Requirements, 1996, Survey of Current Business (January 2000): 66-72.
Table 5.-Industry-by-Commodity Total Requirements, 1996, Survey of Current Business (January 2000): 80-86.
Note: The Direct Shares for Air Transportation include the Value Added in the industry. This is estimated to be 0.50133. This value added is allocated between capital and labour.

The "direct" requirements are the inputs that are directly needed to produce an additional euro of air transportation. For example, if it takes €0.50 of aircraft parts to directly produce €1 of air transportation, then aircraft parts will have a direct input share of 0.50. These values are reported in Table 3 of the US Input-Output Accounts and are shown in the table above.

The "direct-plus-indirect" requirements take into account the interactive nature of changes in output in industries that are mutually dependent. For example, if may take €0.50 of aircraft parts to directly produce €1 of air transportation, but it also may take €0.05 of air transportation to produce €0.50 of aircraft parts. In turn, it would take €0.025 of aircraft parts to produce the €0.05 of air transportation, which would require even more air transportation services, and so on.

The "direct-plus-indirect" shares capture the above interactive effects. In essence, these shares represent the impact on each industry's output when the final demand for air transportation is increased by €1. This effect is determined by allowing the final demand for air transportation to increase by €1, and then "rebalancing" the economy so that the quantity produced equals the quantity consumed of all potential inputs into air transportation. These values, reported in Table 5 of the US Input-Output Accounts, are also shown in the above table. Since a €1 increase in air transportation demand creates more than €1 of overall economic output, the shares add up to a number in excess of one.