International Aviation: Trends and Issues

Report

This Report analyses the historical trends and current issues facing the aviation industry and comments on possible future developments in international aviation. The key areas of investigation include: airline economics; international traffic for scheduled and nonscheduled (charter) passenger services and cargo; traffic forecasts; the regulatory regime; airline operating and financial performance and capital structures; and airline growth, especially alliances and the potential for airline globalisation. In addition, appendices on special interest areas covering the creation of the European Community single aviation market, environmental regulation, airframe manufacturers and aircraft leasing are included, as are supporting data for the extensive array of graphics in the Report.

BUREAU OF TRANSPORT AND COMMUNICATIONS ECONOMICS

Report 86

INTERNATIONAL AVIATION

Trends and Issues

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FOREWORD

The Bureau of Transport and Communications Economics (BTCE) has undertaken research into worldwide aviation trends and issues to meet an identified gap in published work on international aviation. This Report covers world developments in aviation with a focus on the major markets of Asia Pacific, Europe and North America, paying particular attention to international passenger services. The BTCE aims to meet the needs of general interest readers seeking a broad overview of world aviation developments and to provide a reference document for readers with specific areas of interest in aviation.

Substantial contributions to the research, analysis, figures and report writing were made by Meg Crooks (research leader), Brad Jennings, David Mitchell, Loretta Power and Bronwyn Snowden. Additional assistance was provided by Pip Spence. Professor Michael Lawriwsky and Charles Kiefel, from ANZ McCaughan Corporate and Financial Services Ltd, contributed chapter 7.

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Sue Elderton
Research Manager

Bureau of Transport and Communications Economics
Canberra
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ABSTRACT

This Report analyses the historical trends and current issues facing the aviation industry and comments on possible future developments in international aviation. The key areas of investigation include: airline economics; international traffic for scheduled and nonscheduled (charter) passenger services and cargo; traffic forecasts; the regulatory regime; airline operating and financial performance and capital structures; and airline growth, especially alliances and the potential for airline globalisation. In addition, appendices on special interest areas covering the creation of the European Community single aviation market, environmental regulation, airframe manufacturers and aircraft leasing are included, as are supporting data for the extensive array of graphics in the Report.

International aviation is under pressure to change. The regulatory framework for the modern era in aviation was established at the end of World War II. The regulatory regime was widely accepted, and fostered orderly growth in international air services. The history of modern air transport has been a remarkable story of traffic growth; despite this, the industry faces financial difficulties.

International aviation is dynamic. Change is a characteristic of it now; what is not fully revealed in past and current trends is how the system will develop in the future. Much will depend on how the balance between government regulatory requirements and commercial imperatives is settled.

SUMMARY

CHAPTER 1 INTRODUCTION

Purpose: to give the background to the research project and outline the scope of the Report.

- This Report covers trends and issues in international (as opposed to domestic) aviation with a focus on international scheduled passenger traffic in the three major markets of Asia Pacific, Europe and North America. While the aviation industry was the starting point for the analysis, the main players are airlines and governments.
- Base data are drawn from the International Civil Aviation Organization, and unless otherwise stated all monetary units are measured in US dollars.

CHAPTER 2 ELEMENTS OF AIRLINE ECONOMICS

Purpose: to present an economic analysis of international airline operations and provide a framework for the reader to analyse aspects of the international aviation industry contained in the rest of the Report.

- The pattern of trade in international air services results from the interaction of supply and demand factors, and the regulatory framework governing trade in international air services. Trade in international air services is based on reciprocity rather than comparative advantage.

Supply

- Profit maximising privately owned airlines aim to produce services, of a given quality, at the lowest cost possible. Many government owned international airlines are operated as business enterprises and so try to produce services at the least cost. Some government owned airlines are operated for more than profit maximisation; other reasons include national prestige, defence needs, and economic development.
- The cost structure of airlines depends on input technology, input costs and the structure of airline operations. The extent to which an airline can produce at minimum cost depends on the degree of management expertise

in exploiting the technological characteristics of airline inputs and finding lower cost ways of producing services of comparable quality.

- The technological characteristics of aircraft can provide considerable cost advantages to an airline. Unit passenger costs decline with increasing aircraft size, increasing stage length, and increasing load factors. Technological characteristics of aircraft give rise to potential economies of traffic density for airlines, which means that unit passenger costs decline as the amount of traffic carried within the route is increased.
- Empirical studies have shown that economies of network size are not significant. The unit cost reduction from extra patronage generated by an extra network point is offset by the additional fixed costs associated with the extra network point.
- Airline services have a finite life; once an aircraft departs, any unfilled seat (or cargo space) earns no revenue.
- Information plays an integral role in an airline's operations. Computer reservation systems (CRSs) are the major information management system for most airlines, containing information on seats, prices, and revenue for each flight.

Demand

- Demand for travel is a derived demand. This means that people in general do not travel for the intrinsic pleasure of travelling. Travel is usually undertaken in conjunction with the consumption of other goods and services, such as a holiday or business meeting.
- Factors influencing a consumer's decision to travel include: consumer income; the price of air travel; quality of service of air travel; and the price and quality of service of other modes of travel. Empirical studies show that the demand for air travel by passengers is relatively elastic with respect to own price and consumer income. This means that the demand for air travel will change by a proportionately greater amount as a result of a change in price or income.
- In general, passengers prefer to travel on airlines that have large networks.
- Air travellers can be divided into two main categories: leisure travellers, who tend to prefer lower fares but are more flexible on other quality of service conditions; and business travellers, who tend to be more sensitive to quality of service conditions (such as schedule time and frequency) and are less price sensitive. Airlines typically provide different standards of service quality on a particular flight and charge different fares, using ticket purchase conditions to limit the use of cheaper fares by those passengers willing to pay more.
- Other factors affecting the demand for air travel include frequent flier programs (which aim to attract air passengers who travel frequently), the

availability and cost of information for passengers, airline advertising, and perceptions of the safety and security of international air travel.

International market competition

- In general, the greater the number of airlines present in a particular market, the greater the level of competition in that market, leading to more efficient price–output combinations.
- Impediments to competition, such as entry and/or exit barriers, or price and service regulations, may reduce the amount of competition in any market and lead to less efficient market outcomes.
- Barriers to entry and/or exit in international aviation include restrictions in bilateral air service agreements, limited access to international aviation infrastructure, cost advantages arising from airline size, hub and spoke operational systems, frequent flier programs, and CRSs.

Airline conduct

- Pricing strategy is an important element of airline operations. International airlines use yield management systems to manage the range of price and ticket conditions, and to match seat availability with demand.
- Operational strategies can be used to secure cost and/or marketing advantages for airlines and include frequent flier programs, CRSs, and code sharing and interlining.

CHAPTER 3 TRAFFIC: PAST AND PRESENT

Purpose: to outline the major historical trends in international aviation traffic and issues affecting aviation traffic in the nineties.

Cyclical industry

- Annual growth in aviation traffic is strongly influenced by annual growth in GDP. When GDP growth rates increase (or decrease) traffic growth tends to increase (or decrease).
- Generally, the increase (or decrease) in the rate of air traffic growth is greater in magnitude than the corresponding increase (or decrease) in the rate of growth of economic activity.
- Airline yield (a measure of price) is an important determinant of air traffic growth.
- When real airline yield growth rates increase traffic growth rates tend to decrease.

Passenger traffic growth

- Since 1971 there has been positive growth in passenger traffic each year with the exception of 1991.
- Since 1971 there has been a general decline in the average rate of growth in traffic (from 14.6 per cent to 8.3 per cent in the peak of the cycle and from 7 per cent to below negative 3 per cent in the trough of cycles).
- The size and rate of growth of air traffic has varied significantly between regions and individual countries.
- The size of an aviation market reflects the level of economic activity in the countries that the market serves. International aviation activity is concentrated in regions and on specific routes (for example, the North Atlantic route).
- Airlines in Europe carry the largest amount of international passenger traffic, followed by Asia Pacific and North America.
- Airlines in North America carry the largest amount of world (international plus domestic) traffic, followed by Europe and Asia Pacific.
- The top city pairs are concentrated within Asia Pacific and Europe, and on routes between these regions and North America.
- The concentration of aviation activity in a few regions and specific routes means any change in passenger travel patterns within these high activity markets can have a significant effect on worldwide aviation.
- Nonscheduled (charter) passenger traffic is a small proportion of total international passenger traffic, and more prevalent in Europe than in other markets.

Cargo traffic growth

- Since 1971 there has been positive growth in passenger traffic each year although growth was negligible in 1991.
- Airlines in Europe carry the largest amount of both international and world (international plus domestic) cargo traffic, followed by Asia Pacific and North America.
- The future direction of air cargo transport will be influenced by the ability of passenger airlines to maximise the profitability of their cargo business.

Australia

- The Australian international aviation market accounts for a small proportion of all scheduled international passengers.

- Average growth rates for passenger numbers on international scheduled services to and from Australia were higher than average growth rates on worldwide international scheduled services during the period 1977–1992.

CHAPTER 4 TRAFFIC: FORECASTS, GROWTH AND CONSTRAINTS

Purpose: to outline growth forecasts for international aviation traffic and the interdependence of this growth with associated industries, such as the travel and tourism industry, one of the forces driving traffic growth; and the infrastructure constraints that may dampen that growth.

Passenger traffic forecasts

- International passenger traffic has grown faster than domestic passenger traffic and this trend is forecast to continue.
- Growth is forecast for international aviation passenger traffic in all regions and routes.
- The rate of growth in aviation passenger traffic will vary between regions and routes.
- The highest growth rates in international aviation passenger traffic are forecast for routes within, and linked to, the Asia Pacific region.
- Airlines in the Asia Pacific region are set to become the largest carriers of international passenger traffic by the year 2001.
- Airlines in North America and Europe will continue to have the highest levels of world (international plus domestic) passenger traffic, at least until the year 2001.
- The proportion of business travellers has declined as the proportion of leisure travellers has increased in international aviation. This is likely to lead to pressure on airline yields and may change quality of service attributes.

Cargo traffic forecasts

- International cargo traffic has grown faster than domestic cargo traffic and this trend is forecast to continue.
- Cargo traffic grew more rapidly than passenger traffic over the two decades 1971–1992 and this trend is expected to continue into the twenty-first century.
- The highest growth rates in international aviation cargo traffic are forecast for routes within, and linked to, the Asia Pacific region.

- Airlines in the Asia Pacific region are set to become the largest carriers of both international and world (international plus domestic) cargo traffic by the year 2001.

Travel and tourism

- Much of the growth in international passenger traffic is expected to come from leisure travellers, whose numbers will be stimulated by growth in travel and tourism.
- Increases in disposable incomes in fast growing economies, such as a number of Asia Pacific economies are experiencing, will boost travel and tourism.
- Many nations rely on income generated by the tourism industry which in turn depends on aviation activity.

Infrastructure

- Inadequate infrastructure in a number of countries has led to increasing congestion in the air, on runways, and in terminals at a number of international airports.
- Inadequate infrastructure may limit the rate of traffic growth and restrict benefits from aviation services over the next decade.
- Creative and innovative solutions to infrastructure problems will be needed if infrastructure is not to constrain (or divert) future traffic growth. Difficulties in some markets may provide opportunities for other markets and carriers.
- Solving infrastructure problems is difficult to achieve and requires the cooperation of a number of countries, plus time and capital.

CHAPTER 5 THE REGULATORY REGIME

Purpose: to set the regulatory scene; to chart developments in, and pressures on, the international aviation regulatory regime to change; and to canvass possible future developments.

Early steps

- The first step in the modern era of international air transport was the Chicago Conference in 1944. The concept of freedom (or transit privilege) as a principle of air law was defined in the 1940s. Essentially the freedoms are agreed limitations on the provision of international air services.

- Sovereignty remains the cornerstone of the modern regulatory regime in aviation. It provides a country with the ability to influence air services into, out of, and over its territory.
- Countries negotiate international traffic arrangements on a bilateral (government to government) basis.
- Attempts by a number of countries to create a multilateral agreement covering all traffic rights were unsuccessful at the 1944 Chicago Conference. The Australian Government supported a multilateral agreement on commercial rights in international aviation as the best approach and supported the idea of fair and equal opportunity for carriers.

Institutional components

- The regulatory regime continues to be based on a framework which has three main institutional components: the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA), and air service agreements (ASAs). Although each of these components was created and operates separately, it is necessary for them to harmonise some of their work to allow regulation to effectively cover aviation activities.
- Initially ICAO undertook responsibility for a range of technical requirements. Over recent years ICAO has become involved in a wider range of issues, principally regulatory, economic, legal, and security policy.
- Nations can choose whether they do, or do not, participate in ICAO's recommended practices. A country's voluntary participation in the aviation regime, under the auspices of ICAO, is supported by each country's laws and conventions.
- At the time of establishment IATA had a key role in the coordination of fares, rates and associated conditions (subject to individual government approval), and it was involved in a number of other areas.
- Airlines closely followed IATA's procedures for coordinating tariffs in the 1950s, 1960s and in the early 1970s.
- From the beginning IATA conducted a multilateral approach to fares and rates, the results of which were integrated into many bilateral air service agreements. This approach encouraged a coherent and orderly system which was accepted widely. Over time the process became fairly inflexible, costly and time consuming to maintain. Obtaining unanimity became increasingly difficult.
- In the 1970s and 1980s there was growing pressure to increase competition, especially by freeing up prices. Subsequently IATA changed its approach to member participation in tariff and rate coordination. Despite pressure for a more liberal international aviation system, IATA agreed tariffs are still the preferred prices of many airlines (even non IATA airlines) on international

routes. What has emerged is a more flexible system rather than a new system.

- While IATA received exemptions for some of its activities from countries, including the US, Europe and Australia, future exemptions cannot be guaranteed.
- A potentially contentious issue is the effect of one of the larger market's domestic legislation and competition policies on international air services provided by another country's airline(s) (particularly in the markets of the US and the EC).
- Air service agreements are negotiated between governments. The outcome is dependent on the negotiating power and current aviation policies of the countries involved, and other national interests including tourism and trade. The air service agreements can establish principles linking the work of IATA and ICAO, although neither is a direct party to the negotiations.
- Bilateral air service agreements can constrain competition by setting limits on market access, capacity and price.
- Trade in air services occurs in the expectation of reciprocal benefits being granted.
- Since the 1970s cracks have been appearing in the international regulatory system creating a more unstable regulatory environment than was previously the case.

Pressure for change

- The main pressures to change the regulatory regime have come from commercial imperatives, and changing political priorities.
- A number of governments, driven by the need to improve economic efficiency and growth prospects through competition, have moved to liberalise bilateral air service agreements, to wholly or partly privatise their carriers, to deregulate domestic aviation markets, and to form a single aviation market or regional bloc.
- There has been a considerable decline in the direct involvement of governments in aviation in a number of countries. Many governments now are concentrating on their role in ensuring safety, security, and facilitating a competitive environment in the industry.
- Airline carriers, aiming at increasing their competitiveness and thereby ensuring survival, have moved: to increase their ability to respond to market factors (for example, through increased flexibility in setting tariffs); to raise capital and to improve profit levels; and towards operating larger networks, usually by internally funded growth or through alliances with other carriers.
- Bilateral air service agreements are likely to change in incremental steps. Such changes are limited by time, cost, number of contracting parties, and

their history of establishment and acceptance, all of which mitigate against quick change.

- Overall, where changes have been made, the bilateral air service agreements are less prescriptive and less able to be controlled by one party to the agreement, and improve the commercial environment enabling greater market responsiveness.
- The removal or reduction of barriers to competition is easier to achieve in high earning, high traffic growth periods than in a low profit or loss making time of a cycle with negative or low traffic growth. For example, some moves to further open up market conditions in the early 1990s ran into difficulties as the industry suffered losses and a slowdown in traffic growth. In the longer term, when the industry enters the up side of a cycle a number of countries supporting increased competition are likely to choose to further open up their markets as recovery in aviation emerges.
- Theoretically, bilateral air service agreements can be negotiated to establish complete free trade in air services between the contracting parties, but this appears unlikely and may not constitute even a long term goal for most countries.
- Considerable liberalisation of international air service agreements has been achieved between those countries seeking greater competition and less government involvement in airline activity. Despite this, less regulation and more competition can not be assumed to be the future in international aviation; calls for re-regulation in aviation continue to be raised.
- The concept of open skies has been raised as a way to liberalise air service arrangements between countries. The concept of open skies can be interpreted differently by individual countries. The US Government has offered an 'open skies' package to European countries.
- Of concern to the US Department of Transportation are moves which suggest that some European countries may adopt a more defensive position in their negotiations, in particular with the US.
- One area where there has been tension, and years of negotiation in order to improve bilateral air service arrangements, has been between the US and Japan. The US has cast Japan as acting against the liberalising trends being achieved elsewhere, but the Japanese see the US–Japan bilateral air service agreement as being biased against them.
- Who 'owns' routes is one of the recent dilemmas facing international aviation. Are they an asset of the airline to be bought and sold by carriers, or do governments 'own' them by virtue of governments negotiating bilateral air service agreements and designating the airline(s) on a route? Usually the issue has not been a problem, but it can become one where there is multidesignation of carriers and carriers appear to 'transfer' rights through a sale of part or all of a carrier's business. Under a multidesignation policy the allocation, or reallocation, of new, unused or existing routes is an issue which governments need to address.

- In theory, there are a wide range of choices in strategies for future international aviation negotiations, but considerable uncertainty lies in how governments will act. Governments establish the parameters within which international aviation operates; therefore, the direction of government policy is important in identifying the future directions of international aviation.

Ownership and control

- Air service agreements have been built on the wide acceptance of the three key principles of: exclusive sovereignty over a home country's air space; substantial ownership of airlines to rest with citizens in the country of registration; and effective control of airlines to rest with citizens in the country of registration. The principles have been universally adopted and remain some of the last areas in international aviation to be challenged.
- Ownership and control provisions (implicit and explicit) dictate much of the existing structure in aviation.
- Perhaps surprisingly, given the strong support of the principles by countries, there is no definition of 'substantial ownership and effective control' nor any international criteria for determining whether a designated airline meets requirements on ownership and control. It is left to each country to exercise its own judgment regarding what the appropriate level of ownership and control should be in the designated carriers.
- It is not mandatory to include or invoke ownership and control requirements in an air service agreement.
- The increasing pressure by some countries to liberalise bilateral air service agreements has moved from an earlier emphasis to free up tariffs and increase competition to encompass the issues of ownership and control. Ownership and control of airlines are key issues in the 1990s.
- The options are wide open: governments may abandon all constraints, or retreat to the requirement that 100 per cent ownership and control be vested in their citizens. In positioning themselves between these two extremes countries are likely to favour some regulatory control rather than completely open markets.
- While national governments in general have maintained their commitment to substantial ownership and effective control, airline operational arrangements have, in part, gone around the conventions when pressure was sufficient to adopt an alternative approach.
- If the constraints imposed on aviation by the ownership and control principles are reduced or eliminated then the air service industry, in particular the individual airlines (firms), will move in new directions. If the structure of airlines is changed then conduct and performance will change.

- What the future holds is:

  – the necessity for governments to (re)define the principles of substantial ownership and effective control, given the significant developments in world aviation since the principles were first adopted;

  – that in developing new policies to cover these principles that have underpinned international aviation, a number of countries will relinquish the 'special' status of airlines as national icons while other countries will continue to defend the existence of their 'special' home airline, creating a source of tension between countries; and

  – the need for governments and airlines to resolve the implications of inter-airline marketing arrangements which affect ownership and control provisions, consequently the level of competition in the market.

- Much depends on future developments in air service agreements, and whether they remain driven by legal precedent or commercial imperatives.

Competition and privatisation

- In many countries, such as Australia, the government's special relationship with its airlines is moving away from owning and running airlines, towards assessing and assisting the country and other industries, like the travel and tourism industry, to increase national benefits from all aviation activity.
- Once a country decides to free up part of the aviation market, pressure will increase to free up other parts of the market. For example, once governments withdraw from airlines by privatising them, then pressures for competition in the market would support further freeing up the market through economic deregulation. As developments to deregulate the domestic aviation market are achieved, countries would be more likely to support a more liberal approach to their international aviation arrangements. The sequence of events may vary.
- Privatisation of airlines is causing restructuring in many of the world's airlines, with consequences for the conduct and performance of firms in the whole aviation industry. While the stated desire may be to increase efficiency and encourage competition, structural changes could lead to unexpected outcomes.
- Some analysts question whether privatisation benefits are sustainable in the long term.
- If less rather than more competition is the long term effect of deregulation, privatisation and liberalisation, then this has implications for public policy.

Regionalisation and single aviation markets

- Regionalisation of trade in aviation services is likely to be a feature of international aviation in the future.

- Structural changes will create changes in market power, with implications for regional and global approaches to aviation.
- It is possible that aviation reform will first be achieved by a regional approach before global solutions can be adopted. Initially, however, the growth of regional groupings, by dividing the world into separate but stronger groups, could be in conflict with global developments which seek to deal with aviation as one group without differences.
- Paradoxically, regional aviation blocs may result in lower barriers, hence greater competition between member countries, but may raise barriers worldwide between member and nonmember countries. Regionalisation is in danger of creating new, possibly more, barriers to global trade in aviation services.
- If a bloc membership agreement is not sufficiently flexible then a group is in danger of stagnating. Individual gains may not give a sum benefit on a world basis.
- The principle of a country's exclusive sovereignty over the air space above its territory has existed formally in aviation law since 1919. It is perhaps the last principle to be reassessed and possibly revised in world aviation.
- The development of single aviation markets, such as the EC and Australia – New Zealand, bring into question who 'owns' the air space and who negotiates air service agreements (that is, what constitutes the sovereign state in aviation).
- One option would be for a country to lease its air space to another country. Original sovereignty would stay with individual country as 'owner' but be relinquished under a lease agreement for a specified period and purpose should the benefits be perceived by the country to outweigh the costs.
- The emergence of a single aviation market in Europe may pose the greatest immediate challenge to the overall regulatory framework in international aviation.

Bilateral versus multilateral negotiations

- The long history of calls for a multilateral system are evident in the literature, just as achieving a multilateral system has proved elusive.
- Untangling the web of history of bilateral air service agreements and replacing them is an enormous task.
- The bilateral approach remains the chosen instrument of most countries. There is the possibility that some countries and/or blocs may move to a limited multilateral agreement, or an open one that any country may join, allowing the coverage of the multilateral agreement to expand in the process. Initially a multilateral system could coexist with the bilateral system.

- Two key interrelated questions are: *what* would oversee the process of any new system if the bilateral system is abandoned or significantly altered; and *how* might a new or modified system operate? Given the complexity of the air service industry, perhaps no one organisation is appropriate to create (and convince most of the world's airlines and political powers to adopt) a new system.
- There is a lack of consensus on how any future system should be structured and an absence of an obvious leader to act as change broker to lead the pace of change and the implementation of a new system.
- Legal arrangements in the regulatory regime, have dominated past international aviation developments. The pre-eminence of legal factors is being challenged by commercial imperatives in aviation. The direction of future developments in the aviation regulatory regime is unclear.

CHAPTER 6 AIRLINE OPERATING PERFORMANCE

Purpose: to analyse aggregate performance of world airlines over two decades with attention to world aggregate financial operating results, and then, for eleven selected airlines, illustrate variations between airlines and between major markets.

Cyclical industry

- An important feature of aviation is the cyclical nature of the industry.
- Growth in world economic activity, world airline industry profitability, the ordering of turbojet aircraft, and growth in world traffic move in phase over economic cycles.

Airline capacity

- Consumers are able to change their demand for air services as a result of external forces more quickly than airline management is able to adjust capacity. In addition airlines have difficulties matching capacity and demand for air services because there is usually a time lag between order and delivery of aircraft.
- The ordering of turbojet aircraft moves in phase with economic cycles, but overlaying this trend are changes in response to technological developments, individual airlines' needs for capital replacement, and to meet new environmental standards.
- To meet the immediate challenges in the early 1990s many airlines have deferred delivery, cancelled options or scaled down orders.

- It can be expected from the cyclical nature of the industry that in a few years increased traffic growth will mean airlines will once again need to increase their orders for aircraft and possibly face short term shortages.
- Accentuating this cyclical upswing in aircraft orders will be the need to replace aging aircraft to meet environmental requirements later in the 1990s and beyond.
- The matching of capacity with demand, amid numerous cycles within the airline industry and the cyclical effects of exogenous factors, remains one of the difficulties facing airline management.

Airline industry profitability

- Scheduled passenger operations are the primary source of revenue for world (international plus domestic) airlines.
- Despite the pattern of annual traffic growth and technological advances, the airline industry has recorded relatively low operating profit levels over the last two decades.
- The health of the industry is influenced by external political, social and economic factors, and the cyclical nature of the industry itself.
- In any one year between 25 and 33 per cent of the airlines usually report an operating loss, with the majority reporting some level of operating profit.
- Of the top 20 profit earners in 1992, the majority of the airlines came from the Asia Pacific.
- 1990–91–92 was a turbulent period for airlines and this was reflected in the overall operating loss of US$3 billion over the period.
- The operating result for US airlines has a significant influence on world results, averaging 38 per cent of annual operating revenues of all ICAO countries, yet their operating result is usually below this figure.
- The airline industry was experiencing problems before the Gulf Crisis. The Gulf Crisis exacerbated airline difficulties which have been prolonged because of the economic recession in a number of key markets.
- The aggregate operating result of US airlines was sufficiently poor during 1990–91–92 that the positive results for the rest of the world's airlines were overwhelmed and an overall negative result was recorded for airlines from ICAO's contracting countries.

Comparisons by region

- Of the eleven airlines selected from the three major markets, Asia Pacific, Europe and North America, the North American airlines made some of the largest operating profits and some of the largest operating losses.

- For the first half of the 1980s, selected airlines from Asia Pacific generally had positive real operating results which were small compared with the selected airlines of North America and Europe but this began to change in the second half of the 1980s.
- The selected Asia Pacific airlines had higher load factors than the selected North American airlines, which have had relatively low weight load factors over the last decade.
- Despite the similarity in inputs for providing aviation services worldwide, profitability, unit costs and unit revenues vary for airlines of different regions and between airlines within each region.
- There is difficulty in comparing operating measures of airlines from different regions, due to a range of factors including differences in accounting practices, wage levels, the stage length of flights, and exchange rate fluctuations.

CHAPTER 7 AIRLINE CAPITAL STRUCTURES AND INVESTMENT PERFORMANCE

Purpose: to examine a number of sources of capital common to the airline industry.

- Airline capital structures became increasingly dependent on debt and lease funding during the 1980s. This left many airlines vulnerable to the downturn in industry profits during the turbulent period 1990–91–92, at a time when capital expenditure requirements to modernise fleets were very high.
- In recent years several airlines which could not meet their commitments were bankrupted, while other airlines required equity injections which have proved to be difficult to arrange.
- Attracting more debt finance has been difficult and relatively expensive since some ratings agencies have downgraded most international airlines to below investment grade.
- Even some privatisation programs, which represent one of the major sources of equity raising in the industry, have been curtailed.
- In contrast to their European and North American counterparts, Asian airlines have had less financial trauma due to their lower debt structures.
- Asian share prices, however, have trailed their home stock market index.
- A general return to profits is required in order to provide internal sources of funds and to stimulate investors' confidence in a cyclical industry.
- Historically, the rewards for investors have been significant if they could time entry at the start of an airline bull market.

CHAPTER 8 AIRLINE GROWTH

Purpose: to consider why and how airlines grow, and to assess the extent to which globalisation in international airlines exists.

Growth strategies

- Airlines have demonstrated a keenness to operate in larger route networks, either by expanding their own route network or by linking with other airline networks. Motivations include: to gain revenue; to hold or expand market share; to achieve unit cost reduction; and to implement a defensive strategy.

Consolidation

- The effect of an increase in competition and growth in airlines has been the consolidation of airlines.
- If existing regulations are sufficiently relaxed then further consolidation of airlines could result.
- The concentration of ownership through consolidation of airlines seems the likely consequence of deregulating markets, given US experience and predictions for Europe.
- Concentration of international air services amongst a small number of airlines may have a significant impact on smaller operators (such as Qantas and Ansett), and on destinations geographically far removed from the world's major markets.
- Consolidation means countries have to examine whether they value having a domestically owned and/or located airline sufficiently to halt or impede the developments leading to the linking of carriers with the potential to form global carriers removed from a focus serving a particular home country's traffic.
- The relaxation of national rules in favour of a regional bloc's unified rules (as is occurring in the EC), makes it possible for airlines to contemplate moving beyond alliances to cross border mergers. This was demonstrated when Austrian Airlines, KLM, SAS and Swissair pursued such a course prior to the collapse of the Alcazar project.

Alliances

- In international aviation there is a high propensity to form alliances. In theory there is a wide range of choices but competition legislation in various countries, foreign investment requirements, ownership and control provisions for airlines, and other regulations set limits to strategy choices — but not insurmountable limits.

- Alliances can be used to achieve strategic, defensive or structural goals.
- Many alliances offering technical cooperation have proved successful, as have some of the more common marketing arrangements, such as code sharing and interlining. These successful alliances are usually *specific in purpose* and for a *fixed time* period. What have been more difficult to arrange, and are uncharted in terms of proven benefits in the published literature, are attempts to create *all encompassing corporate alliances.*
- Growth of airlines, even within one country, is not achieved without considerable cost, and the benefits are at least questionable, and take some years to achieve.
- Alliances can create high transaction costs (contracting, negotiating, integrating, and policing new arrangements). The very nature of intangible assets, such as managerial skills and industry knowledge, makes integration of two or more airlines costly.
- The ability of management to invest the time and effort, and demonstrate commitment to the new arrangements, is crucial to success in alliances.
- Where there are multiple alliances between a number of airlines, especially if cross equity investments are involved, there is an increased chance for conflicts of interest to arise. The challenge for airlines in the 1990s will be integrating multiple alliances across many borders.
- Each carrier's shareholding in other airlines makes it potentially difficult to determine which carrier owns and/or controls what, and what level of competition is possible should a conflict of interest arise.
- Airlines do not universally support alliances as a way to grow. Some emphasise going it alone, or at most only entering marketing arrangements, while many carriers have shown a keen desire to grow through alliances including equity investments.
- Most governments (tacitly) accept non equity alliances or take a neutral position in regard to alliances, leaving it to the commercial judgment of the carriers where there are no ownership or control issues.
- Alliances are inherently unstable. It is not surprising that in a dynamic environment alliances between different business entities usually 'live' for a relatively short period, as commitment by both parties to make an alliance work will require it to remain mutually beneficial and better than other alternatives that may develop over time. Essentially, alliances succeed only where, and as long as, there is mutual benefit in the arrangement. Terminations of alliances are common, and should not be seen necessarily as failure.
- Alliances are not an end in themselves; rather they are strategies for other outcomes. A well designed alliance provides flexibility for the partners to evolve and to change the nature of the alliance to meet changing circumstances. Failure to be flexible may mean the alliance, hence the firms, stagnate.

- For many airline alliances, success (that is, the achievement of anticipated benefits) has varied and remains to be tested over time.
- British Airways (BA) is a leading example of an airline which has vigorously pursued a number of alliances with other airlines in order to develop a stronghold in major markets and establish a comprehensive global network. BA aims to be the world's first global airline.
- The potential for alliance-linked carriers to create complex hubs in major world markets, to use smaller aircraft as feeder carriers, and re-route and reschedule flights to reduce time of journey, thereby lowering operating costs while raising the quality of service, is significant. It is estimated that a hub in Moscow, linking, say, London to Tokyo via Moscow on the great circle route, would take around four hours off a BA flight.

Globalisation

- If globalisation emerges as a major feature of international aviation then it could reduce the power of individual countries in aviation. This could affect air transport services to, from, and over a country, as well as other strategic economic, defence, and community interests.
- Commercial imperatives are the key driving forces in globalisation.
- The first movers to implement a global strategy are often the ultimate winners in global industries. This provides a powerful incentive to the few airlines capable of becoming global airlines in the near future.
- If one or more airlines become global firms then this is likely to pressure other firms to follow suit.
- The acceptance of 'common branding' is an important strategic step in a move to form a global airline when combining previously separate airlines.
- The main constraints to globalisation in airlines are threefold: the first is institutional and comes from the international aviation regulatory regime, in particular air service agreements; the second comes from conventional practices which may or may not have legislative backing; and the third arises from existing foreign investment limitations set by individual countries.
- The characteristics of aviation markets and marketing are closer to globalisation than is the structure of individual firms (airlines).
- If members in an aviation bloc maintain strong barriers against nonmembers then the regionalisation of airlines could inhibit airline globalisation. On the other hand, if countries and/or carriers perceive that there is a competitive advantage if the regional bloc expands, then regionalisation might be a first step in removing some of the barriers to globalisation. It is too early in the development of regional aviation blocs to draw conclusions on the impact on airlines of regionalisation versus

globalisation, although some convergence of both developments would not be surprising.

- The provision of international air services, in theory, is ideally suited to globalisation because in its simplest form (the movement of people and parcels from point A to point B) it is a homogeneous product. Without limits any firm could treat the world as one entity, offering the same or similar service anywhere.
- Developments within the airline industry (in particular commercial imperatives and the decline in direct government involvement) together with developments in other areas (including related industries, increased mobility of people and growing trade needs) provide strong pressures favouring globalisation of markets and firms in the aviation industry. This is juxtaposed with the constraints set by the international aviation regulatory regime and the desire of many countries to continue to treat the aviation industry as 'special', and worthy of some protective control, which is not a feature of many other worldwide industries.
- The distinction between growing bigger and going global has to be made for international airlines. Airlines still have quite a way to go to move from operating globally to being global enterprises.
- There is some irony in the fact that international air transport services have assisted the globalisation of other industries while the evolutionary process itself is constrained in aviation.

APPENDICES

APPENDIX I CONVERSION RATE BETWEEN US AND AUSTRALIAN DOLLARS

- Conversion rate used between US and Australian dollars used in this Report.

APPENDIX II SUPPORTING DATA

- Supporting data for all figures contained in this Report.

APPENDIX III ICAO STATISTICAL REGIONS

- Map of geographic regions used for the collection of ICAO statistics used as the base data in this Report.

APPENDIX IV STEPS TOWARDS A SINGLE MARKET IN EUROPE

- To achieve a common market in aviation services, the EC had to move from a traditional 'separate nations' approach to a 'common domestic' regulatory framework, requiring partial transfer of control of intra EC transport from individual member countries to an EC authority.
- The EC adopted a gradual approach to change by introducing a series of reform 'packages'. The third package came into effect in January 1993, creating a liberalised EC aviation market.
- Cabotage is the major area of exclusion from the liberalisation process; partial cabotage exists and full cabotage access within the EC for all EC carriers is due in April 1997.
- International aviation negotiations remain under the control of individual EC nations, rather than coming under EC control. This is unlikely to change in the short term.
- Two major constraints to competition in the EC are traffic congestion and the existence of national flag carriers.
- A number of non EC European nations have sought to be included in a liberalised common aviation market, including a number of Eastern European nations.
- A number of unresolved issues remain in international aviation, both between EC member countries, and for EC members' relations with nonmember countries.

APPENDIX V ENVIRONMENTAL REGULATION

- Environmental concerns are an important issue for aviation planning, investment and operations, through direct regulation, public pressure and industry concern.
- The major aspects are air and noise pollution by aircraft, and air, noise and runoff pollution at airports.
- The pressure to further reduce levels of all forms of pollution both at airports and by aircraft can by expected to continue. This will increase infrastructure costs, and aircraft upgrade and replacement costs.
- ICAO has established standards for noise and pollution emissions for aircraft. Individual countries and the EC are considering or have implemented their own pollution control measures.
- Gains from the operation of quieter and cleaner aircraft may be outweighed by overall increases in pollution arising from the expected increase in traffic levels.
- Designing engines to meet more stringent standards without penalties in efficiency may be difficult.

APPENDIX VI AIRFRAME MANUFACTURERS

- The fortunes of airframe manufacturers are linked to those of their airline customers, which in turn are linked to the peaks and troughs of world economic cycles.
- The rate of orders and deliveries fluctuates significantly.
- Market share among airframe manufacturers is concentrated between relatively few producers, with Boeing (51 per cent) and Airbus (30 per cent) accounting for most airframe orders. Similarly, market share for engine manufacturers is concentrated with Pratt and Whitney (62 per cent) taking the major share and General Electric, Rolls Royce and CFM International each having around 10 per cent market share.
- Although anticipated demand growth for air travel is the primary force dictating the need for new aircraft, other factors such as more stringent environmental regulations will influence airlines' purchasing strategies.
- Each of the major manufacturers is involved in, or considering, cross border alliances.
- The states of the former USSR are new entrants to the world industry, with significant surplus capacity following the decline in military expenditure.
- Government support for aerospace manufacturing has been a point of contention, particularly between the US and the EC.
- Major aircraft developments have been an important influence in the rapid growth of air transport. As aircraft became more reliable and efficient, and capable of longer range travel, route developments followed closely behind.
- Congestion of airways, runways and airport terminals, and expected strong growth in air travel, have created a demand for long range and high capacity aircraft. Manufacturers are considering the feasibility of developing larger aircraft, possibly in a consortium.
- There has been development work on a supersonic commercial transport, with longer range, higher capacity and lower operating costs than the Concorde.

APPENDIX VII AIRCRAFT LEASING

- The distinction between lease and debt finance is often blurred, but from a legal perspective a lease separates the ownership of the asset (aircraft) from its use, while debt finance means the airline borrows the funds, usually against a mortgage or secured deposits, and is both the owner and user of the aircraft.
- The trend for airlines to lease rather than own their aircraft has been growing strongly.

- There is a wide range of possible leasing arrangements and different companies do specialise in different types of leases.
- The use of leasing by airlines varies between the major markets.
- The growth of leasing arose because of tax and finance benefits for airlines. In addition, some airlines have found leasing attractive because: it frees up considerable capital for use in non aircraft purchase activities; it allows an airline to replace older aircraft with newer aircraft (an important consideration in trying to lower unit costs and meet new environmental standards); it enables airlines to respond to short term fluctuations in demand; it removes the risk of uncertainty on the value for future resale of the aircraft; and it can assist new entrants in the market to establish their fleet and begin operations earlier than might be possible if left to purchase the aircraft.
- The move to leasing is creating a fundamental change in how airlines are financed.
- The problem with cross border leasing is that it is highly complex, as the funds for the transaction are arranged on a global basis and the collateral can move globally, but the legal requirements are locally based and can involve a number of local jurisdictions.
- Airlines with a higher proportion of their fleet on leases (or subject to debt financing) may be more vulnerable to cyclical downturns in the industry.
- Leasing companies are relatively new players of influence in the aviation industry. They usually have close links with banks and financiers and some are associated with bigger conglomerates.
- Aircraft leasing companies are global firms.
- Leasing companies usually place block orders and can corner the market by taking a number of future delivery slots.

CHAPTER 1 INTRODUCTION

Purpose: to give the background to the research project and outline the scope of the Report.

ORIGIN OF THE REPORT

In recent years the Australian Federal Government has initiated a series of reforms in aviation. The Bureau of Transport and Communications Economics (BTCE) has contributed to the policy development process by undertaking a number of studies into aviation. In addition, the BTCE endeavours to raise public awareness of, and debate on, key issues in aviation by making the results of its research available to the public. The results of this work can be seen in the BTCE's publications on aviation matters.[1]

The BTCE's aviation research has favoured domestic issues in recent years, as this represented the focus of the Federal Government's efforts to introduce microeconomic reforms to ensure a safe, efficient and effective air transport system. To balance its research program, and in recognition of the increasing integration of domestic and international transport networks, the BTCE undertook to analyse and report on the international aviation industry.

Surprisingly international (as opposed to domestic) aviation has received only limited attention from academic institutions, as revealed in their research publications. Most academic and/or government published reports have examined aspects of their domestic aviation market with an occasional reference to international aviation as it affects their country. For example, the US has a wealth of publications covering domestic aviation developments in the US, especially since the deregulation of its domestic air services. There is

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1. The most recent BTCE aviation publications are:
   The Progress of Aviation Reform 1993
   Quality of Service in Australian Passenger Aviation 1992
   The Japan–Australia Air Route 1992
   Fuel Efficiency of Ships and Aircraft 1992
   Deregulation of Domestic Aviation — the First Year 1991
   Costs and Benefits of a Single Australasian Aviation Market 1991
   A New Era in Australian Aviation: Conference Papers 1991
   Domestic Aviation in Transition: Seminar Proceedings 1989

much less published research on worldwide developments and trends, although current, short term issues in international aviation are covered (usually from a particular industry perspective) by trade magazines, journals, and consultants.

To meet this identified knowledge gap, the BTCE undertook its research project into the trends and issues in international aviation. This Report covers world developments with an emphasis on the developments in three major markets: Asia Pacific, Europe, and North America. Reference is made to Australia for illustrative purposes. Australia was not the primary focus of this study.

The aviation industry in general was the starting point for much of the study but the main players, the airlines and governments, provide the focus for the analysis. With few exceptions scheduled passenger traffic is the driving force in airline decisions and this Report reflects that influence. Additional information is given on other players and sources of business, but not to the same extent as the detailed coverage of scheduled passenger services.

This Report provides the results of the broad based study. It is expected that analyses of specific issues in international aviation will follow, subject to policy needs, with particular emphasis on Australia's policy needs and experience.

SCOPE OF THE REPORT

To set the scene for this Report an overview of the elements of airline economics is presented in **chapter 2,** which provides a framework for the reader to analyse the issues and trends covered in the remainder of the Report. The main aspects of airline activity examined in the chapter are supply, demand, markets, competition, and airline conduct.

Traffic details are the focus for **chapters 3 and 4**. In **chapter 3** major historical trends and current traffic movements are examined for scheduled passenger traffic, nonscheduled (charter) passenger traffic, cargo, and Australia's results against the world overview. The focus is on international traffic over the last two decades up to and including the issues affecting the turbulent period of 1990–91–92. The history of aviation traffic over decades is a remarkable record of consistent, positive, annual growth rates in all but one year. The important link between traffic growth and movements in economic growth are explored. For the aviation industry there is a marked cyclical link between changes in GDP and changes in traffic growth, changes in yield growth, profitability, and aircraft orders.

The analysis of traffic data is extended in **chapter 4**, with an examination of traffic forecasts into the 21st century. Continued traffic growth is expected for the future with some regions, such as the Asia Pacific, likely to achieve particularly high growth rates. The forecasts of growth are supported by developments in interdependent industries, such as the travel and tourism industry. The forecast growth levels may not be achieved if potential constraints are not successfully addressed by decision makers. This chapter examines the main infrastructure constraints facing the industry.

The regulatory regime in international aviation is presented in **chapter 5**. Since World War II the institutional building blocks of international aviation have been the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA), and air service agreements (ASAs). From the 1970s there has been increasing pressure for the regulatory regime to change. Developments contributing to the pressure to change have been initiated by governments and airlines. Government initiatives have included the liberalisation of air service agreements, the deregulation of domestic aviation markets, the privatisation (full or partial) of government owned airlines, and the creation of single (regional) aviation markets. Airlines have increased: their responsiveness to market forces, including the introduction of more flexibility in tariff setting; and attempts to join larger route networks, mainly through growth in cross border alliances. The regulatory regime in this dynamic industry continues to change and the exact nature of its future is uncertain. The chapter concludes with an examination of some of the possible future arrangements canvassed in the aviation literature.

In an industry characterised by continued growth it would be reasonable to expect that it would achieve consistent good financial results, yet this has not been the case. **Chapters 6 and 7** analyse the operating and financial performance of international airlines, and airline capital structures.

Chapter 6 analyses the aggregate operating performance of world airlines over two decades. The importance of the US market in the aggregate results is discussed. The cyclical nature of the industry and long term trends are explored. Following the overview of airline operating performance, the operating performance of eleven selected airlines from the key markets of Asia Pacific, Europe, and North America is analysed to illustrate variations between airlines and between the regions. Individual airline operating expenses are tracked against world average operating expenses to provide an indication of each airline's operational efficiency.

Chapter 7 examines temporal trends in capital structures, noting the rising proportion of debt and lease finance which resulted in a number of defaults in the early 1990s. The debt component of capital structures can only be reduced when airlines return to profits and are able to employ retained earnings and attract new equity finance to satisfy their capital expenditure needs.

Growth has been a key airline strategy and this is analysed in **chapter 8**. The motivation for airline growth and the pathways used by airlines to achieve growth are examined. The main airline strategy for growth is alliances with other airlines. A number of alliances are examined to illustrate the mixed results that have been achieved. A leader in the pursuit of alliances has been British Airways (BA), and the airline's recent equity purchases across continents are detailed. Whether globalisation exists in airlines is examined, as are the constraints on globalisation.

What of the future in aviation? The industry is dynamic, consequently the environment is changing and is under pressure to change further. The Report concludes that the future direction of aviation is uncertain. Traditionally aviation law has determined the environment the industry has operated in and that has influenced the decision makers in the industry. The pre-eminence of legal traditions continues to be challenged by commercial imperatives. How the balance between these is struck will be significant in determining the future direction of the industry.

There are seven **appendices** supporting the main body of the Report. The appendices serve two purposes. The first is to support the role of the Report as a reference document and appendices I, II and III fill this role. Appendix I provides the historical conversion rates between US dollars (US$) and Australian dollars ($A) used, appendix II provides the detailed supporting data for all graphs, and appendix III is a map of ICAO's statistical regions for the base data. The second purpose of the appendices is to provide information on specialist areas of interest and appendices IV, V, VI, and VII are relevant to this aim. Appendix IV outlines the development of the single aviation market in the European Community and discusses some of the issues yet to be resolved, appendix V discusses aviation environmental regulation, appendix VI analyses commercial developments in airframe manufacture, and appendix VII briefly examines the main types of aircraft leases and the role of leasing companies.

In addition there is a full list of abbreviations, a glossary of terms and an extensive reference list provided at the end of this Report.

Base data

Where data permitted, the period analysed was 1971 to 1992. The main source of statistics, unless otherwise stated, is the ICAO, the official coordinating body for international aviation. Some 182 contracting countries provide data to ICAO. In keeping with convention in international aviation all monetary figures are in US$ unless otherwise stated. The conversion rate between US$ and $A for each year during the period 1970–1992 is given in appendix I. World (international plus domestic) statistics, where given, are identified but the focus of the analysis is on international (excluding domestic) data.

CHAPTER 2 ELEMENTS OF AIRLINE ECONOMICS

Purpose: to present an economic analysis of international airline operations and provide a framework for the reader to analyse aspects of the international aviation industry contained in the rest of the Report.

International airline activity is largely determined by the interaction between the supply of, and demand for, international air travel services. Supply is influenced by the nature of aircraft technology, factor inputs costs, and international aviation regulations. Demand for international air travel is influenced by income, prices, and quality of service. Airlines will only be competitive if they offer a range of services at prices consumers are willing to pay. This chapter considers the supply and demand characteristics of the international airline industry and examines the influence of these factors on international airline activity. The focus of this chapter (and of this Report) is international airline passenger services as this makes up the majority of international air traffic. Although not discussed explicitly in this chapter, the transport of international air freight is governed by the same general principles.

SUPPLY

Airline costs are the primary influence on the supply of airline services. Profit maximising airlines will aim to provide services, of a given quality, at least possible cost. Many international airlines are, however, government owned airlines for which profit maximisation may not be a primary objective. Without profit maximisation as a goal airlines may not seek to fully minimise costs. Even government owned airlines, however, will face budget constraints that require costs to be minimised for elements of its operations. Cases where privately owned airlines do not minimise costs are usually explained as resulting from the separation of ownership and control, where the objectives of the manager are not the same as the objectives of the owner(s). While this type of problem may explain the behaviour of some airlines, the remainder of this chapter considers that airlines pursue profit maximisation.

Airline costs

The major inputs in the provision of international air services include:

- aircraft (hull and engine);
- fuel;
- labour (including both in-flight and ground staff);
- airport and en route services (including runway and navigation facilities);
- airport terminals;
- computer reservation systems;
- passenger coordination facilities;
- maintenance and hangar facilities;
- advertising; and
- management and corporate services.

The nature of individual inputs will influence airline operations. Some of the input items listed above are specific to a particular flight, some items relate to flying operations in general, the costs of which are not directly attributable to any particular flight, and other items relate to the general managerial costs of operating an airline.

Economic theory distinguishes between variable and fixed costs. Variable input costs, by definition vary as the level of output changes, whereas fixed costs remain constant as the level of output changes.

The classification of inputs as variable or fixed costs depends on the nature of individual inputs and the time frame under consideration. Consider the operations of a single flight. Short run variable costs include fuel costs, crew costs, airport and en route charges, and passenger service costs. In the short run the costs of the aircraft fleet, maintenance facilities and hangars, station and ground expenses, and general and administrative expenses are fixed. Given a slightly longer time frame the airline can adjust fleet size and composition, and the network of points served. In the long run all inputs are variable; consequently airlines will aim to structure their operations so as to provide a set of services desired by consumers, using the least cost combination of inputs.

The classification of airline costs between variable and fixed costs also provides a framework in which to analyse airline operating decisions. The magnitude and distribution of costs between variable and fixed cost elements can have a significant influence on the scale and structure of airline operations. For example, an airline operating services on a route that is unprofitable, due to high fixed costs, would eventually be forced to terminate services on this route. In the short term, however, if the service covers the day to day operating costs (that is, the service covers short run variable costs) the best practice for the airline may be to continue to operate services on the route. In the longer term, the airline will still be forced to terminate the services, but will be better able to redeploy resources and so terminate the unprofitable services at lower cost.

The International Civil Aviation Organization (ICAO) apportions costs as either operating or non operating costs. Non operating costs refer to those items not associated with airline core business operations, and include retirement of equipment, interest receipts and payments, subsidies not associated with operations, and subsidiary company payments or receipts. Non operating expenses do not, in general, affect the short run operational decisions of an airline, and are not considered further in this chapter except to note that continued unfavourable nonoperating items can force an airline out of business.

Airline operating costs are further classified as direct operating costs and indirect operating costs. Direct operating costs refer to expenses associated with aircraft operations. Indirect operating costs are those airline costs associated with flying activities but not directly attributable to operating the aircraft. Table 2.1 lists the ICAO operating cost classification.

Table 2.2 gives an indication of the contribution of different cost elements to total airline costs, using 1982 and 1992 aggregate airline cost data. An approximate measure of aggregate airline short run variable costs can be obtained by adding total flight operating costs, landing and associated charges, and passenger service costs. The data in table 2.2 show that, in 1992, variable costs made up almost fifty per cent of aggregate airline costs. Even allowing for the approximate nature of this estimate, this means that fixed costs are a significant proportion of total costs, in the short run. This has implications for the efficient size and scale of airline operations. Generally, the higher are fixed costs the greater will be the least cost level of output. The figures in table 2.2 also indicate that aircraft fuel and oil is one of the larger components of airline operating costs. There is a sizeable difference between the 1982 and 1992 fuel cost shares, which is discussed later in this chapter.

TABLE 2.1 ICAO OPERATING COST CLASSIFICATION

Direct operating costs	*Indirect operating costs*
Flight operations	User charges and station expense
Flight crew salaries and expenses	Landing and associated airport charges
Aircraft fuel and oil	En route facility charges
Flight equipment and insurance	Station expense
Rental/lease of flight equipment	Passenger services
Flight crew training	Ticketing, sales and promotion
Other flight expenses	General and administration
Maintenance and overhaul	Other operating expenses
Spare parts	
Labour costs	
Depreciation and amortisation	
Flight equipment	
Ground property and equipment	

Source ICAO 1990c, p. X-12.

TABLE 2.2 WORLD AIRLINE OPERATING COSTS AS PROPORTION OF TOTAL OPERATING COSTS: SCHEDULED AIRLINES

(per cent)

Operating costs	*1982*	*1992*
Flight operations	37.0	27.4
Flight crew salaries and expenses	*7.3*	*7.5*
Aircraft fuel and oil	*27.2*	*12.4*
Other (insurance, rental of flight equipment training, etc.)	*2.6*	*7.4*
Maintenance and overhaul	9.8	11.2
Depreciation and amortisation	6.8	6.9
Direct operating expenses	**53.6**	**45.4**
User charges and station expenses	15.6	17.0
Landing and associated airport charges	*3.3*	*4.1*
Other	*12.3*	*12.9*
Passenger services	9.1	10.3
Ticketing, sales and promotion	15.5	16.6
General, administration and other	6.1	10.6
Indirect operating expenses	**46.3**	**54.5**
Total operating expenses	**100**	**100**

Notes Totals may not be the same as the sum of the components due to rounding.
Excluding domestic operations in the former USSR.

Sources ICAO 1993c, p. 26; 1983b, p. 25.

The cost shares in table 2.2 are based on aggregate costs for all scheduled airlines and do not necessarily indicate the cost shares of individual airlines. All else being equal, airlines with longer average stage lengths, such as Qantas, will have higher fuel costs as a proportion of total operating costs, while airlines with shorter average stage lengths will have lower fuel costs as a proportion of total operating costs. Fuel use, however, is not uniform over all stages of aircraft operations: more fuel is burned during landing and take-off than while an aircraft is cruising. All else being equal, airlines with more landing and take-off movements will tend to use more fuel, so fuel costs will be a greater proportion of total operating costs, while airlines with fewer landing and take-off movements will tend to have smaller proportional fuel costs. This means that an airline with higher than average fuel costs as a proportion of total costs, may have longer average stage lengths, greater landing and take-off movements, or both longer average stage lengths and more landing and take-off movements than other airlines. This is important to keep in mind when comparing international airlines, as in chapters 6 and 7.

As fuel is an important component of airline costs, the choice of aircraft and engine technology influences total airline costs. Choosing the right aircraft and engine is essential to efficient airline operations. The presence of sizeable fixed costs and the indivisible nature of some airline inputs means that airlines can reduce unit costs by altering the scale of production and the mix of inputs.

Economies of scale and scope in airline operations

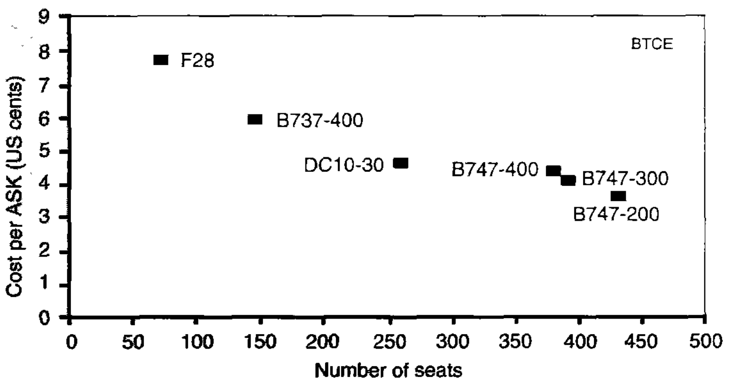
Economies of scale exist if average (unit) output costs decline as airline output increases. Economies of scope exist if it is cheaper for one airline to produce two or more services than if each of the services were produced separately by different airlines. Tretheway and Oum (1992, p. 4) list the major cost advantages available to airlines as:

- cost per seat declines as the size of the aircraft increases, assuming that an aircraft is being flown over distances for which it was designed (see figure 2.1);
- cost per kilometre flown falls as the number of kilometres flown increases (see figure 2.2);
  - technology, however, constrains the extent of the gains available, as after a certain range (depending on the aircraft) the distance flown can be extended only by reducing aircraft capacity;
- cost per passenger falls as the number of seats filled on an aircraft increases towards full capacity (see figure 2.3).

By keeping these relationships in mind, airline management can choose their aircraft and schedule services to match demand and minimise total operating costs.

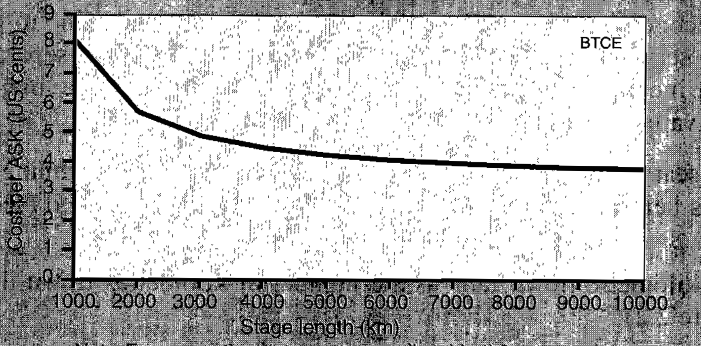
The aircraft costing model Aerocost developed by the Bureau of Transport and Communications Economics (BTCE 1990), was used to estimate the operating costs of various aircraft, under certain conditions, to demonstrate the existence of these relationships. Unless otherwise stated, the default values (included in Aerocost) for parameters such as stage length, load factor and aircraft

Figure 2.1 Cost per ASK by number of seats



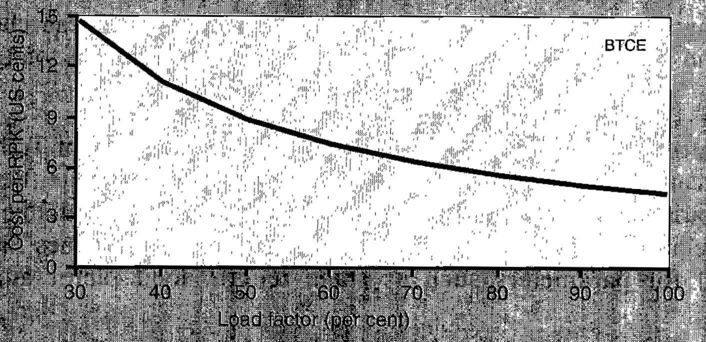
Notes See footnote 1 for further notes associated with this figure.
For supporting data see appendix table II.1.

Figure 2.2 Cost per ASK by stage length for a B747-400



Note For supporting data see appendix table II.2.

Figure 2.3 Cost per RPK by load factor for a B747-400



Note For supporting data see appendix table II.3.

utilisation, were used to estimate the operating costs of the various aircraft included below.

Figure 2.1 shows the relationship between the size of an aircraft (measured in this case by the number of seats) and its operating cost per available seat kilometre (ASK). The default value for stage distance (see supporting data in appendix II) is based on the size of the aircraft and its usual operation. As a result, the value used in the model closely approximates the distance over which each aircraft is designed to travel. All aircraft were assumed to be carrying load factors of 70 per cent. The aircraft used were the Boeing 747 series, the McDonnell Douglas DC10 Series 30 (all of which are large aircraft designed to travel long distances), the Boeing 737-400 and the Fokker F28 (both of which are smaller aircraft and more suited to shorter stage lengths). Figure 2.1 (and the supporting data in appendix table II.1) suggests that unit costs fall as both the size (of the aircraft) and average stage length increases.[1]

Figures 2.2 and 2.3 are based on the operating costs of a Boeing 747-400, chosen because it is widely used in long distance international stage lengths typical of flights to and from Asia Pacific. Figure 2.2 shows how costs per available seat kilometre fall as stage length increases. Technology dictates that the majority of available cost savings are exhausted for stage lengths in excess of 5000 kilometres for a B747-400. The general shape of the unit cost function for the B747-400 is indicative of the shape of the unit cost structure of most other commercial passenger aircraft.

Figure 2.3 shows the relationship between cost per revenue passenger kilometre (RPK) and passenger load factor, for a Boeing 747-400. As expected cost per revenue passenger kilometre declines as the number of passengers carried increases. (By definition maximum aircraft load factors are 100 per cent.)

In addition to the cost advantages available from operating different aircraft, airlines may obtain cost advantages through an increase in the scale and scope of their operations. The simple textbook definition of economies of scale, however, is not able to fully capture the relationship between inputs and outputs in a network orientated service industry such as the airline industry (Tretheway & Oum 1992, p. 8). This is because economies of scale are usually defined in terms of a firm producing a single output. Most international airlines, however, produce a range of different outputs, usually operating more than one service on any given city pair route and a number of interconnected routes. For example, travel from Sydney to Los Angeles via Auckland is not the same product as travel from Sydney to Los Angeles via Honolulu. Modifications to the concepts of economies of scale and economies of scope for the airline industry include economies of traffic density and economies of network size.

Economies of traffic density relate to the amount of traffic carried on any route. Economies of traffic density exist, over a particular route, if unit costs of providing services on that route decline as the number of passengers carried on the route increases. Empirical evidence from the US and Canadian domestic passenger markets suggests that economies of traffic density are a significant cost consideration for airlines. Caves, Christensen and Tretheway (1984, p. 481) found substantial economies of traffic density for airlines of all sizes. Gillen, Oum and Tretheway (1985, pp. 49 & 113) found significant economies of traffic density exist in the Canadian domestic market, for route densities up to 40 million revenue tonne kilometres per point served.

Economies of network size exist if unit costs decline as the size of an airline's network increases. Empirical tests have found unit costs to be relatively

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1. The unit passenger costs for a B747-400 are higher than for a B747-200 because Aerocost includes aircraft capital costs as part of airline operating costs. Since the B747-400 is a younger aircraft its depreciation costs will be higher than for the B747-200.

constant with respect to the size of an airline's network. Caves, Christensen and Tretheway (1984, p. 481) found constant returns to network size for US domestic airlines. Gillen, Oum and Tretheway (1985, pp. 139–43) also found constant returns to network size. The empirical test results indicate that expanding the size of a network by adding an extra city (or route) while keeping average load factor, stage length and traffic density constant does not reduce average passenger costs. Gillen, Oum and Tretheway conclude that efficient airline size depends on the average stage length of the network and on the output mix. Their findings also suggest that the least cost airline size decreases as average stage lengths decrease.

Intuitively these empirical results appear sound. Increasing the amount of traffic within a given network will allow an airline to distribute fixed costs over a greater number of passengers, reducing the average passenger cost of airline services. Adding an extra city to an airline's network, however, will involve additional fixed costs, such as advertising, ticketing and counter facilities, and staff at the new city point. The additional fixed costs will tend to offset the effect on unit costs of any extra traffic generated by adding another city to the network.

In addition to the potential cost advantages from increasing the scale of airline operations, the size and composition of an airline's fleet have been suggested as ways to lower airline average costs. Empirical studies have shown, however, that increasing airline fleet size does not noticeably lower unit costs. Levine (1987, p. 401) suggests that once a fleet size of between five and ten aircraft has been reached, unit costs do not appear to decline with increasing fleet size. Doganis (1991, p. 160) states that the fact that small carriers entering new markets were able to be price competitive against larger and well established firms, following US domestic deregulation and liberalisation of the North Atlantic route, demonstrated that the size of an airline need not disadvantage an airline in terms of operating costs.

There is evidence that airlines can gain cost advantages by increasing the scale of operations using a fleet of similar aircraft. The Edwards Committee (United Kingdom), in 1969, estimated that the hourly operating costs of operating 5 aircraft of the same type would be about 5 per cent higher than the costs of operating 15 aircraft of the same type (Doganis 1991, p. 161). The advantage of operating a fleet of similar aircraft would come from savings in crew training costs and aircraft maintenance costs. An example of an airline that operates a fleet of similar aircraft is Southwest Airlines, a domestic US carrier, which operates only Boeing 737s. Southwest Airlines has much lower unit costs than other major US domestic airlines, and part of this cost advantage may be attributable to operating a fleet of uniform aircraft.

Specific input costs

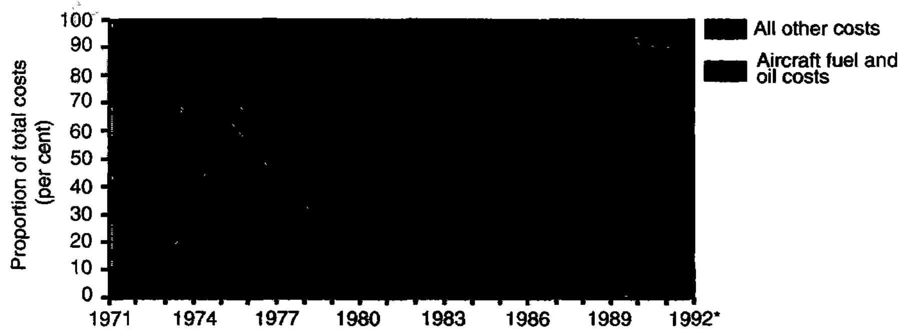
Variable cost inputs

Fuel costs are a major component of airline total costs. In the short run, variations in the unit cost of fuel can have significant effects on airline costs, which will be absorbed by the airline through higher unit costs, though some of the impact will be passed on to air travellers through higher air fares. In the longer run, airlines may adjust aircraft usage and fleet composition as a result of the rise in fuel costs.

Figure 2.4 shows that the oil price rises during the periods 1973–1974 and 1978–1979 caused international airline fuel and oil costs to rise from just on 11 per cent of total operating costs in 1971 to approximately 30 per cent of total operating costs in 1981. Since that time reduced real oil prices, technological improvements, and more fuel efficient practices by airlines have reduced fuel and oil costs, on average, to around 12 per cent of 1992 airline total operating costs.

Labour costs also are an important element of airline costs. While fuel costs are unlikely to diverge greatly between airlines and across different countries (except where the tax treatment of fuel differs between countries), unit labour costs do differ appreciably between different countries. Some countries, especially some of the lesser developed and newly industrialised countries in the Asia Pacific, have significantly lower labour costs. Airlines employing relatively cheaper labour can obtain significant cost advantages for the relatively labour intensive elements of their operations. The Association of European Airlines estimates that, in 1990, labour costs contributed 36 per cent of European airlines' total costs, 34 per cent of US airlines' total costs, and only

Figure 2.4 International airline fuel costs as a proportion of total operating costs 1971–1992



Notes * Preliminary data.
For supporting data see appendix table II.4.

Sources ICAO 1993c and earlier issues.

19 per cent of Far East airlines' total costs (*Air Transport World* 1992b, p. 1). This is one element contributing to the difference in unit operating costs between airlines and across airlines from different geographical regions (see chapter 6 for details).

User charges and station expenses are one of the larger indirect costs for international airlines. User charges and stations expenses are made up of three components: air route charges, landing and associated airport charges, and station expenses (ICAO 1993a, p. X-14). Station expenses refer to the costs of airline activities performed at airports, and include the salaries and expenses of all airport staff involved in handling and servicing aircraft; airport accommodation costs; maintenance and insurance of airport facilities; traffic handling fees charged by third parties for handling the air services of an airline; and airport stores charges. Landing and associated airport charges are airport related air traffic operations, and include landing and take-off services, and parking and hangar facilities. Route facility charges are fees levied for air route facilities and services, such as air traffic control service charges.

In most countries air traffic control services, and landing and take-off facilities are publicly provided. Charges for landing and air traffic control services are generally based on the weight and size of the aircraft. These air service charges, especially charges for air traffic control services, may represent a sizeable proportion of the costs of providing services on particular routes, especially long haul routes, affecting the viability of a route and therefore the choice of airline route structure.

Fixed cost inputs

Airlines are relatively capital intensive, and the purchase of an aircraft is a major capital expense: in January 1993 a newly produced B747-400 cost around $132 million (*Avmark Aviation Economist* 1993, p. 26). This capital outlay may exceed the internally generated cash flow of the airline and so some method of financing, using either debt and/or equity instruments, is required to cover the cost of acquiring aircraft (see chapter 7 for details on finance sources).

Over the last thirty years, there has been a general move by airlines away from owning aircraft to leasing. Statistics on the world's jet fleet show that at the beginning of the 1980s only 6 per cent of the fleet was on operational leases, by 1991 it had reached about 20 per cent, and Knibb (1991, p. 17) estimates that by the end of the 1990s approximately 36 per cent of the world's jet fleet will be operating under lease arrangements.

The trend towards increased leasing is the result of a number of changes in the operating environment of international airlines. Tax advantages, such as increased tax credits on investment and rapid depreciation schedules available in some countries, and the residual value of aircraft have made leasing an increasingly more attractive option. In addition, airline demand for more fuel efficient technology, relatively rapid changes in consumer preferences and the opportunity for resale of aircraft have contributed to the growth in demand for aircraft leasing (see appendix VII for details on leasing).

The increase in the number of airlines employing credit to finance their aircraft has led to a change in cash requirements within the industry. Airlines that choose to lease or use debt instruments to acquire aircraft, rather than buy their aircraft outright using internally generated funds, require a smaller initial capital outlay to commence operations. However, they are far more reliant on their cash flow because of the need to meet periodic lease or interest payments. Tretheway and Oum (1992, p. 116) suggest that in difficult times, such as a recession, an airline leasing its aircraft can experience a negative cash flow, and is more likely to go bankrupt than if it owned its aircraft (see chapters 6 and 7, and appendix VII for details on airline finance).

Many international carriers are government owned. As stated above, government owned airlines often have objectives other than profit maximisation, and governments provide funding to enable the airline to fulfil these other objectives. For government owned airlines, government backing (either explicit or implicit) reduces the risk of bankruptcy because of the availability of government funds to cover short term losses.

Most government owned carriers are set up because the government perceives it in the best interests of the country to have a nationally owned airline. The wisdom of governments owning and operating international airlines is under review in many countries. A number of formerly government owned airlines have been wholly or partly privatised and there are a number of government owned airlines that are due to be privatised in the near future (see chapter 5 for details on privatisation).

Infrastructure, which includes air traffic control facilities, runways and airport passenger terminals, is an essential input in the provision of international aviation services. The supply of infrastructure is usually publicly provided, though there are privately owned and operated airports. While surplus infrastructure capacity can induce a significant amount of extra air traffic to an airport, inadequate infrastructure can be a significant constraint on international airline operations (see chapter 4 for details on congestion). The relative shortage of infrastructure compared with demand for services in particular markets is manifested through the inability of airlines to obtain landing and take-off slots at airports. This difficulty in obtaining landing and take-off slots is exacerbated by the general practice of allocating slots on the basis of past use (grandfather rights). The inability of airlines to obtain additional landing and take-off slots and the excess demand for slots indicates that slots are underpriced; for if airlines had to pay a price equal to the opportunity cost of a slot, any excess demand would cause the price of a slot to be bid up until demand just matched supply.

Infrastructure constraints can be a long term problem; where airports are owned by some form of government authority the ability to expand facilities can often be delayed by a drawn out decision making process. It is unlikely, however, that such a problem would be removed with the privatisation of airports as owners would still need to comply with environmental and other legislative requirements, making it difficult in many instances to expand airport capacity. At best privatisation of airports may reduce the time it takes for the investment decision process.

Ground handling and other operations performed at airports also are an important element of airline costs. An airline may choose to provide its own ground handling services at some airports, but this may be uneconomical if staff and/or resources are idle for significant periods of time. Where an airline finds that it is not economical to provide these services for itself, it will either have to purchase them from other airlines, or from the airport where the airport supplies ground handling services. The lack of competition in ground handling services at some airports may result in airlines having to pay high (monopoly) prices for these services. The EC Commission is looking at competition in ground handling in Europe (see appendix IV for further details).

Computer reservation systems (CRSs) have become an integral part of airline operations. CRSs are the core of all information flows for airlines: information on sales, traffic levels, revenue, scheduling and frequent flier programs can be stored and accessed through a CRS. CRSs have enhanced the ability of airlines to manage not only the passenger side of the market, but also improve the ability of airlines to match aircraft to demand, giving management greater control over its operating costs.

Taxes levied on factor inputs and taxes levied on the operating activities of an airline are an exogenous cost element for airlines, but one that can influence the structure of airline operations. Examples of taxes currently levied include fuel excise charges, factor input taxes, sales taxes and corporate taxes. Fuel excise levels, and fuel excise differentials across countries, may affect airline fuel purchasing and flight operations. Taxes on labour input and the tax treatment of capital in different countries will affect the operational structure and profitability of airlines from different countries.

The effect of technology

Technological change is an important influence on airline costs and international aviation activity. Improvements in aircraft technology have resulted in engines that are able to carry larger payloads, faster, further and more economically. The general progression of aircraft from propeller powered to jet powered, from small to large jets, and from narrow body to wide body jets has markedly reduced the cost of air travel to consumers since the end of World War II. These technological advances opened up long range, high density routes, and assisted the continued strong growth in international air travel (see chapter 3 for traffic details). At present there is growing demand for long range medium sized aircraft (for use on long thin routes) to meet market needs.

The most obvious example of the impact of technological advance on air travel is the introduction, in 1969, of the Boeing 747. This aircraft allowed airlines, especially airlines operating international routes, to carry greater passenger numbers at lower unit costs. This contributed to the high growth in international passenger traffic in the early 1970s as the number of B747s in service increased.

As noted above the oil price rises during the periods 1973–1974 and 1978–1979 caused an increase in airline direct operating costs. Airlines, facing higher fuel costs, demanded more fuel efficient aircraft from manufacturers. Tucker (1989, p. 16) compared total air fuel consumption and world (international plus domestic) passenger and freight kilometres and found that fuel efficiency, measured as total passenger kilometres per unit of fuel, had improved by 29 per cent between 1979 and 1987.

Technological innovations have also reduced airline labour costs. Labour costs are presently being reduced through the increased computerisation of flight engineering operations, lowering the size of the crew required for each flight. Aircraft manufacturers are building derivatives of existing registered aircraft and fitting different aircraft with identical cockpit configurations, thereby reducing airline training and staffing costs of operating a fleet with different aircraft. The International Labour Organisation (ILO 1990, pp. 27–8) states that improvements in avionics and in-flight computer technology have reduced the number of crew required to operate the aircraft and altered the role of crew from pilots to 'flight managers'. Improved maintenance technology has reduced the amount of labour (in both staff levels and time) required to undertake periodic maintenance checks.

Future design developments are difficult to predict. Boeing and Airbus Industrie have developed plans for a 600-plus seat passenger jet. The development of this aircraft could reduce unit passenger costs of air travel on high density routes. The manufacturers must overcome technical constraints, such as the limitations on wing span posed by existing airports, length constraints caused by existing terminals, and noise restrictions. Manufacturers must secure a sufficient number of aircraft orders to cover the development costs, before manufacture of such an aircraft takes place. It is not clear that there is sufficient demand, at this time, for development of such an aircraft to proceed (see appendix VI for details on recent design developments).

Management

The final element of supply is airline management. The quality of management is an important element in producing air services at least cost. The term given by economists to denote general managerial and organisational efficiency is X-efficiency (Leibenstein 1987, p. 934). If management is skilful at finding the low cost production alternatives, without affecting the quality of service, then the gap between actual and minimum attainable costs will be close to zero. The existence of X-inefficiency can be the result of mismanagement of work organisation (for example, inefficient use of staff) or the coordination of activities within the firm (for example, inefficient deployment or management of resources arising from bureaucratic rigidity). According to microeconomic theory, X-inefficiency is more likely to be present in large organisations which lack effective competition. This is of potential concern to those airlines seeking to become larger airlines and/or participate in bigger networks.

DEMAND

Airline costs are not the only determinant of the operation of the international aviation services. Demand also plays an important role. For example, consumers generally prefer travelling with one carrier because of the convenience. This favours the development of 'large' carriers that provide interconnected services to many cities. This section considers the main determinants of demand for international air passenger services and the effect of demand on market structure.

The factors that influence consumers in their choice of air travel include:

- income;
- price of air travel;
- quality of service of air transport;
- price of alternative modes of transport; and
- quality of service of alternative modes of transport.

The quality of service aspects that consumers regard as important in their air travel choice (BTCE 1992b, p. 11) include:

- travel time;
- convenience of service times;
- service frequency;
- availability of nonstop services;
- an airline's network coverage (that is, the number and location of cities served by an airline);
- airline service information;
- on-board services and facilities; and
- airline safety and security.

In general, consumers will tend to demand more air travel services, the higher are their incomes, the lower are air fares relative to the price of other transport modes, and the better are the service quality attributes of air travel. To assess the relative importance of each of these factors of demand, consider the air travel decision of a traveller.

The travel decision

In general, people do not travel for the intrinsic pleasure of travelling. Travel is usually undertaken in conjunction with the consumption of other goods and services, such as a holiday or business meeting. Transport is thus complementary, in consumption, with other goods and services, and the demand for transport is a derived demand, since it is the demand for holidays or business meetings that determines the demand for transport services.

Considering the demand for air travel in this way, one can distinguish a number of decisions for each consumer. Given that the consumer chooses to undertake some travel, either for business or leisure purposes, the consumer must choose the best mode of travel, which for international passenger travel is predominantly air travel (there are exceptions, for example some travel within Europe where high speed rail is a close substitute). If air travel is chosen the consumer must choose between airlines. For the leisure traveller, own income, price of travel, and quality of service are central to the travel choice. For the business traveller, the demand for travel will depend on business requirements, quality of service (especially service frequency and schedule convenience), and price.

Empirical evidence

Empirical studies of demand for airline services show that air travel demand is sensitive to price, income and service quality, with the degree of sensitivity generally related to the reason for the trip. Tretheway and Oum (1992, pp. 14–15) contend that the most important quality of service elements in air travel demand are service frequency and convenience.

Empirical studies of the relationship between the demand for travel, the price of air travel and income show that a rise in the price of air travel results in a more than proportionate fall in demand for air travel (indicating a price elasticity of demand greater than one, in magnitude) and that as income increases, the demand for air travel also increases by proportionately more than income (an income elasticity of demand greater than unity).

Oum and Gillen (1983, p. 187) found income elasticities in the range of 1.6 to 2.5, for Canadian intercity air travel. This means a 1 per cent expansion in income would result in an increase in demand for air travel of between 1.6 and 2.5 per cent. Empirical evidence suggests that a similar relationship holds for international aviation and aggregate economic activity. Tretheway and Oum (1992, p. 15) believe that this sensitivity to income is an important element in explaining the pro-cyclical nature of the industry (see chapter 3 for details on the cyclical nature of airline industry activity).

In considering the demand for air travel it should be remembered that different consumers travel for different reasons, and will react differently to air fare and service quality changes. Individuals travelling for leisure purposes tend to be more sensitive to price and income than those travelling for business. As a rule, leisure travellers tend to book their tickets well in advance, are willing to fly at less popular times and are less likely to change flight plans. Business travellers, however, tend to be less sensitive to price and more sensitive to travel time and convenient flight scheduling. In general, business travellers require flight times to fit in with their other arrangements and flexible conditions attached to their tickets in order to meet their changing business commitments. Tretheway and Oum (1992, p. 16) cite empirical evidence that suggests that schedule convenience is the most important determinant of carrier choice for business travellers. Business travellers who prefer more flexible scheduling arrangements are generally willing to pay a premium for this privilege. It is important to airlines to be able to distinguish between different categories of travellers. Providing flexibility in ticketing and differing levels of service quality does not represent a great increase in cost to the airline, but the amount travellers are willing to pay for these quality enhancements can increase airline profitability.

The tourism industry identifies a third category of traveller, those travelling to visit friends or relatives (referred to as VFR traffic). The characteristics of VFR travellers will vary depending on the nature of the trip. A VFR traveller on a planned trip would have similar demand characteristics to those of a leisure traveller, while one on an emergency trip would have needs similar to those of a business passenger.

In general, international airlines affect aggregate air transport demand through prices and frequency of service. Lower prices on a particular route will attract new passengers and divert some travellers from other routes. Increased frequency of service may provide air transport for previously diverted or frustrated demand. In markets where competition among airlines is already strong the means of lowering fares will be through lower cost production. Given the rigidity of costs in the short run, limiting the extent to which airlines can lower fares, airlines generally compete with each other for market share. Airlines employ other tools, such as frequent flier programs and media advertising, to influence consumers and increase their market share.

Frequent flier programs are considered an important influence on the consumer's choice of airline, especially in the US domestic market. The schemes are increasingly being used by international airlines to create customer loyalty and increase patronage. Where the purchaser of the ticket is the same as the individual or party who accrues the frequent flier rewards, the frequent flier program can be considered a form of price discount, the discount being available only after a customer has met specific conditions, such as flying a specified distance or number of trips.

Frequent flier programs are aimed at developing loyalty in the comparatively small number of passengers, usually business travellers, who are relatively price insensitive, pay full fare, are frequent users of air transport (that is, fly more than 12 trips per year), and travel all year round in the international market (Toh & Hu 1990, p. 180). For example, in 1986, although only 3 per cent of US passengers fell into the category of frequent fliers, they accounted for 27 per cent of total trips and around 40 per cent of airline revenues (Stephenson & Fox 1987, p. 11). Frequent flier programs have also had a significant effect on leisure travellers. Much of the leisure travel market that utilises frequent flier programs are business travellers on holiday, although even 'pure' leisure travellers do patronise frequent flier programs.

In theory, a well structured frequent flier program, with appropriate rewards, can be quite profitable for an airline. However, competition between airlines, through their frequent flier programs, to increase passenger traffic either by offering more frequent flier rewards or by making it easier to qualify for the rewards, can reduce the profitability of a frequent flier program, which may offset some of the anticipated gains to the airline.

Product attributes, such as price and service quality, are not the only factors important to the consumer in the choice of airline. The cost of obtaining information about services offered by different airlines also can influence the consumer's choice of airline. Consumers prefer lower information costs, so tend to prefer airlines with larger networks because of the ease of obtaining information about fares and scheduling.

In addition, airlines serving a large network are advantaged because consumers generally prefer to travel with a single airline throughout their journey. The convenience of a 'one-stop-shop' for purchasing tickets, as well as the perceived benefits in associated services, such as baggage handling and convenient scheduling of connecting flights, means consumers like flying with airlines with bigger networks rather than having to fly with two or more airlines.

Advertising is one medium used to provide information to consumers about the services offered by an airline. Advertising is an important element in attracting customers as it provides consumers with information about the airline, at little personal cost to the consumer. In attracting customers, it is the customer's perception that is important. Airline advertising promotes possible destinations, or highlights service quality and network size, rather than promoting the attributes of air travel itself.

The focus of airline advertising has shifted over the past decade. In the 1970s and early 1980s advertising focused on fostering a recognisable and well known brand name or image, through magazines and television. This form of advertising has been largely replaced now by short run newspaper and television commercials emphasising price, destination and frequency.

INTERNATIONAL MARKET COMPETITION

Competition is generally promoted as a sufficient condition for efficient market outcomes. An efficient market outcome is where the quantity of output is sold for a price equal to long run minimum average cost. Competition in international aviation is conducted within the framework of bilateral international air service agreements. It is conditions within air service agreements, and the policies of individual countries towards international aviation, that affect the level of competition and the price of international airline services. This section considers the 'market' for international airline services, the role of competition (or potential competition) in international aviation, and the impact of impediments to competition in international aviation.

Market definition

Economic theory considers a market as any exchange transaction between two or more parties. The Australian *Trade Practices Act 1974* (Cwlth) definition of a market is more specific, differentiating markets according to product. Section 4E of the Act defines a 'market' in Australia, and includes all goods and services that are close substitutes for each other, or otherwise in close competition. In its interpretation of the Act, the Australian Trade Practices Tribunal has noted the importance of substitutability within the bounds of a market as central to the definition of a market. Using the concept of substitutability, markets may be classified in terms of geographic, product, function and/or time dimensions.

The definition of an international aviation market usually varies to meet the purpose and perspective of the discussion. For example, the market identified in the research literature may be different from the market identified in an airline's analysis of its operating strategy. In domestic aviation the air travel service traded is commonly defined as air travel between a city (or airport) pair. In international aviation, while all air travel is undertaken between city pairs, the city pair is only one description of an international aviation market. Box 2.1 illustrates the range of international aviation market definitions adopted in this Report. The narrowest definition of an international aviation market is the air route linking two cities, for example, New York and London. It can be extended to country to country, region to region, and ultimately to a global market covering all cities served in international aviation.

The degree of substitutability also depends on the type of traveller, usually categorised as leisure or business traveller. As noted previously, leisure travellers are more influenced by price in their choice of holiday destination and flight arrangements. The leisure traveller can make decisions based on the type of holiday and/or the preferred countries, and then choose the best value travel package between city pairs within those countries. The market in which the leisure traveller purchases air travel is more likely to be all air routes servicing two countries or regions. For example, the relevant air travel market for 'sunseeker' leisure travellers will be broad, encompassing a large geographic area, and these travellers are responsive to variations in price. Business travellers, however, generally have specific destinations and as a result their choices are usually limited to airlines competing between specific city pairs.

Effects of competition

The benefits resulting from competition between airlines are generally more efficient price–output combinations (that is, lower price, better quality). The increased dilution of the market among a number of different airlines reduces any one airline's ability to influence the price–output outcome to its own advantage and to the detriment of other parties.

Baumol, Panzar & Willig (1982) claim that actual competition, between a 'large' number of competitors, is not necessary for an efficient outcome. In theory, a market dominated by one or two airlines can still produce an efficient outcome if possible entry forces the incumbent airlines to set competitive market prices.

For potential competition to be effective entry barriers must be small. Initially, the US domestic airline industry was thought to satisfy the conditions of contestability theory, as aircraft are fairly mobile pieces of capital, and airlines were free to enter and exit any market in the deregulated environment, and be classified a contestable market. Most analysts today recognise that there are significant barriers to new entry, such as hub dominance by incumbent airlines, limited access to airport slots for new entrants, the hurdle of an established market presence of incumbent airlines, and strategic responses by existing airlines through prices, product differentiation and anti-competitive mergers. It is now generally accepted that the US domestic airline industry does not satisfy the conditions required of a contestable market. Most international aviation markets are not contestable, mainly because of regulatory barriers, which can limit opportunities for new entrants, but also because of structural and strategic barriers.

Impediments to competition

Impediments to competition may result from international regulatory agreements, structural conditions (such as limited access to international aviation infrastructure) and/or natural advantages of airlines (such as those arising from the cost structure of the industry and associated services). Barriers to entry and/or exit do not only limit entry by new airlines; some barriers, such

BOX 2.1 INTERNATIONAL AVIATION MARKET HIERARCHY

Markets exist in a hierarchical structure and the breakdown of what constitutes a market varies to meet the purpose and perspective of an analysis of international aviation.

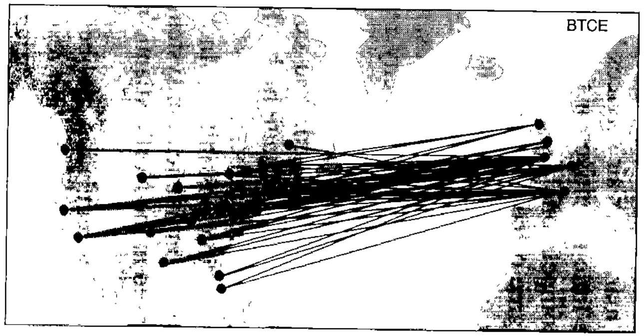
(a) City to city: New York–London

The narrowest definition of an international aviation market is the air route linking two cities, for example, New York and London. In this case, the services offered by airlines operating in the market are close substitutes, and price, service quality and airline image are important factors in attracting passengers. The number of airlines operating in the market is usually determined by the air service agreement negotiated by the two countries, with the more liberal air service agreements allowing for a greater number of carriers in the market serving a range of cities in each country.

(b) Country to country: United States –United Kingdom

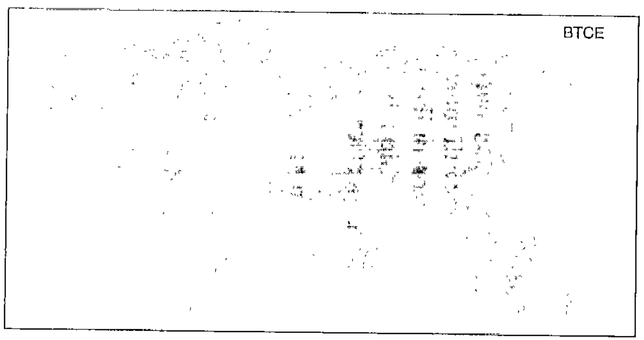
A slightly broader definition of an international aviation market is all city pairs linking two countries. The relevant market may include all city pair combinations between the United States and the United Kingdom. Although this definition of a market is likely to include a larger number of airlines than in the narrower definition, it is no longer true that all services offered by airlines are close substitutes. Leisure travellers might consider that a cheaper fare available on a connecting flight from New York to London, via Boston, is preferable to a higher fare on a direct flight. As mentioned previously, business travellers, however, are likely to be less flexible about their destinations and more time sensitive.

(c) Region to region: North America–Europe



Broader still, the market can be defined as all routes and all airlines linking two regions, such as North America and Europe (referred to as the North Atlantic market). There are a large number of city pair routes, and a number of airlines servicing those routes, allowing many substitution possibilities in the North Atlantic market.

(d) The global market



Finally, the broadest definition of the market is the global market, which includes all points served and all airlines operating in the international aviation industry.

as economies of traffic density, make it difficult for an airline successfully operating in one market to establish itself in another market. One possible consequence of the removal of entry and/or exit barriers in the international market would be the emergence of an industry structure similar to that of the US domestic aviation industry, which would be dominated by a few large global carriers.

This section considers barriers to entry and/or exit, and restrictions to competition in international aviation.

Bilateral air service agreements

Bilateral air service agreements set the framework for trade in air services between countries, and much of the trade in international air services is based on reciprocity rather than comparative advantage. Bilateral air service agreements governed the formative stages of trade in international air services, and commonly included details on safety standards, the routes to be served between countries, which freedoms were granted (see chapter 5 for details on the regulatory framework), the number of carriers designated to fly on each route, airline capacity, flight frequency and, in some cases, the method for determining fares. Bilateral air service agreements, because of these elements, can inhibit the development of greater competition, through restrictions on entry of new airlines, route capacity limitations, and possibly limitations on the extent of price competition between existing carriers.

Many countries have one designated carrier, which may be government owned. Bilateral air service agreements between two countries, each with only one designated carrier, may result in a duopoly market for air services between the two countries. Such a market may provide little incentive for the two carriers to differentiate the product or introduce competition. In a market with few competitors, there is potential for some degree of collusion (either implicit or explicit). On the other hand some duopoly markets may be quite competitive. Even in a market with more than two carriers, which could arise either through multiple designation or the allocation of fifth or other freedom rights, there may be limited competition because of pricing and/or route capacity restrictions written in the air service agreement.

Not all international aviation markets are so regulated, and competition between airlines on routes serviced by many carriers is quite high. The North Atlantic market, for example, is quite dense, with a number of close substitutes for a large proportion of travellers. Substitution possibilities include other airlines, alternative city pair combinations, and communication systems such as teleconferencing. Price competition is observed in the North Atlantic market.

There have been moves to reduce the amount of regulation by liberalising air service agreements. Route capacity limitations and designation restrictions in air service agreements do restrict the opportunities for new carriers to enter international aviation markets. More liberal air service agreements have allowed more freedom for airlines to determine price and route capacity which better reflect market conditions. Dresner and Tretheway (1992b, p. 183) analysed the impact of more liberal bilateral air service agreements, between the US and other countries, on the price of air travel. The empirical evidence suggests that more liberal bilateral agreements, which allowed carriers more freedom to set route capacity levels, additional routes between signatory countries, and more freedom to set fares, resulted in lower discount international air fares. (See chapter 5 for a discussion of the liberalisation of trade in air services.)

Access to aviation infrastructure

Limited access to aviation infrastructure is a potential barrier to entry into the industry (see chapter 4 for details on aviation infrastructure). Aviation infrastructure can be subdivided into three main categories: air traffic control (ATC); airport services (that is aircraft landing and take-off movements); and airport terminals. The lack of access to infrastructure may be due to a lack of availability of landing and take-off slots at an airport, a lack of terminal space or because of congested airspace. The congestion problem at international airports is heightened by air service agreements which concentrate international traffic at a limited number of major gateway airports, while a number of secondary airports have excess capacity (OECD 1992a, pp. 1 & 13).

Congestion at some airports has led airport authorities to introduce methods of allocating scarce slots to airlines. One method often adopted for allocating airport landing and take-off slots are grandfather rights, where slots are allocated according to historical or current access. Such an allocation process raises the possibility of future bias for access to the airport in favour of incumbent airlines, and makes entry more difficult for new airlines. As infrastructure 'shortages' are becoming more acute at some airports, authorities are considering expansion of airport facilities and/or alternative means of allocating slots, such as auctions, lotteries or the introduction of peak pricing schemes.

Economies of scale and scope

The existence of economies of scale and scope in airline operations may be considered a barrier to entry. Economies of scale and scope mean larger airlines can produce output at a lower unit cost than smaller airlines. Unless the new entrant can obtain lower cost inputs or some other form of cost advantage, then cost competitive entry is only possible if the entrant can match the scale of the incumbent's operations, which will be difficult for a new entrant.

Empirical studies (Gillen, Oum & Tretheway 1985; Caves, Christensen & Tretheway 1984; White 1979) have shown that airlines can obtain economies of traffic density but there are no cost advantages to be gained from expanding the size of an existing network. The existence of significant economies of traffic density may be a barrier to entry, as the cost advantage engendered by the traffic density of the incumbent could make it difficult for a new carrier to compete in that market. While empirical studies indicate that network size does not yield cost advantages for airlines, a considerable network size does allow an airline to operate hub and spoke systems, which offers the airline the opportunity to channel traffic through hub points and increase traffic between hub points and create economies of traffic density. This would appear to be the case in the US domestic aviation market but does not appear significant in international aviation. Additionally, while an airline's network size may not result in lower unit costs it may give an airline a significant marketing advantage over its rivals, making profitable entry more difficult for a new airline.

In addition to cost advantages derived from operations, Levine (1987, p. 425) argues that the provision of information in aviation offers economies of scale and is an important barrier to entry in the US domestic aviation industry. Through ownership of a CRS, and widespread use of the system by travel agents, an airline can offer benefits to travel agents who direct more traffic to the airline. Levine (1987, p. 461) argues that by giving travel agents access to its CRS, an airline can monitor not only its own traffic levels but gain access to information on the fares, traffic levels, and a rough approximation of seat inventory of its competitors. Access to this information about its competitors can assist an airline in maintaining its competitiveness and judging the extent of its market power. This practice is sufficiently widespread to be considered a problem. Attempts to restrict access to information on a competitor's fares and traffic levels are under review. These include electronic barriers that restrict airline access only to that part of the CRS containing information about the airline's own services and fares.

Capital requirements

Capital requirements for a start-up airline may be a barrier to entry, or a hurdle to continued operation, for a relatively new airline. New entrants may have trouble obtaining capital because of the perceived risks of investment, low expected rate of return on investment, and constraints on access to capital. International airline profitability is variable and, in general, international airlines do not offer a high return on investment (see chapter 7 for details). In addition, the domestic deregulation experience of Australia and the US has shown that a new airline will most likely suffer losses in the early stages of its development as it faces the established market presence and competitive strategies of incumbent airlines. The high risk of failure for a new airline, combined with the low rate of return for airlines in general, may raise the cost of capital for a new airline above that faced by an existing airline, and make capital a significant barrier to entry. Recent experience in North America and Australia, and in some instances in Europe, suggests that capital is available for new entrant airlines, although to some extent this may reflect the 'romance' of the industry to investors, as opposed to the profitability of airlines.

Limitations on foreign ownership of airlines, as well as governmental restrictions on foreign ownership of domestic companies, restrict the pool of capital available for new entrants into the international aviation industry, and so increase the opportunity cost of capital, making it more difficult for a start-up airline. The experience of new Australian and US domestic airlines suggests that inadequate capital reserves may make sustained operation more difficult, especially in the face of strategic responses from incumbent airlines.

It should be noted that the validity of including capital costs as a barrier to entry is not universally accepted. The argument used to counter their inclusion is that unless there is a significant difference in the capital outlay required by new entrants, compared with the initial outlay of the established firms, then new entrants are not disadvantaged relative to existing airlines. In cases where start-up costs for a new airline are quite large (a single aircraft can cost up to $130 million depending on size and age), some entry costs are irreversible (or sunk), and, where incumbent airlines are likely to adopt an aggressive attitude towards new entrants, to protect their profitability and/or market share, capital costs can be significantly higher for a new entrant and be a barrier to entry.

Computer reservation systems

As already noted, CRSs are considered a potential barrier to entry because of the potential advantages that they give the carriers who own the information system. For example, the order of presentation of information on screen can provide airlines with a real advantage. Tretheway and Oum (1992, p. 50) report that a representative of American Airlines testified to Congress, in 1988, that 92 per cent of all travel agent ticket sales in the US came from the first computer screen displaying information on a given market, and that 54 per cent of sales came from the first line.

CRSs were originally developed for internal use by airlines during the late 1960s and early 1970s. By the late 1970s such systems had become essential for travel agents if they were to keep track of the wide range of fares and the burgeoning number of US domestic services. Consequently, three US airlines (American, TWA and United) invested in the development of a system for agents. By installing a CRS in a travel agency for use by the agency in making bookings, the owner of the CRS could gain information about customer demand for different passenger services and its rivals' business patterns (Levine 1987, p. 461). According to Levine (p. 415) by 1987 the CRSs owned by two airlines (American and United) were used by 70 per cent of travel agents in the US. Internationally, ownership of the various systems has become increasingly concentrated in recent years, through a number of mergers and affiliations between CRS operators. ICAO has released a worldwide code of conduct for use as a guideline by countries to regulate CRSs. Steps have been taken in both the US and Europe to establish codes of behaviour in relation to the use of CRSs. Australia also has recently established a code of conduct for the behaviour of CRS vendors.

Code sharing among airlines is another element of the CRS potential for bias (Tretheway & Oum 1992, p. 19). Code sharing is an arrangement between two or more airlines allowing a connecting flight on two or more carriers to be displayed on the CRS as a single carrier service. For example, under a code sharing agreement a flight from Sydney to Tokyo with one carrier and a flight between Tokyo and Los Angeles on a second carrier are shown on the CRS as a single carrier service. This is to the advantage of the code sharing airlines, as a single carrier service gets the higher priority on the CRS display than an interlining service or two separate flights between the same cities.

Hub and spoke operational systems

Hub and spoke operational systems were adopted by US airlines following domestic deregulation. As mentioned, by using a hub and spoke system, airlines are able to increase traffic density on certain routes, to take advantage of potential economies of traffic density, and to lower unit costs. The role of feeder airlines is important in a hub and spoke system. The benefits also arise from the demand side, as consumers prefer to travel with larger airlines, so an airline with an extensive hub and spoke network has an advantage over a new entrant because of its network of points served. Levine (1987, p. 444) argues that hub and spoke systems allow airlines to overcome production indivisibilities, and constitute a barrier to entry because a new entrant has to enter at a sufficient scale and scope to remain competitive. It is interesting to note, however, that there has been some disquiet expressed by US airlines over the cost of some of their domestic hub and spoke services. In order to cut costs, some of the major airlines are cutting services on those routes and hubs which are poor performers.

International airlines have moved to adopt similar systems, particularly in Europe and the Asia Pacific region. The development of hubs in international aviation is determined by geographical location, current traffic patterns and regulatory constraints. Countries that are centrally located between high traffic generating regions, such as Singapore, have a natural advantage in developing an aviation hub. Bilateral air service agreements create limited international gateways, favouring the development of simple hubs (points of interconnection where flights are independent of each other) acting as centres for international travel into or out of that country. International carriers are constrained, however, in their ability to develop complex hubs (points of interconnection where flights are scheduled to arrive and depart from the hub within a short period of time).

Frequent flier programs

As discussed above, the frequent flier program is an operational strategy adopted by airlines to garner market share, and can be a barrier to new entrants. Once an airline introduces an incentive program into a market, such as a frequent flier program, it is difficult for a new airline to attract passengers without also offering some kind of bonus for loyalty. This raises the cost of entry and represents an additional barrier for new entrants.

The frequent flier program is more effective the larger the airline's network. As stated above, air travellers tend to prefer airlines with larger networks, and an airline with a larger network is in a position to offer more attractive frequent flier destinations. According to Humphreys (1991, p. 13) frequent flier programs create artificial linkages of demands for different services, and if a new entrant is to succeed in a market it would need to establish from the outset a network of a certain size to attract passengers away from the larger airlines' programs, or join an existing frequent flier program in order to compete with existing carriers.

In general, competition in an international aviation market will result in an efficient price–output solution. One of the necessary conditions for competition in any market is that there are no barriers to entry and/or exit. In international aviation there are significant barriers to entry. Bilateral air service agreements can introduce significant barriers to entry as they can prevent the entry of existing airlines into profitable, rent producing, markets, which would tend to dissipate any rents lowering the price of air travel to consumers.

AIRLINE CONDUCT

As indicated at the outset of this chapter, international airline conduct is influenced by a range of factors, including technology, the regulatory regime, pricing and provision of infrastructure, the characteristics of consumer demand and airline costs. This section gives a general treatment of international airline operations, focusing on the influence of competition and attempts by airlines to affect competition. The discussion draws on the experience of the US domestic airline industry to illustrate some aspects of airline conduct.

Product bundling and advertising strategy

The product offered by airlines is not strictly air travel between a city pair. As well as purchasing travel between two cities, the air traveller purchases service quality characteristics, such as in-flight service, safety, and flexibility of ticket conditions. For example, two passengers on the same flight may purchase seats for different prices and though both passengers are travelling the same route, the product each purchases is not identical and can be differentiated by price and service quality characteristics.

Consumers, especially leisure travellers, often purchase air travel as part of a travel package. Travel packages may include accommodation and tour arrangements in addition to air travel. The packaging of products with airline services is an important element of airline business, as travel packaging and package pricing can increase airline patronage. The travel package is usually sold for one price, referred to as price bundling. When offered as part of a package, travel package items (such as accommodation, tours, land and air travel) are often sold at a discount. Offering discounts on accommodation or tours, when purchased with air travel, will induce additional travel by consumers who, if the travel package discount was not available, may not have chosen to undertake air travel. By packaging complementary products together, the information search costs to consumers are reduced, which also induces additional demand for air travel. A summary of the concepts of price bundling and travel packaging is given by Hooper (1992).

Advertising is an important element of airline operations, as it is the prime means used by airlines to market their services to consumers. As mentioned previously, in the past airline advertising used to promote an immediately recognisable brand image, emphasising service quality features or possible destinations to differentiate themselves from other airlines. Now airline advertising is more likely to use short lead times and focus on price, destination and service frequency.

Frequent flier program

The similarity of air services provided by different carriers can make it difficult for airlines to establish a significant level of brand loyalty among frequent users of air transport. Frequent flier programs were developed in an attempt to encourage customer loyalty. These programs have become increasingly important in influencing consumers' choice of airline. Although the costs of operating an effective frequent flier scheme are substantial, the potential loss of the full fare business passengers to other airlines has encouraged airlines to adopt these schemes.

The first modern-style program is generally credited as having been introduced by American Airlines in 1981 (Tretheway & Oum 1992, p. 53). Other carriers did, however, offer incentives to encourage repeat patronage before the introduction of American's AAdvantage frequent flier program (Humphreys 1991, p. 13). Incentives in modern frequent flier programs include increased quality of service, prizes, and free flights for passengers who satisfy the prescribed conditions. Where the purchaser of the airline tickets also obtains the frequent flier rewards, the frequent flier program acts like a price discount. Where the user of air transport and the purchaser of the ticket are different parties, such as a business person (user) travelling on behalf of their employer (purchaser), and the user of the ticket obtains the frequent flier rewards, the principal–agent relationship exists. In such a case the traveller may purchase a greater than optimal level of air travel (for example, flying a longer route, or seeking an upgraded ticket to accrue more frequent flier points), and the frequent flier program is no longer a simple price discount.

What began as a phenomenon of US airlines is now being adopted in other international markets including Europe and Asia Pacific. Airlines can join existing frequent flier programs through alliances, often at a relatively high price, or create a new program to fit their own needs, or choose not to operate or participate in a frequent flier program. As airlines forge alliances, individual frequent flier programs are modified to integrate with other airlines. With an increasing number of airlines linking their frequent flier programs, at some future date the majority of schemes could become so similar that they cease to offer a marketing edge other than to act as a universal price discount for a particular segment of demand, and could diminish as a barrier to entry as new carriers are able to join existing frequent flier programs. In the interim, frequent flier programs contribute to the commercial pressures for international airlines to consolidate and/or globalise (see chapter 8 for details on alliances and globalisation).

Vertical and horizontal links

Vertical and horizontal integration are also important elements of current operating strategies of international airlines. Vertical integration in the airline industry takes the form of ownership of, or agreements with, firms providing complementary services or products. Examples of vertical links include airline ties with suppliers of maintenance and catering services. Many airlines also have commercial links with downstream businesses such as hotels, tourist resorts, and car rental firms. The airline with such links can more easily offer a discount to passengers who purchase hotel accommodation, for example, as part of a package with air travel.

Horizontal integration involves merger or commercial links between airlines producing close substitute products. Tirole (1989, p. 17) suggests that horizontal integration is a merger between two firms producing similar products, and is often undertaken to reduce the dissipation of monopoly rents. Some of the alliances formed between airlines — such as British Airways (BA) has achieved in Europe, the US and Australia — have the potential to expand the horizontal dimension of BA's operations.

Travel agents

The travel agent industry has a strong interdependence with the airline industry. Travel agents act to sell airline tickets on behalf of the airline, and are paid a commission for so doing. In this case the travel agent does not purchase for resale. Travel agents also sell a large variety of other travel products, including tour packages, which may include air travel, accommodation and other travel. In such cases the tour wholesaler purchases the airline ticket for resale and bears the risk of not being able to resell the ticket. Packaging of services is an area of growth for travel agents.

Travel agent links with airlines are not purely vertical. Travel agents not only sell tickets on behalf of airlines but also compete directly with airlines in the sale of airline tickets. Travel agents, however, also sell a range of other products, which give travel agents an advantage over airlines in selling to travellers who require complementary services. Marketing advantages and reducing agent commission costs are two of the reasons that many airlines seek some type of commercial link or agreement with travel agents.

Travel agents play a major part in air travel retailing. In Australia the Trade Practices Commission (TPC 1992, p. 47) estimated that 85 per cent of international and 50 per cent of domestic airline reservations were made through travel agents. O'Connor (1989, p. 92) quotes estimates that, in 1985, about three-quarters of airline ticket revenue in the US came through travel agents. Tretheway and Oum (1992, p. 99) estimated that 70 per cent of airline tickets in Canada were sold through travel agents.

The proliferation of airline services, the increase in fares available, particularly in a liberalised environment, and the packaging of a range of services for travel, make the services of an 'independent' travel agent valuable to air travellers, not only for securing a low price but also for arranging the best package. These are some of the main reasons for the high proportion of airline reservations made through travel agents. O'Connor (1989, p. 92) stated that since deregulation in the US, travel agents were used more often by travellers due to the increase in flight and fare options. The 'independence' of travel agents or at least the lack of bias in advice given, however, may be less than the consumer assumes. Three factors may affect that advice:

- The ownership of the travel agency may affect the independence of the agency, particularly where the agency is owned by an airline. In Australia, immediately prior to deregulation, the domestic airlines purchased a number of travel agents (BTCE 1991b, p. 26). Ansett and Qantas have strong links to travel agencies — both groups own at least one major travel agent and have varying interests in many others (BTCE 1993, pp. 29–30). It should be noted that such purchases may have other purposes than steering traffic in the direction of the parent airline; for example, by vertically integrating the services offered savings may be achieved, such as cutting agent commission costs.
- Payments of override commissions and other incentives may encourage a travel agency to recommend one travel option over another to a client. Tretheway & Oum (1992, p. 49) quoted a US Department of Transportation 1990 survey that showed 24 per cent of travel agents usually selected a particular carrier to get an override commission and 27 per cent more sometimes made a selection on that basis. The study also found that agencies give preference to a small override commission from a major airline over a large override commission from a small new airline (Tretheway & Oum 1992, p. 99).
- The use of a CRS may affect the advice given to the client. It has been argued that CRSs will inevitably have an in-built bias due to the ranking of service choices, and the willingness or ability of a travel agent to carry out an extensive search of all options available will affect the quality of advice given to the client. As already mentioned, attempts have been made by governments to eliminate discriminatory practices in CRSs.

Pricing strategy

The history of pricing strategies as adopted by international airlines is dominated by the International Air Transport Association (IATA). Essentially, IATA is an inter-airline or trade association concerned with the technical and commercial issues facing member airlines (see chapter 5 for details on IATA).

One of the original roles of IATA was to determine how passenger tariffs and cargo rates would be established. IATA procedures for coordinating tariffs and rates were adopted by most airlines in the 1950s, 1960s and early 1970s. The role of IATA as a price coordinating body declined in the late 1970s and early 1980s, primarily as a result of the growing pressure to increase competition (particularly by freeing up prices). Changes in the conditions of IATA membership, and the tariff coordinating process were implemented in 1979. As a result of these changes, airlines that joined IATA were given more freedom to charge non IATA fares, subject to conditions in existing air service agreements. Despite the pressure for a more liberal international aviation industry, IATA sanctioned tariffs are still the preferred prices charged by many airlines (including some non IATA airlines) on international routes.

The increased freedom for airlines to set their own prices, however, has resulted in a significant development in the pricing strategy adopted by international airlines. In the passenger market, airlines can increase profit by differentiating between customer groups. In air, and other forms of transport, market segmentation is usually achieved by offering different levels of service quality. Examples of quality differentiation in aviation include the provision of different fare classes (first, business and economy), with different levels of passenger service; and discount air fares, where airlines offer similar travel service at different prices and attach conditions, such as no refunds available and a minimum and/or maximum length of stay, to passengers paying lower fares, thereby ensuring that those willing to pay extra will be discouraged from taking advantage of cheaper fares.

The use of quality of service to differentiate between passengers has enabled airlines to segment the market on the basis of responsiveness to price and service quality combinations. Airlines have developed yield management techniques (also referred to as seat management or revenue management) to maximise revenue from each flight. The use of yield management techniques to price seats is an aspect of airline conduct that is directly related to the nature of consumer demand.

To introduce a yield management system, an airline must follow some basic steps. Initially the capacity of each flight offered by the airline is determined, and then the demand by full fare passengers for each of these flights is forecast, generally using the historical database for the flight. The next step is choosing a probability rate for seating all potential full fare passengers and then reserving the appropriate number of seats to be sold at full fare. Discount fares are then determined for the remaining seats, and conditions are attached to their sale, so that people willing to pay full fare are less likely to take advantage of the discount fares. The level of discount and the number of discount seats can be varied at any time up to the actual departure of the flight.

Tretheway and Oum (1992, pp. 32–46) provide a more detailed discussion of yield management techniques. The introduction of yield management systems has resulted in the availability of a plethora of different fares on the one route. American Airlines attempted to simplify its fare structure with its April 1992 decision to limit the range of available fares to four basic types. Other airlines, however, did not follow American's lead, and continued to offer a range of discounted fares. As a result, American abandoned its simplified pricing scheme in order to match its competitors. Many players in the industry argue that an effective yield management system is essential for modern airlines.

In setting tariffs, or fares, international airlines also must contend with variable exchange rates. Forsyth (1983, p. 1) notes three problems for airlines when exchange rates move: re-setting fares in different currencies; the cost competitiveness of airlines from different countries changes as relative input costs change with exchange rate fluctuations; and exchange rate movements can affect patterns of passenger traffic and thus affect airline operations. Movements in exchange rates add an additional element for international airlines to take into account in their yield management schemes.

Operational strategy

The development of complex hub and spoke systems in the US domestic market after deregulation is an indicator of the potential for the emergence of complex hub and spoke systems in international aviation. The traditional linear operating systems used by US domestic airlines in the pre deregulated industry are similar to the point-to-point services established in the international industry under existing bilateral air service agreements. Figure 2.5 illustrates the change typical in the US following deregulation in 1978. It compares American's pre deregulation route network in 1974 with its post deregulation route network, with the emergence of its complex hub and spoke system by 1989.

The main features of American's route development, following US domestic deregulation, are the development of four complex hubs at Chicago, Dallas/Fort Worth, Nashville and Raleigh/Durham. Pre deregulation American was primarily a long haul east–west passenger carrier. Deregulation led to an expansion in services through the east–west hubs, Chicago and Dallas/Fort Worth, and the development of north–south traffic through the Nashville and Raleigh/Durham hubs.

Figure 2.5 also shows that following deregulation there was an increase in the number of cities served by American and its affiliated carriers.

Figure 2.5 American Airlines' route network and hubs: pre and post deregulation

PRE DEREGULATION

American Airlines route network 1974

POST DEREGULATION

American Airlines route network and hubs 1989

Source *Avmark Aviation Economist* May 1989.

The main implication to be drawn from this analysis for international aviation is that liberalisation of international aviation regulations would probably see the development of strategic complex hubs. These hubs would be serviced by regional feeder carriers, as in the US domestic market, and there would be commercial links formed between international 'trunk' carriers and feeder carriers to ensure coordinated schedules and seamless service. The history of US aviation markets suggests that large international carriers would serve more city points, either directly or through feeder carriers, than is currently the case.

The advantages to airlines of complex hub and spoke networks are raising average load factors between hub points, increasing revenue per flight, and providing scope for airlines to lower unit costs through the use of different aircraft. The hub and spoke system enables airlines to use aircraft more economically, using larger aircraft on more dense routes and smaller aircraft on routes with less traffic and/or of shorter distance. The hub and spoke system also allows airlines to offer a wider range of destinations, although there is a trade-off for consumers in that it is more likely the consumer will have to travel on indirect services.

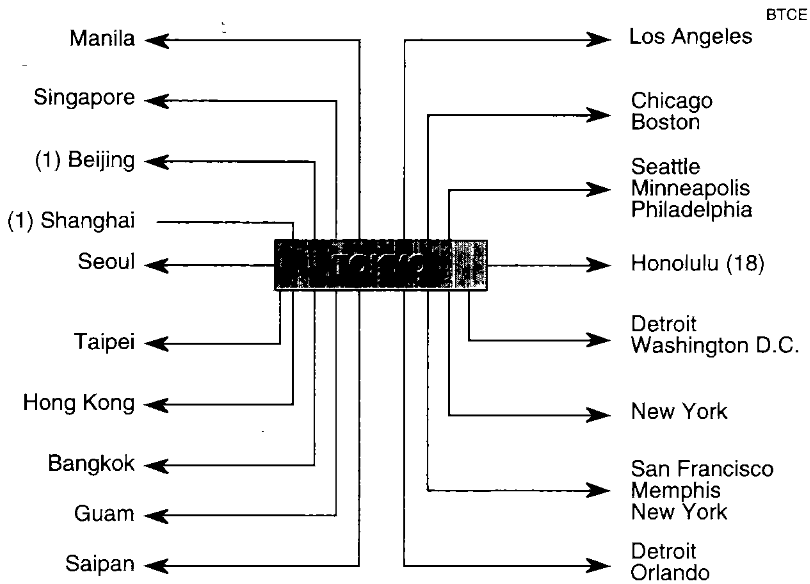
It has been suggested that hubbing is less likely to become widespread in regions involving relatively short distances (for example, Europe), but that hubs are well suited to flights connecting longer distances (for example, intercontinental travel). This is because hubbing is most effective when the delay experienced as a result of the stopover at the hub is relatively small in comparison to total travel time (OECD 1992a, p. 21). This observation is supported by the US carriers' use of airports in some Asian cities as hubs to capture market share in the fast growing Asia Pacific region. Figure 2.6 shows how Northwest has created a hub at Tokyo-Narita, worth around $2 billion in sales a year (Seiden 1992, p. 17), enabling the airline to operate beyond Japan.

A number of airports act as simple hubs in international aviation, but the establishment of complex hub and spoke networks in international aviation is difficult under the current system of bilateral air service agreements. The development of Japanese hubs, by some US airlines, is possible because the US–Japan bilateral air service agreement allows US airlines to fly beyond Japan to other Asia Pacific destinations.

Alliances represent one way in which international airlines can benefit from larger networks, while they are still operating under existing bilateral air service agreements. Many international carriers are forming, or seeking to form, alliances with other international carriers. Some of the major alliances include: KLM and Northwest; BA and Qantas; BA and USAir; and Swissair – Singapore Airlines – Delta (see chapter 8 for details on alliances).

Alliances can be in the form of: marketing arrangements such as code sharing, interlining, and sharing of ground facilities; joint ventures involving the creation of a holding company; or mergers and acquisitions. Most alliances formed to date have been marketing arrangements, though some airlines have

Figure 2.6 Northwest's Asia Pacific hub: Tokyo



Notes As of 1 June 1993.
Seven frequencies per week unless otherwise shown in parenthesis.
Source ABC World Airways Guide, May 1993.

taken equity positions in other airlines. For example, BA has a 25 per cent stake in Qantas and KLM owns 49 per cent of Northwest stock.

Alliances can mean considerable marketing and cost advantages to airlines. Depending upon the agreed terms of the alliance, airlines may utilise aircraft, equipment and staff of another alliance member. The possibility of sharing aircraft, for example, would allow alliance members to economise on fleet size and use aircraft more intensively, reducing total capital costs. Ground services and maintenance facilities can be handled by just one partner in each particular location, reducing costly duplication of facilities. The current growth in international alliances means that airline inputs will become more multinational, making it more difficult to determine 'where' airline services are being produced. These operational changes in international aviation could, in turn, affect air service agreements in the future. Conversely, changes in the air service agreement structures could assist the airline industry to become more multinational in its inputs.

The international aviation industry is continuing to change. Leisure demand for air travel will continue to grow in the future and it is this segment of demand that will most influence the growth of international aviation. Airlines will attempt to meet demand with sufficient capacity. Successful airlines will be those that can produce, and successfully market, services at a price consumers are willing to pay. Cost and marketing advantages are important elements of a profitable airline. Future international aviation activity is dependent upon the balance struck between regulatory arrangements and commercial imperatives. The remaining chapters explore specific issues and trends in key areas of the international aviation industry.

CHAPTER 3 TRAFFIC: PAST AND PRESENT

Purpose: to outline the major historical trends in international aviation traffic and issues affecting aviation traffic in the nineties.

It is important to analyse past and present air transport traffic for a number of reasons. Information on traffic levels may be used to determine: the level of competition in an aviation market; whether economies of scale exist; the level of public and private sector investment; and future estimates of demand. By analysing past and present traffic it is possible to use what is known about the major influences on past growth to estimate how these factors will affect future growth in aviation. This knowledge is useful to both government policy makers and participants in the airline industry in determining the appropriate response to future developments and opportunities in international aviation.

It should be noted that aviation traffic is measured by revenue passenger kilometres (RPKs) and freight tonne kilometres (FTKs), depending on whether passenger or cargo operations are being discussed.[1]

When discussing aviation traffic a distinction is drawn between scheduled and nonscheduled (or charter) services, and between passenger and cargo operations. Scheduled passenger operations are the primary source of revenue for airlines, but airlines generate revenue from a variety of services, including nonaviation business. In 1992 scheduled passenger operations accounted for 74 per cent of gross operating revenues for the airline industry. (As noted in chapter 1 this and other data unless otherwise stated are based on International Civil Aviation Organization data.) This chapter reflects the importance of scheduled passenger operations by focusing on worldwide international scheduled passenger operations, and then provides a shorter analysis of international nonscheduled passenger operations and international cargo

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1. The 1992 figures used in the Report are preliminary figures from the 1993 International Civil Aviation Organization (ICAO) publications *Annual Report of the Council — 1992* and *Civil Aviation Statistics of the World 1992*. At the time of writing they were the most current figures available.

operations. To conclude the chapter, Australia's international aviation market is examined.

SCHEDULED PASSENGER TRAFFIC

In the last two decades worldwide, international passenger traffic has grown faster than domestic passenger traffic. International air traffic has increased its share of world (international plus domestic) RPKs from 35 per cent in 1971 to 50 per cent in 1992, and with international traffic forecast to grow faster than domestic traffic, this proportion will continue to increase into the next century.

International RPKs grew every year over the period 1971–1990, although there were a number of fluctuations in the annual rate of growth. This positive trend in the rate of growth was influenced by a number of factors. Technological developments, for example, have had a major influence on the sustained positive rate of growth in air transport. Doganis (1991, p. 9) states that greater efficiency and increased capabilities have resulted in falling unit costs for airlines. The increase in disposable income throughout the world, combined with decreasing real air fares, meant that more people could afford air travel, so that demand for international air services increased. The International Air Transport Association (IATA 1991a, p. 7) estimated real air fares in 1990 were 68 per cent lower than in 1970.

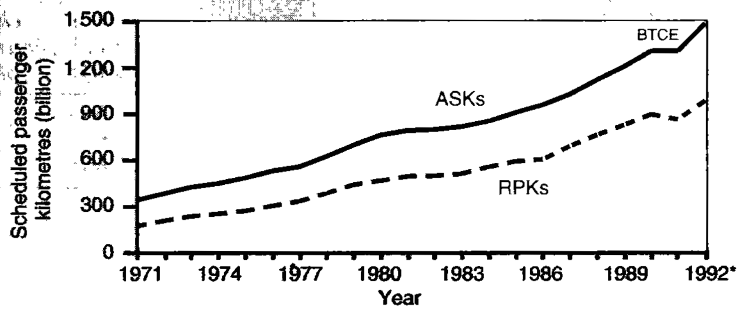
The trend for positive growth since 1971 abruptly changed in 1991 as a result of recession and the Gulf Crisis. There was a decrease of 4 per cent in international RPKs in 1991. Preliminary estimates for 1992 show an increase of 13.8 per cent in international traffic for the year.

The following measures, mentioned in chapter 2, are important in an analysis of aviation data:

- revenue passenger kilometres (RPKs), which are used as a measure of demand;
- available seat kilometres (ASKs), which are used as a measure of capacity; and
- passenger load factor, which measures the demand for RPKs relative to ASKs.

Over the period 1971–1992 ASKs increased by more in *absolute* terms than RPKs, as seen in figure 3.1, which shows ASKs and RPKs performed on international scheduled services. The *rate* of increase in RPKs, however, was faster than for ASKs, so the average passenger load factor on international scheduled services increased from just over 50 per cent in 1971 to 66 per cent in 1992, as seen in figure 3.2. The increase in load factor in the early 1970s followed a decline in load factors in the 1960s due to the introduction of wide body aircraft, which increased seating and raised capacity per flight. Load

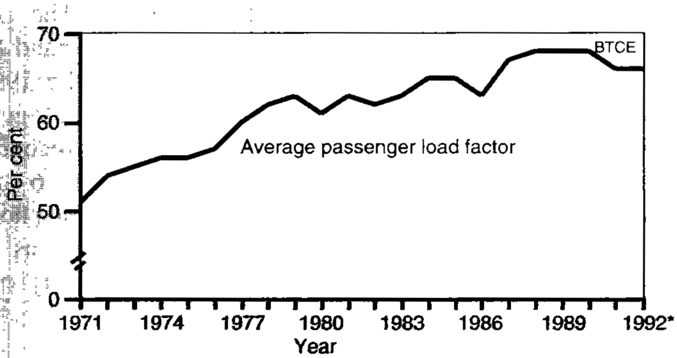
Figure 3.1 Demand (RPKs) and capacity (ASKs) on international scheduled services 1971–1992



Notes * Preliminary data. ASKs - Available seat kilometres.
RPKs - Revenue passenger kilometres.
For supporting data see appendix table II.5.

Sources ICAO 1993c and earlier issues.

Figure 3.2 Average passenger load factor on international scheduled services 1971–1992



Notes *Preliminary data.
For supporting data see appendix table II.6.

Sources ICAO 1993c and earlier issues.

factors rose in the late 1970s and 1980s partly as a result of airlines introducing yield management systems, which aim to maximise revenue (for example by increasing load factors) on any given flight.

1990–91–92 passenger traffic levels

The period 1990–91–92 marked a turbulent time for international aviation. Slower economic growth, especially in key markets like the US and Japan,

TABLE 3.1 PASSENGER TRAFFIC ON INTERNATIONAL SCHEDULED SERVICES 1990–91–92

Year	*RPKs (billion)*	*Percentage change on previous year (per cent)*	*ASKs (billion)*	*Percentage change on previous year (per cent)*	*Load factor (per cent)*	*Load factor change (percentage points)*
1990	893	+8.4	1 304	+8.4	68	0
1991	860	–3.7	1 304	0.0	66	–2
1992[a]	979	+13.8	1 482	+13.7	66	0

a. Preliminary data.

Source ICAO 1993c, p. 19.

combined with negative effects on demand caused by the Gulf Crisis, had a significant impact on airline traffic levels and profits. Nevertheless, positive growth was recorded for passenger traffic on international scheduled services during 1990, despite the world economic slowdown and the Gulf Crisis, as seen in table 3.1. Much of this growth occurred in the first half of the year before the problems in the Gulf arose.

Air traffic levels decreased in 1991 for the first time in over forty years. The lower traffic levels occurred despite deep discounting of fares by many airlines. Preliminary 1992 data show a return to growth for RPKs. The growth of capacity in 1991 resulted in surplus capacity relative to the demand for seats. Capacity grew at about the same rate as traffic in 1992, so the 1991 lower average load factor was sustained in 1992. The lower load factor, together with continued fare discounting in many markets, contributed to a second year of poor financial results for many airlines in 1992 (see chapters 6 and 7 for details). IATA (*ITA Press* 1993f, p. 3) data for international traffic show that in the first half of 1993 overall capacity grew at the same rate as demand, suggesting the industry's problems with growing surplus capacity may have been halted.

Traffic growth and economic growth

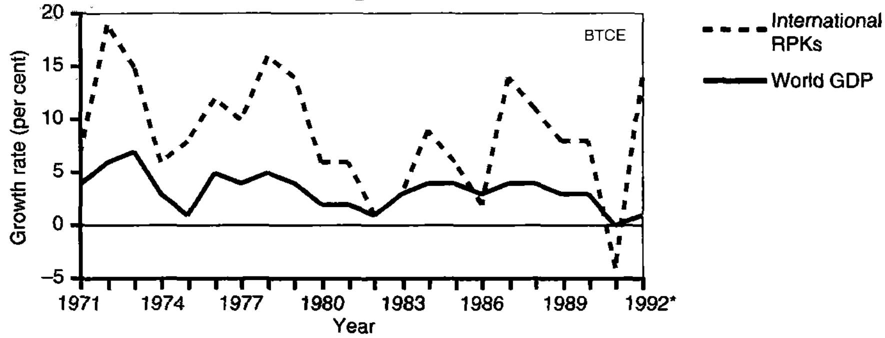
The level of activity in an aviation market is closely related to the level of economic activity in the countries that the market serves. Higher levels of economic activity will result in greater demand for aviation services, because of increased business requirements and generally higher spending by consumers. IATA (1991a, p. 13) compared prosperity in terms of gross national product (GNP) per capita per year with air transport activity in terms of RPKs per capita per year. The results show that the relatively prosperous countries of North America and Western Europe have higher levels of air transport activity compared with less developed countries. Accordingly, newly industrialised countries, especially in Asia, are expected to have high growth rates in air transport over the next decade, as economic prosperity within these countries increases.

In addition to the relationship between the overall level of economic development and air transport activity, the annual rate of growth in air traffic is closely related to the annual rate of world economic growth. Figure 3.3 compares annual growth rates for world gross domestic product (GDP) with annual growth rates for international RPKs, for the period 1971–1992. The correlation between the two series is illustrated by this figure: air passenger traffic growth rates generally expand (or contract) with increased (or reduced) rates of growth in economic activity.

There is evidence to suggest that international, and world (international plus domestic), passenger traffic exhibits a pro-cyclical relationship with economic activity. For aviation the relationship is pronounced: when the GDP growth rate increases (or decreases), the growth rate for passenger traffic increases (or decreases) at a faster rate.

Empirical evidence indicates that air traffic growth has an income elasticity of approximately two (Boeing 1993a, p. 2.4; Tretheway & Oum 1992, p. 115). This means that for a 1 per cent increase in world economic activity, traffic levels would increase by around 2 per cent. Figure 3.3 and the data in table 3.2 support this proposition. The table shows biennial changes in the growth rates of world GDP and international RPKs. Generally, the increase (or decline) in the rate of air passenger traffic growth is greater in magnitude than the corresponding increase (or decline) in the rate of growth of economic activity. Between 1980 and 1982 for example, while the world economy was in recession, the growth rate of GDP decreased by 1.5 per cent. At the same time the growth rate in international RPKs decreased by 5.3 per cent, which was

Figure 3.3 The cyclical nature of international air traffic growth: GDP and RPK growth rates 1971–1992



Notes * Preliminary data. For supporting data see appendix table II.7.

Sources ICAO 1993c and earlier issues; 1993b; IMF 1992; UN 1991 and earlier issues.

TABLE 3.2 BIENNIAL CHANGES IN GROWTH RATES OF WORLD GDP AND INTERNATIONAL RPKS 1972–1992

(Change in percentage rate of growth)

Years	*World GDP*	*International RPKs*
1972–74	–3.1	–13.1
1974–76	2.7	5.9
1976–78	–0.7	4.1
1978–80	–2.3	–10.1
1980–82	–1.5	–5.3
1982–84	3.7	8.0
1984–86	–1.4	–6.4
1986–88	1.4	8.4
1988–90	–1.9	–2.2
1990–92	–1.4	5.5

Sources ICAO 1993c and earlier issues; 1993b, p. 1; IMF 1992, p. 93; UN 1991 and earlier issues.

more than double the change for world GDP. Following the recession the world GDP growth rate increased by 3.7 per cent between 1982 and 1984. At the same time the international RPK growth rate increased by 8.0 per cent, an increase which was just over double the increase in the rate of growth for world GDP.

There is evidence to suggest that aviation activity has a close relationship with economic activity, both aggregated for the world, and disaggregated by region and individual country. Empirical evidence for selected countries in the Asia Pacific region indicates elasticities of air passenger travel with respect to home country GDP of approximately two (Mitchell 1993, p. 1055). Given positive forecasts for GDP in the future the implication of the relationship between GDP and RPKs is that positive traffic growth is likely to continue as a trend, but it will occur in cycles within the industry with marked peaks and troughs.

A significant trend in international RPKs over the period 1971–1992 was a decline in the average rate of growth during periods when the world economy was expanding and contracting. For example, during the buoyant second half of the 1960s and before the effects of the 1973 oil crisis were felt, annual traffic growth averaged 14.6 per cent. During the next two periods of buoyant growth, 1975–1979 and 1983–1990, there was average annual growth of 13.0 per cent and 8.3 per cent, respectively, revealing over time a decline in average traffic growth rates during high growth phases. The average rate of growth during world economic recessions has also fallen. For example, during the low growth period 1973–1975, resulting from the first oil crisis in 1973, there was average annual growth of 7.0 per cent per year. During the recession 1980–1983, there was average annual traffic growth of 3.1 per cent, and in 1991 traffic decreased by 3.7 per cent. Traffic growth rebounded quite strongly in 1992. This strong traffic growth can be attributed in part to the upturn in world GDP growth, but also to significant fare discounting on some major routes.

This decline in aviation traffic growth rates is evident in the peaks and troughs of the international RPK growth rate. Figure 3.3 shows that overall the peaks in the rate of international RPK growth have diminished and the troughs have deepened. This indicates that the rate of growth of international passenger traffic has, on average, declined since 1971. What is uncertain is whether growth will return to previous cyclical high and low levels, or whether the height of peaks will continue to decline and the depth of troughs will continue to deepen. An additional uncertainty is what the time frame will be for growth to move from trough to peak.

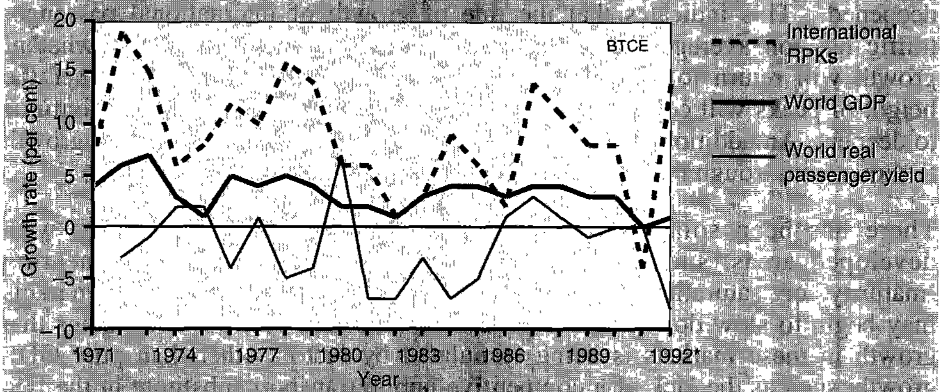
There has been some discussion that aviation markets associated with developed areas, such as the US and Western Europe, may be nearing 'maturity' or 'saturation' and that the rate of traffic growth in these markets may begin to slow down. Airbus Industrie (1993, p. 11), however, notes that growth in these markets is being stimulated by factors other than pure GDP growth, such as the lack of a competitive public transport substitute in the US. Boeing (1993a, p. 2.3) believes that, while there is evidence that some markets are approaching maturity, growth rates in aviation will remain higher than GDP growth rates.

Economic activity is not the only factor that influences aggregate passenger traffic: air fares are another important determinant of air passenger traffic. Airline passenger yield is used as proxy for actual air fares, which are difficult to obtain given the wide use of a variety of, and fluctuating number of, discount fares. Airline passenger yield is defined as revenue per passenger kilometre, and indicates the price per kilometre of air travel to the consumer. In the absence of changes in other factors falling yields, which indicate a lower price of air travel per kilometre, will tend to increase traffic. Conversely, rising yields will tend to reduce traffic levels, subject to demand elasticities.

In real terms, industry yields have been declining, on average, since 1960. Real world airline passenger yields declined on average by 1.3 per cent per year over the period 1971–1981 and by 1.8 per cent per year for the period 1981–1991. There was a significant drop in airline yield growth in both nominal and real terms in 1992, due to vigorous fare discounting by airlines. The movement in airline yields has generally reflected trends in operating costs. Real unit operating costs have fallen, on average, since 1960 due to technological advances, longer average trip lengths, greater competition, and economies of traffic density (see chapter 2 for details). The fall in real operating costs allowed airlines to charge lower real fares to customers, with a consequent decline in yields.

Figure 3.4 shows the relationship between annual growth rates for world GDP, international RPKs, and real airline passenger yield for the period 1971–1992. Over the period 1972–1986 changes in the rate of growth for airline yield ran largely counter to changes in the rate of growth in international RPKs. When real airline yield growth rates increased, traffic growth rates tended to decrease and vice versa. Over the period 1986–1991, airline yield growth rates moved in

Figure 3.4 The effect of changes in real passenger yield on international air traffic growth 1971–1992



Notes *Preliminary data. Yield data was not available in 1971 and excludes states of the former USSR. For supporting data see appendix table II.7.

Sources ICAO 1993c and earlier issues; 1993b; IMF 1992; UN 1991 and earlier issues.

phase with passenger traffic growth rates. This would tend to indicate that GDP growth rates and other factors had a greater effect on international RPK growth rates than airline yield during the period 1986–1991. It appears the significant decrease in yield in 1992 had a strong impact on traffic growth in addition to the impact of the increase in world GDP growth.

Factors other than fluctuations in the rate of economic growth and changes in the rate of growth in airline yields, may be important in influencing traffic growth rates. These factors include determinants of change in the tourism market and the economic effects of unforeseen events, such as the oil price rises in 1973 and 1979 (see chapter 4 for details of the relationship between tourism and aviation traffic growth).

Some major exogenous events that affected the rate of growth in international RPKs, over the period 1971–1992, include:

- 1973–1974: First oil price shock, which resulted in a rise in the cost of fuel. The higher cost of oil raised input costs for many other industries and, together with anti-inflationary policy measures employed by the major industrialised nations, led to a worldwide recession during the period 1974–1975. Figure 3.4 shows that the international RPK growth rate declined in 1973 and 1974, ahead of the recession. The RPK growth rate picked up again in 1975, ahead of the general economic recovery. Air fares increased appreciably due to the rise in the cost of fuel; however, relative to general price levels the price of air travel did not change significantly. Both the decrease in the rate of GDP growth and the increase in real airline yields contributed to the sharp decline in the rate of growth of international RPKs following the oil price rise.

- 1978–1979: Second oil price shock led to increased operating (fuel) costs for airlines and contributed to the downturn in world economic growth rates during the period 1979–1982. International RPK growth rates declined considerably during this period in response to these two factors.
- 1986: Chernobyl nuclear disaster and terrorist events as well as the slight downturn in world economic growth rates in 1985 and 1986 led to the reduction in air traffic growth rates. Real airline yields increased in 1986, indicating an increase in the relative price of air travel for the consumer. The slight fall in the rate of economic growth combined with the increase in real yields and the other events caused the decline in the international RPK growth rate.
- 1990–1992: World recession led to a fall in world GDP growth rates, which contributed to lower rates of international RPK growth during this period. The recession plus the exogenous influence of the Gulf Crisis led to a decrease in international RPKs in 1991. Yields were subsequently reduced by airlines, in part in an attempt to increase patronage and maintain cashflow.

The pro-cyclical nature exhibited by international RPKs meant that in the past, between a trough and peak in the world economic growth rate, the growth rate of international RPKs generally grew faster than the growth rate for GDP. Accordingly, in the 1990s it is expected that the growth rate for world (international plus domestic) RPKs will rebound more strongly than the growth rate for world GDP after the recession. ICAO estimate that GDP grew by just over 1 per cent in 1992, and forecasts accelerating GDP growth to 1995 (*ICAO Journal* 1993, p. 27). Most analysts are cautious about predicting the outcome for the aviation industry in the mid 1990s. Pierre Jeanniot, president of IATA, noted that further financial losses were expected for airlines in 1993 (*ITA Press* 1993f, p. 3). He also believes that airlines could break even in 1994 but will not earn significant profits until 1995 or 1996. The strength of growth rates in traffic remains tied to world GDP; consequently if world economic growth rates remain low then traffic growth rates are likely to remain low.

There is considerable scope for GDP growth rates to prove fragile should major unrest develop on the world arena. The decline in the tension between the major powers of the cold war era reasonably could be expected to generate greater prosperity for industries such as the airline industry. On the other hand, newly won independence in many of the emerging countries has led to increased regional tensions, with negative effects on airline traffic specifically, and world trade and prosperity in general. If tension and upheaval are the hallmark of the future then international aviation traffic growth will be disrupted and constrained. In such a scenario destinations that are located away from the major world trouble spots, such as Australia, may gain traffic diverted from trouble spots elsewhere.

Regional passenger traffic

Although long term growth has been the overall trend, growth rates in world air traffic have varied significantly between regions and individual countries. This variation has been influenced by a number of factors including the level of personal income in the markets served, the level of economic activity in the markets served, the price of air travel, the level of trade between countries, ethnic ties between countries, and tourism promotion.

ICAO divides the world into six statistical regions: Africa; Asia Pacific; Europe; Middle East; North America; and Latin America and the Caribbean (a map of the statistical regions is displayed in appendix III). The unevenness in economic development in these different regions has meant that the majority of world aviation activity is concentrated in regions and on routes which involve the more developed countries. For example, US airlines accounted for 39 per cent of world (international plus domestic) RPKs in 1992.

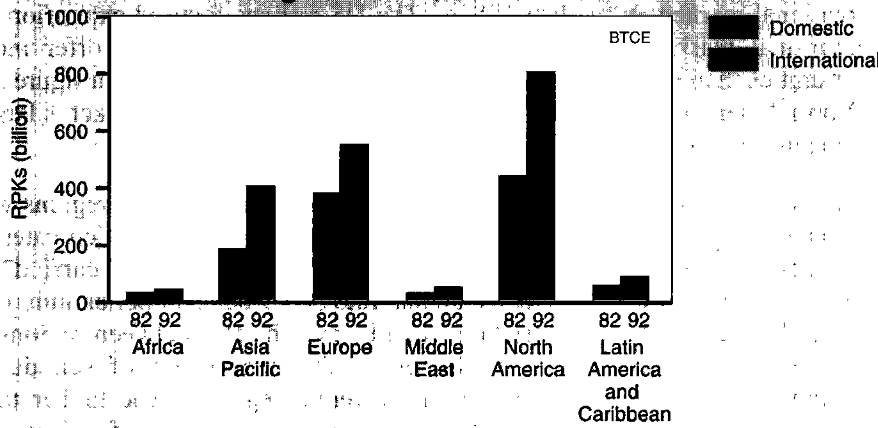
The concentration of aviation activity means that changes in travel patterns within the high activity markets can have significant effects on the entire industry. For example Doganis (1991, p. 20) suggests that the low growth rate for international RPKs during 1986 was due largely to the fall in US traffic to Europe during that year. The drop in US traffic was the result of the Chernobyl nuclear disaster, the US bombing of Libya, and an increase in terrorist activities in Europe and the Middle East. The Asia Pacific is expected to emerge as a new market concentration and have an increasing influence on the world aviation scene in the future.

Aggregate scheduled international air passenger traffic increased in all regions in the 1980s, as illustrated in figure 3.5. The figure compares scheduled world (international plus domestic) RPKs performed by airlines in the six ICAO statistical regions in 1982 and 1992.[2] The figure also shows the break up between international and domestic RPKs for the airlines of each region.

Over the period 1982–1992 the rate of growth in international RPKs was strongest for airlines registered in the North America and Asia Pacific regions. During this period international RPKs flown by airlines registered in North America grew at an average annual rate of 9.3 per cent, and traffic on Asia Pacific airlines grew at an average annual rate of 7.8 per cent. These data compare with a worldwide average annual growth rate of 7.0 per cent recorded

2. RPKs recorded for an ICAO region are aggregated from the number of RPKs flown by the airlines registered in that ICAO region. RPKs performed by the airlines registered in each ICAO region are not therefore a direct measure of RPKs flown in each region. However, given the generally restrictive nature of bilateral air service agreements in relation to fifth freedom and additional rights, and the fact that a high proportion of a carrier's traffic will be travellers from the carrier's home country, RPKs by region of airline registration are considered a good estimate of RPKs actually flown in a region.

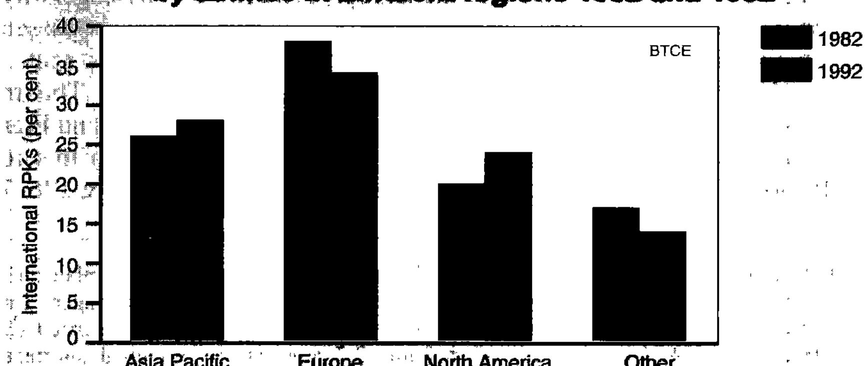
Figure 3.5 Comparison of scheduled world RPKs by region of airline registration 1982 and 1992



Notes See footnote 2 for notes associated with this figure.
For supporting data see appendix table II.8.

Sources ICAO 1993c; 1984c.

Figure 3.6 Proportion of scheduled international RPKs carried by airlines in different regions 1982 and 1992



Note For supporting data see appendix table II.9.

Sources ICAO 1993c; 1984c.

for passenger traffic on all international scheduled services for the same period. The growth rate for traffic carried by airlines registered in North America was particularly strong due to the aggressive expansion of US airlines into international markets in the late 1980s. The US airlines focused expansion on international markets because these markets are considered to offer more opportunities than the more mature US domestic market. As seen in figure 3.5 the North America region is the only one in which the domestic market is larger than the international market.

The growth rate for airlines of the North America and Asia Pacific regions was significantly higher than the growth rate for European airlines, which cater to the largest market for international RPKs. Passenger traffic carried by European airlines grew at an average annual rate of 5.9 per cent per annum over the period 1982–1992. The variation in RPK growth rates between regions is illustrated in figure 3.6 by the change in the proportion of scheduled international RPKs carried by airlines in different regions. The higher than average growth in traffic carried by North American and Asia Pacific airlines is reflected in the increase in the proportion of total international RPKs carried by airlines from these two regions.

Interregional traffic patterns

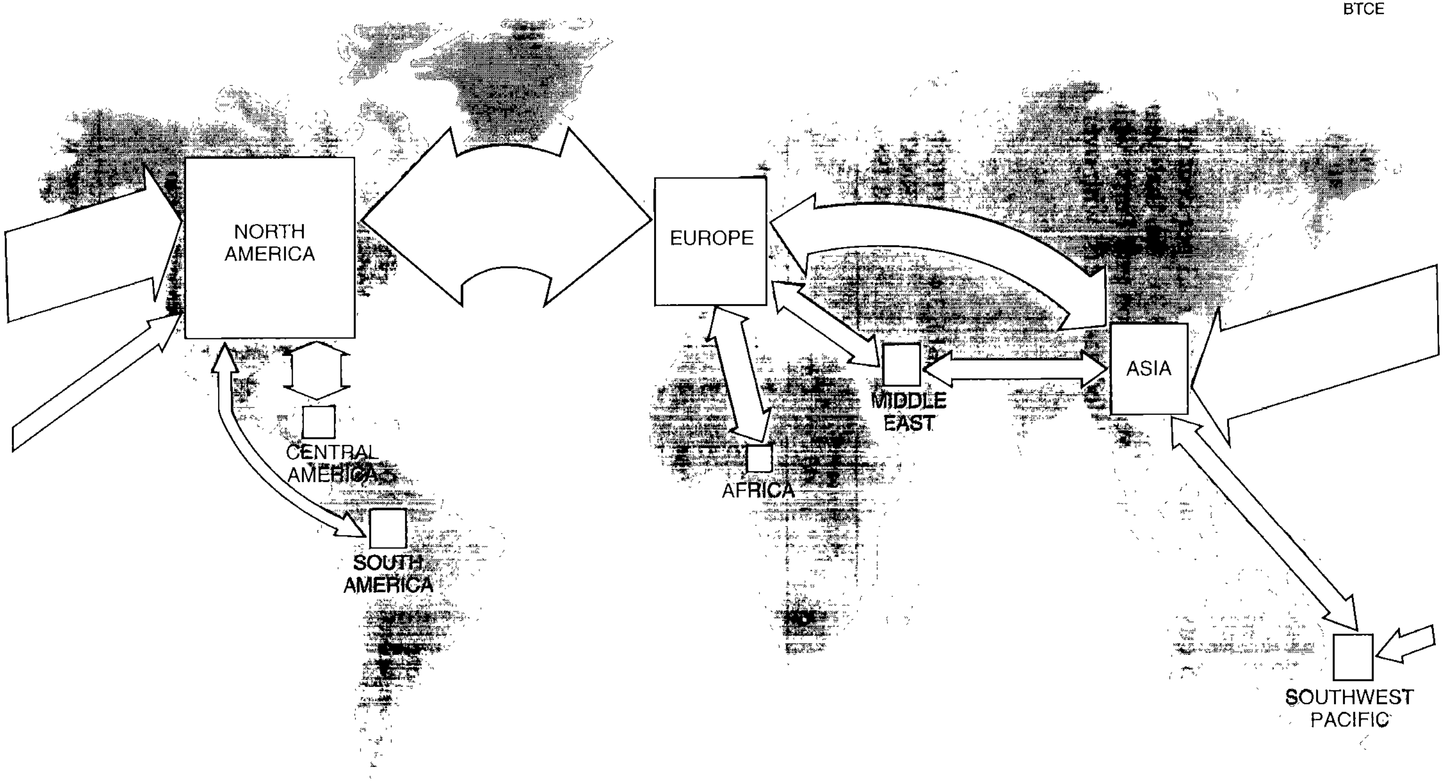
The map at figure 3.7 shows the top ten interregional routes in 1992 in terms of passenger numbers, and highlights the importance to international traffic of the North Atlantic route.[3] This again illustrates the link between high levels of income and large volumes of passenger traffic, since this route draws passengers from the two most developed regions of the world. The route between North America and Europe is relatively short and dense and in 1992 accounted for 12 per cent of total international passengers carried (IATA 1993b, pp. 14 & 18).

Figure 3.7 also illustrates other significant interregional passenger flows including the trans-Pacific route and the Europe–Asia route. Passengers flying between North East Asia and North America account for the largest passenger flow on the trans-Pacific route. Important traffic flows on this route are between North America and Japan, Korea, and Hong Kong. The main European countries on the Europe–Asia route are the UK, Germany and France. The Asian countries with the highest proportion of passengers on this route include Japan, Thailand and India (IATA 1992b, pp. 71, 79, 82, 113 & 126–7).

3. IATA data represent only the traffic of IATA member airlines. IATA member airlines, however, accounted for 95 per cent of all scheduled international passengers carried worldwide in 1992 and 76 per cent of scheduled domestic passengers carried (IATA 1993b, pp. 6, 9 & 15). The arrows in figure 3.7 represent international interregional traffic flows and the squares represent world (international plus domestic) regional traffic. The IATA data used are considered representative of total traffic for both international and world (international plus domestic) traffic.

Figure 3.7 Top ten interregional passenger routes in 1992

BTCE



Notes Passenger numbers exclude traffic of Aeroflot. See footnote 3 for further notes associated with this figure. For supporting data see appendix table II.10.

Source IATA 1993b.

Although not shown in the map at figure 3.7, international passengers travelling within Asia accounted for 37 per cent of total movements for the region in 1992, with 25 million passengers (IATA 1993a, p. 18). The major intra Asian passenger flows are within North East Asia, particularly involving passengers flying between Japan and: Korea, Hong Kong, and Taiwan (IATA 1992b, p. 14).

City pairs

In 1991 the top 25 city pair routes accounted for 13 per cent of passengers on all scheduled international flights (see table 3.3). In that year the highest travelled international route was between London and Paris, which accounted for 1 per cent of all international scheduled passengers, with over three million passengers carried between the two cities.

TABLE 3.3 TRAFFIC BETWEEN INTERNATIONAL CITY PAIRS 1991

City pairs		*Passengers[a] ('000)*
1	London–Paris	3 125
2	London–New York	2 215
3	Hong Kong–Taipei	2 075
4	Kuala Lumpur–Singapore	2 034
5	Hong Kong–Tokyo	1 922
6	Honolulu–Tokyo	1 902
7	Jakarta–Singapore	1 757
8	Dublin–London	1 725
9	Bangkok–Hong Kong	1 715
10	Amsterdam– London	1 607
11	Seoul–Tokyo	1 319
12	New York–Paris	1 237
13	Frankfurt–London	1 143
14	Bangkok–Singapore	1 058
15	Hong Kong–Singapore	1 006
16	Los Angeles–Tokyo	998
17	Taipei–Tokyo	991
18	Singapore–Tokyo	944
19	Hong Kong–Manila	938
20	London–Zurich	903
21	Frankfurt–New York	881
22	New York–Toronto	880
23	Bangkok–Tokyo	842
24	Chicago–Toronto	818
25	London–Los Angeles	795

a. Based on the points where a passenger embarks and disembarks the flights.

Source ICAO 1993c, p. 22.

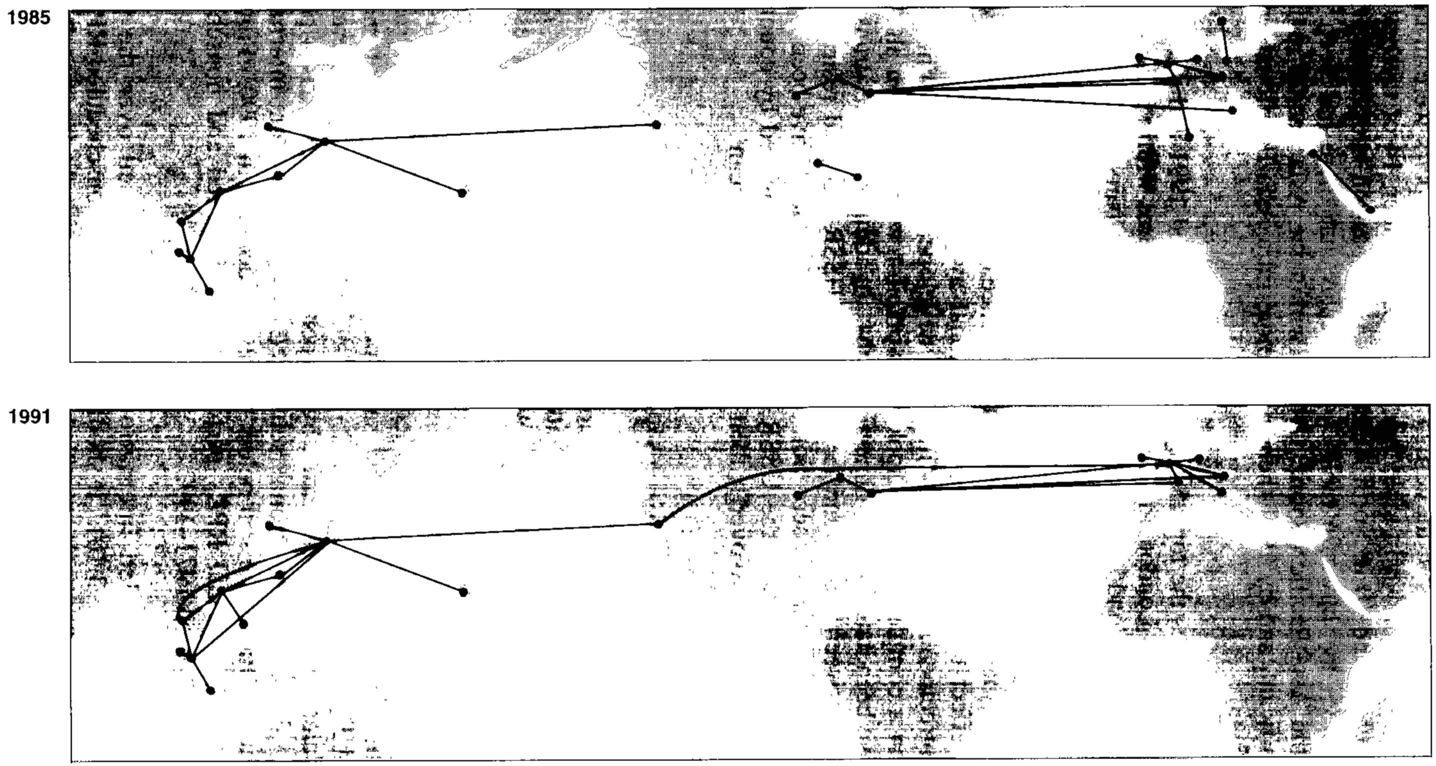
TABLE 3.4 TRAFFIC BETWEEN INTERNATIONAL CITY PAIRS 1985

City pairs		*Passengers[a] ('000)*
1	London–New York	2 334
2	London–Paris	2 310
3	Kuala Lumpur–Singapore	1 365
4	Hong Kong–Tokyo	1 306
5	Amsterdam–London	1 187
6	Hong Kong–Taipei	1 170
7	Honolulu–Tokyo	1 054
8	Taipei–Tokyo	1 021
9	Bangkok–Hong Kong	947
10	Seoul–Tokyo	943
11	Dublin–London	906
12	New York–Paris	893
13	Frankfurt–London	868
14	Jakarta–Singapore	845
15	Algiers–Paris	828
16	New York–Toronto	826
17	Hong Kong–Singapore	802
18	New York–Rome	777
19	Bangkok–Singapore	757
20	Frankfurt–New York	751
21	Los Angeles–Tokyo	738
22	Cairo–Jeddah	693
23	Copenhagen–Oslo	671
24	Miami–Nassau	668
25	Chicago–Toronto	667

a. Based on the points where a passenger embarks and disembarks the flights.

Source ICAO 1987b, p. 22.

Figure 3.8 Comparison of top 25 city pairs 1985 and 1991



Note The data used for this figure are presented in table 3.3 and table 3.4.

Sources ICAO 1993c; 1987b.

In 1991, 26 city points in the top 25 international city pairs were in the Asia Pacific region, as shown in table 3.3. Of the remainder, 14 of the city points were in Europe and 10 in North America. A comparison with the top 25 city pairs in 1985, as shown in table 3.4, indicates that there has been a shift towards the Asia Pacific region. Growth within the Asia Pacific region has been significant, and by 1991 there were more intra Asia Pacific city pairs in the top 25.

Figure 3.8 compares the top 25 city pairs in 1985 and 1991 and illustrates the importance of both London and Tokyo as traffic centres within their respective regions. In 1991 London features in the top 25 city pairs 7 times and Tokyo features 7 times. What is of interest is that while these are key hubs, in terms of the top 25 international city pairs, a direct link between the two hubs, London–Tokyo, is not one of the top city pairs. The predominance of London and Tokyo in the top 25 city pairs and the absence of London–Tokyo reflects, in part, the effect of regulation on international aviation. Under bilateral air service agreements airlines traditionally developed point-to-point services rather than a complex hub and spoke network, for which London and Tokyo would have been natural interconnecting hubs. In addition airlines transporting passengers between Tokyo and London faced USSR imposed restrictions on airlines flying over its airspace. Some of these restrictions have been removed since the disintegration of the USSR; however, fees imposed by countries in this region for the right to overfly their territory are significant.

NONSCHEDULED PASSENGER TRAFFIC

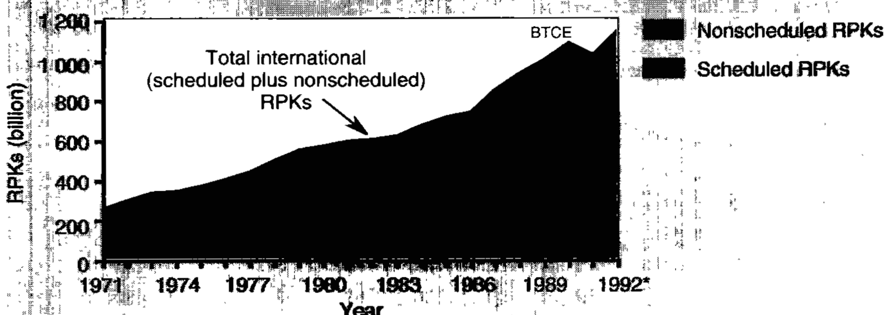
World (international plus domestic) nonscheduled (or charter) passenger traffic is carried predominantly on international routes. In 1992, 90 per cent of estimated world nonscheduled RPKs were carried on international routes.[4]

Nonscheduled RPKs are only a small proportion of total international traffic. In 1992 estimated nonscheduled international traffic made up around 14.7 per cent of total (scheduled plus nonscheduled) international RPKs. International nonscheduled RPKs followed the same pattern of growth as international scheduled RPKs in 1991 and 1992. In 1992 the demand for international nonscheduled air services increased by 2.5 per cent after a fall of 14.4 per cent in 1991. Unlike international scheduled RPKs, however, international nonscheduled RPKs were still below the levels recorded in 1990. Figure 3.9 shows total international RPKs performed on scheduled and nonscheduled services for the period 1971–1992.

Estimated nonscheduled international RPKs increased over the period 1971–1992 (see figure 3.10). It should be noted that nonscheduled RPKs are performed by scheduled and nonscheduled airlines, hence the break up between

4. Due to deficiencies in reporting by some nonscheduled air carriers ICAO has estimated the total level of traffic carried on nonscheduled services on the basis of available data.

Figure 3.9 Total international RPKs performed on scheduled and nonscheduled services 1971–1992



Notes * Preliminary data.
See footnote 4 for further notes associated with this figure.
For supporting data see appendix table II.11.

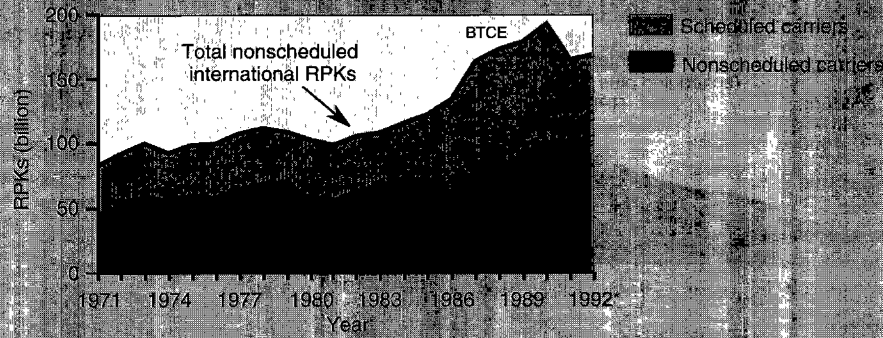
Sources ICAO 1993c and earlier issues; 1993b and earlier issues.

the two types of carriers in figures 3.10 and 3.11. Growth in nonscheduled international RPKs was more volatile than growth in scheduled international RPKs over the period 1971–1992.

The reduction in demand for nonscheduled international services during 1974, the period 1979–1981, and 1991 (shown in figure 3.10) indicates that growth in nonscheduled passenger traffic is cyclical. Growth in nonscheduled traffic responds both to changes in GDP and other exogenous factors. Growth of nonscheduled traffic moves in phase with changes in the rate of growth in scheduled passenger traffic, as both of these measures repond to changes in GDP growth (see comments on traffic growth and economic development earlier in this chapter). Nonscheduled traffic differs from scheduled traffic, however, in that changes in the rate of growth of nonscheduled traffic are of a greater magnitude than for scheduled traffic. For example, during the world recessions in 1974 and 1979–1981 scheduled international RPKs increased but at a slower rate than previously, whereas the level of nonscheduled international RPKs decreased. Scheduled international RPKs decreased in 1991 but the percentage decrease in demand for nonscheduled RPKs was larger.

The decrease in demand for nonscheduled traffic during recessions may be due to the type of traffic carried on nonscheduled services. Most of the passengers on nonscheduled services are holiday makers or people on inclusive holiday tours. During recessions a reduction in disposable income leads to a decline in discretionary expenditure on air travel. Most of the passengers on nonscheduled flights are discretionary travellers, and therefore are more sensitive to reductions in disposable income due to the slow down in economic activity than business travellers, who are more likely to fly on scheduled services with less price sensitivity.

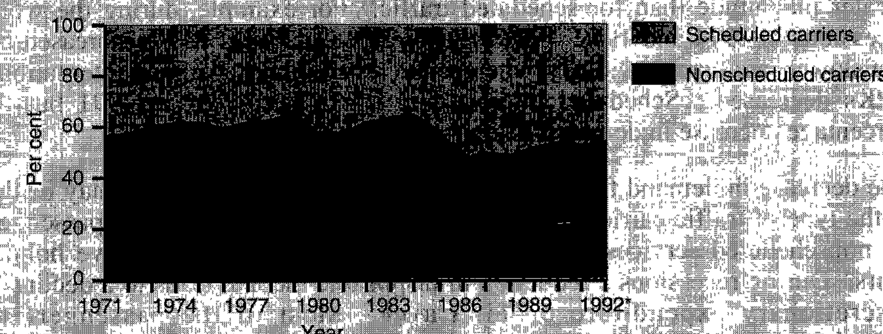
Figure 3.10 Estimated nonscheduled international RPKs 1971–1992



Notes * Preliminary data.
See footnote 4 for further notes associated with this figure.
For supporting data see appendix table II.12.

Sources ICAO 1993b and earlier issues.

Figure 3.11 Estimated nonscheduled international RPKs: the proportion carried on scheduled and nonscheduled carriers 1971–1992



Notes * Preliminary data.
See footnote 4 for further notes associated with this figure.
For supporting data see appendix table II.12.

Sources ICAO 1993b and earlier issues.

Figure 3.11 shows the proportion of nonscheduled international RPKs carried on scheduled and nonscheduled carriers during the period 1971–1992. Throughout the 1970s and for the first half of the 1980s nonscheduled carriers performed around 60 per cent of international nonscheduled RPKs. In 1985 a number of nonscheduled carriers were reclassified as scheduled airlines. Consequently, the share of nonscheduled RPKs carried by nonscheduled carriers dropped to around half of all international nonscheduled RPKs. The share of nonscheduled RPKs carried by nonscheduled carriers increased slightly in the early 1990s, to reach 54 per cent of international nonscheduled RPKs in 1992. The increase in the proportion of nonscheduled RPKs carried by nonscheduled carriers in the early 1990s may reflect the scheduled airlines' move towards trimming back their operations to 'core' business as a result of poor financial results during the turbulent period 1990–91–92.

The distinction between scheduled and nonscheduled traffic has become increasingly blurred in recent years, and some countries (such as European Community member countries) are moving to abolish different treatment of scheduled and nonscheduled traffic.

Data for a break up of international nonscheduled RPKs by regions are not readily available; however, data on tonne kilometres performed (TKP) are available and are used here as a proxy for RPKs to give an indication of the variation in nonscheduled operations in world regions and total trends over the period.[5] Figure 3.12 compares nonscheduled international TKP performed by airlines in different regions over the period 1971–1992. In 1992 European airlines accounted for 79 per cent of TKP on international nonscheduled services, North American airlines accounted for 13 per cent and the other regions only 8 per cent. Nonscheduled traffic is particularly significant within Europe, where it accounts for around 60 per cent of intra European RPKs (ICAO 1992d, p. 10). Figure 3.12 illustrates that Europe has been the only region in which significant growth in nonscheduled operations has occurred in the last two decades.

One of the major reasons for the differences in nonscheduled operations between world regions is the attitudes of the countries involved and the different policies implemented to deal with nonscheduled flights. In North America and on the North Atlantic route, increased price liberalisation for scheduled services has reduced the competitive edge of nonscheduled services and many nonscheduled carriers have either gone out of business or been absorbed into the larger scheduled carriers. This was especially evident on the North Atlantic route, where nonscheduled services have declined from carrying 30 per cent of the total number of passengers on the route in the 1960s to 10 per cent of the total number of passengers in the early 1990s (ICAO 1992d, p. 10).

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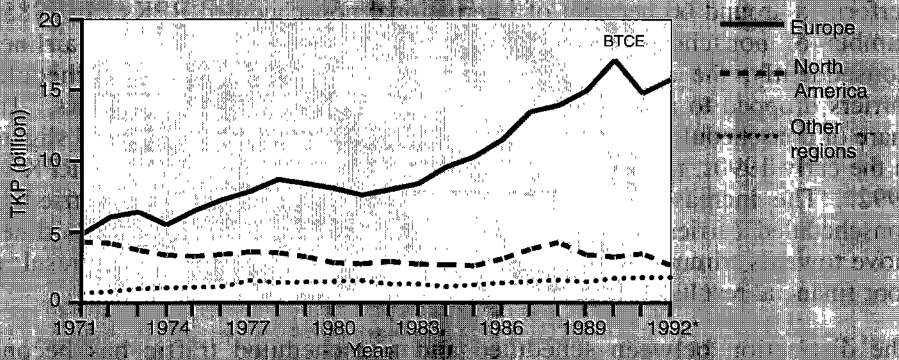
5. The use of TKP as a proxy for RPKs can be argued on the basis that the ratio of total international nonscheduled TKP to total international nonscheduled RPKs was fairly constant over the period 1971–1992, so the ratio for the break up between regions has been assumed to be relatively consistent as well.

Figure 3.12 Comparison of nonscheduled international TKP by airlines in different regions 1971–1992



Notes * Preliminary data.
For supporting data see appendix table II.13.

Sources ICAO 1993c and earlier issues.

The price liberalisation on scheduled services that occurred in the US did not happen within Europe. Nonscheduled services, however, were not normally included in intra European air service agreements and so there were few regulations hindering entry, capacity and pricing (Nuutinen 1989b, p. 13). Rapid growth of nonscheduled operations in Europe occurred in the 1970s and 1980s as a result of many European countries actively encouraging nonscheduled operations because of their high tourist content.

In the mid 1980s consumer preferences in the European leisure market moved towards a higher quality of service with more flexible timetabling. Nuutinen (1989b, p. 12) notes that this was due to an increase in independent leisure travel (as opposed to travelling on a package tour) and growth in property and time-share ownership in the Mediterranean by Europeans from non Mediterranean areas. As a result many European nonscheduled carriers began to incorporate scheduled services in their operations (hence the reclassification of some carriers from nonscheduled to scheduled in 1985).

There is uncertainty surrounding the future of nonscheduled operations in Europe following the creation of a single aviation market in 1993. Guillermo Serrano (*Airline Business* 1993b, p. 38) of Viva believes that nonscheduled carriers may lose a third of their traffic to scheduled carriers in the 1990s, but opinion is divided as to the future of nonscheduled operations in the market. The low costs of the nonscheduled operations and links with tour operators may give nonscheduled carriers such an advantage that they will retain their strong position in the market. Alternatively, some believe that the distinction between scheduled and nonscheduled airlines will disappear due to liberalisation. For example, under the new arrangements nonscheduled carriers may list series of nonscheduled flights on CRSs, where previously nonscheduled services were not displayed on CRSs.

Pryke (1987, p. 11) notes that most third world countries and Middle East nations have tight restrictions regarding nonscheduled operations in order to protect their infant aviation industries.

Nonscheduled services are often used in many countries to test certain markets prior to the introduction of scheduled services.

CARGO

ICAO defines air cargo as any property carried on an aircraft that is not mail, baggage or stores (ICAO 1985b, p. 24). ICAO uses the terms cargo and freight interchangeably, and freight includes express and diplomatic bags (ICAO 1991b, p. D–2). Boeing (1992b, p. 6), on the other hand, defines air cargo as freight plus mail. To avoid confusion, ICAO's definition of cargo is used and freight tonne kilometres (FTKs) is used as the measure of demand for freight operations in this Report. There is a short discussion on scheduled air mail later in this section.

International air cargo consists of two types of operations: scheduled freight and nonscheduled freight. In 1992 international scheduled freight accounted for 89 per cent of FTKs performed on total (scheduled plus nonscheduled) international services. Scheduled FTKs make up such a large proportion of total FTKs that the rest of this section focuses on FTKs performed on international scheduled services only.

In the last twenty years air freight traffic has followed the trend in passenger traffic: international freight traffic has grown faster than domestic freight traffic. International scheduled freight has increased its share of world (international plus domestic) scheduled FTKs from 54 per cent in 1971 to 80 per cent 1992, and with international traffic forecast to grow faster than domestic traffic this proportion will continue to increase into the next century.

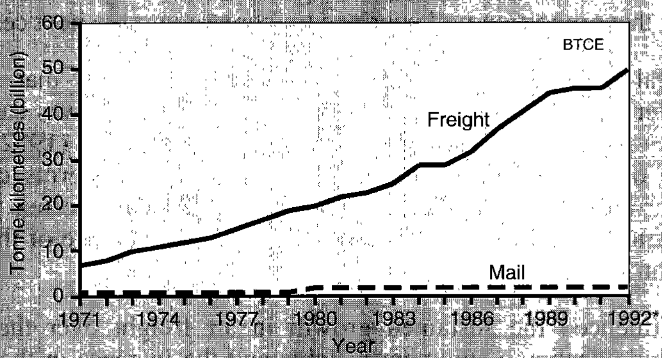
The International Labour Organisation (ILO 1990, p. 3) notes that in 1989 about one-quarter of the world's manufactured goods, in value, was carried by air, and believes that the proportion is steadily rising. Scherk (1992, p. 16) agrees aviation operations are playing an increasing role in terms of cargo distribution over all transportation modes. He found that in the ten years to 1992, cargo traffic carried on air services doubled as a percentage of the entire cargo distribution task.

Factors that influenced the sustained growth in air freight over the period 1971–1990 include declining shipment weights and the increase in the cost of maintaining inventory due to constantly rising product values. Freight traffic was affected by worldwide recession and the Gulf Crisis in a similar manner to passenger traffic during the turbulent period 1990–91–92. Figure 3.13 compares the level of international freight and mail tonne kilometres over the period 1971–1992. The level of mail tonne kilometres performed approximately doubled between 1971 and 1992. However, compared with the strong growth trend in international FTKs the level of mail tonne kilometres performed has remained a relatively small proportion of the freight and mail distribution task. Mail tonne kilometres represented a mere 4.3 per cent of the combined international freight and mail task in 1992.

The requirements and yields for freight customers vary in a similar fashion to passengers carried by airlines. For some freight customers convenience and timing of flights is more important than price: this market segment is known as the express (or courier) market. The other market segment is composed of those freight customers who want to transport their goods by air but for whom price is a more important consideration than timing. The segmentation of these two markets is reflected in the significant difference in yields in the two markets. The growth of FTKs in these two markets differs just as the growth between business and leisure travellers differs. Wilhelm Althen (*Flight International* 1993a, p. 22), vice-president of Lufthansa Cargo, noted that much of the growth in world FTKs is coming from the small but highly lucrative express-parcels market, which is growing at 10 per cent per year.

McDonnell Douglas estimate that air cargo produces an average of 13.5 per cent of airline operating revenue (McDonnell Douglas 1992, p. 47). Airbus Industrie (1993, p. 87) suggest that an airline that focused on freight in addition to passengers as a source of revenue could gain twenty to thirty per cent of its overall turnover from this source. Woetzel and Chu (1992, pp. 93–5) suggest that cargo can contribute significantly to airline profits, but that many airlines

Figure 3.13 Comparison of international freight and mail tonne kilometres 1971–1992



Notes * Preliminary data. For supporting data see appendix table II.14.

Sources ICAO 1993c and earlier issues.

are failing to maximise revenue and minimise costs from their air cargo business. The future direction which air cargo transport takes may be influenced by the ability of passenger airlines to maximise the profitability of their cargo business.

The majority of international freight is carried in aircraft performing scheduled passenger services. In 1992 around 63 per cent of all international scheduled air freight was carried in the freight holds of passenger aircraft and combis. An American Airlines' survey showed that 95 per cent of all air cargo could be carried in the lower holds of wide body passenger aircraft. This multipurpose use of aircraft has some attraction to passenger airlines as it allows them to exploit their unused capacity. This may have an impact on the use of dedicated freighter aircraft. Lyon (1992b, pp. 44–7) noted that passenger aircraft typically operate with load factors of around 22 per cent of freight capacity. Figure 3.14 illustrates the level of international scheduled FTKs performed on dedicated freight services and passenger services for the period 1975–1992.

During the first half of the 1980s growth in FTKs was stronger on passenger services. In the late 1980s FTKs carried on dedicated services grew more rapidly than on passenger services. Since 1990 there has been variable growth on both types of services. In 1992 the world's top ten freight carriers (measured in international plus domestic FTKs) were (*Air Transport World* 1993c, p. 56):

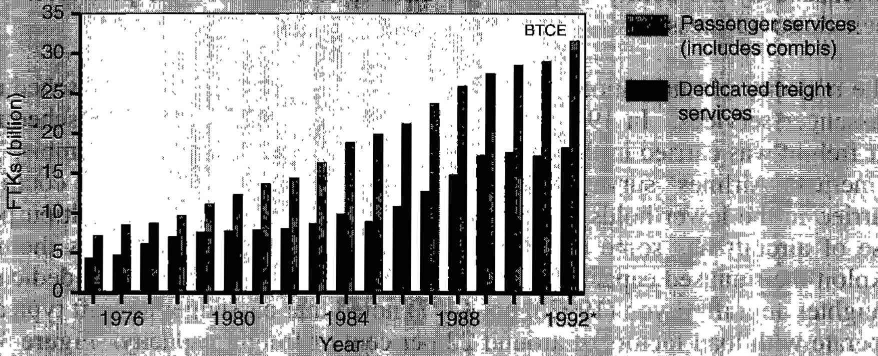
1 Federal Express
2 Lufthansa
3 Air France/Air Inter/UTA
4 Japan Airlines (JAL)
5 United Parcel Service (UPS)
6 Korean Air
7 Northwest
8 British Airways
9 KLM
10 Aeroflot

Only two of the ten, Federal Express and UPS, are dedicated freight carriers, and Federal Express was number 1 in 1989, 1990 and 1991. For comparison, in terms of total operating revenue, *Air Transport World* in its World Airline Report placed Federal Express at number 6 in 1991 and number 7 in 1992, while in 1992, UPS was placed at number 33 (*Air Transport World* 1993c, pp. 56 & 62–6; *Air Transport World* 1992a, p. 70; *Air Transport World* 1991, p. 104; Endres 1990, p. 973).

1990–91–92 cargo traffic levels

As with passenger transport, the worldwide economic recession was a major cause of the poor results experienced in the freight industry during the turbulent period 1990–91–92. As seen in table 3.5 there was positive growth in cargo traffic on international scheduled services in 1990, but at 3 per cent it compared

Figure 3.14 FTKs performed on international scheduled services 1975–1992



Notes * Preliminary data. Dedicated freight services exclude operations in states of the former USSR.
For supporting data see appendix table II.15.

Sources ICAO 1993c and earlier issues.

poorly with the average annual growth rate of cargo traffic of 8.6 per cent over the period 1980–1990. The Gulf Crisis had an ambiguous effect, with the decline in trade in the region offset, in part, by the increase in air freight in support of the military build-up in Saudi Arabia. Following the Gulf Crisis in 1991, Valencia (1991, p. 42) suggested that cargo was seen as the 'saviour of the airlines', with high rates of growth predicted and airlines reported to be making large investments in air freighters. In 1991, however, international scheduled FTKs remained at about the same level as 1990.

Preliminary statistics for 1992 indicate a return to growth in FTKs on international scheduled services. Aviation analyst David Woolley noted that the major problem in the air cargo sector in 1992 was that, like the passenger sector, increases in capacity along with price wars resulted in poor yields for airlines (Woolley 1992, p. 19). Statistics for early 1993 show a continuing decline in cargo yield (Putzger 1993, p. 3). From October 1993 IATA member airlines imposed a surcharge on cargo in order to improve yields (rates varied from region to region).

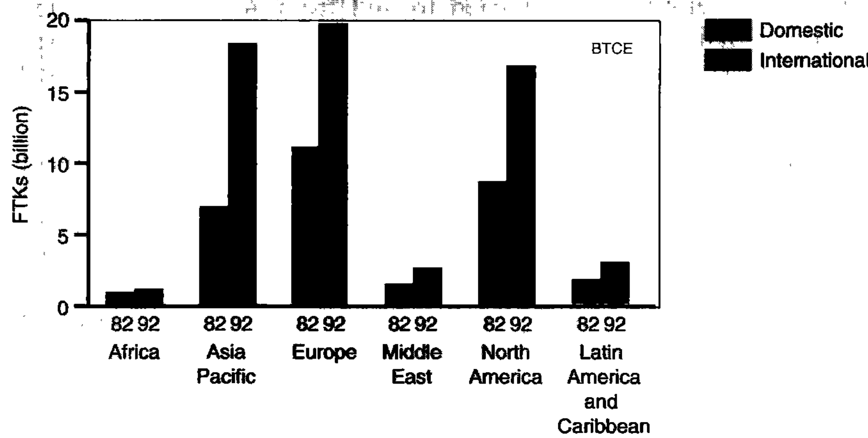
TABLE 3.5 CARGO TRAFFIC ON INTERNATIONAL SCHEDULED SERVICES 1990–91–92

Year	*FTKs (million)*	*Percentage change on previous year (per cent)*	*FTKs on dedicated freight services (million)*	*Percentage change on previous year (per cent)*	*FTKs on passenger services (million)*	*Percentage change on previous year (per cent)*
1990	46 330	+3.1	17 699	+2.0	28 631	+3.8
1991	46 410	+0.2	17 309	– 2.2	29 101	+1.6
1992[a]	50 060	+7.9	18 355	+6.0	31 705	+8.9

a. Preliminary data.

Sources ICAO 1993c, pp. 19–20; 1992c, p. 20; 1991b, p. 20.

Figure 3.15 Comparison of scheduled world FTKs by region of airline registration 1982 and 1992



Notes See footnote 6 for notes associated with this figure. For supporting data see appendix table II.16.

Sources ICAO 1993c; 1984c.

Regional cargo traffic

European airlines have historically carried the largest number of FTKs in both the world (international plus domestic), and international markets. Over the period 1982–1992, however, FTKs carried by airlines of the Asia Pacific increased significantly compared with FTKs carried by European airlines. During the period international FTKs carried by airlines of the Asia Pacific grew at an average annual rate of 10.4 per cent whereas FTKs carried by airlines of Europe grew at an average annual rate of 7.5 per cent. This was less than worldwide average annual growth of 8.3 per cent recorded for freight traffic on all international scheduled services for the same period. Figure 3.15 compares scheduled world (international plus domestic) FTKs performed by airlines in the six ICAO statistical regions in 1982 and 1992.[6] The increase in international air freight carried in the Asia Pacific is particularly influenced by the geography of the region, which favours air transport. In the Asia Pacific the lack of competition in most international markets from land based modes of transport (road and rail) means that the main form of competition for air freight is maritime transport, which is a slower form of transport more suited to high bulk, low time sensitive cargo.

6. FTKs measured for each region are aggregated from the number of FTKs flown by the airlines registered in each ICAO region. FTKs performed by the airlines registered in each ICAO region are not therefore a direct measure of FTKs flown in each region. FTKs by region of airline registration, however, are considered a reasonable estimate of FTKs actually flown in a region.

AUSTRALIA

The purpose of this section is to look at international aviation passenger numbers and freight tonnes carried to and from Australia, to compare Australia's aviation market with world trends. This section follows the structure adopted in this chapter's earlier analysis of international aviation traffic.

The Australian international aviation market accounts for a small portion of all scheduled international passenger numbers. In 1992 services to and from Australia accounted for 3.1 per cent of the total number of passengers on worldwide international scheduled services (DTC 1993a, p. vi). Although Australia only accounts for a small portion of the worldwide market, this market share is quite substantial given that Australia accounts for less than half of one per cent of the world's population.

In the past twenty years the distribution of passenger numbers between international services to and from Australia, and domestic services within Australia, has followed the world trend: international passenger numbers have grown faster than domestic passenger numbers. In 1971 international passengers accounted for just under 17 per cent of passengers on services in the Australian (international plus domestic) market (DCA 1972, pp. 1 & 7). By 1992 the proportion of international passengers had doubled to make up 34 per cent of that market (DTC 1993b, p. vi; DTC 1993 Aviation Database).

As mentioned in chapter 2, an aviation market can be defined in a number of ways depending on the purpose of the discussion. So far in this chapter the discussion has been focused on the global aviation market and regional aviation markets (with a brief section on city pairs). When discussing Australia's major international aviation markets the focus is on country to country markets (with some discussion of city pairs).

When examining the aviation market between two countries it is important to distinguish between data measured on an uplift–discharge basis and data measured on an origin–destination basis. Passenger numbers measured on an uplift–discharge basis count the actual number of passengers on any given stage length between two city pairs. Passenger numbers measured on an origin–destination basis, on the other hand, count a passenger as flying between the two city pairs at the point of commencement and final completion point of the journey regardless of points visited between. It is usually more appropriate to use origin–destination data if the tourist market between two countries is being examined.

This distinction is particularly important for Australia. Australia is an 'end of the line' destination and many international flights to and from Australia stop at another point between Australia and the point of origin or destination of the passenger. Singapore is an important transit point for Australia–Asia and Australia–Europe traffic. Statistics on Australia–Singapore passengers offer a prime example of the difference between uplift–discharge and origin–destination data. In 1992 there were 1 270 887 passengers on flights to and from Australia–Singapore measured on an uplift–discharge basis (DTC 1993b, p. viii). On an origin–destination basis there were only 437 449 Australian residents and Singaporean visitors on flights to and from Australia–Singapore in 1992 (DTC 1993a, p. 9). The difference between the two measures is 833 438 passengers, with the larger number counting all who flew the stage length Singapore–Australia regardless of where each passenger's journey commenced or finished. The data presented in the rest of this section will be on an uplift–discharge basis (unless otherwise stated) and so need to be used with caution by not assuming that passenger numbers between two countries equal the number of residents moving between the two countries.

International passenger numbers to and from Australia increased every year during the period 1971–1992. Figure 3.16 illustrates passengers carried on international scheduled services to and from Australia in the period 1973–1992, with particular reference to the contribution to growth of the largest aviation market (New Zealand) and the market that has experienced the most significant growth in recent times (Japan).[7] Growth in passenger traffic to and from Australia was particularly strong in the late 1980s, reflecting significant growth in traffic between Australia and Asian countries. Another interesting feature is that passengers carried on international services to and from Australia increased in 1991, which was counter to the worldwide trend.

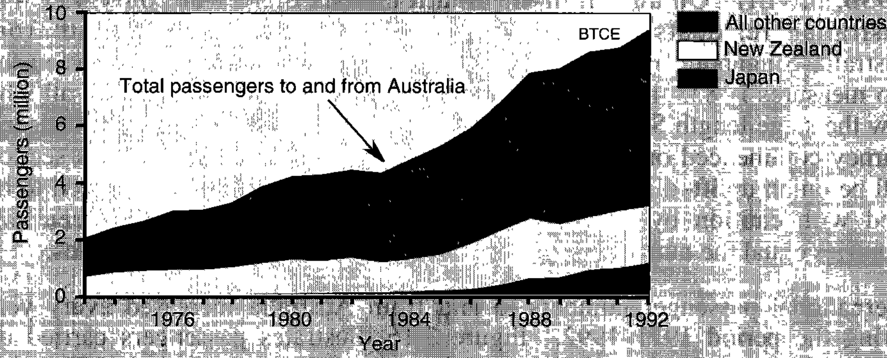
Figure 3.17 compares average annual passenger growth rates to and from Australia with the rate of growth in passenger numbers on worldwide international services for the periods 1977–1982, 1982–1987 and 1987–1992. The average growth rate in passenger numbers on services to and from Australia was higher than the average growth rate in passenger numbers on worldwide international services for the 15 years.

1990–91–92 passenger numbers

Table 3.6 shows data covering international scheduled services to and from Australia during the turbulent period 1990–91–92. In 1992 there were 9.3 million international passengers on flights to and from Australia. This was a 7.5 per cent increase on passenger numbers in 1991 (DTC 1993b, p. viii). The increase in passenger numbers in 1992 signalled a return to stronger growth after relatively low growth in passenger numbers to and from Australia in 1991. The recovery of the growth rate in passenger numbers to and from Australia was not as strong as the recovery in the growth rate for passenger numbers on worldwide international scheduled services. In 1991, however, passenger numbers to and from Australia increased by 1.5 per cent, whereas passenger numbers on worldwide international services declined. This may have been based, in part, on the perception that the Pacific region was safe from Gulf

7. Data for New Zealand and Japan for 1971–1972 are not compatible, hence the shorter time period for this graph.

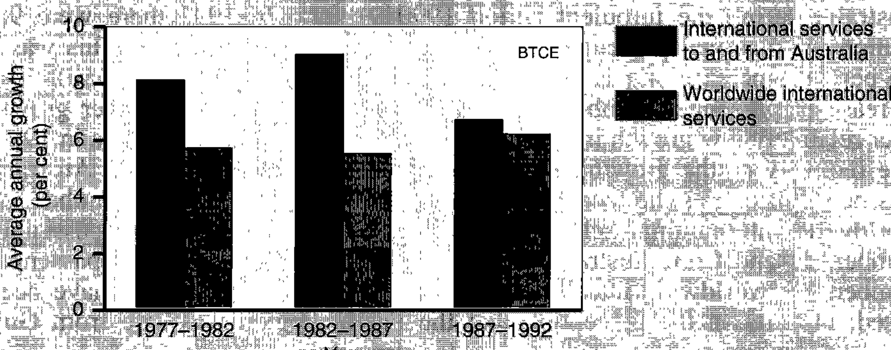
Figure 3.16 Passengers carried on international scheduled services to and from Australia 1973–1992



Notes Data on an uplift-discharge basis.
For supporting data see appendix table II.17.

Sources DTC 1993b and earlier issues; DoA 1986 and earlier issues; DoT Australia 1982 and earlier issues; DCA 1973 and earlier issues.

Figure 3.17 Comparison of average annual passenger growth rates 1977–1982, 1982–1987 and 1987–1992



Note For supporting data see appendix table II.18.

Sources DTC 1993 Aviation Database; ICAO 1993c; 1992c; 1984c.

TABLE 3.6 INTERNATIONAL SCHEDULED SERVICES TO AND FROM AUSTRALIA 1990–91–92

Year	*Passengers to and from Australia*	*Passenger growth to and from Australia (per cent)*	*Seats available*	*Percentage change on previous year (per cent)*	*Seat load factor (per cent)*	*Percentage points change*	*Passenger growth on all international scheduled services (per cent)*
1990	8 520 564	+7.4	12 779 633	+8.4	66.7	– 0.6	+6.9
1991	8 652 577	+1.5	13 287 802	+4.0	65.1	–1.6	–5.0
1992[a]	9 302 052	+7.5	14 269 513	+7.4	65.2	+0.1	+12.8

a. Preliminary data.

Sources DTC 1993b, p. 12; ICAO 1993c, p. 19.

related difficulties, and as a result some tourists may have diverted travel plans to the region.

Qantas experienced a decline in passengers carried in 1991, which resulted in a loss of market share when compared with 1990 levels, but data show higher than average growth in passenger numbers for Qantas in 1992 and the first half of 1993, and a recovery in the airline's market share (DTC 1993b, pp. vi & 4). As shown in table 3.6, capacity (seats available) on international flights to and from Australia grew faster than the demand for seats in the early 1990s, in line with the worldwide trend, and this resulted in a fall in the seat load factor.

Traffic growth and economic growth

As pointed out earlier in this chapter, residents of countries with a high level of income per capita tend to participate more in air transport activity than residents of countries with low levels of income per capita. Australia is a developed country with a relatively high level of income per capita and its residents have a higher than average level of participation in air transport activity. Geographic factors also favour international air transport to and from Australia, as substitution to alternative forms of transport is limited.

The traditional sources of visitors to Australia are western countries with a relatively high level of income per capita: New Zealand, the UK, and the US. Strong rates of economic growth in Japan in the 1980s, however, combined with the effective marketing of Australia as a tourist destination to the Japanese, have seen Japan become the largest source of visitors to Australia. In the future, economic growth in the Asia Pacific will stimulate growth in aviation markets associated with the Asia Pacific. As a result, countries in the Asia Pacific are expected to increase in importance as sources of visitors to Australia.

Major passenger markets

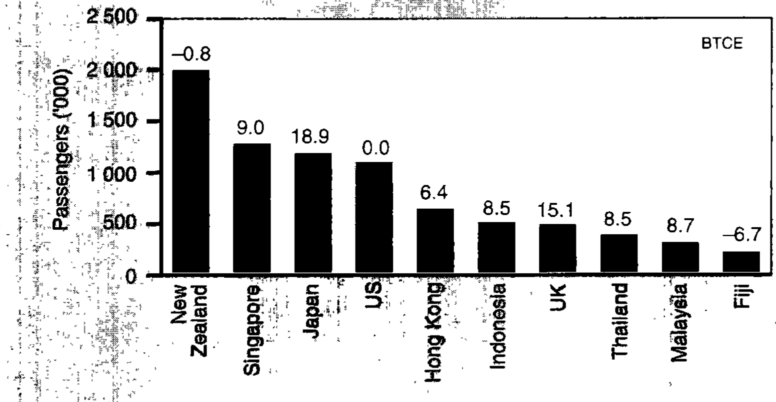
Australia's major international market has traditionally been New Zealand, reflecting the proximity of the two countries as well as cultural and trade links. There was strong growth in this market in the late 1980s but growth in passenger numbers has been variable since 1988. Passenger numbers declined in this market in 1989 and 1990, increased in 1991 and decreased by 0.8 per cent in 1992 (DTC 1993b, p. viii; DTC 1992b, p. viii). The decrease in 1989 and 1990 may be in part the result of people previously bringing their travel plans forward to coincide with Australia's Expo and the Bicentennial celebrations during 1988, which was a peak year in passenger numbers for the Australia – New Zealand aviation market. The movements in passenger growth rates in the Australia – New Zealand market in 1991 and 1992 were counter to movements in passenger growth rates on all international services to and from Australia. According to Lipman and Wheatcroft (1990, p. 62) it is possible that this market may be nearing saturation point, and therefore there would be only limited growth potential. However, the single aviation market established between the two countries in 1992 may stimulate renewed growth in air traffic across the Tasman.

Other key markets in relation to Australia (uplift–discharge basis) are shown in figure 3.18, and include Singapore, Japan and the US. As well as passenger numbers for the year ended 31 December 1992, the figure shows the growth rates for major markets to and from Australia in 1992 over 1991 data.

Before 1992 Australia's three largest uplift–discharge markets were New Zealand, Singapore and the US. These markets have shown variable growth since 1989, and in 1992 the US was replaced by Japan as the third largest uplift–discharge market to and from Australia. The Australia–Japan market experienced the highest growth rate (18.9 per cent) of the ten major markets in 1992. This is higher than the 7 per cent growth rate of 1991 but is still lower than the very strong growth rate of 41 per cent that occurred in this market in 1990. Data released by the Japan National Tourism Organization show that, although the overall number of tourists who travelled outside Japan in 1991 fell compared with 1990 data, the number of Japanese residents who visited Australia increased (JNTO 1992, p. 10).

Of the top ten countries in terms of passengers to and from Australia in 1992, the UK had the second highest annual increase in 1992 of 15.1 per cent, although the passenger growth rate in this market has been variable since 1989 (DTC 1993b, p. viii). Fiji experienced the largest decrease in passenger movements for the year. This country is a holiday destinations for Australian residents, and recorded a fall in passenger movements for 1991 as well as 1992. This fall in passenger movements is partly attributable to the high proportion of Australian residents in this market and low rate of economic growth in Australia, but may also reflect other factors such as changes in preferences towards other holiday destinations.

Figure 3.18 Passenger numbers in major markets to and from Australia, year ending 31 December 1992



Notes Percentage growth on 1991 data shown above each column.
Data on an uplift–discharge basis.
For supporting data see appendix table II.19.

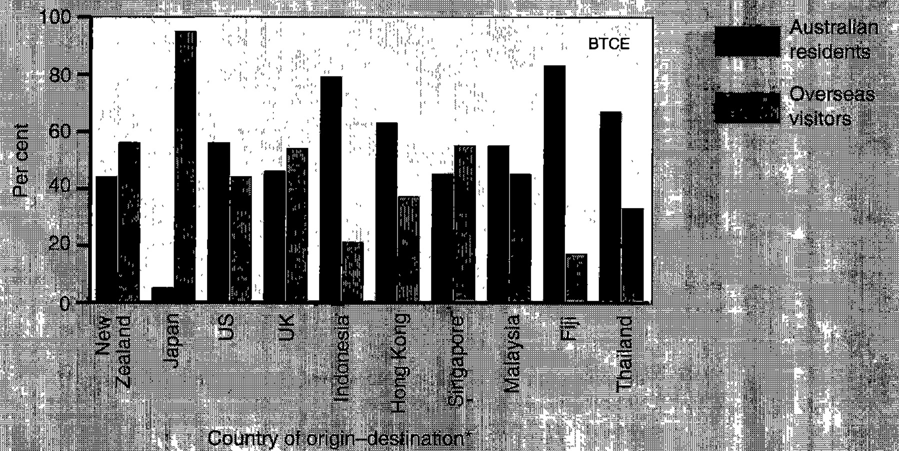
Source DTC 1993b.

The Australian resident and overseas visitor composition of origin–destination passengers for international scheduled services on the major routes to and from Australia is shown in figure 3.19.[8] In the large origin–destination markets such as New Zealand, the US and UK, the balance between residents and visitors is fairly even and lay between 40 and 60 per cent in the year ended 31 December 1992. On the Australia–Japan route, 95 per cent of the origin–destination passenger numbers were Japanese visitors to Australia, reflecting the large proportion of holiday travellers on this route (DTC 1993a, pp. 11–12). The high proportion of Australian residents on many routes between Australia and destinations in the Asia Pacific, such Indonesia, Thailand and Fiji, also reflects the high level of holiday travellers on these routes.

Figure 3.20 shows Australia's four largest international city pairs in 1992 (with corresponding data for 1991) and compares them with the world's top city pair London–Paris in 1991. Sydney–Auckland was Australia's largest city pair in 1992, accounting for around 7.0 per cent of total passenger numbers to and from Australia in that year (DTC 1993b, p. vi). Sydney–Auckland was not ranked in the world top 25 city pairs in 1991, but during 1988, a peak year for airline activity on the Australia – New Zealand route, the Sydney–Auckland city pair ranked as the 24th largest city pair in terms of passengers carried.

8. The data in this graph are origin–destination resident and visitor movements and will not necessarily match the data in figure 3.18.

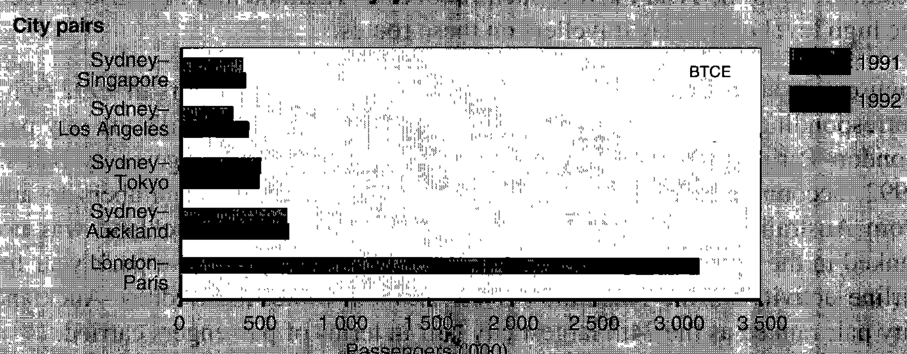
Figure 3.19 Resident and visitor composition of passengers on international scheduled services to and from Australia 1992



Notes * See footnote 8 for notes associated with this figure.
For supporting data see appendix table II.20.

Source DTC 1993a.

Figure 3.20 Passengers between major international Australian city pairs 1991 and 1992



Notes London–Paris city pair data for 1992 was not available at time of writing. For supporting data see appendix table II.21.

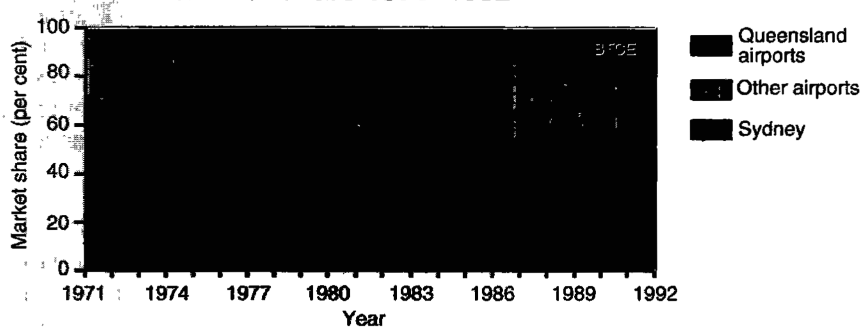
Sources DTC 1993b; ICAO 1993c.

Figure 3.21 shows the proportion of international passenger numbers travelling to and from Australia passing through the different international Australian airports during the period 1971–1992. Most passengers flying to and from Australia passed through Sydney airport. The proportion of international passengers passing through Sydney international airport declined steadily, from just over 70 per cent in the early 1970s to just under 50 per cent in 1992. The Federal Airports Corporation forecasts that this decline in the percentage of total international traffic to and from Australia handled by Sydney airport will continue, although the actual number of passengers passing through the airport will increase (FAC 1993, p. v).

Of particular interest has been the rapid increase in international passengers entering Australia via international airports in Queensland, although these airports catered for only 19.8 per cent of international passengers flying to and from Australia in 1992 compared with nearly half passing through Sydney. The number of passengers entering and leaving Australia via Townsville airport dropped between 1986 and 1990, and in March 1991 international services to and from Townsville ceased. International operations to and from Townsville recommenced in November 1992. The overall drop in passenger numbers through Townsville between 1986 and 1992 was offset by the increase in international passengers passing through Brisbane and Cairns airports. The increasing use of Queensland airports is expected to continue, with the FAC forecasting that in the financial year 2001–02 these airports will cater for 26 per cent of passengers flying to and from Australia (FAC 1993, p. v).

Brisbane, Australia's third largest international airport in terms of passenger numbers, experienced a 38.8 per cent increase in the number of passengers passing through the airport between 1989 and 1992. Cairns is the fifth largest international airport in Australia, and it experienced a 147.6 per cent increase in

Figure 3.21 Australian airports international traffic: market share 1971–1992



Note For supporting data see appendix table II.22.

Sources DTC 1993 Aviation Database; DTC 1993b and earlier issues; DoA 1986 and earlier issues; DoT Australia 1981 and earlier issues.

international passenger numbers over the same period. This compares with an increase in international passenger numbers through Sydney airport of 11.9 per cent between 1989 and 1992 (DTC 1993b, p. vii). Cairns has seen spectacular growth rates on routes to and from Asia in particular. For example, passenger numbers on the Tokyo–Cairns route increased by 70 per cent and 30 per cent, respectively, in 1991 and 1992 on the previous year's data (DTC 1993b, pp. 15–17; DTC 1992b, pp. 15–17).

Nonscheduled passengers

The prime objective for Australian international aviation policy is to develop and maintain a network of commercially viable scheduled services complemented by nonscheduled (charter) operations. The Australian Federal Government has recognised that nonscheduled services may encourage inbound tourist passengers, and allowances for automatic authorisation have been established under strict guidelines. Those nonscheduled sevices which do not meet these guidelines are considered on a case by case basis, and emphasis is placed on the quick processing of these applications (DTC pers. comm., 1993).

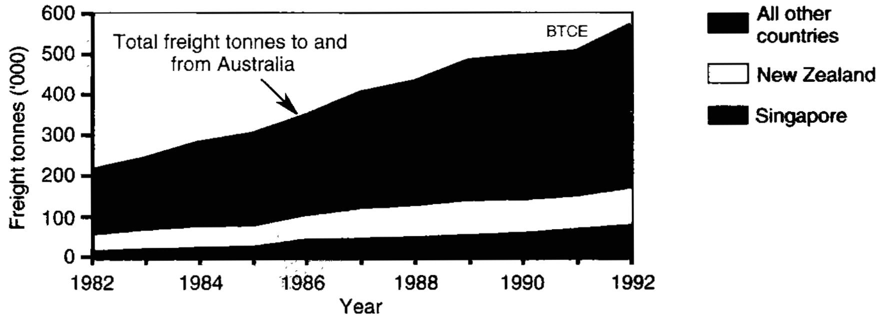
A study of Britannia Airways' nonscheduled sevices to Australia from November 1990 to March 1991 indicates that between 25 and 32 per cent of the passengers carried were generated by the nonscheduled service (that is they would not have come otherwise). On average, however, those who travelled on the nonscheduled service stayed for shorter periods in Australia and spent less money overall when compared with tourists from the UK who travelled on scheduled flights (DTC 1992e, p. 10).

Cargo

For Australia, international air freight has grown consistently since the early 1970s. For most of the 1980s annual growth in air freight was greater than 5 per cent. In 1991, freight tonnes increased by 0.5 per cent on the previous year's data, the lowest level of growth since 1975. The growth rate for freight improved in 1992, similar to the growth rate in passenger numbers. Figure 3.22 shows growth in freight to and from Australia as well as the two largest markets New Zealand and Singapore. Other important markets include the US and Japan. The figure does not show the break-up between inbound and outbound freight. Around 10 per cent of total freight to and from Australia is carried on dedicated freight aircraft (DTC 1993 Aviation Database).

Inbound international air freight increased by 8.5 per cent between 1991 and 1992, while outbound freight increased by 16.8 per cent. New Zealand was the biggest source of inbound air freight in 1992, followed by Singapore. Singapore was the largest destination for outbound air freight from Australia, followed by New Zealand (DTC 1993b, pp. 1–2). Growth in outbound freight to Singapore was particularly significant in the late 1980s and early 1990s. Outbound freight to Singapore increased by 84 per cent between 1988 and 1992. In the year to

Figure 3.22 Freight carried on international scheduled services to and from Australia 1982–1992



Note For supporting data see appendix table II.23.

Sources DTC 1993b and earlier issues; DoA 1986 and earlier issues.

30 June 1993 Qantas increased its air freight task by 17 per cent over the previous year. In the same period air freight accounted for 7.7 per cent of Qantas' total revenue (Qantas 1993, pp. 2 & 16).

CONCLUSION

This chapter examined the major trends in international aviation traffic over the period 1971–1992 and the factors that have influenced these trends. It was shown that a strong relationship exists between the overall level of economic activity and air transport activity in a market, as well as a close relationship between year on year changes in world GDP and international scheduled RPKs. Passenger yield and exogenous 'shocks' also were shown to influence the rate of growth of international air passenger traffic.

In extending the analysis of the influence of GDP levels to the different regions, it was shown that those regions and routes that serve areas with high levels of economic activity tend to have high levels of air transport activity. Growth of air transport activity in the Asia Pacific has been particularly significant. This growth has been influenced by both the economic growth in the region and the fact that the geography of this region favours air transport.

Chapter 4 continues the examination of aviation traffic by looking at forecasts for traffic growth rates. In particular, the chapter examines two forces that influence the rate of traffic growth: travel and tourism, which is likely to boost the growth rate; and infrastructure and congestion problems, which could constrain growth.

CHAPTER 4 TRAFFIC: FORECASTS, GROWTH AND CONSTRAINTS

Purpose: to outline growth forecasts for international aviation traffic and the interdependence of this growth with associated industries, such as the travel and tourism industry, one of the forces driving traffic growth; and the infrastructure constraints that may dampen that growth.

FORECASTS

Aviation traffic forecasts are important because they allow policy makers and players in the aviation industry to prepare appropriate responses to future opportunities and developments in the industry. The importance of drawing an accurate assessment of the future in aviation is well illustrated in the area of infrastructure investment. Aviation infrastructure requires a high capital investment and involves a long lead time from assessment of future needs and options, to investment and the work in progress stage, to the actual use of the project. Development periods of anywhere from 10 to 30 years are not unusual for aviation infrastructure. The large capital outlays and long time frames involved in the creation of aviation infrastructure require reliable forecasts of the traffic that will be using the infrastructure. In addition to this illustrative example, there are other areas where decision makers in aviation — in public policy, airlines, airports, aircraft manufacture and other related industries, and regional development planning — need to consider possible scenarios to assist them to meet future challenges.

Passenger traffic

Demand for air travel decreased in 1991. Reduced spending, particularly on discretionary items like air travel, was due to a slowdown in economic activity in a number of major economies, and the Gulf Crisis. Strong growth is expected to return to world (international plus domestic) aviation in the long term. The International Civil Aviation Organization's (ICAO) preliminary estimates for 1992 show a growth rate of 6 per cent in world revenue passenger kilometres (RPKs).[1]

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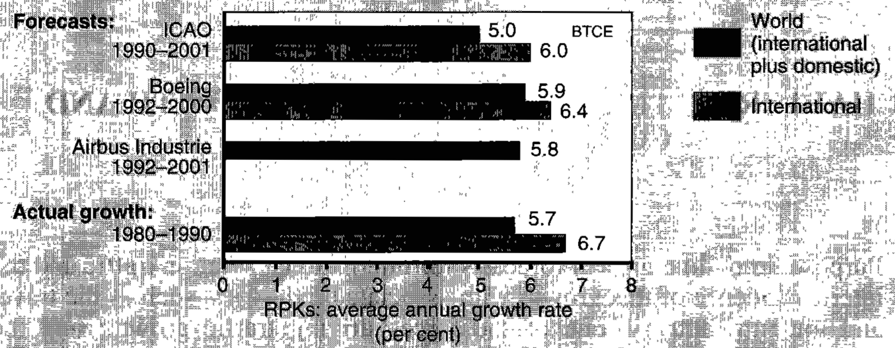
1. The 1992 figures used in the Report are preliminary figures from the ICAO publications *Annual Report of the Council — 1992* and *Civil Aviation Statistics of the World 1992*. At the time of writing they were the most current figures available.

Figure 4.1 Forecast world and international RPK growth rates



Note Airbus Industrie does not provide a separate forecast for international RPKs.

Sources Airbus Industrie 1993; Boeing 1993a; ICAO 1992d.

The International Air Transport Association (IATA 1993a, p. 16) forecast that by the year 2010 civil aviation could inject more than $1500 billion into the world economy and provide 30 million jobs if infrastructure constraints are dealt with to meet future demand (infrastructure is discussed in detail later in this chapter). This is in line with the general consensus among aviation organisations (both government and industry based bodies), that demand for air travel will continue to grow in the medium term.

ICAO (1992d, pp. 1–2) forecast world scheduled passenger traffic will grow at an average annual rate of 5 per cent over the period 1990–2001.[2] The overall growth is divided into international scheduled passenger traffic, forecast to grow at 6 per cent over the period, and domestic scheduled traffic at 4 per cent. The higher growth in international passenger traffic means that international traffic will increase its share of world RPKs from 50 per cent in 1992 to 53 per cent in the year 2001, continuing the trend evident for the last two decades as noted in chapter 3.

Figure 4.1 compares ICAO's forecasts for the rate of growth in world (international plus domestic) and international RPKs with forecasts by two major airframe manufacturers, Boeing and Airbus Industrie, and actual growth rates for the past period 1980–1990. Box 4.1 outlines the assumptions made by ICAO and the two major airframe manufacturers in preparing their forecasts.

It should be noted that airframe manufacturers may have some interest in forecasting buoyant growth for the airlines; however, forecasts by the airframe

2. RPKs and freight tonne kilometres (FTKs) are used interchangeably with the term traffic, depending on whether passenger or cargo operations are being discussed.

BOX 4.1 ASSUMPTIONS MADE BY ICAO, BOEING AND AIRBUS INDUSTRIE IN PREPARING THEIR FORECASTS

ICAO

ICAO forecasts were outlined in ICAO's 1992 Circular 237 *Outlook for Air Transport to the Year 2001* (pp. 29–30). The main assumptions made by ICAO in forecasting for the period 1990–2001 were:

- a 'most likely' average rate of world economic growth of 2.6 per cent per annum (in real terms);
- moderate growth in world trade at a 'most likely' average rate of about 4 per cent per annum;
- a 'most likely' increase of 0.5 per cent per annum (in real terms) in average yield (fares and rates) for the world as a whole; and
- availability of adequate capital resources for the development of aviation and tourist infrastructure.

Boeing

Boeing forecasts were outlined in the company's *Current Market Outlook 1993* (pp. 1.2, 2.1 & 2.21). The main assumptions made by Boeing in forecasting for the period 1992–2000 were:

- no major wars;
- a viable (profitable) airline industry;
- an open and competitive airline environment;
- no major constraints on jet aircraft departure growth due to congestion;
- noisy aircraft can be economically replaced;
- telecommunications and alternative travel modes will not impede air travel growth;
- world economic growth of 2.9 per cent in 1993 and average annual growth of 3.6 per cent per year until the year 2000; and
- a 3 per cent increase in yields in 1993 (in real terms) from the 1992 level and then a long term decline averaging just under 1 per cent per year.

Airbus Industrie

Airbus Industrie forecasts are outlined in *Market Perspectives for Civil Jet Aircraft*, (1993, p. 10). The main assumptions made by Airbus Industrie in forecasting for the period 1992–2001 were:

- increases in gross domestic product (GDP) of 3.3 per cent annually, following a cyclical pattern (based on DRI/McGraw-Hill estimates);
- a continuing trend of real fare decreases in the order of 0.5 per cent per annum;
- worldwide population increasing by about 1 per cent per year in the industrialised world and 2.5 per cent per year in developing countries: and
- more shorter excursions will made in addition to annual holidays.

manufacturers are supported by other sources such as ICAO and IATA. For this reason they are presented in this report as reasonable estimates for future traffic growth. Boeing (1993a, p. 2.6) compared the forecasts that it prepared in the past with actual traffic data starting in the 1970s, and the forecasts appear to be within a good range. Figure 4.1 illustrates that all of the forecasters predict larger increases in international traffic than in domestic traffic during the forecasting period but that growth in international aviation traffic during the 1990s will be slower than during the previous decade.

Future developments in the air passenger market

The International Air Traveller Survey (EDR 1991) indicated that the purpose of 46.9 per cent of European and 24.5 per cent of North American travellers' trips was business. The survey also found that a large proportion of business travellers took advantage of economy and discount fares.

Boeing (1993a, p. 2.4) found that international business travel had declined as a percentage of world travel, from 16 per cent in 1985 to 15 per cent in 1990. Boeing (1993a, p. 2.4) and Airbus Industrie (1993, p. 12) both believe that business travellers will continue to decline as a percentage of total passenger traffic in the future. Boeing forecast that international business travel will decline to 14 per cent of world travel by the year 2010.

This fall in the proportion of travel will not result from an absolute decline in the number of business travellers but from a higher rate of growth in leisure travellers. Much of the future growth in international passenger traffic is expected to come from leisure travellers. If this proves correct, then it is likely to have a significant impact on airline yields and quality of service, as business travellers traditionally have been less price sensitive and more time sensitive than tourists, consequently business passengers have contributed a higher proportion to airline revenue than their proportion of total passengers numbers might suggest. The trend towards higher growth in leisure passengers is examined in more detail in the travel and tourism section later in this chapter.

Regional passenger traffic

One significant element common to all forecasts is the higher than average growth rates forecast for the Asia Pacific region. Boeing (1993a, p. 2.25) forecasts that the Asia Pacific will contribute more than 40 per cent of growth in passenger traffic for the period 1992–2010. As shown in figure 4.2, ICAO forecasts that Asia Pacific airlines will perform the largest number of scheduled international RPKs by the year 2001, replacing Europe as the largest international market.[3] Note that these data do not include RPKs performed on

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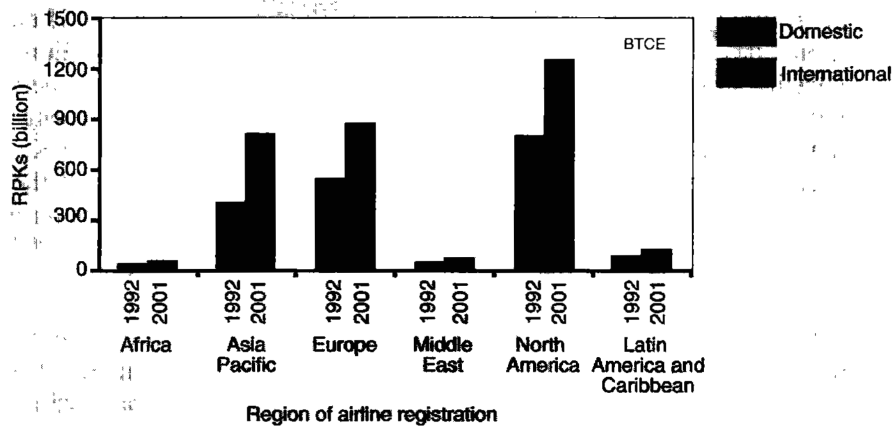
3. RPKs recorded for an ICAO region are aggregated from the number of RPKs flown by the airlines registered in that ICAO region. RPKs performed by the airlines registered in each ICAO region are not therefore a direct measure of RPKs flown in each region. However, given the generally restrictive nature of bilateral air service agreements in relation to fifth freedom and additional rights, and the fact that a high proportion of a carrier's traffic will be travellers from the carrier's home country, RPKs by region of airline registration are considered a good estimate of RPKs actually flown in a region.

Figure 4.2 Comparison of regional RPKs: 1992 and forecasts for 2001



Notes See footnote 3 for notes associated with this figure. For supporting data see appendix table II.24.

Sources ICAO 1993c; 1992d.

nonscheduled (charter) services and that European airlines carry a significant number of nonscheduled RPKs. As discussed in chapter 3, in the early 1990s about 60 per cent of all RPKs performed on intra European routes were on nonscheduled services (ICAO 1992d, p. 10).

Although Asia Pacific airlines are forecast to perform the largest number of scheduled international RPKs in the year 2001, North American and European airlines are forecast to perform a larger number of scheduled world (international plus domestic) RPKs in the year 2001. Growth rates within the North American and European markets should see these regions retain their places as the two top world aviation regions for some years to come. Indeed, Boeing (1993a, p. 2.26) predicts that the North American region will continue to dominate world aviation at least until the year 2010. Therefore, future growth in the North American and European regions cannot be ignored despite the importance of the expanding Asia Pacific region.

Examining IATA forecasts for subregions provides some interesting contrasts to ICAO's regional forecasts. For example, IATA's (1992b, p. 41) international scheduled passenger forecasts for the period 1992–1996 predict that passenger numbers into and out of Eastern/Central Europe will experience the highest level of growth for the period, followed by Asian and Latin American subregions.

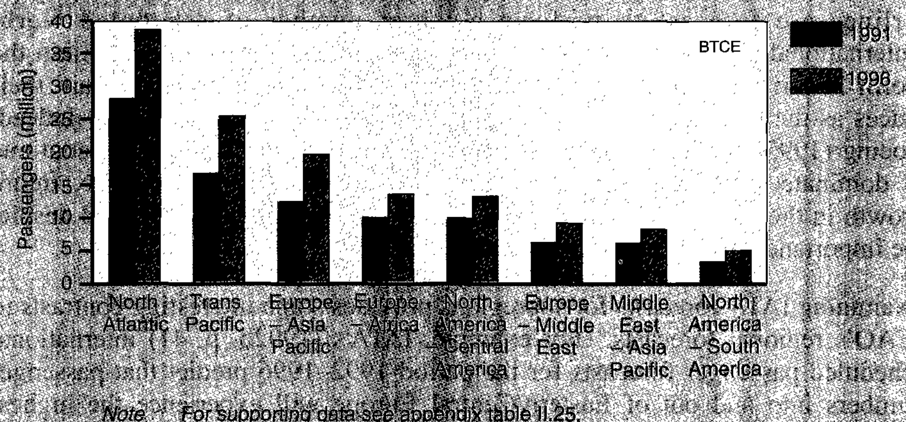
Route passenger traffic

A comparison of forecast passenger numbers on major interregional routes is shown in figure 4.3, where the current and future significance of the North Atlantic route is evident. The figure also illustrates other significant interregional passenger flows, including the trans-Pacific route and the Europe – Asia Pacific route. Passengers flying between Japan and North America accounted for a significant proportion of traffic, with 8.8 million passengers travelling between Japan and North America in 1991. Korea and Hong Kong (with more than one million passengers travelling between each of these countries and North America in 1991), will remain important countries on the trans-Pacific route, with high growth rates forecast in the future (IATA 1992b, pp. 71, 79 & 82).

In 1991 the main European countries on the Europe – Asia Pacific route were the UK (33 per cent of all passengers journeyed to and/or from the UK), Germany and France. The Asia Pacific countries with the highest proportion of passengers on this route include Japan (21 per cent of all passengers journeyed to and/or from Japan), Thailand and India (IATA 1992b, pp. 79, 113 & 126–7). In addition, passengers travelling to and/or from Korea and Malaysia grew significantly in the late 1980s, although the growth was from a small traffic base (IATA 1991b, p. 11). IATA forecasts (IATA 1992b, pp. 82 & 85) that this growth will continue during the early 1990s.

Boeing forecasts for major international routes also show higher than average growth rates for routes both within, to, and from the Asia Pacific region, as shown in figure 4.4 (Boeing 1993a, p. 2.28). These growth rates are above that

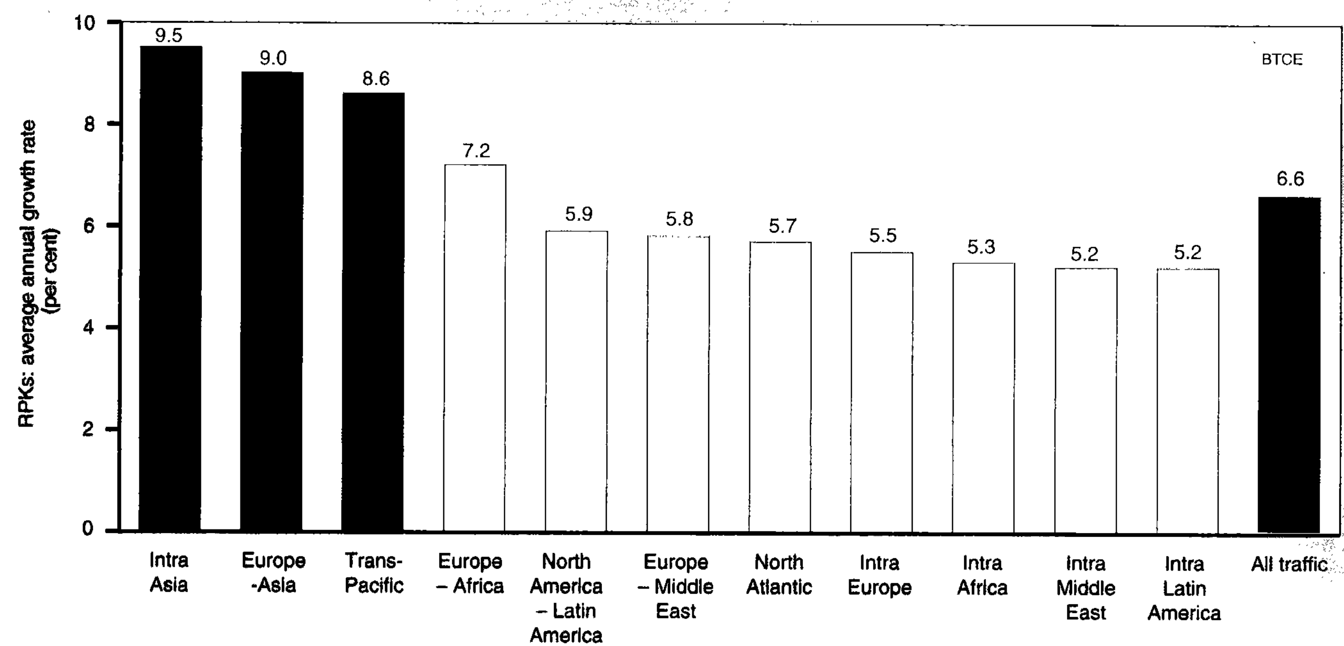
Figure 4.3 Passenger numbers on major interregional routes, 1991 and forecasts for 1996



Note For supporting data see appendix table II.25.

Source IATA 1992b.

Figure 4.4 Forecast RPK growth rates on major international routes 1992–2000



Note For supporting data see appendix table II.26.

Source Boeing 1993a.

forecast for the growth rate of international traffic within the planned, liberalised Europe and the forecast growth rate for all international traffic. Boeing's growth forecasts are supported by work done by ICAO's Pacific Area Traffic Forecasting Group (now the Asia/Pacific Area Traffic Forecasting Group). This group was set up to develop forecasts of aviation activity in the trans-Pacific and Pacific rim areas to support planning for future air navigation needs. The group forecast that during the period 1990–2000:

- trans-Pacific passenger traffic will grow at an average annual rate of 7.8 per cent; and
- intra Asia Pacific passenger traffic will grow at 8.0 per cent (ICAO 1993d, pp. 15 & 25).

These growth rates are significantly higher than ICAO forecasts for other major world aviation regions.

Some routes linking Latin America and Africa to more developed regions are also forecast to grow at a higher rate than the more mature markets linking developed regions, although this growth is from a small base. The North America – Latin America market, in particular, is forecast to experience a higher than average growth rate over the period 2000–2010. This is in line with a predicted strong economic growth rate in the region. Feldman (1993, p. 56) reports that Latin America's share of world gross domestic product (GDP) is expected to increase from 5.6 per cent in the early 1990s to 7.8 per cent in the year 2005.

Feldman believes that US airlines in particular may increase their presence in the North America – Latin America market due to the profitability of this market. In support of this are the experiences of American Airlines, which generated most of its operating profit from its Latin American routes in 1992, and Continental and Delta, which recorded positive operating results only on Latin American routes during the same period (Office of Airline Statistics 1993, pp. 4–14). All three airlines had less than 12 per cent of their total capacity on Latin American routes (*Air Transport World* 1993b, p. 112), pointing to higher than average margins between revenues and costs in this market. Booth (*Airline Business* 1993c, pp. 108–10) notes that US expansion may be constrained if Latin American governments are pressed into seeking to protect the market share of their own carriers, most of which are facing significant financial difficulties.

Asia Pacific forecast passenger growth

The high forecast growth rate for international aviation in the Asia Pacific region is supported by recent growth trends. During the period 1970–1990 the international traffic growth rates involving Asian origin and/or destination points, were far greater than those between various non Asian points.

Specific examples of high growth rates in markets involving Asia include significant growth experienced in:

- the Europe–Asia market, which grew at 13.2 per cent per year over the period;
- the intra Asia market, at 12.9 per cent; and
- the trans-Pacific (North America – Asia) market, at 12.3 per cent.

This compares with the non Asian markets, which had lower average growth rates over the period 1970–1990. Examples of major non Asian markets include growth in:

- the Europe–Africa market, which grew at 5.5 per cent per year over the period;
- the intra Europe market, at 7.9 per cent; and
- the North Atlantic (North America – Europe) market, at 6.0 per cent (Boeing 1993a, p. 2.28).

This trend towards higher growth rates in Asia Pacific markets is expected to continue. IATA (1992a, p. 6) forecasts that by the year 2000 Asia Pacific traffic will account for 39 per cent of international scheduled traffic compared with its share in 1990 of 31.2 per cent. In the year 2010 IATA forecasts that this share will exceed 50 per cent. The higher growth rates will see the Asia Pacific increase in importance as an aviation market.

The importance of the Asia Pacific stems in part from the opportunities it holds for airlines to expand and/or create new markets, which the more mature markets do not offer to the same extent. In line with the increasing importance of Asian traffic this region is increasing in importance as a source of revenue for airlines. Qantas, for example, generated around 33 per cent of its international revenue from Asia in the financial year 1992–1993 compared with 21 per cent in the financial year 1987–1988 (Qantas pers. comm., 1993).

The main factors affecting growth in the Asia Pacific in the future will be those which will influence tourism and therefore aviation growth in general (these are discussed in the travel and tourism section later in this chapter). Other factors which will specifically influence the Asia Pacific's strong demand for aviation services include:

- the number of large population centres which are separated by oceans and/or difficult terrain, limiting international surface transport and making air transport particularly suitable to the demands of the region; and
- the large population (home to 56 per cent of the world's population) coupled with a largely untapped potential market compared with the relatively mature markets of Europe and North America. A much smaller proportion of the Asian population have flown compared with the US and Western Europe (O'Lone 1992b, p. 35).

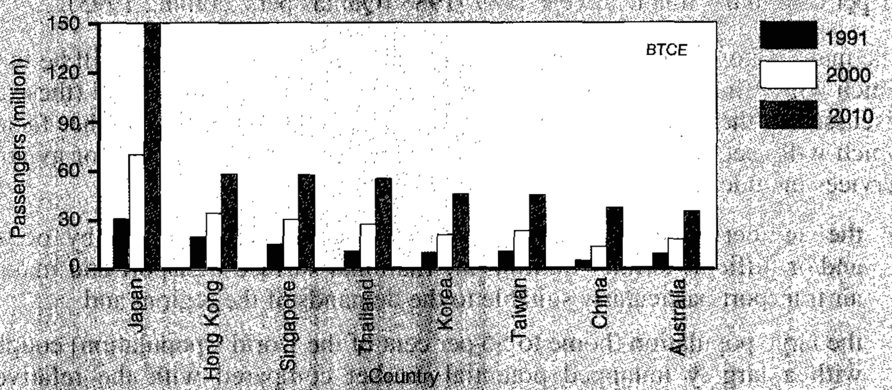
IATA (1992a, p. 8) identified a number of countries which will continue to dominate the travel market in the Asia Pacific region in terms of passenger generation, and these are shown in figure 4.5. Japan is expected to remain the largest market, followed by Hong Kong, Singapore and Thailand.

Significant annual growth rates in passenger numbers over the period 1991–1996 are expected in China (13.6 per cent), Malaysia (10.7 per cent), Indonesia (10.5 per cent), Korea (8.9 per cent) and Japan (8.8 per cent) (IATA 1992b, pp. 60, 74, 79, 85 & 109).

Air services associated with China in particular have the potential for rapid growth. China's aviation industry was deregulated in 1988 and by the end of 1992 international RPKs performed by Chinese airlines had increased by almost 100 per cent. This is strong growth compared with an increase of slightly less than 30 per cent for international RPKs performed by airlines of all ICAO contracting countries between 1988 and 1992. Preliminary data released by the State Statistics Bureau (*Flight International* 1993c, p. 14) show that the strong aviation traffic growth was sustained in the first half of 1993 although at a slower rate than 1991 and 1992.

Growth in the number of Chinese airlines has been so rapid in the early 1990s that China is facing a shortage of appropriately qualified technical and managerial airline staff. As a result of this, in 1993 the Civil Aviation Administration of China (CAAC) tightened restrictions for the creation of new airlines. Start-up airlines have to provide evidence of sufficient finance and qualified staff before being allowed to commence operations (*Australian Aviation* 1993b, p. 24). Significant growth in aviation is expected to continue

Figure 4.5 Asia Pacific passengers: 1991 and forecasts for 2000 and 2010



Note For supporting data see appendix table II.27.

Sources IATA 1992b; 1992a; 1991b.

for China as the large population of the country gains prosperity, and trade links with the rest of the world grow. In the future, China, in its own right, may expand into a major aviation bloc which will challenge the power of some of the established markets and add to the uncertainty of the future of regional groupings in the Asia Pacific (see chapter 5 for details on regionalisation).

The inadequacy of infrastructure in many Asia Pacific countries (as in some countries in other regions) is becoming a major problem, particularly given the strong rates of growth predicted over the next 20 years for the region (world congestion problems are discussed later in this chapter). Seven airports catered for 66 per cent of international passengers travelling to, from and within the Asia Pacific region in 1990, and all of these airports had some kind of congestion problems (IATA 1992a, p. 26). The growing congestion problems at major centres within the region, such as Japan and Hong Kong, may act as a catalyst for airlines to expand their networks to other Asian countries.

In addition to route developments in the Asia Pacific region, the opening up of new markets and continued high rates of growth in traffic provide opportunities for related business development. Lufthansa airline's consultancy arm, for example, is developing a training program for technical apprentices of China Airlines, while its subsidiary LSG Lufthansa Service Asia provides catering for airlines at seven locations in Asia (Lufthansa 1993; 1992, p. 17).

Another indication of the importance the Asia Pacific region is beginning to play in world aviation is the interest shown by aircraft manufacturers in meeting the specific needs of the Asia Pacific market. The recent interest by the major manufacturers in super jumbos is aimed at catering for the long range, high capacity needs of the region. Asia Pacific carriers already account for 50 per cent of the market for wide body aircraft (*Asian Aviation* 1992a, p.5) and wide body aircraft are used on more than 90 per cent of all international flights out of Tokyo-Narita, Bangkok, Hong Kong and Sydney. In 1992, international passenger load factors averaged 68 per cent for the region (the highest of all of the regions) and reach much higher levels in peak times. Increased flight frequency, and using larger jets, are predicted to be the methods for dealing with future growth (*Asian Aviation* 1992b, p. 16).

Air service negotiations between the US and UK give an indication of the value of access to routes into the Asia Pacific. In the negotiations held in May 1991 the US was granted the right to substitute between carriers serving Heathrow airport (that is allow United to use Pan Am's old slots). This was an extremely important right for US carriers. In return, the UK gained equally important fifth freedom rights from the US to serve Korea, Taiwan, Singapore, Malaysia, Indonesia, New Zealand and Australia.

Although strong growth rates have been forecast for the Asia Pacific region, this forecast growth should not be regarded as a solution to the financial problems that the world airline industry has experienced in the early 1990s (see chapter 6 for details on airline operating performance). Increasing competition international traffic of perishable and high value, low bulk products, air freight appears to have a promising future. The major uncertainty is whether the trend will be towards the use of dedicated freighter aircraft to transport cargo or towards increased use of the lower holds of passenger aircraft. The type of commodities which experience an increased growth in demand for air freight will affect these decisions.

Boeing (1993b, p. 61) forecasts that the dedicated freighter capacity share of the freight market will decline from 44 per cent in 1992 to 36 per cent by the year 2010. On the other hand, Felix Rio, President of Aeromexpress (*Air Cargo World* 1992, p. 54), suggests that the future will see passenger aircraft becoming more specialised with less capacity for freight. Dedicated freight aircraft will continue to serve a niche market for freight which has an origin–destination not easily accommodated by passenger airlines, and/or which is too large to fit in the lower hold of passenger aircraft. The very large freighter aircraft such as the Russian AN 124 are reported to have created new markets for air cargo (Gish 1992, pp. 71–3).

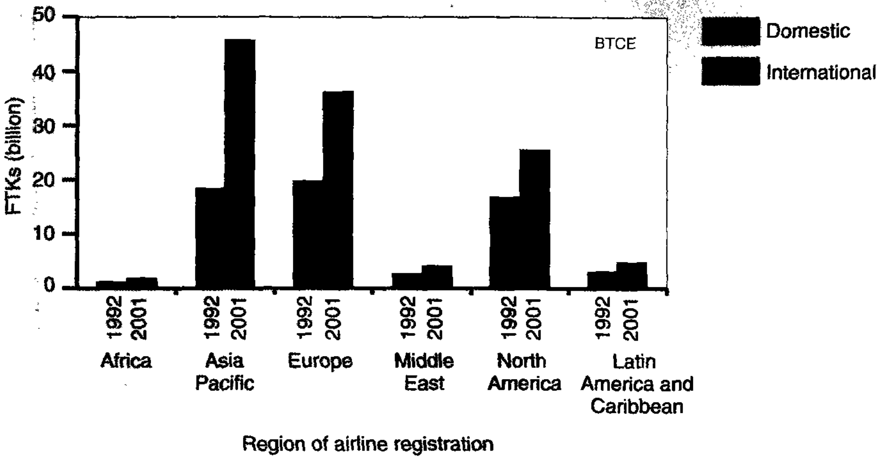
Mail carried on scheduled services accounted for a mere 1 per cent of estimated gross operating revenue of world (international plus domestic) scheduled and nonscheduled airlines in 1992. Mail tonne kilometres are relatively insignificant compared with FTKs, as shown in figure 3.13. Boeing forecasts (1993b, p. 3) that world mail tonne kilometres will grow at an average annual rate of 4 per cent over the period 1992–2010. This is almost three per cent lower than the forecast for average annual FTK growth. The basic characteristics of the freight and mail markets are different. Freight operations are concerned with the transmission of goods for trade, whereas mail operations are primarily concerned with the transmission of documents. The trend towards the electronic transmission of information is dampening growth in air mail.

Regional cargo traffic

Figure 4.7 compares FTKs performed by airlines in different regions, and shows that European airlines performed the largest number of scheduled international and world (international plus domestic) FTKs in 1992.[5] Like passenger traffic however, high growth is forecast for freight traffic in the Asia Pacific region. ICAO forecasts that by the year 2001 airlines in the Asia Pacific region will perform the largest number of scheduled international FTKs, equal to 42 per cent of international FTKs in that year. In addition, by the year 2001 airlines of the Asia Pacific will perform the largest number of world FTKs.

5. As with RPKs earlier, FTKs measured for each region are aggregated from the number of FTKs flown by each airline registered in the ICAO region. FTKs performed by the airlines registered in each ICAO region are not therefore a direct measure of FTKs flown in each region. FTKs by region of airline registration, however, are considered a reasonable estimate of FTKs actually flown in a region.

Figure 4.7 Comparison of regional FTKs: 1992 and forecasts for 2001



Notes See footnote 5 for notes associated with this figure.
For supporting data see appendix table II.28.

Sources ICAO 1993c; 1992d.

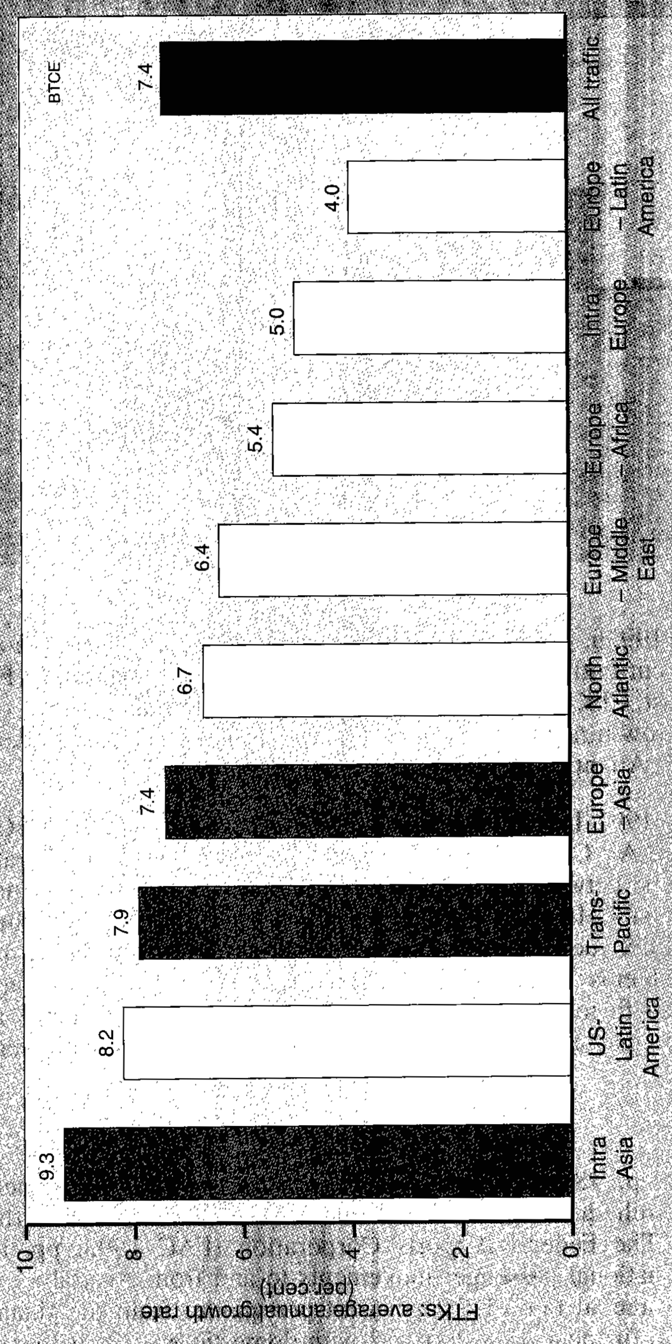
Boeing data (1993b, p. 16) show that the trans-Pacific, Europe–Asia and North Atlantic are currently the largest international freight markets. Figure 4.8 details forecast FTK growth rates in major international markets. As noted above, high growth rates for freight are expected in the Asian region, compared with the North Atlantic and intra European markets.

In November 1992 David Hartman, managing director of DRI/McGraw-Hill, speaking at the Air Cargo Forum '92, predicted the highest growth rates for air routes would be between Asia and Latin America, between Asia and Europe, and within Asia. He cited problems within the European Community, slow growth in the US economy, a decline in economic reform in the former Soviet bloc, and problems with GATT (General Agreement on Tariffs and Trade) negotiations as factors which might affect world trade and hence air cargo. Exchange rates may also be important in determining growth in air freight.

Australia

IATA (1992b, p. 48) forecasts average annual growth of 7.2 per cent in international scheduled passengers to and from Australia for the period 1992–1996. The Federal Airports Corporation (FAC 1993, pp. iii & vi), forecasts international passenger movements to and from Australia to increase at an average annual rate of 6.2 per cent per annum from the financial year 1991–92 to the financial year 2001–02 with domestic passenger movements to increase at an average annual rate of 4.0 per cent over the same period. The

Figure 4.8 Forecast FTK growth rates on major international routes 1992–2010



Source Boeing 1993b.

higher growth in international passenger traffic means that, as with the worldwide trend, international traffic will increase its share of the total Australian aviation market.

In line with forecasts that the Asia Pacific region will have an increasing role in international aviation in the future, ICAO's Pacific Area Traffic Forecasting Group (now the Asia/Pacific Area Traffic Forecasting Group) and the FAC forecast strong growth in traffic to and from Australia from Asian countries, Japan in particular. In the financial year 1991–92 traffic on Japanese and Asian routes accounted for 38 per cent of total international passenger movements to and from Australia. The FAC (1993, p. iii) forecasts that this proportion will increase to 46 per cent of total traffic by the financial year 2001–02. ICAO (1993d, pp. 29–30) believes that Japan will surpass Australia's current largest international passenger market, New Zealand, by 1997.

Australia may be well positioned geographically to take advantage of the strong rate of growth in air travel in many Asian countries. This is because the predicted strong growth rates within the region are based on journeys becoming increasingly affordable for people within newly industrialised countries (*Aviation Daily* 1991c, p. 529). The expected increase in short vacation trips, particularly from Japan and Korea, favours nearby destinations such as Australia. ICAO (1993d, p. 29) forecasts average annual growth of 14.5 per cent between Australia and Asia over the period 1992–1997.

Australian carriers have already indicated their interest in the Asia Pacific region. The gains from the Asia Pacific region will not be automatic, however, and there will be strong competition with airlines from the US, Europe and those within Asia. If a complex hub and spoke system develops in the international sphere, Australia is unlikely to be able to create complex hubs through any of its international airports, as it is an end of the line destination. Australia is more likely to provide spoke services to more complex hubs in the region. In the interim, international Australian and New Zealand airlines would maintain their own simple hubs (for example in Sydney and Brisbane) to assist in their individual networks.

Qantas has continued to develop a strong network in the Asia Pacific (Qantas 1992, p. 7), and multidesignation will allow other Australian carriers to take advantage of opportunities in the region. An established Australian domestic carrier, Ansett, and a new international airline, Australia Air, were allocated capacity on international routes from Australia to Asia Pacific destinations in 1993 (see chapter 5 for details). Ansett Airlines began services between Australia and Bali in September 1993. If Australian carriers are to gain a substantial share of the growth in the Asia Pacific market they will need to market their services effectively, develop extensive networks individually or through alliances within the region, and implement cost control measures in order to remain competitive.

INTERDEPENDENCE OF GROWTH IN AIR TRAVEL AND TOURISM

The demand for air travel is derived demand. Like the demand for all forms of transport, air travel depends on the demand for other goods and services such as holidays and business meetings (see chapter 2 for details). Leisure travellers account for the majority of aviation traffic, so trends in tourism will have a significant impact on the growth of aviation. This section examines how future developments in the travel and tourism industry will affect the development of international air traffic.

Expenditure on tourism is largely discretionary and subject to considerable variation over time and between regions. In 1990 the global travel and tourism industry contributed an estimated 5.9 per cent of world gross national product, generating $2900 billion gross output. It employed 1 in every 15.3 people making it the largest employer among global industries, and in 1990 it accounted for 6.7 per cent of worldwide investment (WTTC 1993, pp. 3, 17 & 21).

Continued strong growth in tourism is expected in the future. Future growth in tourism will be influenced by market forces within the tourism industry, and exogenous factors. Market forces that impact on the growth of tourism include marketing strategies for tourism, product development, and industry structure. Future developments in most of these market forces will see the tourism industry better able to meet consumer preferences, and this will promote growth in tourism.

Cleverdon (1992, p. 89) notes that the cost of the overall tourism product, and travel costs in particular, have fallen in real terms in the past due to technological advances, economies of scale and increases in competition. He notes also that the decreases in the real cost of tourism were accompanied by falls in the price to the consumer of air travel and tourism. The fall in the real price of air travel and tourism increased the affordability of tourism, and this boosted traffic growth. Future changes in the price to the consumer of tourism (including the effects of exchange rate movements) will have an important influence on growth in tourism.

The exogenous factors that affect traffic levels and tourism growth are social changes, changes in demographics, political changes and economic growth (including changes in disposable income). Social changes in the past have increased consumers desire to travel. Anthony Edwards, a specialist in quantitative tourism forecasting, conducted a study called *International Tourism Forecasts to 2005* for the Economist Intelligence Unit. The study examined factors affecting growth in international tourism. Edwards (1992b, p. 224) notes that during the twentieth century higher levels of education worldwide, improvements in the safety and ease of travel, and increased global communications made people aware of the possibilities for travel and this increased consumers' preferences for tourism products. Cleverdon (1992, pp. 88–9) notes that an increase in leisure time, and an increase in ethnic ties between developed and less developed countries will provide impetus for future strong growth in tourism.

Future demographic changes will also increase the ability of consumers to undertake tourist activities. Cleverdon (1992, pp. 88–9) believes that aging of the world's population, earlier retirement ages, an increase in the number of women in paid employment, and faster than average growth in households with no dependents will all boost future tourism growth. An example of the rapid changes that will take place is in Europe where, in the 1990s, the proportion of the population over 60 years of age will increase by 10 per cent (OECD 1992b, p. 19).

Political changes have the ability to either increase or decrease the level of tourism. Relaxation of travel restrictions and easing of foreign exchange controls will allow growth in tourism to and from the countries that maintained travel and foreign exchange constraints in the past. Regional conflicts, however, have the potential to severely constrain tourism growth both to and from the areas in question, due to a perceived decrease in safety and disruptions to travel and tourism services.

Increases in economic growth, hence increases in disposable income, tend to increase the level of tourism because people can then afford to spend more on travel. Future increases in income will lead to increases in the level of tourism, in particular in the high growth countries, such as some in the Asia Pacific.

Based on expected increases in income and the other changes described above, the World Tourism Organisation forecasts growth in international tourist arrivals of 4 per cent per year during the 1990s (Cleverdon 1992, p. 91). This level of growth is within the range of possible growth rates projected by Hiemstra (1991, p. 65). In addition to the overall growth trend for tourism there are indications that there will be a future trend towards an increase in the frequency of trips (Airbus Industrie 1993, p. 10; World Travel and Tourism Review 1992, p. 81). What are of interest to the aviation industry are the characteristics of future growth in tourism that will particularly influence growth in aviation.

Choice of mode is an important decision. For a leisure traveller the choice of mode is affected by the destination(s) the tourist wishes to visit, the safety and convenience of the different modes, and the price of the different forms of travel. For international travel, distance travelled and geography are particularly influential in mode choice. The longer the distance travelled the more convenient air travel becomes. In terms of geography, separation of countries by oceans and/or difficult terrain promotes the use of aviation services.

In the Asia Pacific, the Americas and Europe the majority of international tourist arrivals are intraregional travellers (that is, from within the same region). In 1991 63 per cent of international tourist arrivals in the Asia Pacific travelled by air compared with 45 per cent in the Americas and 26 per cent in Europe (WTO 1993, pp. 42, 64, 88 & 122). In some cases, such as in the Americas and Europe, land based transport is a viable substitute for aviation travel. The short distances between countries in Europe, in particular, provide competition for aviation services from road and rail, whereas in most cases there are limited alternatives to aviation in the Asia Pacific.

Increases in the travel budgets of tourists are likely to promote longer haul travel. In the long term, general economic growth as well as the social, demographic and political changes noted above may increase the budget of tourists, and their higher propensity to undertake longer haul travel will boost aviation (in particular international aviation) traffic growth.

Another factor that will particularly influence growth in aviation is changes in air fares. Hooper (1993, pp. 37–8) conducted a study on elasticities of demand for air travel and found that consumers tend to allocate a set proportion of their tourism budget to travel. As air fares fall the real purchasing power of the tourist's budget increases. Hooper (1993, p. 37) also noted that, rather than switching some consumption to other tourism goods and services, however, the tourist tends to absorb the increase in purchasing power by travelling to destinations which are further away (that is the tourist will visit longer haul destinations).

Boeing (1993a, p. 2.18) and Airbus Industrie (1993, p. 10) forecast overall falls in real air fares and yields during the 1990s, while Edwards (1992b, p. 152) forecasts real fare decreases in most regions up to the year 2005. The decrease in the price of air travel in the 1990s will increase long haul travel. Edwards (1992a, p. 20) forecasts that long haul travel is likely to increase from 13.3 per cent of all international tourist trips in 1989 to 15.4 per cent of all trips in the year 2000.

The increase in the desire and propensity of consumers to undertake tourist activities will boost aviation traffic growth in the future. Aviation traffic will be boosted by an overall increase in tourism expenditure, especially an increase in the frequency of trips and the proportion allocated to air travel.

The above discussion focused on factors likely to influence international aviation growth in general. As noted previously the highest growth in international traffic is forecast for the Asia Pacific region. IATA (1991b, p. 6) attributes high aviation traffic growth rates in this region to:

- strong economic growth rates within the region, estimated at almost twice that of Europe or the US;
- increased disposable income;
- greater political stability in the region;
- further relaxation of travel restrictions in some countries;
- ethnic ties;

- increased leisure time; and
- tourism promotion.

International aviation is an important component of the tourism industry and can affect its success or failure. For any destination, access to the tourist market is influenced by a number of factors, including bilateral air service agreements, which determine the routes and capacity levels available for designated airlines (see chapter 5 for details). Any constraints on the future growth of aviation also have the potential to constrain tourism growth, and vice versa. The impact of infrastructure constraints are discussed later in this chapter.

Australia

Many nations rely on income generated by the tourism industry. In Australia, the Bureau of Tourism Research (BTR 1992c), a government authority providing a national focus for the collection, dissemination and analysis of official tourism statistics, estimated that for Australia international tourism contributed 1.8 per cent to GDP in the financial year 1991–92 and generated 144 000 jobs (domestic tourism contributed a further 3.8 per cent to GDP and generated 322 000 jobs).

The important link between international aviation and Australia's tourism industry was recognised in the 1989 statement by the then Minister for Transport and Communications, the Hon. Ralph Willis, MP (Willis 1989), and again in the 1992 statement by the then Minister for Shipping and Aviation, Senator the Hon. Bob Collins, who noted that tourism accounted for 10 per cent of Australia's total export earnings in the financial year 1990–91 (Collins 1992a). The policy of the Australian Government places importance on the wider benefits for the nation to be gained from more liberalised air services.

In 1992 there were 2.6 million short term visitors to Australia (ABS 1993, p. 3). The Bureau of Tourism Research forecasts the number of international visitors to Australia to increase by 40 per cent from 1992 to 3.64 million by 1996, and 5.15 million by 2001 (BTR 1992b, p. 29). Australia's largest source of international tourists is Japan, with 24 per cent of the Australian market in 1992 (BTR 1992c). The number of Japanese visiting Australia increased by 80 per cent between 1989 and 1992. The proportion of Japanese overseas travellers visiting Australia increased from 3.6 per cent of the total Japanese outbound market in 1989 to 5.3 per cent in 1992 (JNTO 1992, p. 10; JNTO pers. comm., 1993).

Tourist numbers from other areas in Asia showed marked increases in 1992 on 1991. These increases included Taiwan (83 per cent), Korea (42 per cent), Thailand (36 per cent), Singapore (33 per cent), Malaysia (26 per cent), Indonesia (24 per cent), and Hong Kong (19 per cent) (ABS 1993, p. 4). With a recession affecting the Japanese economy and spending by Japanese tourists in

Australia declining (BTR 1992a, p. 101; BTR pers. comm., 1993), the additional growth markets had an importance in diversifying origin markets for tourists visiting Australia. The Australian Tourist Commission, a statutory authority established to market Australia internationally as a tourist destination, also recognises the potential of China, initially a very small market in the early 1990s. Australia's more traditional markets such as the UK, US, New Zealand and Germany remained important, although visitors from New Zealand, Canada and the US declined in numbers in 1992 (ABS 1993, p. 4).

In 1993, the Australian dollar depreciated against other currencies, making Australia relatively cheaper for overseas tourists, while at the same time overseas destinations became relatively more expensive for Australians travelling overseas. It is anticipated that these exchange rate changes will boost growth in overseas visitors coming to Australia and dampen growth in Australians travelling overseas.

Future Australian tourism and related aviation traffic to and from Australia is expected to show significant growth. The World Travel and Tourism Review (1992, p. 84) notes that the staging of special events, as well as increasing tourist numbers visiting the destination because of the event, can contribute to general growth in tourism to the destination. This was evident in the peak in traffic in 1988 for Australia's Bicentennial celebrations and Expo. Sydney will be hosting the Olympics in the year 2000, and this will boost tourism during that period and may also generate benefits in higher levels of tourism as a result of Australia's higher profile. In addition to the attraction of the Australian environment, Australia has the advantages of political and social stability, with a relatively high level of personal security for tourists.

In order to maintain and expand this source of foreign income, it is important that Australia's accessibility to the international tourism market is maintained. Australia's international tourism industry is almost entirely dependent upon air transport. There are few substitution possibilities to air travel for visiting Australia, due to its island status, geographic isolation from the major population centres of the world, and the limited time most business travellers and tourists, (particularly Asian tourists) have available for a travel or holiday package.

Constraints on capacity levels may reduce the number of tourists, although this is not necessarily so if capacity on a route exceeds demand. The Centre for International Economics (CIE 1988, pp. 40–8) has suggested that, even if numbers are affected, this may not have a significant economic impact if the only tourists who reduce their demand are those who provide a low yield to Australia through low spending pattern. These would be the ones most likely to be affected by higher air fares through constraints on competition and capacity on a route. This reflects the point that the economic value of tourism should not be measured in terms of numbers of passengers only, but rather in terms of the economic effect generated by expenditure per visitor.

The Bureau of Tourism Research estimates that yield per tourist varies, not only in total, but on a per day basis. In 1992 Japanese tourists visited Australia for an average of 9 days and on average spent $A1241 over their whole trip and around $A143 per day. British tourists visited for an average of 47 days and spent on average $A2174 over their whole trip and around $A47 per day in 1992 (BTR 1992a, p. 101; BTR 1993). The comparative value of each can be measured in different ways, whether by total expenditure per visit or by expenditure per day. It might even be appropriate, though difficult, to value tourism on a 'profit' basis, after subtracting economic and social costs. The extent to which tourists compete for resources, resulting in the possibility of more 'economically valuable' tourists being crowded out by other tourists, is one economic cost that would need to be considered (CIE 1988, p. 46).

The significance of a previously downplayed market sector, the backpackers, is being reassessed on this basis. In 1992 the Bureau of Tourism Research found that 9 per cent of total inbound tourists were backpackers (BTR pers. comm., 1993). A study by Jeff Jarvis (Australian Tourist Commission 1993a, p. 1), Monash University Graduate Tourism Program 1992, calculated that the yield for accommodation for backpackers was 5.8 times greater than that for accommodation for Japanese tourists and that the market was worth $A1.5 billion per year to Australia.

Jarvis found that the average backpacker spent more than $A7500 on their whole trip at around $A40 per day; this compares with an average for all tourists of $A1760 for their whole trip at around $A69 per day in 1992 (Australian Tourist Commission 1993b, p. 6; BTR 1993). Although average expenditure per day is lower for backpackers, an additional benefit of travellers in this market is that they are likely to travel to Australia again. Jarvis (Australian Tourist Commission 1993a, p. 3) found that 40 per cent of backpackers intended to return to Australia within five years.

The Australian Government allocated $4 million for backpacker market promotion over four years, and in early 1993 Qantas targeted British travel agents specialising in backpacker sales (Tolhurst 1993, p. 40). A study by Loker, of James Cook University (Australian Tourist Commission 1993b, p. 8), forecast an increase of 196 per cent in the number of backpackers travelling in Australia by the year 2000 from the early 1990s.

As noted previously, growth in aviation is determined, in part, by travel and tourism growth, but may be constrained by a lack of adequate infrastructure to cope with the increase in demand. The next section outlines the three areas where inadequate infrastructure may cause problems for growth in aviation traffic.

CONSTRAINTS TO GROWTH: INFRASTRUCTURE AND CONGESTION

The aviation industry requires the provision of infrastructure for its operations. Infrastructure may be broken down into three major areas: air traffic control (ATC), airport services (that is, support services for aircraft movements) and terminal facilities. All three areas are critical to the operation of the aviation industry. Infrastructure requirements in a number of countries have not kept up with the growth in demand for air transport. This has led to increasing congestion in the air, on the runways, and in the terminals of a number of international airports. It is important to understand the nature of the infrastructure inadequacies, because the aviation industry's plans are premised on forecasts for long term growth. The expectation of continued growth could be seriously constrained if the issue of inadequate infrastructure is not addressed.

A related area of infrastructure provision is that of ground transport services for passengers and freight to and from airports. At some airports (such as Tokyo-Narita and Bangkok) major bottlenecks occur because of inadequate infrastructure links between the airport and city centre. Appropriate integrated planning for such transport services is important, because land transport congestion has increased and the demands of aviation on land infrastructure have also increased. Ground transport is not analysed in this paper, but is worthy of further study.

Congestion creates direct costs for the airlines and consumers. In 1989 airport delay in Europe was estimated by the Association of European Airlines (Boeing 1992a, p. 2.36) to cost over $5 billion a year, and these costs could reach $10 billion a year by the year 2000. In 1992 the US Air Transport Association (IATA 1993a, p. 17) estimated US costs at $2 billion for crews, and the costs of operating delayed aircraft plus costs to passengers of $1 billion. The growing pressure of increased air travel on world aviation infrastructure may limit growth and restrict the benefits from aviation services over the next decade.

Air traffic control

A 1990 IATA (1993a, p. 16) study on congestion in Europe reported that 25 per cent of all flights in Europe were delayed by over 15 minutes. In the US, the Federal Aviation Administration (FAA) estimated an average flight delay of 16.6 minutes in 1989; this is equivalent to 500 aircraft sitting on a tarmac with their engines on for the year (IATA 1993a, p. 17).

In May 1992 the Association of European Airlines (AEA) reported that 21 per cent of European flight departures were delayed by more than 15 minutes, compared with 15.3 per cent for May 1991 (Moxon 1992a, p. 8). In early June 1992 IATA predicted significant delays throughout the European summer. AEA estimated that 400 000 passengers on 2600 flights were delayed each day at European airports, and held a 'Day of Action' on 15 July 1992 to publicise ATC problems in Europe.

A 1992 study conducted for Eurocontrol, an umbrella ATC organisation in Europe, revealed that aircraft movements within the airspace of 15 of its participating countries rose by 8.2 per cent for the first nine months of 1992; over the same period in 1991, however, overall levels of delay did not increase (*ITA Press* 1993a, p. 15), indicating perhaps that, while delays increased over some peak periods, delays may have been reduced at other times. While the predicted collapse of ATC in Europe in the summer of 1992 did not occur, a study commissioned by IATA showed that without improvements European ATC would be unable to cope with increases in traffic beyond 1995 (Meredith 1991, p. 43). The increasing inability of ATC systems to cope with growth in traffic is exacerbated by problems in Eastern Europe and states of the former USSR, where ATC infrastructure is often old and ownership is unclear due to the fragmentation of the USSR. This is significant as traffic routes in the area are being further opened up for flights between Europe and Asia, and for flights across the North Pole.

Congestion in the air will continue to increase unless there are developments in the ability of air traffic management systems to handle higher traffic densities. Developments can take the form of either technical or operational improvements. Technical developments in the area of satellite based navigation and communications already exist and are currently being tested. The Future Air Navigation System (FANS), developed by a special committee of ICAO members, is an operational system based on satellite technology which will initially enhance and eventually replace much of the terrestrial based navigation and communication systems in place today. Before FANS can be implemented, however, some important issues will have to be resolved. These include cost to users, ensuring equal access to all users, and guaranteeing continued availability of satellite services (satellite services may be provided by military satellite systems operated by the US and states of the former USSR).

The quality of the service is also a significant issue. The US Department of Defense proposes to provide a service for civilian users with a navigational accuracy to 100 metres, whereas the system has the ability to provide accurate positioning to within 10 metres. The higher level of accuracy would allow the system to be used for precision landing and take-off, reducing or eliminating the need for additional ground based instrument approach systems.

The Inmarsat satellite system is a possible alternative to the military satellite systems of the US and states of the former USSR, and may be upgraded to allow for navigational use, avoiding the problem of the lower quality offered by the US military and questions regarding access in a time of war. The development of FANS, together with improved supplementary radar installations and ground based communications, should make higher density air traffic feasible, with more economical operation due to better meteorological reporting (Bailey & Phelan 1992, p. 26; Moorman 1993, pp. 36–43).

It is the operational areas which provide significant barriers to improved air traffic management. Europe provides an example of the problems, with 55 ATC centres (more than twice the number of the US) 31 control systems, 22 operating systems with differing operational standards (such as separation standards), 18 different computer hardware suppliers, 70 different programming languages, and inadequate communication between ATC centres (Labich 1992, p. 25). The agreed solution is an integrated ATC system for Western Europe. The European Civil Aviation Conference (ECAC) endorsed a plan 'Strategies for the 1990s' to integrate ATC systems (Transportation Research Board 1992, p. 33), and expects to spend over $4 billion on ATC developments (Macgregor 1992). Some Eastern European countries also have been accepted for integration in the European ATC system.

Implementation of an integrated ATC system is slow, however, due to: political considerations (primarily national sovereignty) resulting in a lack of centralised control; the high cost of standardisation; a shortage of trained controllers; and the complexity of the task. A single ATC system is not expected until next century (Labich 1992, p. 25).

Continuing military demands for airspace in Europe, despite some reduction in international political tensions, further contribute to the difficulties in managing airspace (Reed 1992a, p. 77). In January 1993, French civil aviation authorities sought the transfer of a number of air corridors previously reserved for the military to civil air traffic (*Interavia Air Letter* 1993a, p. 2). This limitation of airspace use is a constraint faced by civil aviation in many countries throughout the world.

The Asia Pacific region also contains a wide disparity in equipment, training and operational standards. In addition, it has the problem of large areas of uninhabited territory over which accurate surveillance and communications have, until now, been difficult. This has resulted in an inefficient use of airspace in a region exhibiting growing demand for air traffic services. The minimum separation between aircraft in the Asia Pacific when out of radar range is between 185 and 370 kilometres, compared with 110 kilometres in the North Atlantic region. The problem is being tackled at a regional level, with the introduction of standardised and coordinated systems and the establishment of a 15-country Asia Pacific air navigation planning and implementation regional group. Some countries and airlines in the region are conducting trials of advanced satellite based air navigation and communications systems (part of the FANS system); however, some countries have difficulty in financing such systems from limited budgets. Australia has played a significant part in the development and testing of FANS technology (*Aerospace Yearbook 1992* p. 66; Bailey & Phelan 1992, p. 24; Stackhouse 1992, pp. 33–5).

Added to the ATC difficulties is the problem that one country acting alone over its sovereign airspace (the traditional approach in air transport) cannot effectively address the problem. It is ATC, unlike airport services and terminal facilities, which requires a multinational approach. In the mid 1980s it was recognised that congestion was becoming a major problem in aviation throughout the world. The IATA Congestion Task Force was set up in 1988 to represent the suppliers and users of infrastructure. This group has identified and lobbied governments to act cooperatively at a regional level to ensure adequate ATC infrastructure to meet forecast growth in air transport services.

Airport services

As with ATC, congestion in landing and take-off slots at airports is increasing, with more than 100 major city airports in Europe, the US and the Asia Pacific region experiencing congestion problems (Endres 1991, p. 113). IATA's 1989 report on European congestion found that without major upgrades, out of 27 major airports 11 would reach their operating limits by 1995 and another 5 by the year 2000 (Meredith 1991, p. 43). The most seriously affected are Frankfurt, Madrid, Gatwick, Heathrow and Barcelona. A study conducted for IATA by the Strategic Research Institute in 1990 concluded that the most serious airport constraints in Europe were located in Germany; this conclusion was reaffirmed by IATA in 1992 (Windmuller 1992, pp. 15–16).

On the other hand, a study conducted for British Midland Airways (O'Toole 1993a, p. 14) determined that Heathrow Airport operated at 99.7 per cent of its operating limit at peak times, whereas Frankfurt Airport operated at 97 per cent of its limit (and this percentage is likely to reduce as the US military reduces its presence in Europe), Paris – Charles de Gaulle operated at 73 per cent of its limit and Amsterdam's Schiphol operated at only 66 per cent. Slots at Heathrow airport are in high demand and are valued in terms of millions of dollars. American Airlines paid $445 million for three of TWA's US–London routes and United paid $400 million for Pan Am's US–London routes (*Economist* 1993a, p. 11). These prices reflect the importance of Heathrow as a point of embarkation and/or disembarkation.

Only one new airport, Munich 2, has been constructed recently in Europe, with plans existing for other airports near Athens, Oslo and Berlin (Boeing 1992a, p. 2.36). Runway expansion is planned at six major airports: Paris – Charles de Gaulle, Stockholm, Amsterdam, Madrid, Manchester and Barcelona, in conjunction with procedural changes at airports throughout Europe in order to meet the 4 to 6 per cent expected annual growth rate over the next 15 years. Airbus Industrie (1993, p. 27) notes that current strategies are aimed at increasing airport capacity in Europe by 30 per cent up to the year 2010.

Bernstein (1992, pp. 98–9) compared forecasts for growth in aircraft movements in Europe to the year 2010 with an increase in airport capacity of 30 per cent and found that under this scenario the relationship between airport capacity and the number of aircraft movements will return to 1992 levels shortly after the year 2000. Under these circumstances Airbus Industrie (1993, p. 27) believes that airport capacity will begin to limit aircraft movement growth early in the next century. The EC, concerned that airport constraints could affect its single aviation market program, has reviewed slot allocation mechanisms. Other airports such as Vienna and Hanover see themselves as potential hubs for Europe due to their location, and are seeking to expand their airport capacity. Eastern Europe also is seeking to expand airport capacity to cater for an expected increase in demand; Goold (1992a, pp. 32–5) believes the main problem in Eastern Europe is one of finance.

In the US, approximately 90 per cent of all traffic has its origin or destination at a complex hub (Boeing 1992a, p. 2.37). An airport's strategic planning is closely linked with those airlines which use the airport as a hub. Privatisation of airports is an issue under consideration in the US. Local authorities are encouraged to sell their airports, with the US Government providing financial incentives (Goold 1992a, pp. 31–2). Kennedy and LaGuardia in New York, O'Hare in Chicago and Washington National airports had slot controls introduced in the late 1960s under the High Density Rule (HDR) (Donoghue 1992, p. 5).

In 1993, Airbus Industrie (1993, p. 24) reported that 33 major airports in the US had existing, or potential near term operating constraints. Only one new airport is under construction, at Denver (Boeing 1992a, p. 2.37); however, 26 major airports are in the process of building or planning new runways (Airbus Industrie 1993, p. 25). Chicago considered another airport to supplement O'Hare airport. Alternative proposals were made for a development at least 50 kilometres from Chicago's central business district, with costs varying from $4 billion to $18 billion (Brogden 1992, p. 5). In October 1992 the project was abandoned, and replaced by proposals to upgrade O'Hare and Midway airports (*ITA Press* 1992c, p. 13).

The Asia Pacific region is another problem area for airport congestion due to the rate of increase in air travel in the region. A survey by the Triple-T Task Force of the Pacific Economic Cooperation Committee (1993, p. I–4) found that 19 airports in the Asia Pacific catered for more than 80 per cent of international traffic in the region. An IATA study (1992a, pp. 8 & 26) forecast increases in traffic between 1990 and 2010 of 500 per cent for Japan, 500 per cent for Thailand, 450 per cent for Taiwan, 400 per cent for Singapore, 400 per cent for Australia, 320 per cent for Hong Kong, and 300 per cent for Hawaii. The study found critical congestion problems at seven airports, which in 1990 accounted for two-thirds of the region's international traffic: Bangkok, Bombay, Hong Kong, Tokyo-Narita, Osaka, Seoul and Sydney.

Japan faces constraints on existing infrastructure, proposed upgrades and the construction of new airports as a consequence of a shortage of land available, environmental restrictions (stringent noise curfews apply), and political difficulties. The most ambitious new airport development is the new Kansai Airport which will operate for 24 hours a day on an artificial island five kilometres offshore in Osaka Bay. The timetable for the completion of this project has been set back due to greater than expected subsidence of the island, but the airport is expected to become operational in 1994. Until then, no new slots are available for proposed services into Osaka, a situation which has applied since 1976.

Tokyo-Narita airport, which handles around 60 per cent of Japanese international travel, also has no new slots available, although a new terminal should ease passenger congestion (BTCE 1992a, pp. 34 & 66; *Asian Aviation* 1992c, p. 58). In addition to the expansion of airport capacity, the Japanese Government has implemented a countrywide program to upgrade regional airports as centres for domestic air services, to take pressure off congested major international gateways.

Hong Kong is another country facing infrastructure constraints. Kai Tak airport, the existing international airport, is expected to reach its operating limit in 1994 and was reported to have almost no slots for new entrants in late 1993 (*Aviation Report* 1993b, p. 6). The new Chek Lap Kok airport being built is due to open in 1997, leaving a considerable period where expansion of services will be constrained. It appears that nearby airports at Macau and Shenzhen (in China) may by used by airlines as a substitute for Hong Kong. Other nations such as Taiwan, Korea and China plan upgrades and new airports. At present only Changi Airport in Singapore has spare airport capacity among the region's major airports. New airports planned for Bangkok and Kuala Lumpur prior to the year 2000 may challenge Singapore's position as regional hub. Kingsford Smith airport in Sydney also experiences congestion problems in peak periods, although the planned opening of a third runway in 1995 will help alleviate this problem.

Airport developments worth an estimated $85 billion are being undertaken through the 1990s to meet growing demand throughout the world (*Airports International* 1991, p. 3). Projects worth $35 billion are being undertaken in the Asia Pacific region, with Kansai Airport accounting for nearly one-third of this amount. Europe has projects worth S25 billion, North America $20 billion, and the rest of the world $5 billion. This level of development, however, does not match the extent of the problem, which is exacerbated by the lead time required to plan and construct the facilities.

Many nations have plans for major works but lack capital and, at times, face acute opposition to airport expansion or development from public groups including environmental groups. Construction of a new airport at Bangkok was delayed due to the cost (Brogden 1992, p. 7), with construction now due to be completed around the year 2000 (*Aerospace Yearbook 1992*, p. 73). Japan has faced significant opposition to its airport developments, by landowners in particular. Most of the major airports in the Asia Pacific are run by governments, but, with increasing capital requirements and a changing political and social environment, nongovernment entities running airports may be a trend in the future (Triple-T Task Force 1993, p. IV-136). The CAAC, for example, is looking for foreign investors to assist in the financing and development of infrastructure to meet future needs in China (*Flight International* 1993c, p. 13). Congestion at major airports offers opportunities for development at secondary airports, for example, Cairns, Brisbane and Adelaide in Australia; Manchester in England; and Nagoya and Fukuoka in Japan.

Slot allocation

It is expected that pent-up demand will ensure that in some cases the 'solution' to airport congestion problems in the form of new airports or expanded facilities, will be saturation solutions. That is, the solution will offer short term relief to congestion but leave little or no unused airport capacity to meet future growth. In these cases airport authorities have considered alternative ways of controlling congestion. One method is to treat existing landing and take-off slots as scarce resources and try to allocate them in a manner that reduces the need to continuously increase airport capacity. A number of different methods of allocation exist.

Balinski and Sand (1985, pp. 179–92) categorise slot allocation schemes as either administrative or competitive. Administrative schemes included scheduling committees, first come first served allocation, proportional allotment on the basis of set guidelines, lotteries with probabilities influenced by predetermined factors, and fees based on time and/or demand. Competitive schemes are based on market mechanisms and include auctions. The latter could include a series of auctions, either simultaneous or sequential, for slots at a number of airports; an auction with a subsequent market for buying and selling slots among airlines; or repeated auctions. Another issue requiring determination is the life of the allocation: do slots have a finite time with a subsequent reallocation, or an indefinite life? In the latter case will there be any provision for reallocation under predetermined or unexpected circumstances?

Allocation of the scarce resource of landing and take-off slots at congested airports is a contentious issue. Assuming that some form of allocation is necessary, controversial issues associated with slot allocation include:

- arguments over the equity and efficiency of the different methods of slot allocation;
- the appropriate level of charges for slot use;
- whether there should be discrimination according to ability to pay;
- the issue of grandfather rights, which can raise barriers to entry in congested markets leaving new entrants out of prime airports; and
- questions on how any money made from the allocation of slots is to be spent and whether it is to go into consolidated revenue or is to be returned to the industry through upgrading and other infrastructure provision.

The sensitivity of this last issue can be seen in the decision by the EC to exclude consideration of slot allocation from the third package of reforms introduced in June 1992, although slot allocation rules were subsequently adopted in 1993 (see appendix IV for details).

A number of different types of slot allocation mechanisms have been tried. The US introduced a pricing mechanism for slots in 1986. The scheme operates through a system of buying and selling slots together with a one-off reallocation of slots taken from existing slot holders. It also introduced 'use it or lose it' provisions, under which slots not used for at least 65 per cent of the time in a two-month period are forfeited to the FAA, with a lottery system used to reallocate surrendered slots. A 1991 report on US slot allocation commissioned for the European Community's Transport Directorate found that there has been little surrender of slots, and of those slots reallocated to new entrants or small carriers, only about 7 per cent were still in use by the original recipient; the rest had been sold or acquired as part of a merger.

In late 1992 provisions for existing slot holders were tightened, so that airlines not using slots at least 80 per cent of the time could lose them (*Air Transport World* 1992c, p. 10). There has been a large number of transactions of slots at the four HDR airports, where there are limits to the number of authorised flights, but this trend has declined and has not facilitated the entry of new airlines, with existing carriers accumulating surplus slots and leasing them out rather than selling them. Most sales of slots were exchanges between partners or with cargo companies rather than outright sales. The EC report noted that this had occurred at a time of contraction in the industry and, with one exception, there was no evidence of any potential new carrier being frustrated in attempts to enter HDR airports (*Avmark Aviation Economist* 1992a, p. 3).

In Australia, Sydney (Kingsford Smith) Airport was faced with congestion problems during peak periods in the late 1980s. In April 1989 the FAC (1991) adopted a strategy that avoids the issue of specifically allocating slots, seeking instead to reduce demand at peak times through user charging. The UK also uses peak period pricing (Tretheway & Oum 1992, p. 96).

From April 1989 a landing charge applied to all general aviation aircraft landing at Sydney airport during the morning and evening peak periods. In January 1991 this was replaced with a two-tier charge breaking the peak periods up into shoulder and peak periods; charges during the shoulder period applied only to nonregular public transport movements (that is, to aircraft other than scheduled commercial passenger aircraft), but charges during the peak period applied to all aircraft. Taylor (1992, pp. 63–4) suggested that such a method of controlling congestion has the disadvantage of not requiring operators to schedule realistic arrival and take-off times, with the result that scheduling is often clustered and a number of aircraft are queued for landing and take-off, with consequent delays, waste of fuel and additional pollution. Taylor (1992, p. 63) noted that one result of the charges was that traffic during the shoulder period increased at a rate greater than the average.

The alternative method to slot allocation or user charging for reducing congestion is the continuing construction and expansion of airports. Adoption of the latter strategy may not lead to an economically efficient solution. It would mean that users of this asset would not bear the full economic cost; and it may ignore or undervalue the associated social and environmental costs of such increases in airport capacity. Pricing options may be more effective solutions to airport capacity problems than additional investment in infrastructure. The demand for access to airport landing and take-off slots is generally clustered in peak periods. Appropriate pricing will reduce the congestion in peak periods, transferring demand into periods surrounding the peaks. Where such pricing does not eliminate all congestion then investment in additional infrastructure may be warranted.

Slot allocation can therefore be used either to establish a pricing mechanism for a scarce resource or to open or limit access to airports on a noneconomic basis. For example, slot allocation could be used to facilitate entry of new carriers or access by a class of airport users such as general aviation. The difficulty is in reconciling the competing objectives through slot allocation while establishing an appropriate level of capacity for the airport.

Airport passenger terminals

Many of the factors affecting congestion for airport services also affect congestion at passenger terminals. While congestion in the air and for airport landing and take-off slots is dependent upon the number of aircraft using these services, congestion at terminals is dependent not only on the number of aircraft but also on the number of passengers being carried on those aircraft.

As congestion in landing and take-off has increased, airlines, particularly those in the Asia Pacific region, have sought to increase the size of aircraft to limit the increase in aircraft movements. This has caused problems at terminals as airports have had to accommodate larger (longer, bigger wingspan, heavier) aircraft parked around terminals that may not have been designed for such aircraft. The terminals must also process larger 'batches' of passengers, resulting in passenger traffic peaks which continue for a longer period.

Boeing (1992a, p. 2.36–2.38) noted that during the 1980s, many airlines switched to using smaller aircraft on short to medium haul routes in order to increase frequency to try and capture market share. With the expected increase in demand for air travel and the pressure on ATC and airport landing and take-off slots in the future, both the number and the average size of aircraft are likely to increase. This is supported by the interest shown by airlines, especially Asian airlines, in buying still larger aircraft (*Asian Aviation* 1991, p. 11). Congestion at terminals will therefore continue to increase, although it appears to be the least pressing area of congestion at present.

In addition to the construction of new terminal facilities to meet expected future demand, developments have occurred in the processing of passengers to minimise delays and avoid problems such as lost baggage. These have included the development of an automated ticket and boarding pass (ATB), a combined, magnetically encoded flight coupon/boarding pass, and machine readable baggage tags, passports and visas. Under consideration by a number of countries is Advanced Passenger Information, whereby passenger information is forwarded to customs and immigration authorities at the arrival point prior to arrival to assist passenger processing, and EDI, whereby the many aspects of information exchange necessary for aviation operations can occur electronically (*IATA Review* 1992, pp. 19–20). Australia, New Zealand and the US are already operating an Advanced Passenger Information system.

A likely development in aviation is a blurring of the distinction between international and domestic aviation services. There is the possibility of flights carrying international and domestic passengers (complicated where some passengers are from countries within a common border arrangement and some are not) requiring different facilitation services in areas such as customs, immigration, quarantine, health and security. The EC is examining single clearance for entry into the EC so that after entering an EC member country, passengers and cargo do not have to clear customs and immigration at the borders to other EC member countries. As with many other areas, issues associated with passengers are taking longer to agree on than arrangements for cargo.

Australian airports face this change: the previous Qantas (international) and Australian Airlines (domestic) services integrating their operations; Ansett providing international and domestic services; the possibility of Air New Zealand providing international and domestic services in Australia under the Australia – New Zealand single aviation market. In some instances it will require the redesign of terminals and changes in processing procedures to allow movements of passengers with different processing requirements through the same gates. In other cases it requires new terminals, and sophisticated transit systems between existing terminals to allow seamless international and domestic operations by airlines.

Some creative and innovative solutions to infrastructure constraints will be needed if future growth is not to be constrained (or diverted). Part of the problem is that solutions require the cooperation of a number of countries, plus time, and capital, before congestion problems can be alleviated. An area of potential conflict is the different viewpoints of airports and airlines, with each often having different objectives for bilateral air service agreements, slot allocation and overall airport management. For instance, airports may seek to open up a market while airlines may seek to limit competition and maintain the status quo. As a last recourse, financial imperatives will force steps to be taken to meet changing infrastructure needs, but many countries may face considerable dysfunction of air transport services before the level of cooperation, capital and action is harnessed to solve problem spots.

While some countries may experience adverse effects from infrastructure inadequacies, these inadequancies may provide opportunities for other countries to pursue a new or bigger role in the provision of international aviation infrastructure as a second best option. This offers some local development benefits but may not provide an optimal solution in the medium term.

CONCLUSION

International aviation traffic is forecast to continue growing for the rest of the 1990s and into the next century. International passenger traffic is set to increase in importance as this sector of the world (international plus domestic) aviation industry grows. Growth in tourism through increases in economic growth will provide most of the impetus for growth in aviation. Strong economic growth in the Asia Pacific region will see this area become more important in international aviation, although growth in the larger, more developed markets will still be significant. Cargo traffic will also grow at a significant rate into the next century.

Aviation traffic is dependent on adequate infrastructure provision. Increases in congestion may begin to influence patterns of aviation growth in the 1990s and particularly in the first decade of the twenty-first century. This will occur through the diversion of travellers away from areas with congested airports to less congested areas, travellers changing to a different mode of transport due to the increasing unreliability of flight schedules, and a general dampening of aviation traffic growth due to congestion making air transport less convenient relative to other modes of transport unless the issue is addressed.

CHAPTER 5 THE REGULATORY REGIME

Purpose: to set the regulatory scene; to chart developments in, and pressures on, the international aviation regulatory regime to change; and to canvass possible future developments.

EARLY STEPS

The first step in the modern era of international air transport was the Chicago Conference in 1944. Representatives from fifty-two countries met to plan the future of international civil aviation. It was from these negotiations that the concept of freedom (or transit privilege) was defined as a principle of air law. Essentially the freedoms are agreed limitations on the provision of international air services. The freedoms reaffirmed the 1919 Paris Convention, which provided complete and absolute sovereignty to each nation over the air space above its territory. Sovereignty remains the cornerstone of the modern regulatory regime in aviation. It provides a country with the ability to influence air services into, out of, and over its territory, whether there be an emergency or a commercial need for air services. See box 5.1 for details on International Aviation Rights of Passage (freedoms).

The two main players at the Chicago Conference were the US and the UK. The US sought a liberal approach to future aviation (its aviation industry was in a relatively strong position near the end of World War II). In contrast, the UK sought to protect its aviation industry (its industry was in a weakened condition at the end of the war). At the Chicago Conference opinions differed over how negotiations for international aviation should be conducted.

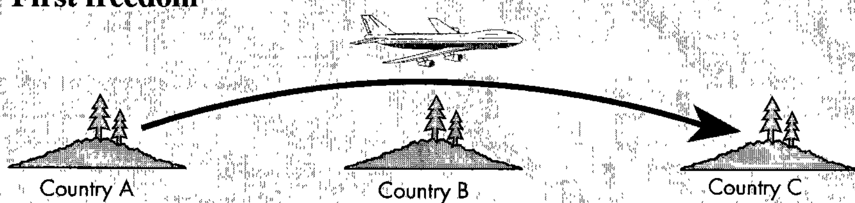
Attempts to create a multilateral agreement covering all traffic rights were unsuccessful at the Chicago Conference. Countries negotiating international traffic arrangements adopted a bilateral (government to government) approach. Bilateral agreements had operated prior to World War II; the first was established between France and Germany in 1913.

At the Chicago Conference the Australian Government supported a multilateral agreement on commercial rights in international aviation as the best approach and supported the idea of fair and equal opportunity for carriers. In fact, Australia's multilateral approach went further than this. It supported the

BOX 5.1 INTERNATIONAL AVIATION RIGHTS OF PASSAGE

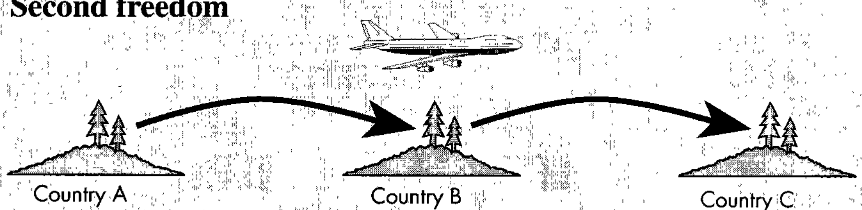
International Aviation Rights of Passage (commonly known as freedoms)

First freedom



The right of an airline of one country to fly over the territory of another country without landing.

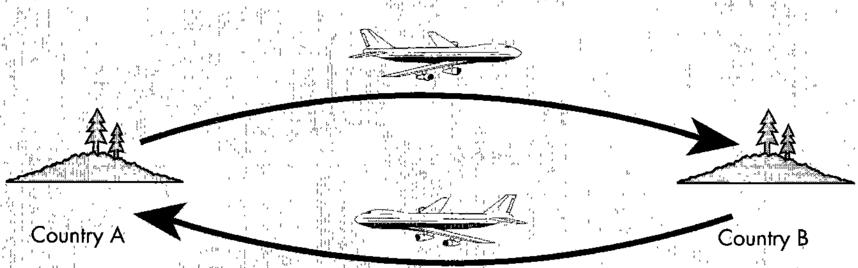
Second freedom



The right of an airline of one country to land in another country for non traffic reasons, such as maintenance or refuelling, while en route to another country.

The first two freedoms are referred to as technical rights, and some 100 countries are contracting parties to 'The International Air Services Transit Agreement', which provides multilateral approval of these technical rights.

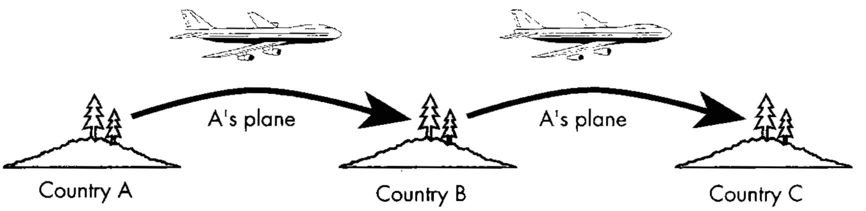
Third and fourth freedoms



The right of an airline of one country to carry traffic (passengers, mail, cargo) from its country of registry to another country (third freedom).

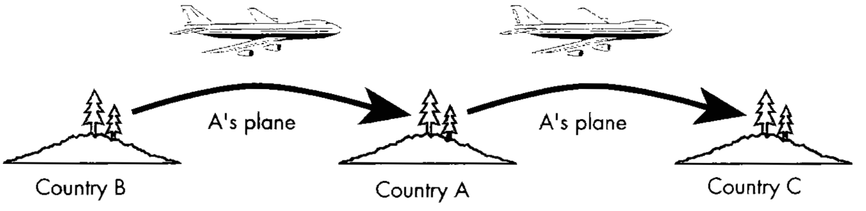
The right of an airline of one country to carry traffic from another country to its own country of registry (fourth freedom).

Fifth freedom



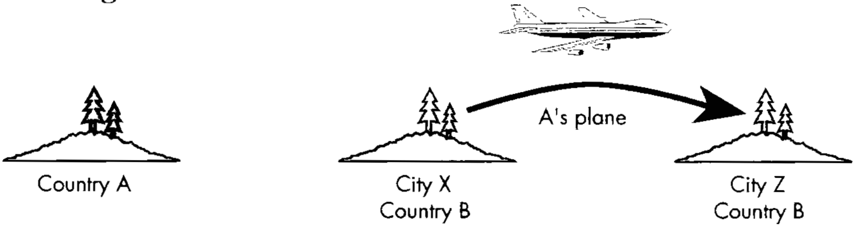
The right of an airline of one country to carry traffic between two countries outside its own country of registry as long as the flight originates or terminates in its own country of registry.
The third, fourth and fifth freedoms have traditionally been granted through bilateral air service negotiations.

Sixth freedom



The right of an airline of one country to carry traffic between two foreign countries via its own country of registry. This is a combination of third and fourth freedoms.

Cabotage



An airline has the right to carry traffic between two points within the territory of another country. Cabotage is rarely granted to foreign airlines, although this may change in a single aviation bloc comprised of a number of countries.

establishment of an international air transport authority with full control and operation of international air services on trunk routes (for example trans-Tasman), and the ownership of aircraft and equipment (Australian Government 1946, pp. 160–1). Such an approach would have limited the concept of 'nationality' of airlines.

A number of countries had attempted to obtain a multilateral agreement on air services prior to the Chicago Conference, but without success. Discussions since World War II (including Paris 1955, Strasbourg 1957–1960) have been unable to reach a consensus on a multilateral regulatory system, although many players argue that such an approach is needed. It is difficult to achieve general agreement to changes worldwide, as different countries want to achieve different outcomes from international aviation. These outcomes include a desire to: increase employment opportunities; improve technology transfer; increase trade opportunities and serve commercial needs; increase capacity to earn foreign exchange; promote national development; meet defence needs; promote other industries such as tourism; facilitate migration and cross cultural developments; aid postal services; aid national prestige on the world scene; or a combination of these factors. These varying needs lead countries to favour different approaches for negotiating international air transport.

What emerged after World War II was a regulatory regime which was widely supported by countries engaged in international aviation. The regulatory regime continues to be based on a framework which has three main institutional components, the:

- International Civil Aviation Organization (ICAO),
- International Air Transport Association (IATA), and
- air service agreements (ASAs).

These three institutional components establish the principles that make up the regulatory regime in international aviation. Although each of these components was created and operates separately, it is necessary for them to harmonise some of their work to allow regulation to effectively cover aviation activities.

The following discussion on the regulatory regime in international aviation begins with a brief outline of the key institutional components: ICAO, IATA, and air service agreements. This is followed by an examination of the pressures to change the existing regulatory regime after decades of relatively stable arrangements. A summary of possible developments for the future is provided to conclude this chapter's discussion on the international aviation regulatory regime.

International Civil Aviation Organization

ICAO, an inter-government organisation, was established in 1947 following the introduction of the 'Convention on International Civil Aviation', referred to as the Chicago Convention. ICAO's forerunner was the International Commission for Air Navigation, established in Paris in 1919. The current organisation is a specialised agency of the United Nations, and its primary function is the development of international standards and recommended practices for the safe and efficient conduct of international civil air transport.

The maintenance of efficient and safe international air transport services is of vital importance to Australia. Australia was a founding member of ICAO and since that time has been frequently elected as a Category 1 member of the 33-member Governing Council.

From the beginning, ICAO undertook responsibility for a wide range of technical requirements, but had less responsibility for economic matters. Over recent years ICAO has become involved in a wider range of issues facing the international air transport industry, principally regulatory, economic, legal and security policy. It attempts to achieve its aims through agreement and moral suasion. ICAO's lack of enforcement power is seen as a weakness by some.

Individual countries are responsible for setting and enforcing operational and safety related standards and practices. These are usually derived from ICAO's series of 'International Standards and Recommended Practices', which appear in 18 annexes to the 'Convention on International Civil Aviation'. These annexes allow ICAO member countries to operate under similar operational and safety standards, and deal with such varied fields as aeronautical communications, meteorology, airworthiness, operations, environmental standards, and security.

ICAO activities cover:

- six regions (Europe, North America, Asia Pacific, Middle East, Africa, Latin America and the Caribbean — see map of these regions in appendix III);
- over 60 000 services in areas including air navigation, legal, security, economic and statistical information, and personnel training;
- some 16 000 airports;
- around 710 commercial carriers;
- more than a billion passengers carried on scheduled routes in a year, of which some 25 per cent are international;
- 14 million flights per annum, 23 per cent of which are international (figures exclude domestic flights within the states of the former USSR); and
- 182 contracting nations (increasing with newly emerging countries such as those in Europe).

It is important to recognise that nations can choose whether they do, or do not, participate in ICAO's recommended practices. A country's voluntary participation in the aviation regime, under the auspices of ICAO, is supported by each country's laws and conventions. In addition, international, national and local aviation regulations and agreements can affect the aviation industry.

In December 1994 ICAO will celebrate its 50th anniversary since the signing of the Chicago Convention on 7 December 1944. ICAO aims to celebrate its role in promoting the safe and orderly development of international civil aviation. The main activity will be a worldwide air transport conference, which will be convened at ICAO headquarters in Montreal from 23 November to 7 December 1994. The theme of the conference will be: 'International Air Transport Regulation: Present and Future'. Contracting countries will be encouraged to hold their own activities to mark the anniversary.

International Air Transport Association

IATA is an inter-airline or trade association that represents the interests of airlines, and is involved in technical and commercial aspects of aviation. The forerunner to the modern day IATA was the International Air Traffic Association, which was founded by six airlines at The Hague in 1919. Many of the delegates who represented their governments at the Chicago Conference in 1944 were concerned over the failure to resolve the issue of how fares and rates would be set, together with related conditions. Following an initial informal meeting in Chicago, airline representatives met in Havana in 1945 to resolve how prices and related cooperative arrangements would be determined. IATA was established, with forty-two active member companies and eighteen associate members. At the time of establishment IATA had a key role in the coordination of fares, cargo rates and associated conditions (subject to individual government approval), but it was involved in a number of other areas, as indicated by the establishment of four committees — financial, legal, technical, and traffic. Through its committee work it has been able to coordinate and standardise many aspects of airline operations. An important and continuing function of IATA is its clearing house facility, which even nonmembers use to handle inter-airline accounts.

Airlines closely followed IATA's procedures for coordinating tariffs in the 1950s, 1960s and in the early 1970s. IATA's multilateral negotiation process for establishing airline fares and cargo rates was fairly rigid. In the regional traffic conferences over 200 000 specific passenger fares and more than 100 000 cargo rates were negotiated together with the detailed conditions of service associated with each fare. First, IATA held traffic conferences by regions, which could take some months. After the regional traffic conferences IATA members met in a joint session. The meetings were usually held in secret, and in the final joint session agreement had to be unanimous, otherwise the fares and conditions had to be renegotiated.

From the beginning IATA conducted a multilateral approach to fares and rates, the results of which were integrated into the many separate bilateral air service agreements. This approach encouraged a coherent and orderly system which was accepted widely. Over time, however, the process became fairly inflexible, costly and time consuming to maintain. The chance of obtaining unanimity became increasingly difficult in the 1970s, as many more carriers entered international aviation.

In the 1970s and 1980s there was growing pressure to increase competition, especially by freeing up prices. Subsequently IATA's traditional price setting role declined. This was one of the first major breaks in the conventional regulatory regime.

The main pressure points for changing the coordination of tariffs under IATA came from:

- The growth and success in the 1970s and 1980s of non IATA carriers, especially carriers from newly developing countries, including many in the Asian market such as Singapore Airlines, Thai International and Cathay Pacific.
- The impact of US reforms in aviation. In the first instance, the economic deregulation of the US domestic aviation market in the late 1970s. The US is an important market as it encompasses up to 40 per cent of world (international plus domestic) aviation passengers. The move to liberalise the internal European Community (EC) market in the 1990s will maintain this pressure for change. In addition, the withdrawal of US airlines from participation in IATA price coordination on the North Atlantic route and licensing of Laker Airways (serving New York – London with markedly cheaper air fares) weakened IATA's influence on fares and conditions in this important route.
- The increase in nonscheduled (charter) services. Charters make up a significant part of the European market, but there has been a gradual blurring of the distinction between scheduled and nonscheduled flights in recent times.
- An increase in the number of liberal bilateral air service agreements. These agreements aim to increase competition, especially by introducing a more flexible approach to setting tariffs, particularly on the North Atlantic route.
- An increase in the adoption of competition policy and a move against cartels in a number of economies (such as the US, the EC and Australia).

The changes in the IATA's role were agreed to at the 1978 annual general meeting of IATA member airlines. Member airlines approved a number of changes in the conditions of membership and tariff setting process, which were implemented in 1979. The changes gave airlines the opportunity to join IATA as a trade association without being party to tariff agreements, more freedom to charge non IATA tariffs, less restrictive conditions of service, and more open and public conferences. In 1992 there were 90 out of a total 213 members participating in tariff coordinating activities, while the rest were not parties in the process to establish tariffs. Despite pressure for a more liberal international aviation system, IATA agreed tariffs are still the preferred prices of many airlines (even non IATA airlines) on international routes. What has emerged is a more flexible system rather than a new system.

Exemptions for price coordination

US antitrust legislation ran counter to the IATA tradition of coordinating air fares, cargo rates and related conditions. In 1978 IATA and associated parties were required to show cause why the US Civil Aeronautics Board should not withdraw its approval of IATA's traffic conferences and other agreements. This would have meant the withdrawal of IATA's exemption from US antitrust legislation. This move was a potential threat to IATA, as more than 40 per cent of IATA member airlines flew to and from the US, and it drew considerable protest from governments worldwide. In 1980 the US approved the IATA agreements for two years but excluded US airlines from participating in IATA pricing agreements on the North Atlantic route. This limited US airlines' participation in IATA. Subsequently the show cause order was abandoned.

Since then some US airlines have joined IATA as full members, some are only trade association members and the rest remain outside of IATA. One result of the show cause process was the development of a multilateral agreement on tariffs between the US and the European Civil Aviation Conference (ECAC) (signed in 1982; lapsed in October 1991). When negotiated it represented a new development and further highlighted the possibility of multilateral agreements and that agreement on tariffs could be reached outside of IATA processes.

Australia also has questioned IATA's tariff coordination and exemption from Australian competition legislation. In 1975 the Trade Practices Commission (TPC) granted interim authorisation to all IATA activities as they applied to international airlines operating in Australia. In 1985 a review of IATA practices followed an application by IATA for authorisation of its arrangements in Australia. The TPC was prepared to grant that authorisation in all areas except that of tariff compliance, after finding that this eliminated or reduced air fare competition. Specifically, IATA was denied the right to:

- compel a member to charge IATA fares or commissions;
- prevent a member from advertising its tariffs; or
- compel a member
  - to require an agent to charge IATA fares or commissions; or
  - to prevent an agent from advertising its tariffs *(International Air Transport Association ("IATA")* 1986 ATPR (Com) 50-101).

BDW Aviation Services (pers. comm. 1992) believe that this TPC ruling was important as it specifically denied IATA its vital enforcement role over airlines and agents. Prohibitions on retail price maintenance did not apply to services, so the decision did not prevent individual airlines from enforcing retail prices through agents, but it did prevent any concerted action by airlines through IATA. The TPC has identified the need to review authorisation of IATA's fares and related issues.

The EC has tightened its rules on setting passenger fares. In 1991 IATA's bloc exemption on fare coordination was granted again, but only if participation was voluntary and nonbinding. Further the EC is examining whether coordination of cargo rates should be eliminated (Feldman 1992b, p. 74).

A potentially contentious issue is the effect of one of the large market's domestic legislation and competition policies on international air services (such as the US and the EC). For example, IATA's work could be challenged through the invoking of US antitrust legislation. In 1992 the US Justice Department renewed its opposition to the IATA tariff coordination process in a submission to the US Department of Transportation, which was considering the exemption of IATA activities from US law. In addition, the impact of new EC regulations (see appendix IV for details) on non EC airlines operating into EC member countries is still unknown. The principle has been established in the EC that the Commission's jurisdiction regarding competition can include nonmember countries' airlines which operate in the EC (Doganis 1991, p. 90).

The potential impact of an individual country's home legislation on international aviation is largely untested in the courts; nevertheless the potential 'threat' can affect airline behaviour. While IATA received exemptions for some of its activities from some countries, including the US, Europe and Australia, future exemptions can not be guaranteed. The general move to increase competition in the aviation market does bring into question the validity of maintaining any form of price coordination, but intense political lobbying can be expected if exemptions are abandoned in major markets.

Air service agreements

Air service agreements (ASAs), often referred to as bilateral agreements, are negotiated between governments. (See box 5.2 for details on the usual structure of a bilateral air service agreement.) The outcome is dependent on the negotiating power and current aviation policies of the countries involved and other national interests including tourism and trade. The air service agreements can establish principles linking the work of IATA and ICAO, although neither is a direct party to the negotiations. The major provisions in many of the original agreements were based on the 1946 agreement between the US and the UK, known as Bermuda I.

Trade in air services occurs in the expectation of reciprocal benefits being granted. This makes it different from trade in other goods and services, which are traded on a principle of comparative advantage. Air service agreements have

BOX 5.2 STRUCTURE OF BILATERAL AIR SERVICE AGREEMENTS

A bilateral air service agreement is negotiated between two countries to regulate international air traffic between them. Although some form of such agreements existed to regulate air traffic in the 1920s and 1930s (Dempsey 1987, p. 48), it was not until 1944 that there was a concerted attempt to design a framework for the regulation of international aviation.

Some representatives at the Chicago Conference of 1944 unsuccessfully attempted to establish a multilateral framework for international aviation. The Chicago Convention reaffirmed each nation's exclusive sovereignty over its own air space, as established in Paris in 1919, and did not include the multilateral granting of rights for scheduled international air services.

The Conference adopted a *Form of Standard Agreement for Provisional Air Routes* as a model for future bilateral agreement. This was largely superseded as a model by the air service agreement negotiated between the US and the UK in 1946, called Bermuda I. This agreement was used as a model for over thirty years, but increasing trends towards liberalisation of international aviation have meant that air service agreements are being modified to reflect the liberalisation of air traffic in different markets (Dempsey 1987, pp. 53–7; Doganis 1991, p. 53). Bilateral air service agreements range from highly protective to quite liberal agreements.

Bilateral air service agreements usually comprise three segments:

- The *Air Service Agreement*, through its articles, specifies arrangements for setting fares and capacity levels, and covers technical details such as custom duties, funds transfers and airport charges. Usually there is an article which seeks to uphold the principle of fair and equal opportunity for airlines from the two contracting parties.

- The *Schedule of Routes* details traffic rights and specifies routes to be served by the designated airline(s) of each country. Particular points of origin/destination may be specified, or a general right may be granted. The rights given to the airline(s) of one country are not necessarily the same as those given to the airline(s) of the other. Airlines are not specified, as each country can designate the airline(s) to receive the rights obtained under the agreement. Usually each designated airline must satisfy ownership and control conditions, and be approved by the other country.

- The schedule specifies whether fifth freedom rights exist (that is, the granting to one country the right to pick up traffic in or from other countries between or beyond the two contracting countries (see box 5.1). Fifth freedoms cannot be used without approval from the third country involved, and are included in an appropriate separate agreement.

- The *Memoranda of Understanding* (or Exchange of Notes in Agreed Minutes) contain an annex(es), which may be confidential, and clarify points in the principal air service agreement.

(Doganis 1991, p. 28; ANZ McCaughan 1992, glossary, p. 1.)

formalised this notion of reciprocity. The actual provisions vary in each agreement but they can include aspects on:

- market access,
- named routes to be served by each country,
- which freedoms are to be granted,
- capacity (size of aircraft),
- frequency of flights, and
- method for determining tariffs.

Usually the air service agreement includes the aim of achieving fair and equitable opportunity in the market. The overall effect is to create a regulated but orderly arrangement for international travel between two countries. Where a country seeks to extend an arrangement to a third (or more) country(ies) it has to negotiate separate additional agreements with each extra country. This would include fifth freedoms or 'beyond rights' and other freedoms variously identified over and above fifth freedoms (see box 5.1 for details on freedoms).

Bilateral air service agreements can constrain competition by setting limits on market access, capacity and price, the latter particularly where fare flexibility is not encouraged because IATA tariffs are adopted. Historically there has been limited price competition, so passengers and freight shippers have paid a higher price for aviation services than may have been the case in a competitive market. On some routes there are a number of airlines with access to the market, so that it would be difficult for capacity or price to be regulated (for example, Australia–UK and the North Atlantic).

Supporters of a more competitive market often claim that consumers are best served by deregulated markets and therefore are poorly served by the traditional bilateral system. In addition to the disadvantages to consumers, some writers argue that there has been little incentive in the past for some airlines to reduce their cost structure (Doganis 1991, p. 45; Bruning 1991, p. 260). Findlay and Forsyth (1992, p. 15) state that bilateral air service agreements constrain the opportunities for airlines to minimise their costs, for example through contracting out of services or leasing a route to another airline. The bilateral negotiation process has the added disadvantages of being time consuming, costly and offering a level of protection which may work against the interests of airports and regional development by limiting growth and opportunities.

Supporters of the regulatory framework, however, argue that the aviation industry has gained from the standards established, as the regulatory framework permitted the orderly development of a complex industry throughout the world.

On the face of it, the benefits and costs of bilateral air service agreements have varied considerably over time, between agreements and individual routes, and between countries with established airline(s) and those countries attempting to establish new carriers. Traditional bilateral air service agreements contain restrictive and protectionist provisions but this is not to say the system has failed the industry. International aviation traffic has grown remarkably over many years (see chapter 3 for details). Advances in technology and marketing techniques do not appear to have been inhibited. Many countries, especially developing nations, believe that the bilateral system serves them well by ensuring equal rights in air transport arrangements. Individual countries have varying opinions based on perceived national costs and benefits, which reflect their different economic circumstances and airline capabilities.

The three institutional components of the regulatory regime, ICAO, IATA and bilateral air service agreements, exist separately but their activities are interrelated. For example, including IATA tariffs in bilateral air service agreements gives them legitimacy, hence acceptability. Standardisation and harmonisation is served by all three.

The regulatory framework, which supported the coordination and orderly process of the international aviation regime, was marked by a very stable period from the mid 1940s to the 1970s. Since the 1970s cracks have been appearing in the system creating a much more unstable environment than was previously the case. The next section in this chapter examines the pressures for change, especially evident since the 1970s, and the consequent developments in the changing regulatory environment.

PRESSURE FOR CHANGE

A key question is: what pressures and consequent developments have contributed to moves to change the well established conventional regulatory system in international aviation?

The main pressures have come from economic and market imperatives, and changing political priorities. A number of *governments*, driven by the need to improve economic efficiency and growth prospects through competition, have moved: to liberalise bilateral air service agreements; to wholly or partly privatise their carriers; to deregulate domestic aviation markets; and to form a single aviation market or regional bloc. These moves have led to a considerable decline in the direct involvement of governments in aviation in a number of countries. Many governments now are concentrating on their role in ensuring safety, security, and facilitating a competitive environment in the industry.

Airline *carriers*, aiming at increasing their competitiveness, thereby ensuring survival, have moved: to increase their ability to respond to market factors (for example, through increased flexibility in setting tariffs as discussed earlier in this chapter); to raise capital and to improve profit levels; and towards operating larger networks, usually by internally funded growth or through alliances with other carriers.

Liberalising bilateral air service agreements

Regulation may be achieved through unilateral, bilateral or multilateral means. Theoretically, bilateral air service agreements can be negotiated to establish complete free trade in air services between the contracting parties but this appears unlikely and may not constitute even a long term goal for most countries. Bilateral air service agreements are likely to change in incremental steps. Such changes are limited by time, cost, number of contracting parties, and their history of establishment and acceptance, all of which mitigate against quick change.

Since the late 1970s liberal bilateral air service agreements have grown in number. Liberal air service agreements may include such features as:

- giving airlines freedom to determine capacity without government intervention, in line with the overall aim to reduce government intervention in most aviation matters;
- requiring 'double disapproval' of tariffs, that is, creating arrangements under which fares can be disallowed only if rejected by both countries, as opposed to the 'double approval' required under Bermuda I and subsequent agreements;
- establishing multidesignation of airlines (where a country grants more than one of its carriers the right to carry international traffic), with less emphasis on maintaining a flag carrier;
- reducing route restrictions to allow more routes between various cities to be taken up;
- including charter flight arrangements, with less insistence that they do not compete with scheduled services; and
- specifying the desirability of fair and competitive practices (Dresner & Tretheway 1992a, p. 193).

Overall, where changes have been made, the agreements are less prescriptive, less able to be controlled by one party to the agreement, and improve the commercial environment enabling greater market responsiveness. There is an expectation by many countries that markets will be opened to more competition.

Considerable liberalisation of aviation markets has been achieved in those countries seeking greater competition and less government involvement in airline activity. One negative consequence may be retaliatory action (by those countries opposing greater liberalisation in international aviation) against countries trying to introduce more open markets. Despite liberalisation, less regulation and more competition cannot be assumed to be the future in international aviation; calls for re-regulation in aviation continue to be raised.

The impact of regulation on the level of competition is important and worthy of further study. The removal or reduction of barriers to competition is easier to achieve in high earning, high traffic growth periods than in a low profit or loss making element of a cycle with negative or low traffic growth. Consequently some moves to further open up market conditions in the early 1990s ran into difficulties as the industry suffered losses and a slowdown in traffic growth. In the longer term, when the industry enters the up side of a cycle a number of countries supporting increased competition are likely to choose to further open up their markets as recovery in aviation emerges.

Open skies, as a concept, has been raised as a way to liberalise air service arrangements between countries. US Government representatives have frequently gone on record as being determined to 'open up the skies'. The US and European airlines would each like to obtain wider access to the other continent's domestic market. The US had responded in the negative to earlier offers by the Dutch, Swiss, Singaporeans and Scandinavians to negotiate 'open skies', but on 31 March 1992, Andrew Card, the then US Secretary of Transportation, offered to negotiate 'open skies' agreements with all European countries. The US Department of Transportation's criteria for 'open skies' include:

- open entry on all routes;
- unrestricted capacity and frequency on all routes;
- unrestricted route and traffic rights; that is, the right to operate between any point in the United States and any point in a European country, including no restrictions on immediate and beyond points, change of gauge, routing flexibility, coterminalization, or fifth freedom rights;
- flexibility in setting fares within some guidelines;
- liberal charter arrangements;
- liberal cargo arrangements;
- ability to convert earnings into hard currency and remit them promptly and without restriction;
- open code sharing opportunities;
- right to perform ground handling in another country;
- pro-competitive provisions on commercial opportunities, user charges, fair competition and intermodal rights; and
- explicit commitment to nondiscriminatory operation of, and access to, CRSs.

These guidelines do not include foreign airlines having cabotage in the US nor do they remove or reduce US foreign ownership provisions. This proposal attempts to further liberalise conditions by removing restrictions on the operations and designation of carriers. It will not create unrestricted open skies for air transport to, from, and over a country for any carrier. The concept of open skies can be interpreted differently by individual countries.

The announcement does not ensure that carriers will be keen to take up the offer of 'open skies'. The first US 'open skies' deal under the new arrangement was signed on 4 September 1992 between the US and the Netherlands. Countries with a small or nonexistent domestic market and access to third country markets, like the Netherlands and Singapore, have little to lose by opening their home market and are keen to support liberal approaches to their negotiations. In contrast, many other countries are concerned that without adequate safeguards the survival of their carriers will be threatened by the dominance of megacarriers, especially US carriers, under such a scheme.

One of the more likely 'open skies' in the near future could be the agreement between US and Canada, which has been negotiated over some time. Not all constraints in bilateral air service arrangements, however, would be removed as cabotage to the other country is unlikely to be offered. The planned 'opening up' is focused on the US and Canada's cross border airline traffic excluding traffic on similar routes from other countries. A key area in the negotiations has been slot allocation for Canadian carriers, especially at the highly congested Washington National and LaGuardia airports. Other issues are scheduled flights, length of the phase-in period for US carriers to Canada, and pre-clearance services such as customs. Mexico may be added to form a regional 'open sky' for aviation services between the three countries.

In contrast, and of concern to the US Department of Transportation, are moves which suggest that some European countries may adopt a more defensive position in their negotiations. France served a one-year termination notice on the US on 4 May 1992, renouncing the 1946 bilateral air service agreement. This means the agreement has to be renegotiated, and France appears to be seeking tighter controls on US services to and beyond France.

In late 1992 Germany stopped short of terminating its 1955 bilateral air service agreement but sought to renegotiate the agreement aiming for better access to US points by Lufthansa. In 1993 Germany and the US agreed to a transitional four-year pact confirming increased access for Lufthansa to US airports. The agreement ends in 1997 when new negotiations would need to be completed, possibly with a US style 'open skies' agreement being established.

Potentially, a polarisation of views on bilateral air service arrangements, from a very liberal to a highly restrictive approach, could be quite disruptive to international aviation developments. This may be of particular concern to the EC if its member countries adopt opposing positions to negotiations with nonmember countries (see appendix IV for details on the EC single aviation market). Some European carriers have expressed concern that in a more open and competitive environment their market could be overtaken by US megacarriers.

When BA initially bid for equity in USAir, some of the main US airlines lobbied the US Government to tie the US–UK bilateral air service negotiations to BA's bid for equity in USAir, in an attempt to obtain concessions for US carriers operating into the UK. The suggested concessions included greater access to UK airports, in particular Heathrow, and other capacity liberalisation. The US move was deflected when BA withdrew its original proposal (see chapter 8 for more detail).

One area where there has been tension, and years of negotiation in order to improve bilateral air service arrangements, has been between the US and Japan. The US has cast Japan as acting against the liberalising trends being achieved elsewhere, but the Japanese see the bilateral air service agreement as being biased against them. Japan wants to renegotiate the 1952 bilateral air service agreement with the US.

With fifth freedom rights it is possible for US carriers to use Japanese cities (and other Asian cities) as hubs to capture more market share in the fast growing Asia Pacific market. This may be judged as disadvantageous to the Japanese carriers (and other airlines). Both United and Northwest hub through Tokyo. Figure 2.6 shows how Northwest's hub at Tokyo enables it to operate well beyond Japan. In addition, such a hub can be linked to the airline's domestic US hubs, going some way to creating a global network, especially once these hubs are linked to hubs elsewhere in the world through airline alliances such as Northwest's links with KLM.

Despite some liberalisation of bilateral air service agreements, international aviation remains a regulated industry. The number of new bilateral air service agreements and amendments to existing agreements continue to grow. In 1991, of the 30 new bilateral air service agreements registered with ICAO (1992b, p. 1) more than four-fifths were from Asia Pacific nations. In addition, close to three-quarters of the amended bilateral air service agreements were from countries in the Asia Pacific, which forecasts identify as the growth market to the turn of the century (see chapter 4 for details on forecasts). There are over 1400 bilateral air service agreements throughout the world, with in excess of 40 bilateral air service agreements having Australia as a contracting party.

More sucess has been achieved with liberalisation of cargo in air service agreements. For example, multidesignation of dedicated freighters was introduced in 1989 in the Australia – New Zealand air service agreement, but this will not be achieved fully in passenger services until late 1994. Martin (1991b, p. 17) reported that the US–Spain bilateral air service agreement is an example of a less restrictive agreement. It permits cargo services from both countries to operate from any and all points in either country, as well as to points between and beyond. Any limits are set by the marketplace. The EC has floated a proposal for a multilateral air cargo agreement. Although it has gained little support so far, cargo services could lead the way for liberalising passenger services. It has proved easier to get agreement on cargo services, as there are fewer sensitivities in cargo than in passenger services (including issues of immigration) and the benefits of trade are accepted more readily. In addition, cargo has traditionally attracted fewer price controls and fewer constraints on entry and capacity.

Who 'owns' routes is one of the recent dilemmas facing international aviation. Are they an asset of the airline to be bought and sold by carriers, or do governments 'own' them by virtue of governments negotiating bilateral air service agreements and designating the airline(s) on a route? Usually the issue has not been a problem, but it can become one where there is multidesignation of carriers, and carriers appear to 'transfer' rights through a sale of part or all of a carrier's business. For example, when United and American Airlines bought Pan Am's and TWA's landing slots at Heathrow the US and the UK were forced to revise their bilateral air service agreement. These instances had market forces seemingly outstripping the regulators. The allocation, or reallocation, of new, unused or even existing routes is an issue which governments worldwide will need to address.

The Australian Government in July 1992 established the International Air Services Commission (IASC) as an independent statutory authority. The IASC's role is to allocate capacity rights to Australian carriers and route entitlements available under bilateral air service agreements. In making its determinations the IASC follows a public benefit test. The Commission's procedure is to advertise capacity as it becomes available and invite submissions to operate the route; these submissions are placed on the public record and further comments and submissions may be made. On consideration of these submissions a draft determination is made public and further comment invited. Following this a final determination is made. The IASC may, at any time, undertake a review of a determination if it believes there may be grounds for varying, suspending or revoking the determination. The determination can only be varied, suspended or revoked if: a term or condition of the determination has been breached; that a change in circumstances means a breach is likely in the future; or the carrier does not use fully its allocated capacity.

Previously, in Australia, international capacity rights had been available only to Qantas. With the 1992 introduction of a multidesignation policy by the Australian Government some bilateral air service agreements needed to be renegotiated. The Government has given Qantas a degree of protection during the transition to multidesignation by allocating to Qantas the capacity and route entitlements being used by it at 26 February 1992 for a period of up to five years, after which the rights can be contested at the renewal stage. Qantas also received underutilised capacity and route entitlements sufficient for it to introduce a number of planned new services by November 1992 for a period of three years. Since its establishment the IASC has invited applications and submissions for new capacity covering a range of routes throughout the world. Additional carriers have been granted capacity to operate international air services. Details of new allocations are given later in this chapter.

The future international regulatory arrangements for trade in air services are not clear. The independent Think Tank on Multilateral Aviation Liberalisation, chaired by Hans Raben (*Free Trade in the Air* 1991, pp. 4–5), proposed that the process of negotiating liberal bilateral air service agreements is slow, limited in scope, bureaucratic and costly. The group concluded that a multilateral approach is a better method for achieving liberalisation of international aviation. To achieve liberalisation of world aviation it proposed that any liberal multilateral air service agreement should contain provisions ensuring:

- the freedom for a registered airline of a participating country to operate scheduled or nonscheduled flights to, from, and within member countries;
- no frequency or capacity restrictions;
- that any controls on operations only cover technical and financial fitness or infrastructure enhancement controls, and their use should be on a nondiscriminatory basis;
- no pricing (fares and rates) controls;
- the prevention of anti-competitive agreements, predatory practices or abuse of a dominant market position, and the elimination of subsidies;
- a fair and nondiscriminatory approach to commercial opportunities;
- that ownership and control of airlines are to rest with nationals of member countries;
- any country can join, providing it is willing to be bound to the agreement;
- the publication of all details of the agreement;
- the introduction of simple procedures for speedy settlement of disputes; and
- the adoption of transitional arrangements where necessary but limited in number and time period (for example, the reduction of foreign ownership limits and the protection of the interests of developing countries).

These conditions would exist regardless of the countries or routes involved.

In its review the US National Commission to Ensure a Strong Competitive Airline Industry (1993, p. 3) concluded that 'the bilateral system must be replaced with an open and comprehensive multinational regime'.

ICAO has created a study group of experts, representing a wide range of interests throughout the world, to examine aspects of the bilateral process. The results of their deliberations are not expected to be presented before late 1994. Their work may provide an indication of the range of views and level of commitment of players towards world aviation liberalisation, and provide an indication of options likely to be accepted by key players including governments, airlines and airport authorities. A note of caution for the future is not to see calls for a more liberal approach to international aviation as new, nor is it any more likely to achieve greater success than similar calls in previous times have achieved.

In theory, there are a wide range of choices in strategies for future international aviation negotiations, but considerable uncertainty lies in how governments will act. Governments establish the parameters within which international aviation operates; therefore, the direction of government policy is important in identifying the future directions of international aviation.

Rules on ownership and control

Air service agreements have been built on the wide acceptance of the three key principles of:

- exclusive sovereignty over a home country's air space;
- substantial ownership of airlines to rest with citizens in the country of registration; and
- effective control of airlines to rest with citizens in the country of registration.

The principles have been universally adopted and remain some of the last areas in international aviation to be challenged.

The rules on substantial ownership and effective control have been at the heart of the conventional regulatory system and would appear to prohibit the development of global enterprises in aviation (as distinct from airlines which operate across the globe — see chapter 8 for details). Perhaps surprisingly, given the strong support of the principles by countries, there is no definition of 'substantial ownership and effective control' nor any international criteria for determining whether a designated airline meets requirements on ownership and control. It is left to each country to exercise its own judgment regarding what the appropriate level of ownership and control should be in the designated carriers. It is not mandatory to include or invoke such requirements in an air service agreement. This is particularly the case for developing countries belonging to a regional economic grouping, which was confirmed by ICAO in 1983. Yet, overwhelmingly, substantial ownership and effective control requirements have been key principles implicit in international air service agreements.

Carriers argue that it is the possibility of one country invoking traditional ownership and control principles which deters them from attempting to seek a high level of involvement with a foreign airline through joint ventures or equity investment. Likewise governments, among other reasons such as security (military and economic) and prestige, are loath to risk supporting a radical change to the tradition of the home country maintaining substantial ownership and effective control in its designated carrier(s).

Despite the appearance of rigidity regarding the three principles, there have been cracks in the traditional regime. For example, in a small way a new framework already exists with:

- SAS — established in 1946 with member countries Norway, Sweden, and Denmark and in the process creating a new concept of nation: Scandinavia;

- Air Afrique — established in 1961 and is comprised of eleven francophone African nations: Benin, Burkina Faso, Central African Republic, Chad, Congo, Cote d'Ivoire, Mali, Mauritania, Niger, Senegal, and Congo; and
- Gulf Air — established in 1971 and is jointly owned by Bahrain, Oman, Qatar, and the United Arab Emirates.

The establishment of these transnational companies has been accommodated within the existing regulatory regime. However, such arrangements remain exceptions to the rule. Essentially, international airlines have been owned and controlled by a government and/or private shareholders from the one country.

The increasing pressure by some countries to liberalise bilateral air service agreements has moved from an earlier emphasis to free up tariffs and increase competition to encompass the issues of ownership and control. Ownership and control of airlines are key issues in the 1990s. Countries supporting lowering the requirements differ in their solution to the issues: some wish to distinguish between ownership and control, while some argue ownership and control restrictions should be eliminated or reduced, to a new level, yet to be determined. Such moves are not entirely new nor impossible.

For example, bilateral air service agreements with Hong Kong adopt a more liberal approach to the issue by replacing the traditional requirements for substantial ownership and effective control by respective nationals with the requirement that the airline be incorporated and have its principal place of business in Hong Kong. This change is necessary because Cathay Pacific's ownership is held by non Hong Kong residents. Once such a principle is agreed to in a bilateral air service agreement then substantial ownership and effective control by citizens of the country of registry would not be demanded by the other contracting country in the agreement.

Countries and carriers have stated that their actions are limited because of the possibility that any unilateral action to bypass ownership and control provisions could invoke retaliatory action. In the preparation for the initial sale of Qantas, both BA and Singapore Airlines made an effort to reassure interested parties that they were seeking partnership with their proposed investment, not control.

Another area which may be seen as challenging ownership and control lies in the marketing agreements entered into between airlines. Code sharing (and to a lesser extent the sharing of CRSs and frequent flier schemes) between airlines may provide benefits to consumers and carriers, but a dilemma can be created for governments trying to determine what further concessions they will permit and even what control they can and wish to exercise.

Control of airlines becomes an important and sensitive issue as foreign investment (accompanied with ownership) is increased. This can be seen in the response to BA's investment in USAir. A degree of investment, hence ownership, in USAir was accepted but just what the level of investment should be centred on whether control would be passed to BA (see chapter 8 for details).

The US Government has a few reports before it, suggesting Congress change the law which limits foreign investment in airlines to a 25 per cent voting share. The US National Commission to Ensure a Strong Competitive Airline Industry (1993, pp. 22–3) recommended that increased foreign investment, including higher levels of voting stock up to 49 per cent, should be made available, but only to those countries: providing liberal air service agreements; providing equivalent opportunities for US airlines; where the foreign investor is not government owned; which assign reciprocal investment rights for US airlines; and only if the increase in the foreign investment allowance serves US national interests and the development of a liberal global regime for air services. In effect the US would exchange investment in US carriers for relaxation of market access under an 'open skies' agreement such as happened with KLM's greater integration with Northwest after the US and the Netherlands signed an 'open skies' agreement.

Once substantial ownership and effective control may have been assumed to be at, or near, 100 per cent, but this has changed. A number of countries have permitted foreign ownership of carriers anywhere up to 49 per cent. At the upper end it is assumed a simple majority of 51 per cent ensures substantial ownership and effective control. Where foreign ownership in airlines is permitted it is usually set somewhere between 25 and 35 per cent. In the push for airlines to grow and/or join bigger service networks, the need for capital injection by many airlines, and various governments' increased support of efficiency through competition, there is pressure to (re)define what countries deem to be 'substantial ownership' and 'effective control'.

If ownership of airlines cuts across national boundaries significantly, or airlines are owned by non airline interests (something which has not been common so far in the aviation industry), or one airline carries all or most of the traffic on behalf of another airline, then further issues need to be resolved. The question could be posed: How would the current system adapt to the possibility of country A designating country B's carriers under a franchise agreement to be country A's carriers? What would be the impact on the existing bilateral air service agreement system? It can be argued that control rather than ownership is the crucial issue.

The options are wide open: governments may abandon all constraints, or retreat to the requirement that 100 per cent ownership and control be vested in their citizens. In positioning themselves between these two extremes countries are likely to favour some regulatory control rather than open markets. What the future holds is:

- The necessity for governments to (re)define the principles of substantial ownership and effective control, given the significant developments in world aviation since the principles were first adopted.

- That in developing new policies to cover these principles that have underpinned international aviation, a number of countries will relinquish the 'special' status of airlines as national icons while other countries will continue to defend the existence of their 'special' home airline, creating a source of tension between countries.
- Governments and airlines need to resolve the implications of inter-airline marketing arrangements which affect ownership and control provisions, consequently the level of competition in the market.

The future holds the possibility that air service negotiations will have to resolve tension between countries with differing ownership and control requirements, as well as foreign investment requirements, and the probability that in many instances commercial imperatives will take over the traditional legal approach to the determination of how international air transport services function.

While national governments in general have maintained their commitment to substantial ownership and effective control, airline operational arrangements have, in part, gone around the conventions when pressure was sufficient to adopt an alternative approach. Ownership and control provisions (implicit and explicit) dictate much of the existing structure in aviation. If the constraints imposed on aviation by these principles are reduced or eliminated then the air service industry, in particular the individual airlines (firms), will move in new directions. If the structure of airlines is changed then conduct and performance will change. Much depends on future developments in air service agreements, and whether they remain driven by legal precedent or commercial imperatives.

Privatisation

Another key pressure for change in the regulatory framework has come from the decline in the role of some governments in aviation. This can be seen in the reduction in government ownership of airlines and the trend to deregulate domestic aviation markets.[1] It is important not to equate deregulation with privatisation. It is possible to have one without the other, although experience shows that once reform is introduced into one section of the aviation market pressure builds up to reform other sectors.

Governments, driven by the desire to improve economic efficiency, to introduce more competition and opportunities for growth, have moved to wholly or partly privatise their airline(s). The main sale options for governments when privatising an airline are: to raise equity in the airline via a float on the stock exchange (planned for 75 per cent of the equity in Qantas in the financial year 1994–95); to offer shares through private placement; to offer shares in a trade

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1. For details of deregulation in the Australian domestic aviation market see three recent BTCE publications: *Deregulation of Domestic Aviation — the First Year* (BTCE 1991b); *Quality of Service in Australian Passenger Aviation* (BTCE 1992b); and *The Progress of Aviation Reform* (BTCE 1993).

sale (such as BA's purchase of 25 per cent equity in Qantas); to enter into a joint venture; to offer equity to employees or management; and, potentially, through new marketing arrangements such as franchising or contracting out services. Some governments have postponed or scaled down their privatisation processes because of economic circumstances and/or unacceptable bids, but this is expected to be only a short term interruption.

Privatisation has occurred in a number of industries, including telecommunications and financial markets, as well as road and rail transport in various countries. Some of the stated reasons contributing to this world trend to privatise government enterprises include:

- the need to raise capital for operational and investment purposes for the airlines;
- the need to reduce or eliminate the drain of funds from the public sector;
- a desire by government to raise finance from the sale of government enterprises;
- the belief that there is a need to encourage better commercial practices by airlines by withdrawing political objectives and bureaucratic procedures from the decision making process; and
- the desire to open aviation markets up to more competition, and to achieve more efficient resource utilisation and benefits to consumers.

Airlines such as British Airways (BA), privatised in 1987, operated profitably when other airlines struggled in the early 1990s, and in this light are often quoted in support of airline privatisation. Some analysts, however, question whether privatisation benefits are sustainable in the long term. Uli Baur, from SH&E Inc, addressed this issue at the Airline Business Conference in 1992. He postulated that profitability improvement in privatised airlines may not always be sustainable. He suggested that following a short term peak, the efficiency and financial performance of privatised airlines may deteriorate to earlier, less efficient levels (Baur 1992, p. 14).

In many countries, such as Australia, the government's special relationship with its airlines is moving away from owning and running airlines, towards assessing and assisting the country and other industries, like the travel and tourism industry, to increase national benefits from all aviation activity (Willis 1989, p. 1). The status of some of the world's airlines in regards to privatisation is shown in table 5.1. These examples, from a number of diverse countries, illustrate that planning privatisation of government owned airlines is a worldwide phenomenon, but the number of airlines actually privatised is still relatively small. In 1992 at least 14 airlines expected to offer shares to investors, while some 40 airlines planned to wholly or partly privatise (*Airline Business* 1992a, p. 75). The privatisation of Qantas included an initial trade sale of 25 per cent to BA, announced in December 1992, and a subsequent float of the remaining 75 per cent. Aggregate foreign investment in Qantas is limited

TABLE 5.1 AIRLINE PRIVATISATION

Full privatisation	*Partial privatisation (current or completed)*	*Privatisation (planned)*	*Government owned*
Air Canada	Aerolineas Argentinas	Adria Airways	Aer Lingus
Air New Zealand[a]	Aeromexico	Aeroflot	Air Jamaica
Air Panama	Aeroperu	Air China	Air Lanka
British Airways	Air Afrique	Air France	Air Malta
JAL	Air Caledonie	Air India	Air Seychelle
Korean Air	Air Madagascar	Air Niugini	Air Vanuatu
	Air Mauritius	Air Tanzania	Air Zimbabwe
	Air Pacific	Air Zaire	Biman Bangladesh
	Alitalia	Bahamisair	Egypt Air
	Austrian Airlines	Balkan Bulgarian	Emirates
	Aviateca	BWIA	Ethiopian Airways
	Cathay Pacific	China Southern	Gulf Air
	CSA (Czech)	Dominicana	Iberia
	Cyprus Airways	Ecuatoriana	Kuwait Airways
	Finnair	El Al	Polynesian
	KLM	Garuda	Royal Air Maroc
	Lan Chile	Ghana Airways	Royal Brunei
	Lufthansa	Indian Airlines	Royal Tongan
	Luxair	Kenya Airways	Saudi Arabian Airlines
	Malaysia Airlines	LAP (Paraguay)	TAP Air Portugal
	Malev	Lloyd Aero Boliviano	
	Mexicana Airlines	LOT Polish Airlines	
	Middle East AL	Nigeria Airways	
	Pakistan International	Olympic	
	Philippine Airlines	PLUNA	
	Qantas	Royal Jordanian AL	
	Sabena	Solomon Airways	
	SAS	South African Airways	
	Singapore Airlines	Sudan Airways	
	Swissair	Tarom	
	Thai Airways	THY Turkish Airways	
	Varig	Uganda Airways	
	VASP	Zambia Airways	
	Viasa		

a. New Zealand Government holds a 'Kiwi share' which gives it the right of veto on Board decisions.

Sources *Airline Business* 1993a, pp. 12–15; 1992b, p. 52; *Aviation Daily* 1992f, p. 142; *Aviation Report* 1993a, p. 1; BDW Aviation Services 1992, p. 2; Cameron 1992a, pp. 40–5; Hamill & Sarfield 1992, pp. 29–129; ICAO 1992b, p. 2; *ITA Press* 1992b, pp. 5 & 8; 1992a, p. 7; Air New Zealand 1991; Fisher 1991, pp. 14–21; *ITA Press* 1991, p. 7.

to 35 per cent and there is a 25 per cent ceiling for any single foreign investor. The foreign ownership provisions are broadly consistent with conventions on substantial ownership and effective control in Australia's bilateral air service agreements. Prior to the initial trade sale, Qantas purchased Australian Airlines in September 1992.

Recent airline privatisation

British Airways' privatisation was part of a wider policy of privatisation by the British Government. The objectives of the program were to raise government proceeds, encourage wider share ownership, encourage employee share ownership and reduce government involvement in industry. When the announcement of a sale process was made in 1979, the company was inefficient and did not enjoy a strong international reputation. Preparations for the sale were made during the early 1980s but in 1985 the privatisation was deferred pending settlement of the Laker US anti-trust legislation. The February 1987 float was 11 times oversubscribed with more than a million applications for shares. A significant proportion was reserved for the employee share ownership plan, which has proved successful in motivating staff in an industry which is dependent on friendly and efficient employees. BA has delivered superior industry performance immediately before privatisation and strengthened its position post privatisation.

Air New Zealand's privatisation in 1989 included the purchase of 35 per cent by a consortium composed of Qantas (19.9 per cent), Japan Airlines (7.5 per cent), and American (7.5 per cent). The share capital is divided between A shares reserved for New Zealand citizens (65 per cent) and B shares which can be owned by anyone. The New Zealand Government retained a 'Kiwi share' which provides for veto powers over ownership and control, and certain decisions, such as relocation of headquarters and divestment of core businesses. In July 1991, a 1 for 2 rights issue was made, raising total capital.

Thai International made a public offering in the airline in March 1992 when 100 million shares were sold, raising $225 million at a prospective price/earnings ratio of 16 times (Ballantyne 1992, p. 22). The partial privatisation was oversubscribed as more than 421 000 small investors applied for allocations. Minimum share allocations were determined on a random basis, while foreign investment was limited to 15 per cent of the issue and 5 per cent was reserved for employees. The company has declared that a 66 per cent debt/capital ratio is a realistic target. Proceeds were used to help finance aircraft purchases.

Qantas' capital structure underwent considerable change in the lead up to its privatisation. In 1992 Qantas purchased Australian Airlines, which added $A973 million (US$729 million) debt to Qantas' already overburdened capital structure (Lawriwsky 1992). The acquisition, however, has strengthened the position of Qantas in the domestic market by exploiting operational synergies. Subsequently, BA out-bid Singapore Airlines for a 25 per cent holding. In

1993 the Australian Government re-capitalised Qantas through an equity injection of just over a billion dollars. In the second quarter of 1993 the float process was deferred until the financial year 1994–95, following downward revisions to the 1993–94 financial year earnings projections of many international airlines and the realisation that synergies from the incorporation of Australian Airlines and the BA connection could not be demonstrated quickly. It is anticipated that the postponement of the float will allow the Federal Government to obtain better value from the float.

Potential effects

The move to privatise many airlines is adding pressure to further free up aviation markets. For example, some countries have further liberalised their bilateral air service agreements and allowed an increase in foreign equity in carriers. It has been postulated in this Report that once a country decides to free up part of the aviation market, pressure will increase to free up other parts of the market. For example, once governments withdraw from airlines by privatising them then pressures for competition in the market would support freeing up the market through economic deregulation. As developments to free the domestic aviation market are achieved countries would be more likely to support a more liberal approach to their international aviation arrangements. The sequence of events may vary but the point remains: that freeing up one part of a market can prompt demands for freeing up other segments of the market. This was the US experience once it began steps to deregulate its domestic aviation market.

Privatisation of airlines is causing restructuring in many of the world's airlines with consequences for the conduct and performance of firms in the whole aviation industry. While the stated desire may be to increase efficiency and encourage competition, the outcome of structural changes could lead to unexpected outcomes. If less rather than more competition is the long term effect of deregulation, privatisation and liberalisation then this has implications for public policy. If a partially or wholly privatised airline is in crisis some governments may have to decide whether they are prepared to let the airline cease (or reduce) operations, or be bought out by another carrier (domestic or foreign owned). Governments may be loath to re-enter or increase their involvement in airline business yet in the changed circumstances they may decide to opt for a less favoured option, including taking over the airline; or let a private monopoly or near monopoly airline flourish; or ensure increased competition through greater foreign presence in the host country's aviation.

Possibilities for increased foreign involvement could include the home country franchising a foreign carrier to act as its designated carrier (outlined above); and/or giving foreign carriers cabotage to ensure a level of competition in the home country; or allowing more foreign ownership in the host country's airlines; or governments taking other interventionist measures to facilitate competition in its market. Countries vulnerable to such a scenario would include small sized markets; and/or developing economies; and/or markets geographically distant from the main international airline activity; and/or countries experiencing serious political or economic upheaval.

Single aviation markets

Another emerging pressure for change to the conventional regulatory framework comes from the growth in transnational single aviation markets. These exist or are being negotiated in Australia – New Zealand, the EC, North America, Scandinavia, and South America.

Single aviation markets may take a variety of forms. For example, they may be created within a geographic region, as the existing and proposed single markets are; or they may be single markets with common interests, such as historical or cultural ties. The growth in regionalisation in international aviation can be seen in the recent formation of single aviation markets. One option for a single market is for member countries to confine arrangements to cross border aviation between the member countries, leaving each member country to negotiate separate bilateral air service agreements with nonmember countries. From a global point of view, in this example, there would be little change to the existing international aviation arrangements.

An alternative option would be for all the member countries in the single aviation market to operate as a unified market for the purposes of international aviation negotiations with one authority negotiating international aviation treaties on behalf of all member countries, or all member countries jointly negotiating with a nonmember country. This type of single market would change the potential power in negotiations of contracting countries. A multilateral approach by members under one authority to international air service agreements, arising from newly developed single aviation blocs, may result in a more liberal approach to trade in aviation services, but this is not assured. If regional blocs negotiate as a supra-national entity then joint (multiple nations) negotiations of air service agreements may become commonplace.

While most single aviation markets are created by government initiatives, it is possible for an airline(s), such as Scandinavian Airlines Systems (SAS), to operate as if a market bloc for international aviation purposes. It has been rare in the past for bilateral air service agreements to involve more than two countries. When Norway, Sweden and Denmark formed SAS, the three countries negotiated jointly with other countries.

The creation of aviation blocs in the major markets of North America and Europe will bring pressure on the other markets to consider forming a similar arrangement. In North America, the US and Canada are negotiating to form a North America Free Trade Association, which may be opened up to include Mexico. The European Community is the largest single aviation market established to date. The Andean Pact and the Australia – New Zealand single market are two other established regional aviation blocs.

The one market where growth has occurred, without pursuing closer regional ties, is the Asian market. Asian carriers are generally more profitable and the market overall is growing rapidly, hence future prospects are good. There are not the immediate commercial forces driving many airlines in Asia to form a bloc. In addition, the diverse cultural traditions and histories of the countries, in many cases histories of conflict rather than of cooperation, have created an environment where the harmonisation of laws and commercial practices would be difficult to achieve and require a long time frame.

Historically the area has demonstrated less cohesion than in Europe and North America but this may change in the future. There have been preliminary discussions amongst some of the Asian countries and their airlines about limited cooperation. Traditions and organisational structures across Asian Pacific countries do not automatically support one or two major regional blocs. The Association of South East Asian Nations (ASEAN) and the Asia Pacific Economic Cooperation (APEC) initiative could facilitate closer regional ties in aviation, but this is unlikely to be achieved in the short term. Many of the emerging countries in Asia are just succeeding in creating their own strongly identified national carrier and would be expected to protect their fledgling carriers from existing strong carriers (mostly Asian and US carriers) operating in the region.

One market which is developing rapidly, and by the turn of the century will constitute a major aviation market in its own right in Asia Pacific, is China. China's airlines are developing rapidly and penetration of the market can be expected to grow as the large home population gains prosperity and trade links with the rest of the world grow. In the future, China will challenge the power of some of the established markets, and add to the uncertainty of the future of regionalisation in the Asia Pacific. Similarly, a potential single aviation market could be a combination of emerging nations from what was the USSR. It is possible that some of these former USSR states will cooperate and negotiate jointly, at least for international aviation. Structural changes will create changes in market power with implications for regional and global approaches to aviation.

Effects of regionalisation

Regionalisation of trade in aviation services is likely to be a feature of international aviation in the future. Regional approaches can offer workable solutions to specific problems, whereas a global approach faces the difficulty of requiring many more countries to agree to each initiative. Usually it is more difficult to establish a commonality of interests among a greater number of countries. The possibility of achieving reform first by a regional approach before reaching global solutions was recognised by the US National Commission to Ensure a Strong and Competitive Airline Industry (1993, p. 22).

Initially, however, the growth of regional groupings, by dividing the world into separate but stronger groups, could be in conflict with global developments which seek to deal with aviation as one group without differences.

Regionalisation is likely to assist the development of a partial complex hub and spoke system. At present simple hubs exist, usually at major international gateways in each country, with a few centres in any one region favoured by geographic location operating as an important centre, but the network is constrained in developing into a complex hub and spoke network as operates in the US domestic aviation market.[2] Where national barriers are subsumed in an aviation bloc then complex hubs will be free to develop with spokes radiating out to other points regardless of in which country the point served is located.

A complex hub and spoke system covering all of the Asia Pacific region would have implications for Australian international carriers. Currently Australia negotiates bilateral air service agreements with individual countries from around the world and operates flights from Australia to various points around the globe. If a complex hub and spoke system developed in the Asia Pacific market then Australia may find its participation in aviation marginalised.

Australia's geographic location — far distant from major aviation centres — and its status as an end of the line destination (it is not an intermediate link point between major centres for large volumes of traffic) means it would be a spoke feeding into a hub located outside of Australia. It would be a player in the growth in the importance of feeder services in such a scenario but it would be unlikely that it would be a major player. Airlines could consolidate into a two tier system of service providers: major airlines acting as dominant hub servers; and minor airlines acting as spoke feeders. Developments similar to this emerged after the US Government deregulated the US domestic aviation market, although some US airlines are questioning the soundness of their strategies in hubbing. The potential for similar developments in future international aviation is revealed in BA's choices for alliance partners. In a two tier airlines scenario, BA would be a first tier airline while its partners in equity alliances would be second tier airlines, feeding into BA's large international route network.

A possible complex hub in the Asia Pacific is Singapore, which would be well located to service north–south and east–west traffic within, and to/from, the Asia Pacific market. Under this scenario Australian international carriers could

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2. In this Report a distinction is drawn between simple and complex hubs. A simple hub is usually a single 'centrally' located airport which services a limited number of independent feeder routes (spokes). Flights into and out of the hub are not closely coordinated. Many international gateways would qualify as simple hubs, which may be large or small. In contrast, a complex hub involves the connection of a number of hubs which in turn serve an array of feeder routes. Flights into and out of the hub are timed in batches to minimise connection time for passengers and to maximise potential connections.

become limited regional feeder airlines operating via Australia–Singapore routes, possibly Australia – South Pacific routes, and some flights linking Australia–Africa and Australia – South America. None of these routes offer high yields nor, at first, are they likely to be anything other than low density routes. If Australian carriers ceased to operate north, west and/or east of a complex hub in Singapore they would lose: valuable routes and sufficient traffic density; a role as an international carrier; and access to a number of major world markets, deemed by airlines as an important strategy in maintaining long term viability. An alternative scenario would be for Australian carriers to seek to form a complex hub themselves, located beyond Australia, such as Singapore. To be able to do this would require changes to the conventional regulatory regime. The creation of a single aviation market(s) in the region could create the opportunity to take such a step.

A complex hub and spoke system based on regions rather than a global network may offer some of the benefits of opening up a market but, overall, regional divisions may create a less optimal route network. Hubs and spokes developed within regions may be ideal within one geographic region but not operate effectively when the range of hubs and spokes are meshed within a global perspective. Paradoxically, regional aviation blocs may result in lower barriers, hence greater competition between member countries, but raise barriers worldwide between member and nonmember countries. For example, member countries may offer unrestricted fifth and additional freedoms, including cabotage, to member countries but raise restrictions on access to nonmember countries. Regionalisation is in danger of creating new, possibly more, barriers to global trade in aviation services. If a bloc membership agreement is not sufficiently flexible then a group is in danger of stagnating. Individual gains may not give a sum benefit on a world basis.

The creation of single aviation markets, where previously two or more countries had operated separately, raises the issues of how existing control, ownership, and sovereignty principles will be interpreted in the future. Ownership and control principles in aviation are being re-evaluated because of a number of developments in aviation, and were dealt with earlier in this chapter. The principle of a country's exclusive sovereignty over the air space above its territory has existed formally in aviation law since 1919. It is perhaps the last principle to be reassessed and possibly revised in world aviation. The development of single aviation markets, such as the EC and Australia – New Zealand, bring into question who 'owns' the air space and who negotiates air service agreements (that is, what constitutes the sovereign state). In a simple country by country approach the answer was not difficult, a country had its boundaries which defined its existence, hence sovereignty over that 'land', and this included the air space above the 'land'. As a sovereign state, the country negotiated its own air service agreements.

Aviation blocs will operate as one market internally for members. Of interest is how, in the future, member countries will negotiate with nonmember countries. Where member countries in a bloc continue to negotiate their air service agreements with nonmembers separately on a bilateral basis the existing sovereignty principle would remain intact. Member countries are likely over time to recognise their commonality of interests and the potential market power they would have if they negotiated air service agreements in one voice when dealing with nonmember countries or blocs. If this develops as a characteristic of the future aviation scene then the principle of exclusive sovereignty over a country's air space may need to be redefined. A common sovereignty principle shared by all member countries could replace the conventional understanding for commercial aviation purposes. For example, for commercial aviation purposes Australia and New Zealand could agree that their air space was not distinguishable and belonged to them jointly as long as the single aviation market existed. Member countries of the EC could agree that there is no national ownership of individual member's air space, rather it is an asset common to the group. This would assist a single body to negotiate on the group's behalf, making the bloc (especially one as big as the EC) a powerful force in air service negotiations.

Redefining the meaning of sovereignty as a principle in commercial aviation is a 'potential' development for the future. Countries to date have not readily relinquished direct control over their asset — the air space above their territory — but with growing recognition of a commonality of interest in regions and the negotiation power of a joint or supra-national entity with responsibility for negotiations in aviation with nonmember countries, then countries may decide the balance of benefit lies with a new approach to sovereignty over the air space. Another alternative would be for a country to lease its air space to another country. Original sovereignty would stay with individual country as 'owner' but be relinquished under a lease agreement for a specified period and purpose should the benefits be perceived by the country to outweigh the costs.

European Community

The emergence of a single aviation market in Europe may pose the greatest immediate challenge to the overall regulatory framework in international aviation. The EC has developed guidelines for Europe to be a single aviation market in a series of three packages, with implementation from January 1993 (see appendix IV for details on Europe's steps to a single aviation market and the issues which are yet to be resolved). The third package of reforms was introduced in June 1992 and included:

- Common licensing standards to be introduced covering minimum start-up capital, operating standards and proven viability for new carriers. National ownership rules to be abolished and replaced with EC ownership criteria, with automatic approval for a carrier licensed in one country to operate in other EC countries.
- Airlines are to have freedom to set air fares, with safeguards against predatory pricing, and fares considered excessively high or excessively low.

- Market access to be extended to allow unrestricted access for all EC carriers to all intra EC routes apart from domestic routes. Provision was made for consecutive cabotage rights for carriers. However, full cabotage rights will not be introduced until 1 April 1997 and consecutive cabotage access is to be limited to 50 per cent of capacity. Until 1 April 1997 member countries retain the power to regulate access to their domestic routes.

Aviation in Europe contains a complex array of components which are not fully compatible, and a number of issues are yet to be resolved before the separate parts are 'able to operate as one'.

The path the EC adopts for negotiating between member countries, and with nonmember countries, will be important in influencing international aviation throughout the world. In 1990 and 1991 the EC negotiated multilateral agreements with non European Community countries, including Norway, Sweden and Switzerland (Tretheway 1993, p. 8). As a bloc in negotiations the EC would hold a powerful position in any negotiation of air services. If a supra-national commission in the EC takes central control of international aviation negotiations then significant changes to the bilateral approach can be expected. The EC's future negotiation position and power may be revealed in its negotiations covering the North Atlantic route with nonmember nations, in particular the US.

Andean Pact

The Andean Pact includes Colombia, Venezuela, Ecuador, Peru and Bolivia. Other trade groupings are proposed in the Americas, including the North American free trade zone (Canada, US and Mexico) and Mercosur (Argentina, Brazil, Paraguay and Uruguay). The Caracas Declaration issued in May 1991 specified: the immediate introduction of multiple access with third, fourth and fifth freedom rights for all carriers in the member countries (scheduled, nonscheduled, passenger, cargo); multidesignation as of 31 December 1991; and the Andean Pact could negotiate as a bloc with other countries on a multilateral basis from 31 December 1992 (Booth 1991, pp. 80–5). The integration process, however, has faced difficulties. Donato (1992, p. 2.18) reported that these difficulties were due to a lack of an understanding of the mechanism for allocating traffic rights, the existence of air transport taxes, and tariff matters.

Australia – New Zealand

The Australian and New Zealand Governments have negotiated closer trade ties through the Closer Economic Relations (CER) Agreement. As part of the policy development process, a joint Australia – New Zealand team undertook a study of the costs and benefits of a single Australasian aviation market.[3] The

3. The results were published in BTCE and Jarden Morgan NZ Limited (1991), *Costs and Benefits of a Single Australasian Aviation Market.*

study concluded that, under a range of scenarios, there would be significant welfare gains to Australia, New Zealand and, to a lesser extent, third countries if a single aviation market was established. The Governments of Australia and New Zealand agreed to create a single aviation market in 1992.

Australian policy initiatives: In February 1992 the Australian Government announced major changes to its aviation regulatory framework (Collins 1992a), including the proposal to establish a single aviation market between Australia and New Zealand. The main components of the policy initiative included:

- the removal of aviation specific restrictions on equity investments between Australian carriers;
- the introduction of multidesignation for international aviation (both passenger and freight) and renegotiation of bilateral air service agreements, where required, to enhance route and capacity agreements;
- the removal of the distinction between domestic and international carriers, allowing Qantas to phase in domestic services;
- the introduction of a single aviation market between Australia and New Zealand with multidesignation, following consultation with the New Zealand Government;
- the intention to accelerate and encourage infrastructure developments;
- the facilitation of Australian based nonscheduled operations; and
- the designation of additional Australian freight carriers.

Australia looked to create a new aviation market, with reforms in three major areas.

One major area of reform was the move towards a single aviation market between Australia and New Zealand. This was the subject of negotiation between the Australian and New Zealand Governments following the February 1992 announcement. In August 1992 the two Governments agreed to a three stage implementation plan (Collins 1992b; Storey 1992):

- From November 1992 to November 1993, New Zealand airlines would have access to two additional destinations via Australia, with similar rights beyond New Zealand for Australian carriers. Over the same period the trans-Tasman would be partially opened up, with three routes (excluding routes between Sydney and the three New Zealand ports of Auckland, Christchurch and Wellington and the route between Brisbane and Auckland) being made available to other carriers without capacity limits. Following consultation, a determination was issued under the IASC legislation (see below) for Ansett to operate the routes between Melbourne and the three New Zealand ports. The airline would be allowed to commence service in 1993.
- From November 1993 to November 1994, New Zealand airlines would be given access to an additional three destinations via Australia, and an

additional three trans-Tasman routes would be opened up, with previous restrictions on routes from Sydney and Brisbane removed.

- From November 1994 New Zealand airlines would have access to another four points beyond Australia, with all trans-Tasman routes being open to all Australian and New Zealand carriers. By this time cabotage access to each country's domestic routes by the other country's carriers is likely to be available but not to carriers from nonmember countries.

Planned immigration pre-clearance aims to streamline passenger processing. The possibility of the two countries establishing a joint negotiating bloc in the future was mentioned in a joint communique from the two ministers in June 1992 (Collins & Storey 1992).

Another area of recent reform was in airline ownership and operation. Restrictions on cross investment between Australian carriers, and the distinction between domestic and international carriers, were removed. In June 1992 the Australian Government announced that Qantas would be able to purchase Australian Airlines, and other Australian carriers would be able to provide international services, subject to criteria. In September 1992 Qantas finalised the purchase of Australian Airlines. Domestic carriers were now able to apply for designation on international routes and Qantas commenced carrying domestic passengers on 1 November 1992.

The third major area of reform was the introduction of multidesignation. Australian carriers, in addition to Qantas, are now entitled to operate as international carriers, although for at least three years access is restricted to new or unused capacity. In June 1992 the Federal Parliament passed legislation establishing the International Air Services Commission (IASC), which was given the ongoing responsibility to select airlines to operate available international routes (see earlier section for additional details).

The IASC has offered capacity in a number of markets, initially Brunei, Burma, China, India and Sri Lanka, and later Austria, Bahrain, Egypt, France, Greece, the Netherlands and Switzerland, with more being offered as they become available. A number of existing and new Australian carriers applied for available capacity under the new regulatory environment in late 1992 to early 1993. Some subsequently withdrew their submissions. The IASC made its first determination in January 1993. It has allocated capacity to Qantas, Ansett (previously a domestic carrier) and Australia Air International, a new carrier seeking to open up services to China. National Airlines, an air cargo nonscheduled airline, also received capacity to provide scheduled cargo services to New Zealand.

Ansett, previously a domestic carrier, sought to expand into international aviation services, and nominated six Asian destinations to which it would like to fly. Ansett initially targeted Malaysia, Indonesia, Thailand, Singapore, Hong Kong and Japan for its international development (Ansett Australia 1992). In 1993 the IASC allocated capacity to Ansett for Malaysia, Indonesia, Singapore, Japan, Hong Kong and Korea, with Ansett commencing services to Bali in Indonesia in September and expected to commence operations to Malaysia early in 1994. In 1993 Qantas also was given new capacity to a number of destinations. The new entrant, Australian Air International, was given capacity to China in a determination in March (IASC 1993).

The creation of single aviation markets (or regional blocs) has the potential to significantly influence international aviation arrangements. A number of international air service agreements may need to be substantially revised. Whether a future system will be truly multilateral in nature or merely replace countries with regions in traditional bilateral negotiations is as yet unclear.

Other pressures

The pressures to change the regulatory system covered so far have been initiated by both governments and carriers. These developments include moves: to increase carrier competitiveness and responsiveness to market forces, especially in terms of more flexibility in the setting of tariffs; to liberalise bilateral air service agreements; to wholly or partly privatise government carriers; and to form single aviation markets.

Other pressures that may force the conventional regime to change could come from:

- deregulation of domestic aviation markets (for example US 1978, Chile 1979, New Zealand 1983, Canada 1979–1988, Australia 1991, South Africa 1992, EC 1993, and Argentina 1993) as part of the growing support for competition policies;
- the emergence of strong and growing markets such as Latin America and Asia Pacific (see chapters 3 and 4 for details on the latter);
- the inadequacy of some infrastructure (see chapter 4 for details);
- increased congestion (of airways, runways, terminals and connecting land transport networks) (see chapter 4 for details);
- the growing financial pressures and long term low profit levels experienced by airlines (see chapters 6 and 7 for details);
- moves toward globalisation of the international aviation industry (see chapter 8 for details);
- an increasing concern about the dominance of US economic power (given the size of the networks which US carriers have access to and the size of the US carriers). Some countries want to change the historical basis of their bilateral air service agreements to achieve greater benefit and to redress alleged historical bias (Japan and EC's officials regularly refer to an imbalance in their access to US cities in comparison with US access to cities in their markets); and

- the belief in, and policies to support, a system more open to competition which may advantage (or reduce the disadvantage of) certain carriers and provide better quality of service for consumers and other industries, leading to an increase in net national benefits.

Numerous pressures to change the traditional regulatory regime in aviation are analysed in this Report. These pressures have emerged at a time when the progress of reform in international trade in goods and services has experienced difficulties.

A FUTURE REGULATORY REGIME

L.H. Slotmaker when addressing the symposium on 'Multilateralism vs Bilateralism' sponsored by ECAC said (Katz 1991, p. 18):

> Of course, a general multilateral regime covering the whole world may be better in principle...we should finally abandon the irrelevant idea of a country's 'own' traffic and we should adopt the idea of a common market. Then we might succeed in solving the present difficulties in a way most favourable to the travelling public, the airline industry and the taxpayer.

This was in 1955, yet it is still topical today. The long history of calls for a multilateral system are evident in the literature, just as achieving a multilateral system has proved elusive. If the bilateral system is to be replaced it is most likely to be a gradual process. Untangling the web of history of bilateral air service agreements and replacing them is an enormous task.

ICAO held a world wide Air Transport Colloquium in Montreal in April 1992. More than 500 delegates from over 100 governments, airlines, airports and associations debated the role and future of the bilateral system, which has controlled international aviation traffic rights since the Chicago Conference. The opinions expressed varied, leaving the impression that the bilateral system will prevail for some time. There is the possibility that some countries and/or blocs may move to a limited multilateral agreement, or an open one that any country may join, allowing the coverage of the multilateral agreement to expand in the process. Initially a multilateral system could coexist with the bilateral system.

At the 1992 ICAO Colloquium a number of countries expressed concern that while a multilateral system may be in the interests of large countries or blocs, it could disadvantage other countries. Some countries believed the bilateral air service negotiations could accommodate a more liberal approach. Under this approach any need to adopt a new regulatory regime, such as encouraging more competition in international aviation, would not require a new international organisation. The support for at least a liberalised bilateral system, if not a multilateral system, has grown and the pressure is likely to continue as some powerful countries support such change. Nevertheless the bilateral approach remains the chosen instrument of most countries. ICAO has convened a study group of experts to examine the future regulatory regime for international air services. The results of their deliberations will be considered at a special air transport conference to be convened by ICAO at the end of 1994.

One of the recurring themes at the Colloquium was *what* would oversee the process of any new system if the bilateral system is abandoned or significantly altered; and a second theme was *how* might a new or modified system operate? These issues of course are interrelated. In this section a number of possibilities are outlined but there is no clear indication of where, if any, a new direction will emerge as there is not a consensus on the issues amongst countries.

In trying to anticipate *what* organisation(s) might coordinate any new system the following have been raised in the literature and at public forums.

- *The General Agreement on Tariffs and Trade* (GATT) organisation could take over the role of charting a new course under its negotiations on traded services. Historically the GATT was concerned with the traded goods sector, although it has since extended its work to cover services. There are, however, some problems with the GATT being the change broker of the current system, including that the US, an influential player, opposes such a move. The Group of Negotiations on Services (GNS) aimed to establish a General Agreement on Trade in Services (GATS) covering all service sectors including telecommunications, banking, insurance, construction, tourism, and maritime transport. In late 1993, after seven years of negotiations and over 100 countries, GATS achieved international agreement providing a legal basis for negotiations to reduce discriminatory barriers and market access restrictions to foreign service suppliers. In the latter years of negotiations, aviation had been included in the sectoral annex on Air Transport Services under GATS, covering aircraft repair and maintenance, selling and marketing of air transport services, and CRS services. The GATS agreement did not apply to existing air service agreements' traffic rights and services directly related to the exercise of these rights.

  The current air service system is built on one-to-one special agreements, quite contrary to the General Agreement on Tariffs and Trade's (GATT) traditional nondiscriminatory dealings involving most favoured nations and national treatment provisions. While the possibility for the GATT to coordinate a new system in trade in air services exists, such a move would change considerably the Chicago system of nearly half a century — it would be quite difficult to achieve the agreement of the many countries and airlines throughout the world to such a radical change (for uncertain results). The GATT's attempt to liberalise trade by agreement does give a focus to a multilateral approach to trade with the possibility that some of the benefits could be considered for aviation in the long term.

  ICAO could take a lead role in managing a multilateral system. It has shown interest in sponsoring discussions on proposals for a future regulatory regime in aviation. It faces the difficulty that it operates on 'one country, one vote'. Given the wide range of positions expressed at the 1992 ICAO Colloquium, consensus appears rather unlikely as the one country, one vote system probably strengthens the position of those wishing to limit the liberalisation process, at least in the medium term. ICAO may be seen as a body which lacks the mandate to act in such a role; it is not renowned for its speed in resolving difficulties and it is already a political organisation (hence could lack credibility as a neutral player). On the other hand, ICAO could provide the leadership required for change in the absence of any other leader in the change process and may be better suited than other existing bodies to implement change.

- In theory a *combined GATT–ICAO authority* could be forged to oversee a liberal multilateral approach to aviation, but it does not appear to be a strong possibility in the near future.
- *An expanding multilateral agreement* was suggested by the independent Think Tank, established after IATA's symposium in Marrakesh in 1989 and chaired by Hans Raben. A small number of countries (not necessarily in the same geographic region) could draw up a multilateral agreement, covering market access, capacity, pricing, ownership and establishment, which other countries could join over time. Leadership could be taken by a small number of countries. Depending on which countries established such an agreement, a significant proportion of the market for international aviation services could be covered because of the high concentration of the industry in specific markets and routes. The most likely area for a first step to a multilateral agreement would be the North Atlantic route where similar multilateral arrangements have been reached and where European and North American regional groups could assist in the creation of a multinational agreement. The growth of single aviation (or regional) markets may assist the development of this approach.
- *No one international authority* assumes responsibility for liberalising bilaterals or any initial forays into multilateral negotiations. Individual countries and/or blocs may achieve change within a combined multilateral and bilateral system, at least in the medium term without an internationally coordinated plan.

A completely new global authority seems unlikely to be created in the near future.

To answer *how* the future system might develop, the following summarise some of the possibilities discussed in the literature and at conferences.

- *Open skies.* While of benefit in theory, it is an unlikely near future development in its pure form (that is without any restriction, including cabotage for foreign airlines). As noted earlier, the US has offered a form of 'open skies' to European countries but it is still being negotiated within the bilateral approach. If the increasing erosion of the traditionally highly protected environment is to continue, a process of evolution rather than revolution seems more likely in the move to increase the level of competition in international aviation.

- *Bloc to bloc* negotiations could emerge in the future, especially with the emergence of single aviation markets and the creation of closer economic ties and cooperation in the Americas and Asia Pacific. Essentially this could mean a revamp of the country to country format of the conventional system that could lead to either a more liberal or a more defensive style of negotiations. While some countries may form blocs, in order to increase their gain or match another group's power in negotiation, it is unlikely that all countries would find bloc negotiations satisfactory. This is particularly true in areas where groupings of countries have been less cohesive than elsewhere, such as in Asia (although a level of cooperation is being fostered in the region). Much may depend on how operations between countries within Europe develop, as well as the outcome of negotiations between Europe and the US. Some countries, including Japan, have expressed concern that they could be marginalised by any development of larger blocs or a trend toward regionalisation. Discussions at the 1992 ICAO Colloquium revealed that supporters of bloc negotiations still have quite a way to go to overcome associated problems.

- *Multilateral negotiations* are often raised as ideal by a number of airline and government officials, usually on the premise that they will lead to a more liberal aviation market. However, that should not be assumed to be the outcome of a multilateral approach. Multilateral negotiations would require change to the current system where bilateral arrangements have been a key feature. The formation of trading blocs, cross equity ownership, the development of multinational ownership, and/or the adoption of a standard bilateral agreement, could assist the development of multilateral negotiations if in breaking down national barriers new barriers to trade in aviation services do not emerge to blur a commonality of purpose.

  A multilateral approach is not an end in itself. Rather, supporters of a multilateral approach usually envisage a reduction in regulation and the creation of a more competitive environment benefiting consumers, possibly raising traffic levels and encouraging more efficient airlines. A worldwide multilateral air service agreement does not appear likely in the near future, but it could develop over time, especially with more bloc (or regional) agreements. A multilateral approach challenges other principles integral to the bilateral approach including substantial ownership and effective control provisions as well as cabotage. A multilateral approach could, in theory, offer more chance for broad change in a shorter time than change through bilateral negotiations.

- *Further liberalise the current bilateral system.* Some believe that the current system has not been fully tested and that it is able to accommodate greater competition, reduced government involvement and national constraints. Speakers at the ICAO 1992 Colloquium from Japan and India, amongst other nations, stated that the bilateral system can offer a range of alternatives while multilateral negotiations could lead to the domination of international aviation by a few megacarriers. They would argue that bilateral arrangements do not have to create a restrictive agreement. Under this scenario new rules could be developed without the need for any new institution to coordinate regulatory changes.

- *A greater regulatory framework* to replace the current system. While there are many forces adding to the pressure for change, this pressure is usually assumed to be one for liberalising the international aviation market structure, yet the reverse is possible. While it appears likely that the regulatory arrangements may become less stringent, the increased pressure to protect the consumer, the environment (see appendix V for details on the latter) and the desire by many countries to have their own viable flag carrier, could force countries and/or organisations to seek re-regulation or new regulations in future international aviation arrangements.

The future direction of the regulatory framework is uncertain. It is a daunting task to create a new world order in international aviation. The current regulatory regime of ICAO, IATA, and bilateral air service agreements, are able to administer and manage the system established in the 1940s but are not necessarily well placed to create a new regime. Given the complexity of the air service industry, perhaps no one organisation is appropriate to create, and convince most of the world's airlines and political powers, to implement significant changes. Governments and international organisations, like the GATT and ICAO, can not readily chart new courses outside of their existing mandate, and countries and airlines have shown some reluctance to transfer wider authority to the existing bodies.

The bilateral system for negotiating air transport agreements appears likely to be the dominant force for some time to come. The pragmatic question to ask is: to what extent can international air service agreements be liberalised? One starting point is the bilateral system. Whatever system reigns in the future, it is likely the principle of sovereignty over the air space above a territory will remain, although the traditional view may be modified to meet local needs. As countries reorganise their allegiances it may be necessary to redefine what is meant by sovereignty in terms of transit for air transport. Some countries may even choose to temporarily limit or forego their sovereignty of the air, for example by contracting out services or leasing the service rights to other players. This would require change to most current bilateral agreements but it may not mean the abandonment of bilateral or similar agreements. Ultimately countries are unlikely to give up the absolute control of sovereignty of their air space. Consequently, total free trade in international air services seems unlikely in the near future.

The process of change has occurred in a piecemeal fashion to date. The lack of a coherent pattern and the unevenness of change in the world's regulatory regime in international aviation may in part reflect a lack of consensus on how any future system should be structured and the absence of an obvious leader (international forum, country or airline) to act as change broker to lead the pace of change and the implementation of a new system. Opinion amongst governments, airlines, airport operators and other players is split on the need to significantly change the current regulatory framework, especially bilateral air service agreements, and how such change can be implemented. Further, anticipated gains from estimated traffic growth and liberalisation of aviation markets may be constrained if infrastructure inadequacies (see chapter 4 for details) are not addressed.

Legal arrangements, in particular through the regulatory framework, have dominated past international aviation developments. The pre-eminence of legal factors is being challenged by commercial imperatives in aviation, which is likely to change the balance between these forces. The direction of future developments in the aviation regulatory regime is unclear.

CHAPTER 6 AIRLINE OPERATING PERFORMANCE

Purpose: to analyse aggregate performance of world airlines over two decades with attention to world aggregate financial operating results, and then, for eleven selected airlines, illustrate variations between airlines and between major markets.

INTRODUCTION

The airline industry has had a remarkable history of traffic growth. Since World War II demand for air services has increased in all but one year. At a glance such a growth industry might be expected to achieve considerable profit levels. However, despite the pattern of annual growth and technological advances, the airline industry has had a history of relatively low profit results with a number of airlines returning a loss on operations. For example, the US National Commission to Ensure a Strong Competitive Airline Industry (1993, p. 13) noted that in the last 25 years the profit margin of US airlines was below the average profit margin for US industry in all but one year.

In this chapter financial operating performance of scheduled world (international plus domestic) airlines is the focus of the analysis.[1] Like any other industry, the future of the airline industry rests on the demand for airline services and the ability of the airlines to provide services efficiently to ensure sustained profits for long term viability. Eleven airlines have been selected for comparison of financial operating performance and efficiency. These airlines illustrate the different levels of operating profitability, and the different unit costs and unit revenues in three different regions and between airlines within each region.

It should be noted that this chapter deals with the overall financial operating performance of airlines, so that passenger and cargo operations are included as well as some nonaviation business. In 1992 scheduled and nonscheduled world (international plus domestic) airlines of the International Civil Aviation Organization (ICAO) contracting countries were estimated by ICAO to have

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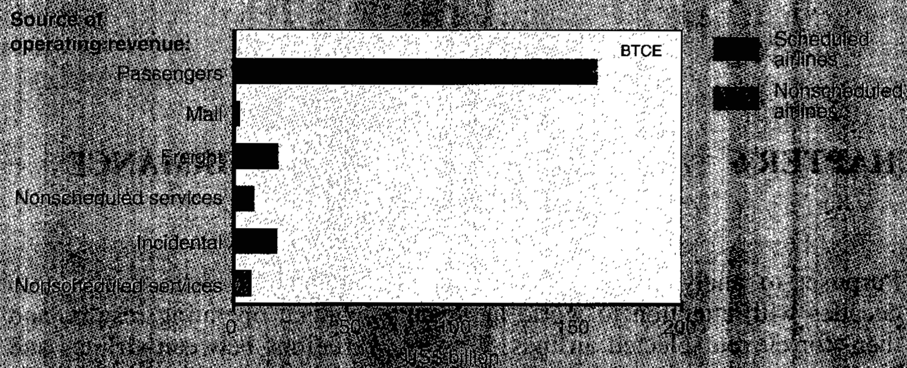
1. The time series data are drawn from ICAO *Annual Report of the Council* series, ICAO *Financial Data Commercial Air Carriers Series F*, and ICAO *Civil Aviation Statistics of the World* series.

Figure 6.1 Estimated gross operating revenues of world (international plus domestic) airlines 1992



Notes Preliminary data for 1992. See footnote 3 for further notes associated with this figure. For supporting data see appendix table II.29.

Source ICAO 1993c.

generated gross operating revenues of just under $220 billion.[2] Figure 6.1 illustrates the break up of estimated gross operating revenues of world airlines in 1992 by type of operation.[3] The figure 6.1 shows that scheduled passengers generate the largest proportion of operating revenues for airlines (74 per cent in 1992).

When discussing total and average operating revenues and operating expenses all sources of operating revenues and operating expenses for scheduled airlines are included (these are shown in figure 6.1). Nonscheduled airlines' results are excluded because there are reporting deficiencies among these airlines. They account for a small percentage of operating revenues (3.4 per cent in 1992).

CYCLICAL NATURE OF INTERNATIONAL AIR TRANSPORT

In chapter 3 the cyclical nature of growth in international revenue passenger kilometres (RPKs) was outlined. In addition the analysis showed that a strong relationship exists between the rate of growth of world gross domestic product (GDP) and international RPKs. Further, the relationship between the rate of growth in international RPKs and real passenger yield was discussed.

2. Preliminary figures excluding domestic operations in states of the former USSR.
3. ICAO defines operating revenue as revenue arising from the operation of air transport services and any incidental services. The incidental item includes revenue generated from surface transportation, food services, service and maintenance sales, property and other operating revenues which accrue to the airline from sources other than air transportation.

Passenger yield is usually defined as revenue per passenger kilometre. Yield also can be related to a more general term for traffic such as tonne kilometres performed (TKP), which may be used as a measure of demand in passenger, cargo and mail operations. TKP are used in this chapter because they are a complete measure of total demand in the aviation industry. An airline's profitability relates to all the services it performs, and TKP can be used as a measure of demand for all the services performed by an airline whereas RPK cannot be used to measure demand for freight and mail services, so it is not used here.

In this section the analysis of cycles in the aviation industry in chapter 3 is extended to examine the relationship between the rate of growth in TKP for scheduled airlines, GDP growth rates and the profitability of scheduled airlines.

An airline's operating result is the difference between operating revenues and operating expenses. As traffic (TKP) levels increase, assuming traffic yield is greater than unit cost, revenue and operating profit will tend to increase. As yield increases, given unit cost and traffic levels remain constant, revenue will tend to increase and operating profit will increase.

There is, however, a tradeoff between operating profit, yield and traffic levels. An increase in airline yield will increase revenue and operating profit if the level of traffic does not change. Some customers, however, will switch from using air transport to another mode of transport or cancel their travel plans because of the price increase. This decrease in traffic will have a dampening effect on the increase in revenues and operating profit coming from the yield increase. An increase in yield may therefore increase *or* decrease revenues and operating profit, depending on the magnitude of customers' response to the change in price (that is, the demand elasticity for air transport services). To measure the effect of changes in yield on operating profit it is necessary to adjust for changes in traffic growth.

Generally when the rate of growth in real yield decreases then the rate of growth in traffic increases (see chapter 3 for details). The year on year changes in real yield have an effect (usually inverse) on traffic growth rates. Over the long term, real yield has declined and this effects the profitability of airlines.

Figure 6.2 shows the trend in average real and nominal scheduled airline passenger yield for the period 1971–1992.[4] While nominal passenger yield has increased over the period (average annual growth of 4.1 per cent per annum), real passenger yield has declined (average annual growth of –1.9 per cent per annum). The long term decline in real yield is a major concern for airlines.

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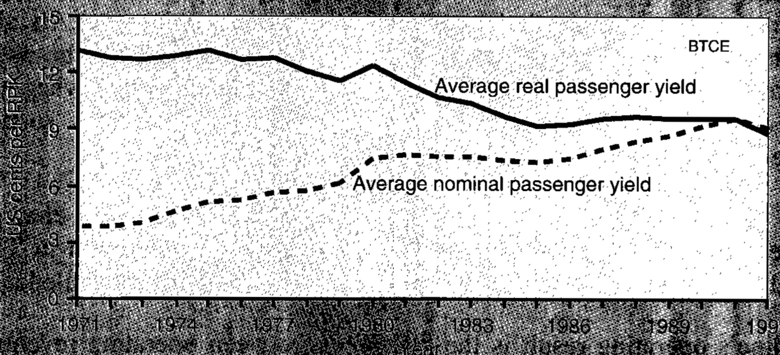
4. Nominal figures have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993), p. 554 for 1990, 1991 and 1992.

Figure 6.2 Real and nominal world scheduled passenger yield 1971–1992



Notes * Preliminary data. See footnote 4 for notes associated with this figure.
For supporting data see appendix table II.30.

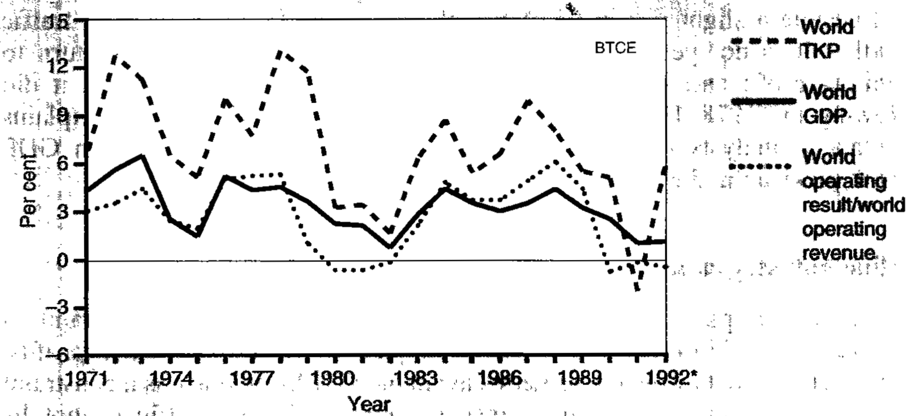
Sources ICAO 1993b and earlier issues.

Increases in average real passenger yield usually occurred when there were large increases in nominal passenger yield such as in the periods 1973–1975 and 1979–1980 following the oil price shocks. Average real passenger yield decreased significantly during the first half of the 1980s but increased slightly during the period 1985–1988 when nominal passenger yield increased quite strongly. Between 1988 and 1991 average real passenger yield remained at around 9.6 cents per RPK. In 1992 both real and nominal passenger yields declined significantly. The fare discounting wars in some of the key markets was a major contributing factor to the decline.

The overall decrease in average real passenger yield has boosted passenger traffic growth, but its effect on profitability is not so clear. There is a point at which decreases in real yield for the airlines will have a negative effect on profitability. This occurred in 1992 when the imbalance between demand and capacity, combined with poor passenger yields, led to a third year of financial losses despite the increase in passenger traffic.

Figure 6.3 illustrates the cyclical nature of airline profitability using TKP growth rates, world GDP growth rates, and operating result as a proportion of operating revenues for scheduled world (international plus domestic) airlines. Operating result (profit/loss) as a proportion of operating revenues is used as a measure of profitability because it gives an indication of the relative margins between revenues and costs for the airline industry as a whole and for firms within the airline industry. If operating result as a proportion of operating revenues rises at a constant level of traffic, then services are being provided

Figure 6.3 The cyclical nature of airline profitability 1971–1992



Notes. * Preliminary data. For supporting data see appendix table II.31.

Sources ICAO 1993c and earlier issues; 1993b; UN 1991 and earlier issues.

more efficiently (that is costs have fallen) or consumers are willing to pay more for the services being provided (revenues have risen).

Growth in world economic activity, world airline industry profitability and growth in world traffic move in phase over economic cycles. Figure 6.3 shows that profitability (operating result as a proportion of operating revenues) in the aviation industry closely follows variations in the growth rate of economic activity (measured by world GDP). This is apparent in the fall in profitability: during the period 1973–1975, following the first oil price shock; during the period 1978–1982, following the second oil price shock; and from 1990 following the downturn in economic activity and the Gulf Crisis.

At this aggregated level the performance of the aviation industry in the period 1988–1992 bears some similarity to the period 1978–1982. In the period 1978–1982 traffic growth rates fell from just under 12 per cent per annum to less than 2 per cent. In 1987 traffic growth rates peaked at just over 10 per cent per annum and by 1991 the growth rate had declined so far that traffic decreased in that year. In the period 1978–1982 the world GDP growth rate fell from between 4 and 5 per cent to less than 1 per cent. In 1988 the world GDP growth rate peaked between 4 and 5 per cent and declined to less than 1 per cent in 1991. In the period 1978–1982 the operating result declined from just over 5 per cent of operating revenues to between 0 and –1 per cent. In 1988 the operating result peaked at just over 6 per cent of operating revenues and declined to between 0 and –1 per cent in 1991.

The main difference between these two periods is highlighted by 1992 results. During the 1980–1982 slump, operating profits rose slightly before GDP and traffic growth bottomed out. All three measures rose significantly following this period. In 1992, however, real operating profit declined from the 1991 level despite a slight rise in GDP growth and a significant increase in traffic growth. It is not yet clear how long it will take the industry to return to operating profit and whether profitability will recover as strongly as it did following the 1978–1982 period, but the previous experience partly explains why many analysts have predicted strong growth for aviation when GDP growth picks up in the major economies.

Airline industry capacity and activity cycles

Airline capacity plays an important role in aviation as a potential constraint on the level of traffic (TKP) and so has an impact on airline yields and profits. Insufficient capacity (tonne kilometres available (TKA)) will act as a constraint on traffic and thus unexpected surges in demand for air traffic cannot be accommodated and profits will be forgone. It is in an airline's interests to have sufficient capacity to meet demand, which in a service industry such as aviation implies that some unused capacity is likely to exist at any point in time. It is also in an airline's interests, however, not to carry surplus capacity for too long. An airline with surplus TKA has to cover the cost of providing the underutilised capacity and this too can limit profitability. Airlines can increase capacity by increasing the usage of their current fleet (that is, scheduling more flights) and/or increasing their fleet size or fleet mix.

Airline operating profit will improve the better airlines are at matching aircraft delivery (that is, increases in capacity) with increases in aviation traffic. It is difficult for airlines to match changing traffic demand with changing capacity. A key component to managing the input process for airlines is timing the delivery of aircraft. Usually there is a time lag between order and delivery of aircraft. At times this lag can be three or more years.

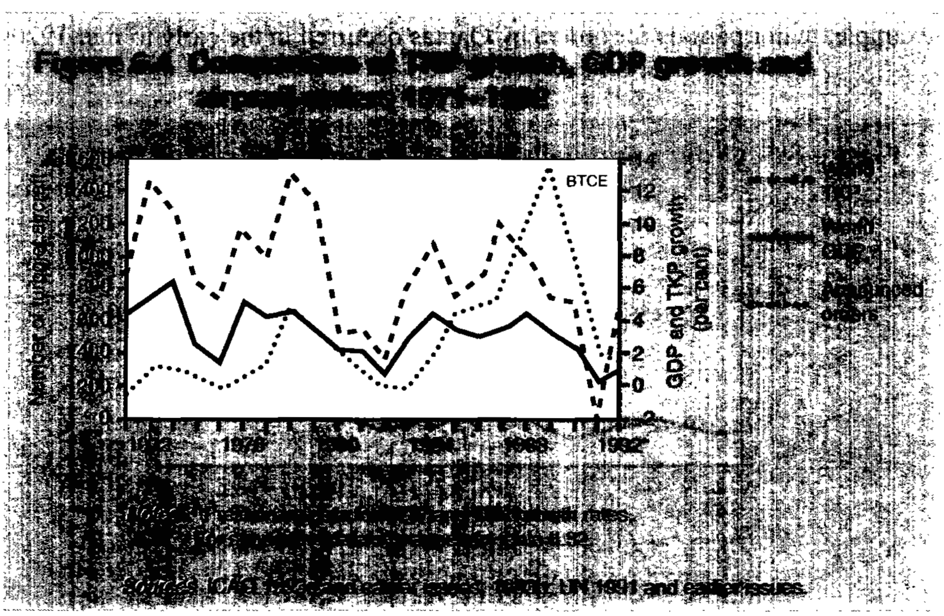
Aircraft orders appear to follow changes in GDP growth rates, probably with a lag of one year, as shown in figure 6.4. This is possibly due to two reasons. Firstly, changes in the rate of air traffic growth are linked to changes in GDP growth rates, as shown in figure 6.4, so the aviation industry considers changes in GDP in one year and translates this to changes in demand, and hence increases or decreases its aircraft orders accordingly. Secondly, airline profitability is also linked to changes in GDP and traffic growth, so as these change together so does the profitability of the airline, hence its ability to buy or raise finance for new aircraft.

On the basis of the above analysis it appears that the airline industry examines recent changes in GDP growth and traffic demand, then estimates future demand on that basis. A scenario would be to decide that in the future demand will rise to X so an addition of Y aircraft will be required, hence order (by purchasing or leasing) Y aircraft then wait to receive delivery of the aircraft (see appendix VII for details on aircraft leasing). The airline industry, therefore, orders aircraft on expectations of future growth in demand rather than existing new demand.

As demand on a network expands an airline can increase the number of services, using its existing stock of aircraft, at a cost equal to the incremental cost of providing the extra services, up until the airline meets its capacity constraint. Acquiring an additional aircraft gives the airline a discrete expansion in capacity equal to the size of the aircraft times the number of flights it can feasibly provide. The expansion of capacity tends to be 'lumpy' rather than incremental as the addition of aircraft is necessarily a step function. It is not possible to introduce each aircraft's additional capacity in smaller units over time. The impact of each additional aircraft is dependent on the size of the total fleet. Where the fleet is large and the number of new aircraft deliveries is small then the impact on capacity is minimal (and vice versa).

Figure 6.5 shows aggregate announced orders and deliveries of turbojet aircraft during the period 1971–1992 (see appendix VI for details on aircraft manufacturers). Turbojet aircraft orders and deliveries are used as a proxy for orders and deliveries of all types of aircraft as they account for the majority of the current commercial fleet. The trend has been towards increasing the use of turbojet aircraft: in 1971 turbojet aircraft accounted for about 54 per cent of the commercial fleet and this has steadily increased to around 78 per cent in 1992.

As noted above, aircraft orders appear to be made on the basis of immediate past experience of traffic growth. During the troughs in the growth of TKP in

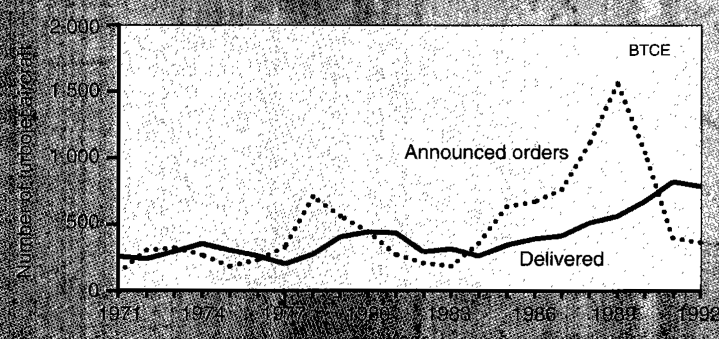


the periods 1973–1975, 1980–1982 and 1990–1992 the number of turbojet aircraft ordered fell substantially, as shown in figure 6.4. Following the recession in the early 1980s, aircraft orders were quite small due to a surplus of aircraft and the industry's lower expectations (ESG 1993b, p. 16). Aircraft orders grew strongly again in 1985 following a year in which passenger traffic growth was strong. There was a surge in aircraft orders in the period 1988–1990 following sustained traffic growth in 1987–1989. Orders for turbojet aircraft reached an all time peak in 1989: there were 1563 new orders for jet aircraft in that year; this was 130 per cent higher than the average number of jet aircraft ordered each year during the 1980s. Aircraft orders have declined since 1990 following the slowdown in passenger traffic activity. In addition to a fall in orders, airlines cancelled and/or deferred deliveries of aircraft in 1992 worth billions of dollars and unlike previous years the aircraft were rarely bought by other customers (*ICAO Journal* 1993, p. 12).

Figure 6.5 shows that annual order and delivery patterns for aircraft are not smooth and have no constant trend line. Periods where orders exceed deliveries essentially occur when TKP growth is at a relatively high level. This is usually followed by a period where deliveries exceed orders due to weaker performance by the airlines as a result of a slowdown in the growth of TKP. The poor financial performance of airlines during periods of low growth in TKP may be exacerbated by nonessential expansion in capacity resulting from earlier orders (say from 2 to 3 years before) during strong growth periods.

Two additional factors that affect the ordering of aircraft are that aircraft require replacement at regular intervals, and changes in technology. The impact of significant technological developments may add another layer of peaks and troughs in aircraft orders. The GDP linked cycles are of shorter duration, while the major technology linked cycles occur over a longer time frame. For example, major periods for orders by Qantas occurred in the early to mid 1970s

Figure 6.5 Orders and deliveries of turbojet aircraft 1971–1992



Note For supporting data see appendix table I.38.

Sources ICAO 1993b and earlier issues.

and from the mid 1980s. In the 1970s Qantas restructured its fleet, replacing the older B707s with the newer and larger B747-200s. Since the mid 1980s Qantas has been retiring these and replacing them initially with B747–300s and later with B747-400s. Individual airline ordering patterns may not match the industrywide pattern in all instances.

Surplus aircraft

Demand for air transport (measured in traffic volume) fluctuates in response to endogenous and exogenous factors, and adjusts relatively quickly to changes in the environment. This is not the case for capacity. The capital outlay for the purchase of an aircraft is a significant input cost for an airline. (Sources of finance for the airlines are discussed in detail in chapter 7). In a year of low growth in traffic in 1991 airlines expanded their capacity by taking delivery of a record number of turbojet aircraft, as shown in figure 6.5. These deliveries were based on orders made in the late 1980s (around the time of peak orders in 1989). The process between orders and delivery requires time, hence airline management is not able to respond as quickly in changing capacity to meet changing demand.

The expansion in capacity along with a decline in air traffic demand in 1991 led to surplus capacity in the aviation industry. The airlines have attempted to deal with surplus capacity problems by reducing capacity through the grounding of aircraft, delaying delivery of aircraft and cancelling orders. Some of the cancelled orders for new aircraft were picked up by Asian carriers in 1991 but by 1992 a number of Asia Pacific carriers such as Thai Airways, Malaysian Airlines and Korean Air were also scaling down their fleets by delaying deliveries and cancelling new orders (*Asian Aviation* 1993c, p. 12).

At the peak of surplus aircraft in 1992 more than 1000 aircraft (around 70 per cent were older chapter 2 aircraft) were parked and idle — representing about 10 per cent of the world's commercial aircraft fleet. The *Economist* (1992, p. 63) reported:

> ...that it began a year ago when Dan Sabovich, the general manager of Mojave Airport, agreed to park a couple of jets at the former Marine Corps base in the desert 100 miles north of Los Angeles. With their windows taped up and engines covered, aircraft can be preserved for years in a dry climate. Now Mr Sabovich is caring for more than 160 airliners of every shape and size. They include 40 Boeing 727s that belonged to bankrupt Eastern Air Lines and some British Airways TriStars. Also there is a brace of shiny new Boeing 747s belonging to Air Canada which cost $140 million each and flew to the airport straight from the factory in Seattle.

This treatment of aircraft is very similar to the maritime practice of laid-up ships. The maritime industry has a history of problems with overcapacity. It has the problem of long lead times between ordering and delivering equipment. In addition, significant changes in technology can introduce obsolescence. One of the interesting contrasts between shipping and aviation at this point in time is that ships have a history of being treated as commodities (in addition to being working equipment). The shipping industry encounters periods when there is little or no operating profit to be made by using the equipment to move freight. In these circumstances the ship can be laid up (that is put in storage) and left until better times return to the industry.

In many cases, however, it is actually cheaper for the owners to continue to run the ship at marginal price, waiting for good times to return to the industry. On a number of occasions, when the shipping industry has picked up again, as well as a large increase in freight rates, the value of the ship increases substantially. In this manner it is possible to make a return from the industry simply in terms of capital gains. It is possible that the airline industry will head in this direction in the future by treating aircraft as commodities for investment purposes, such as wider adoption of securitisation practices.[5]

The total aircraft market is composed of both new and used aircraft. The surplus of aircraft in the early 1990s was the consequence of: a number of new aircraft coming on the market during a decline in traffic growth but ordered in previous years, which were not able to be placed in service; the cessation of a number of bankrupt airlines which left aircraft free for use elsewhere; and the completion of a number of short term leases commenced in the 1980s which left aircraft available for new leasing arrangements. These developments meant more aircraft were released onto the market in the early 1990s than were required.

London stockbroking firm James Capel (French 1993, p. 30) believes that problems with a surplus in aircraft will continue until the mid 1990s. ESG Aviation Services (1993b, p. 15) disagreed with this view, stating that the load factor assumptions used in Capel's analysis were too high. Based on its own commercial jet transport forecast ESG Aviation Services believes that a shortage of capacity could develop in the second half of the 1990s. An important factor in this forecast is the level of retirements, but ESG noted that many parked aircraft have the limited attractiveness of being older chapter 2 (see appendix V for details) narrow body aircraft, for which the market price dropped significantly between 1990 and 1993. For example, the price of a Boeing 727-200 (first release model) lost three-quarters of its value between 1990 and 1993, while the price of a McDonnell Douglas DC-9-30 fell by 70 per cent over the same period (*Avmark Newsletter* 1993, pp. 2–4; *Avmark Newsletter* 1992, p. 2). Many of the parked aircraft will probably never fly again.

There is restructuring taking place in the airline industry, with older aircraft which do not comply with environmental noise and emission standards being replaced with newer chapter 3 aircraft (see appendix V for details). Norris

5. Securitisation is a method of financing which gathers together a large number of debt instruments which generate regular repayments and finances the original payout(s) from funds contributed by investment funds, insurance firms, superannuation or pension funds and other corporate investors.

(1993, p. 49) notes that changes in the composition of the fleet stored at Mojave reflect this, with the older chapter 1 and 2 aircraft staying in storage or being broken up. The ESG forecast (1993a, p. 18) for aircraft deliveries and retirements shows that at least 40 per cent of the active fleet at the end of 1992 consisted of pre 1975 Boeing and McDonnell Douglas aircraft, of which ESG predicts more than 50 per cent will be retired in the period 1993–2000. Based on the level of retirements, deliveries and traffic growth ESG (1993b, p. 15) forecasts a capacity shortage may develop by 1997.

It can be expected that while traffic growth remains low the surplus of aircraft will continue. To meet the immediate challenges in the early 1990s many airlines have deferred delivery, cancelled options or scaled down orders. It can be expected from the cyclical nature of the industry that, given continued growth in traffic, in a few years airlines will once again need to increase their orders for aircraft. Accentuating this cyclical upswing in aircraft orders will be the need to replace aging aircraft to meet environmental requirements later in the 1990s and beyond. The matching of capacity with demand, amid numerous cycles within the airline industry and the cyclical effects of exogenous factors, remains one of the difficulties facing airline management.

FINANCIAL OPERATING PERFORMANCE: WORLD OVERVIEW

Operating result

The operating result (also referred to as the operating profit/operating loss) is the difference between operating revenues and operating expenses in any one year. In this section the operating result of the world's airlines in 1991 US dollars is examined, as well as the operating result as a percentage of operating revenues[6] — this measure gives an indication of the relative operating profitability of the airline industry and firms within the airline industry.

The airline industry has recorded low operating profit levels on average but its earnings are subject to considerable fluctuation due to:

- external political, social and economic events; and
- the cyclical nature of the industry itself.

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6. These aggregate data include:
   - the scheduled airlines of ICAO contracting countries;
   - estimates for nonreporting airlines — the estimates are considered reliable for operating items (between 10 to 14 per cent of revenues and expenses are attributed to nonreporting airlines) but estimates for nonoperating items of nonreporting airlines are considered very uncertain;
   - net results of the world's airlines — the net results are calculated from the operating result by allowing for nonoperating items (for example, interest, direct subsidies and taxes) and are likely to have a substantial error component. Note that not all nonoperating items are shown in table 6.1.

   These aggregate data exclude:
   - the USSR and China in 1971 and 1972;
   - domestic operations in states of the former USSR for the entire period.

External political, social, and economic events which had an effect on the airline industry, the cyclical nature of the industry, and the profitability of the industry were examined previously in chapter 3 and earlier in this chapter.

The generally low operating profit levels achieved in the aviation industry have occurred despite strong growth in traffic. Many would expect that an industry with a history of strong growth in demand for its services would have a healthy margin between operating revenues and operating costs. In aviation this has not been the case. Doganis (1991, p. 18) reported that during the 1950s profit margins within the industry were low. Load factors were around 60 per cent, but aircraft were relatively expensive to run. The introduction of the first jets into commercial aviation in the 1960s led to an increase in speed and capacity in aircraft. The major impact of these developments was that airlines could carry a larger payload, faster, and at lower unit costs. Airlines recorded some profits during the 1960s after an initial loss in 1961.

Costs rose significantly following the fuel crises in 1973 and 1979. The introduction of wide body jets in the period 1968–1971 increased capacity and load factors fell, which placed further financial pressure on airlines. The industry experienced low operating profit levels throughout the seventies. In 1980 the industry recorded its first overall operating loss since 1961.

Overall, the airline industry did not return to operating profit until 1983, as shown in table 6.1. The industry's operating profit level fell again in 1985 and 1986. Strong growth in demand in the late 1980s was translated into higher operating profit margins for the industry before the industry slumped in the early 1990s as a result of recession in major world economies and to a lesser degree the Gulf Crisis.

The operating result (profit/loss) for the world's airlines ranged from a 1990 low of –0.8 per cent of operating revenues to a 1988 high of 6.1 per cent of operating revenues during the period 1971–1992 as shown in table 6.1. During that period the operating result was rarely above 5 per cent of operating revenues and the world's scheduled airlines recorded a loss in the three years of 1980–1982 and again in the turbulent period 1990–91–92. The overall operating result as a percentage of operating revenues has been relatively low, averaging 2.6 per cent per annum over the two decades to 1992.

The highest operating result during the period 1971–1992 occurred in 1988 with an operating profit of $11.75 billion (in 1991 US dollars), which was 6.1 per cent of operating revenues. This was towards the end of a period of high traffic growth — world TKP had grown by 9.9 per cent in 1988 from the 1987 level compared to an average annual growth rate of 6.0 per cent during the 1980s and there was considerable optimism in the industry as reflected in the 1989 peak in commercial jet orders, worth $96 billion (in 1991 dollars) (Boeing 1991, p. 60).

TABLE 6.1 WORLD SCHEDULED AIRLINES: OPERATING AND NET RESULTS 1971–1992

			Operating result		Net result			
Year	Operating revenues ($M)	Operating expenses ($M)	Amount ($M)	Percentage of operating revenues (per cent)	Amount ($M)	Percentage of operating revenues (per cent)	Direct subsidies ($M)	Income taxes ($M)
1971	67 731	65 680	2 051	3.0	465	0.7	276.1	–148.1
1972	74 951	72 328	2 623	3.5	762	1.0	361.2	–576.0
1973	84 108	80 445	3 663	4.4	1 330	1.6	214.6	–1 014.6
1974	91 437	89 247	2 189	2.4	113	0.1	141.0	–823.7
1975	96 998	95 150	1 848	1.9	–170	–0.2	422.8	–126.6
1976	103 865	98 705	5 160	5.0	1 974	1.9	315.9	–1 459.8
1977	113 207	107 295	5 909	5.2	3 724	3.3	285.6	–1 418.9
1978	122 775	116 299	6 476	5.3	5 039	4.1	242.3	–1 128.1
1979	132 705	131 325	1 380	1.0	1 103	0.8	129.4	–272.0
1980	144 906	145 954	–1 049	–0.7	–1 519	–1.0	274.4	–203.3
1981	139 323	140 360	–1 037	–0.7	–1 723	–1.2	113.9	13.5
1982	131 596	131 822	–226	–0.2	–1 835	–1.4	296.4	141.1
1983	134 393	131 522	2 871	2.1	–957	–0.7	519.5	–464.8
1984	138 133	131 449	6 684	4.8	2 621	1.9	308.0	–1 441.6
1985	142 045	136 855	5 191	3.7	2 659	1.9	278.5	–835.6
1986	154 802	149 087	5 715	3.7	1 864	1.2	347.9	–1 366.6
1987	176 066	167 443	8 624	4.9	2 994	1.7	347.3	–1 976.3
1988	191 455	179 705	11 750	6.1	5 760	3.0	391.7	–3 755.4
1989	195 395	187 043	8 352	4.3	3 736	1.9	186.8	–3 241.9
1990	207 211	208 775	–1 564	–0.8	–4 484	–2.2	239.9	–312.9
1991	204 500	205 000	–500	–0.2	–3 500	–1.7	100.0	550.0
1992[a]	205 822	206 793	–971	–0.5	na	na	na	na

na = not available.

a. Preliminary data.

Notes All prices are in 1991 US dollars.
See footnotes 4 and 6 for further notes associated with this table.

Sources ICAO 1993b and earlier issues.

As noted in chapter 3, 1990–91–92 was a turbulent period for scheduled airlines and this is reflected in the overall operating result. The $9.9 billion turnaround from a 1989 operating profit level of around $8.4 billion (in 1991 US dollars) to a 1990 operating loss of around $1.5 billion represented a 5.1 per cent drop in the operating result as a percentage of operating revenues. This is the largest single change in the operating result as a percentage of operating revenues since 1979. The suddenness, as well as the magnitude, of the reversal from operating profit to loss in 1990 after seven years of achieving profit may in part explain why airlines had such difficulty adjusting to their changed circumstances.

The difficult operating conditions for airlines during this period were reflected in the high number of carriers that went out of business in 1991 and 1992 (ICAO 1992b, p. 3). The 70 carriers that ceased operating in 1991 included three large carriers from the US (Pan Am, Eastern Air Lines and Midway

Airlines). In 1990, these three airlines alone accounted for 18.1 per cent of international TKP by US airlines and just under 6 per cent of worldwide international TKP. Of the 50 airlines that went out of business in 1992 a number had never commenced operations, indicating that the recession affected the viability of both new and established carriers. The recession also affected the extent of airline operations, with a net decrease in the number of direct city pair links served by airlines in 1991 (ICAO 1992b, p. 4).

It is important to understand that international airlines were already experiencing difficulties before the invasion of Kuwait by the Iraqi troops in August 1990. International traffic demand growth rates and the airlines' operating result had peaked in 1987 and 1988, respectively, as noted earlier in this chapter, and these two measures recorded significant decreases prior to the invasion of Kuwait. The Gulf Crisis exacerbated an already difficult period in international aviation, which has been prolonged because of the economic recession in a number of key markets. It has been more the recession than the Gulf Crisis which accounted for some of the difficulties for airlines in the early 1990s.

Robert Crandall, Chairman of American Airlines, stated that the two years, 1990 and 1991, wiped out all the profits the US airlines had achieved since the commencement of air travel (Hendersen 1992, p. 31). He believes that the airline industry is one of the least profitable businesses in the world (*IATA Review* 1991, p. 3). It should be noted, however, that this comment does not take into account the capital growth (that is the growth in the assets of the airlines), which has been considerable. Table 6.1 indicates that the airline industry does have a history of relatively low levels of operating result as a percentage of operating revenues.

As noted earlier in this chapter the airlines have to provide extra capacity over what is required to satisfy demand, in order to be able to meet changing consumer transportation needs. At the same time, however, airlines need to match capacity with demand in order to maximise their operating result. In 1991 the average load factor (demand as a proportion of capacity) for the industry fell because capacity increased while demand fell. Growth in capacity in 1992, following the fall in load factors in the previous year, resulted in surplus capacity relative to the demand for seats. This surplus capacity together with continued fare discounting in some markets contributed to another year of poor financial results for many airlines in 1992.

The preliminary operating loss for world scheduled airlines during the turbulent period 1990–91–92 is estimated by ICAO to be around $3 billion. The operating loss does not include nonoperating items. The net result for the airlines is calculated from the operating result with nonoperating items such as interest, taxes and subsidies taken into account. This calculation, however, is subject to a greater number of error problems than the operating result; because of its better reliability the operating result is used in this chapter.

While the world's airlines as a group reported a loss in 1992 it should be remembered that there are regions and individual airlines operating profitably. In 1992, airlines of the Asia Pacific, Europe and Middle East regions as a group recorded operating profits (although airlines of the Asia Pacific were the only group to record a net profit as well) (*ICAO Journal* 1993, p. 9). The *Airline Business* (1993c, p. 85) top 100 airlines for 1992 noted that 12 out of the 20 highest net profit earners were from Asia Pacific. Examples of profitable airlines in Asia Pacific included airlines such as Singapore Airlines and Cathay Pacific, which *Air Transport World* (1993c, p. 56) rated as two of the three top airlines in terms of operating and net profit in 1992. British Airways also achieved good results compared with many other airlines, but it has purchased considerable equity in other airlines in recent times (see chapter 8 for details) and meeting these commitments may affect its profit in the near term.

Although airlines of the Asia Pacific have continued to generate operating profits so far during the recession, their level of profit has declined. The chairman of the Orient Airlines Association (OAA), Chatrachai Bunya Ananta, announced that members reported a 34 per cent drop in combined operating profit in the year ended March 1993 (Bailey 1993, p. 14). Some of the most profitable Asia Pacific carriers, such as Singapore Airlines, Cathay Pacific and Korean Airlines, recorded decreases in operating profit between 1991 and 1992 (*Air Transport World* 1993c, p. 62). Data for 1993 show that this trend is continuing into 1993, with Singapore Airlines recording a further fall in profits in the first half of 1993.

Asia Pacific is considered one of the most promising regions in the future in terms of traffic growth and profitability. Traffic growth will occur but some doubts have been raised as to whether the relatively high margins between operating revenues and costs recorded in the past can be maintained. Change in the business to leisure traffic mix (exacerbated by the recession in the early 1990s) and a change in the type of routes served by Asia Pacific airlines may affect the profitability of Asia Pacific airlines in the future.

The change in the business to leisure traffic mix is a worldwide development and affects operating revenues. Business travel appears to be more price elastic than previously thought. Cost cutting by businesses and significant discounting of airline fares in the recession has caused business passengers to shift down to the lower travel classes (hence cheaper tickets). The possibility of increased competition between airlines in the future may limit the extent of future price increases. In addition to lower fare levels, the increasing proportion of leisure traffic (in other words the increase in the level of passengers travelling on cheaper fares) means that the yield mix may have been permanently altered to the detriment of airline earnings.

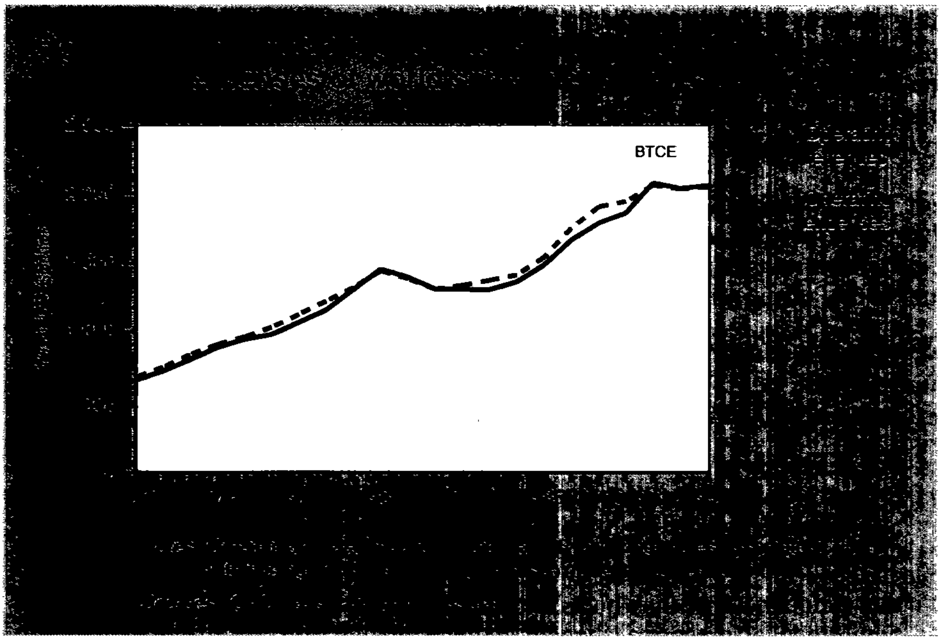
The change in the type of routes served by Asia Pacific airlines affects operating costs. *Airline Business* (1993d, p. 7) reported that the lower costs of most Asia Pacific airlines are based on long haul route structures which, by the nature of aircraft operations, have lower costs (see chapter 2 for details). It also noted that most traffic growth in Asia in the future will be on short haul routes. This is supported by IATA (1992b, p. 15) forecasts, which predict that some of the highest growth rates in passenger numbers will be between countries within the Asia Pacific such as Malaysia–Singapore, China – Hong Kong, Japan–Korea, and Hong Kong – Taiwan. *Airline Business* (1993d, p. 7) believes the increase in shorter haul routes within Asia will increase unit costs to airlines and hence bring about a structural reduction in the margin between revenues and costs.

Singapore Airlines is an example of an Asia Pacific carrier with a decreasing margin between revenues and costs. Kevin Gin (*Airline Business* 1993d, p. 7) of BZW-Pacific Union reported that between 1989 and 1993 Singapore Airlines' operating margin was approximately halved. The carrier's traffic mix is also changing. Currently just under half of the airline's traffic travels in Premium class but this proportion is declining.

Consolidation has been a general feature of the airline industry in recent times. This has been particularly notable in the US since deregulation. The poor operating profitability of airlines has affected the viability of many carriers in the early 1990s. The trend to consolidate seems likely to continue, possibly at an accelerated rate but subject to constraints imposed by the regulatory regime. Airlines have been integrating their activities on a non equity commercial basis (code sharing, interlining, CRS, integration of scheduling, and shared support services such as maintenance, catering, and training); and through equity purchases (mergers, acquisitions, and cross shareholding investments) (see chapter 8 for details).

Liberalisation in the European aviation market may mean that the future of more than a dozen of the twenty-one Euro-flag carriers is in the balance. A number of smaller carriers have already gone into liquidation in Europe, including Minerv, TEA, Air Europe and Air Holland. It appears that consolidation of airlines and inter-airline alliances will continue (especially if a complex hub and spoke system develops for intra Europe traffic) in this new competitive single aviation market. Lufthansa's retiring Chairman, Heinz Ruhnau predicted that by the year 2000, Europe will have only three to four major carriers and that many new entrants after 1993 will fail shortly after start-up (*Airline Executive International* 1991, p. 6).

Given the difficulties and current instabilities of the firms in the industry one may ask, why invest in the airlines? The answer to this question appears paradoxical. It is perhaps best answered by noting that those who invest in airlines may do so for reasons other than the rate of return. In the case of flag carriers, governments may perceive that the advantages of owning an airline for national prestige, defence and economic development including tourism, outweigh the opportunity cost of not earning a higher rate of return on their investments elsewhere. Other nonfinancial reasons for investing in an airline could be that owning an airline could be considered a symbol of entrepreneurial success or the investor could be lured by the 'romance' of the industry. In



financial terms, airlines provide a low level of dividend return compared with other industries, and a sample of airlines show that their share prices increase at a slower rate than their home stock market index. Given the cyclical nature of the industry, however, it has been possible to make significant returns during airline bull markets (see chapter 7 for details).

Real operating revenues and expenses for the scheduled airlines of ICAO contracting countries (excluding domestic operations in states of the former USSR) are shown in figure 6.6 for the period 1971–1992. Over this period the average annual growth in real operating expenses of 5.6 per cent has marginally exceeded the average annual rate of increase in real operating revenues of 5.4 per cent. This reflects the problem airlines have had in containing costs. Airline costs are discussed later in this section. Figure 6.6 illustrates how close operating revenues and expenses have been over the period 1971–1992. The periods 1976–1978 and 1984–1989 provided the better periods for the world's airlines, when operating profit as a percentage of operating revenues exceeded 3.5 per cent.

Airline costs

Airline operating profits have been constrained by rising input prices (see chapter 2 for an outline of airline input costs). What the airlines find difficult is that many of their costs are outside the direct control of management, leaving little room to manoeuvre when costs fluctuate considerably and operating profit margins are relatively low. Some of the cost increases identified by airlines in the turbulent period of 1990–91–92 were the result of the crisis following the Iraqi invasion of Kuwait, but the rise in many of the input costs had begun prior to the Gulf Crisis and continued well beyond the effects of this difficulty.

For example, a closer examination of the changes in the price of fuel reveals that the price changes, when averaged out for the 12 months covering the Gulf Crisis, were not as great as was initially anticipated. In addition, the price of fuel in real terms remained below that paid by the airlines early in the 1980s.

Nevertheless airlines are vulnerable to sudden increases in the price of fuel. Flint (1991a, p. 32) believes that there are many factors contributing to the airline carriers' vulnerability to fuel price rises, including:

- the existence of inefficiencies due to the cushioning effect of the low fuel prices prevalent throughout the previous decade — this enabled many operators to retain fuel inefficient aircraft which are not economically viable when fuel prices are higher;
- the suddenness with which fuel price hikes are imposed, as well as the magnitude of the price changes, which far outstrips an airline's ability to make timely and appropriate adjustments; and
- the increased block time[7] due to congestion of airports and air traffic control systems.

What fuel costs reveal is the fluctuating nature of airline input costs, which affects management's ability to contain costs, hence its ability to achieve satisfactory operating profit levels.

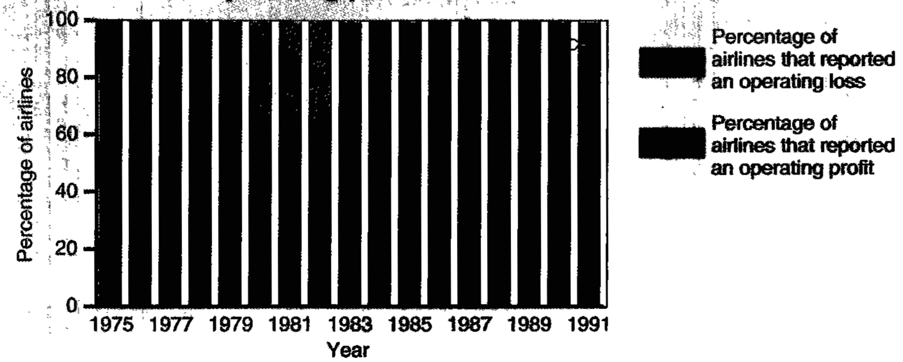
Net result

Caution should be exercised when considering the net result, as it is subject to considerable error due to the significant aggregation involved in capturing the details for the world's scheduled airlines. It is calculated from the operating result with allowances for nonoperating items including interest, direct subsidies and taxes. The net result for airlines of the ICAO contracting countries (excluding domestic operations in states of the former USSR) is shown in table 6.1 for the period 1971–1991.

For these two decades the net result as a percentage of operating revenues was consistently low, averaging 0.8 per cent. The highest net result was recorded at 4.1 per cent of operating revenues in 1978, while the lowest was –2.2 per cent in 1990. In one-third of the years in the period a negative net result was recorded. While the calculation cannot be relied on for complete accuracy, the

7. Block time is the total amount of time measured from when the aircraft moves from the loading point before takeoff until it stops at the unloading point after the flight (ICAO 1984a, p. 125).

Figure 6.7 Percentages of world scheduled airlines reporting an operating profit or loss 1975–1991



Notes Approximate percentages. For supporting data see appendix table II.35.

Sources *ICAO Journal* 1993; ICAO 1992b and earlier issues.

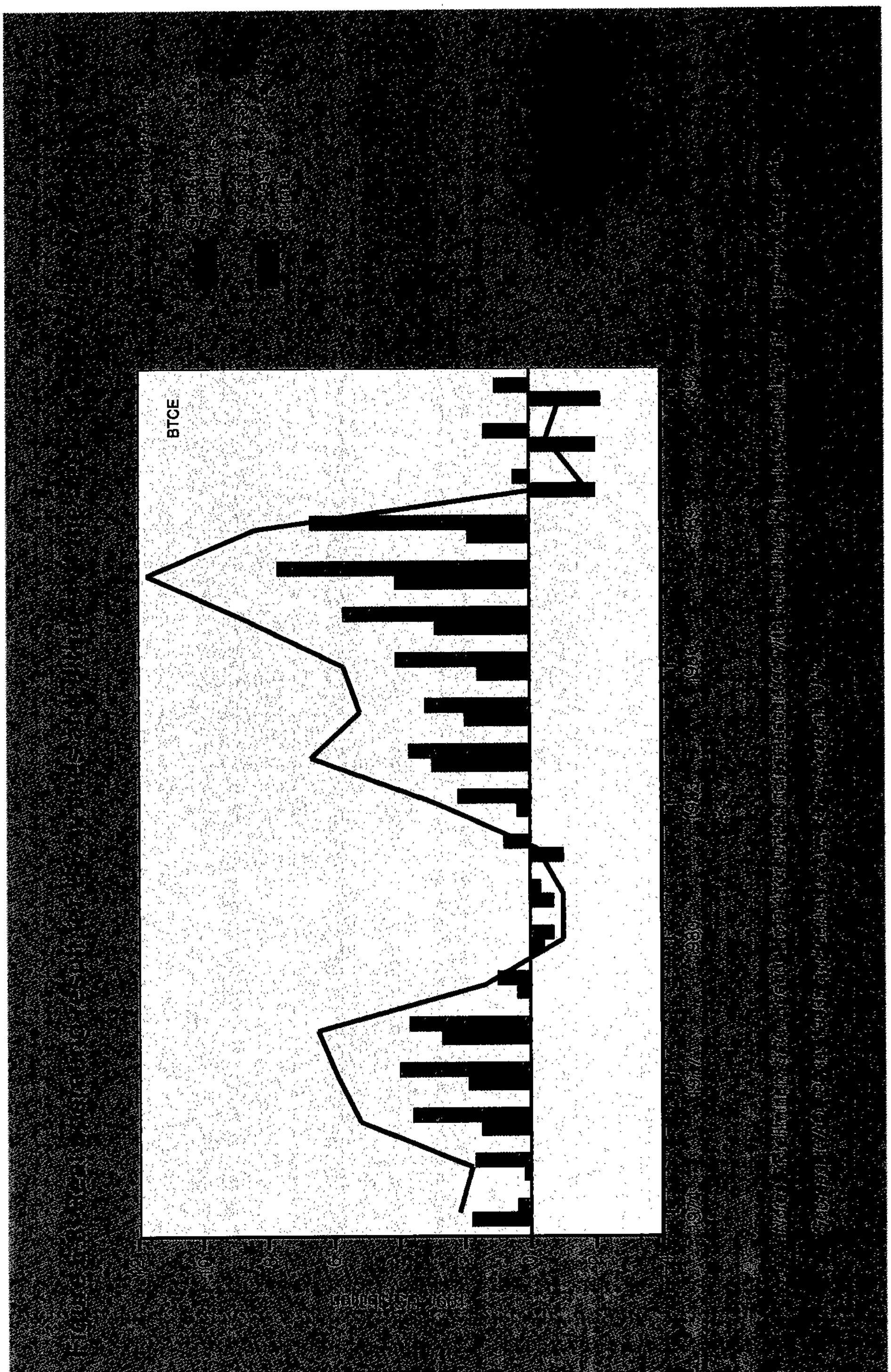
net result shown illustrates an overall low level of profitability achieved by ICAO scheduled airlines, which represent a high proportion of the world's (international plus domestic) airlines.

Profit and loss in the airline industry

The aggregated data for airline operating revenues, operating expenses and net result for ICAO's scheduled airlines (excluding domestic operations in states of the former USSR) do not reveal the considerable differences between individual airlines and regions. Figure 6.7 shows the percentages of airlines of the ICAO contracting countries reporting an operating profit or loss in the period 1975–1991. In any one year, between 25 and 33 per cent of the airlines usually report an operating loss, with the majority reporting some level of operating profit. The number of airlines that reported an operating loss went as high as 50 per cent in 1980 and 1982. A majority of airlines reported an operating loss only twice in the period 1975–1991. This was during the period of poor profitability in the early 1990s when some 60 per cent of airlines reported an operating loss in 1990 and 55 per cent of airlines reported an operating loss in 1991. This is in comparison to 1989 when three-quarters of the airlines reported an operating profit.

Impact of US results

The operating result for the world's airlines is significantly influenced by the 'health' of the US majors and national airlines. Although scheduled US airlines accounted for a small proportion of the actual number of airlines in the world, in the period 1975–1992 they accounted for between 36 and 42 per cent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(averaging 38 per cent) of annual operating revenues of all ICAO contracting countries and around 35 per cent of total TKP. Consequently the operating result for the US airlines has a significant influence on the overall result for the world's airlines. Figure 6.8 compares the operating result of US airlines with the rest of the world's airlines.

US airlines accounted for an average of 38 per cent of total operating revenues over the period 1975–1992 but their operating result was usually below this figure. For example, in the period 1983–1989 when both the US airlines and the rest of the world's airlines recorded a positive operating result, US airlines accounted for an average of 39 per cent of operating revenues but averaged only 31 per cent of the operating profit (possibly due to greater competition in the deregulated US domestic market).

The US airlines had particularly poor results during recessions, including 1980–1982 and the turbulent period 1990–91–92. During these periods the operating result of the rest of the world's airlines was poor but the US airlines' operating result was usually worse. In 1982 after two years of operating losses the rest of the world's airlines made an operating profit but US airlines were still in the red, so that overall the world's airlines together recorded an operating loss. The aggregate operating result for the rest of the world's airlines was positive in 1990–91–92 although these results were a large drop from the high operating profits in the latter half of the 1980s. The US airlines' operating result was so poor during this period that it overwhelmed the positive result of the rest of the world's airlines to show an overall negative result for world airlines in 1990–91–92.

Part of the reason the US airline's financial performance fell was that amidst the turmoil in the industry in 1991 the US airlines engaged in significant discounting, including corporate discounting. Airlines have often sought market share (or volume), which can have marketing, distribution and competitive advantages in the long run but not necessarily maximise operating profit per unit sold in the short run. The drive for market share is costly. One estimate judged that corporate discounting in 1991 cost the US carriers $4.5 billion in lost revenue. American Airlines agreed that the loss was substantial but believe this estimate is high (*Commercial Aviation Report* 1992a, p. 6). The deep discounting or 'fare wars' strategy continued in 1992 and it restricted airline earnings. In the US in 1992 just under 88 per cent of domestic air passengers travelled on discount fares with an average discount of just over 63 per cent (on the full fare) (Salomon Brothers 1993, p. 8).

The heavy discounting by US carriers in 1991 and 1992 created problems for the bottom line of many carriers and left many US airlines with little room to move. Consequently changes which were needed became more urgent, and some actions could no longer be delayed, or required earlier implementation than previously planned. Some of the main changes adopted by airlines included: considerable 'downsizing' (staff cuts); use of Chapter 11 protection by US airlines; rescheduling and/or cancellation of delivery of new aircraft;

more commercial alliances; rescheduling of debt payments; and changes in route structure, such as Continental Airlines' withdrawal from routes to and from Australia in October 1993. US carriers which filed for Chapter 11 bankruptcy conditions included Eastern Airlines in March 1989 (ceased operations January 1991), Continental on 3 December 1990 (out of Chapter 11 on 29 April 1993), Pan Am on 8 January 1991 (ceased operations on 4 December 1991), Trans World Airlines (TWA) on 31 January 1991 (out of Chapter 11 on 3 November 1993), Midway Airlines on 26 March 1991 (ceased operations on 14 November 1991), and America West on 27 June 1991. In addition some US airlines have disappeared into the fold of bigger airlines. In 1991 more than 30 per cent of the US fleet belonged to bankrupt and/or Chapter 11 carriers (Poupelle 1991, p. 2) and Chapter 11 airlines carried 25 per cent of US traffic (*Airline Business* 1991, p. 11). These developments illustrate the financial difficulties of carriers in the US, which is such a significant market for air transport.

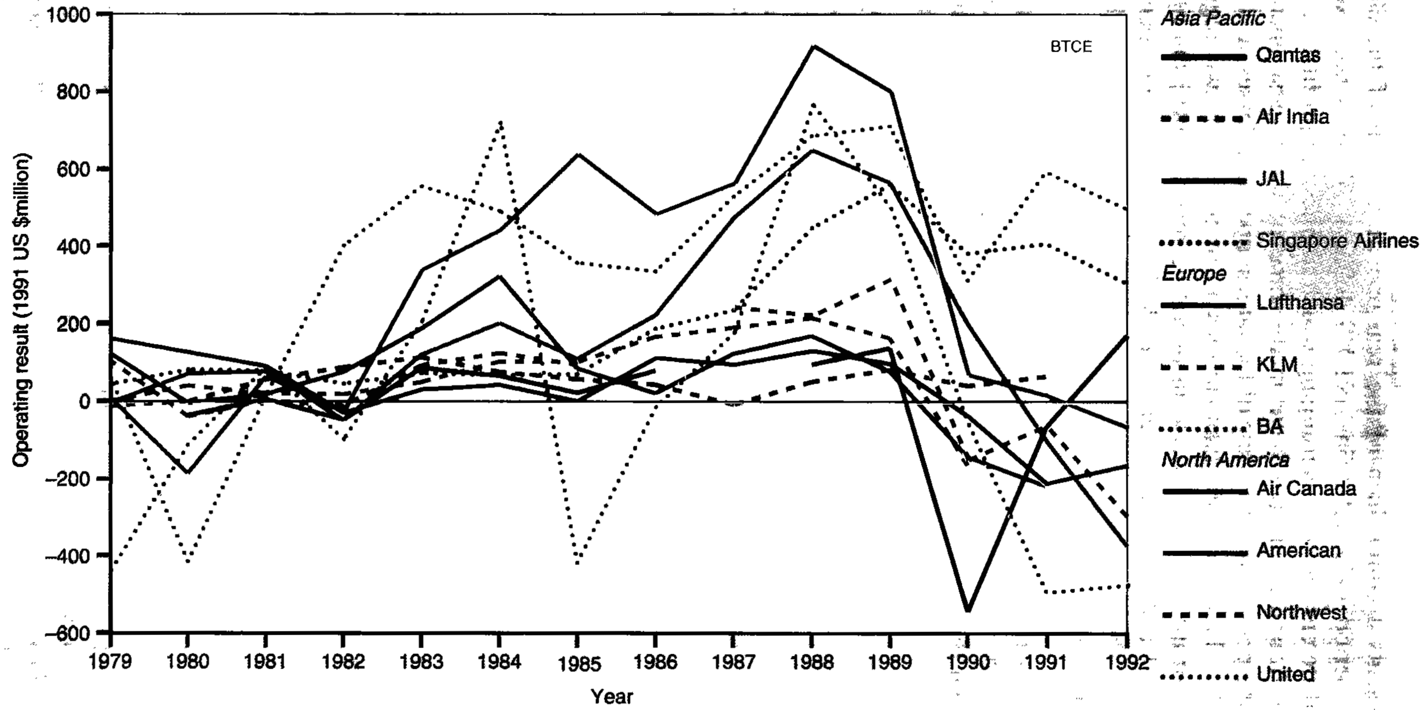
Due to the poor profitability of US airlines and the relatively slow recovery in the economy it is generally believed that airlines will continue to face difficulties with some possibly ceasing operations, or seeking Chapter 11 protection. Further consolidation appears likely in the markets of the US and Europe. Developments in these markets have traditionally determined much of what happens in the aviation industry.

FINANCIAL OPERATING PERFORMANCE: INDIVIDUAL AIRLINES

As noted previously, aggregate results for the world's scheduled airlines of ICAO contracting countries do not reveal the range of financial performance for individual airlines. The aggregate operating result for the world's airlines in 1990–91–92, for example, did not reveal that the loss incurred by US airlines overwhelmed the positive operating result for airlines of the rest of the world, resulting in an overall operating loss being recorded for world airlines.

To give an indication of the range of operating performance by the world's airlines, eleven airlines have been selected from the Asia Pacific, European and North American regions. A comparison of the financial data in real terms (all data in 1991 US dollars) has been undertaken to illustrate the different levels of profitability, and the different unit costs and unit revenues in these different regions and between airlines within each region. The eleven airlines have been selected from ICAO's three largest statistical regions: Asia Pacific airlines used in the analysis are Qantas, Air India, Japan Airlines (JAL) and Singapore Airlines; European airlines used in the analysis are Lufthansa German Airlines, KLM Royal Dutch Airlines and British Airways (BA); and North American airlines used are Air Canada, American Airlines, Northwest Airlines and United Airlines.

Figure 6.9 Real operating result for selected airlines 1979–1992



Notes See footnote 4 for notes associated with this figure. Data used in this figure were unavailable from ICAO for: Qantas in 1979 and 1987; Air India in 1992; Lufthansa in 1992; KLM in 1991 and 1992; and Northwest in 1986. For supporting data see appendix table II.37.

Sources ICAO 1993f and earlier issues; 1992c and earlier issues.

Operating result

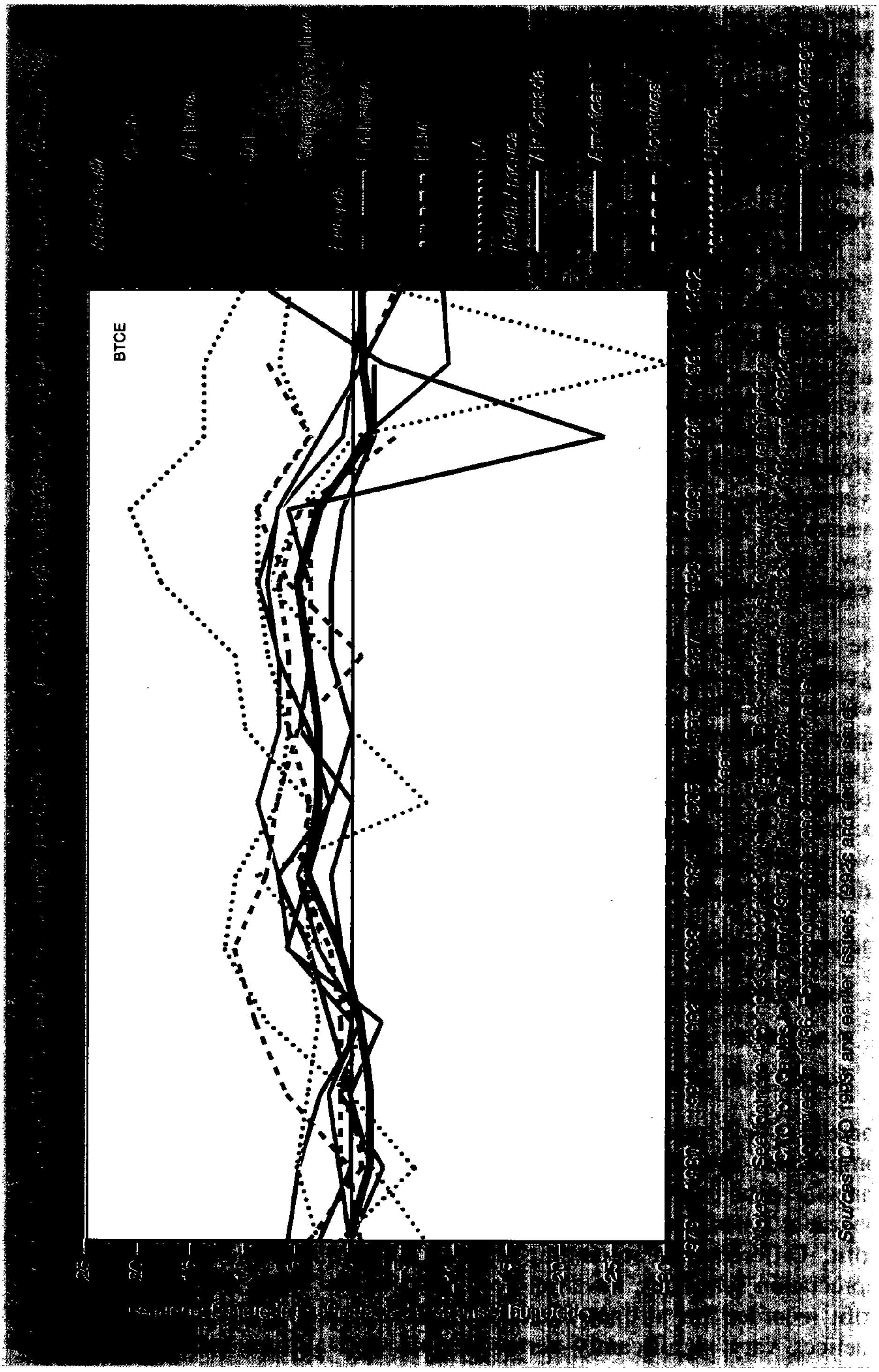
Figure 6.9 presents a comparison of the real operating result of the eleven airlines for the period 1979–1992 (in 1991 US dollars). There is not a single pattern in the different regions determining which airlines are profitable. The selected North American airlines have made some of the largest operating profits during the period but also some of the largest operating losses, and their operating results fluctuate more than airlines from the other two regions. Notably, many airlines recorded a rise in operating result (profit) during the period 1987–1989 and all experienced a marked decline in their operating result in 1990. What differs is the magnitude of individual airline's fluctuations in operating result.

The real operating result of the selected European carriers has varied between strong and poor results in a similar manner to the selected North American carriers, although the European carriers' results seem a little more consistent throughout the period, with less fluctuation than the North American airlines.

An interesting feature of the real operating result of the selected Asia Pacific airlines is that for the first half of the period their results were generally positive but small compared with the results of the selected North American and European carriers. In the second half of the 1980s, however, the magnitude of the real operating result for some of the selected Asia Pacific airlines increased. This perhaps reflected the large increases in demand for services within and connected to the Asia Pacific. This growth was due to strong economic growth in some countries in the region in the 1980s, and the ability of some Asian carriers to control their costs more effectively than many of the North American and European carriers.

An analysis and comparison of the real operating result of the airlines is informative on general profit/loss annual developments, but the operating result does not give a good basis for comparing the profitability of different airlines as it takes no account of the differences in the size of operating revenues and expenses for the airlines (nor the stage lengths of their flights, amongst other variables). In figure 6.10 the operating results, as a percentage of operating revenues, for each of the eleven airlines are shown. This comparison gives a much clearer idea of how the airlines performed in producing their operating result. In many instances the selected airlines of the Asia Pacific did at least as well as airlines from the other two regions, if not better, although the selected airlines in North America and Europe overall achieved a higher real operating result.

The differences in operating result as a percentage of operating revenues shown in figure 6.10 also gives an indication of the range of performance by airlines within regions. From the selected Asia Pacific carriers, for example, since the mid 1980s one of the carriers (Singapore Airlines) has had consistently good operating results as a percentage of operating revenues, one of the carriers (Air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India) has had performance in the middle ranges, and two of the airlines (Qantas and JAL) have had variable operating results.

Performance averages per traffic unit

The measures

When examining the performance of airlines, operating revenues and expenses are frequently related to the measure of demand TKP (tonne kilometres performed), and to the measure of capacity TKA (tonne kilometres available). It is not possible to use the journey of a passenger or the transportation of a consignment of freight or mail as a unit of output for an airline because of the varying stage length and journeys between different city pairs. Operating revenues and expenses are therefore related to TKP and TKA in order to provide a measure of unit revenue and unit cost for an airline's output. The differences between operating revenues and expenses per TKP and operating revenues and expenses per TKA give an indication of the margin between revenue and cost and, therefore, profitability for the airline. The measures also allow inter-airline comparisons to be carried out without having to consider any breakdown between passenger and freight operations.

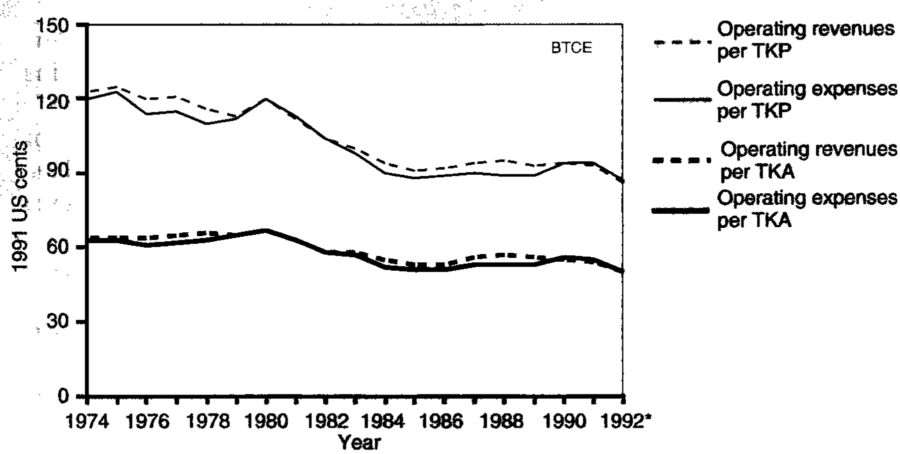
The use of TKP or TKA as the base for unit revenue and unit cost can be argued. TKP may be considered more appropriate as it measures the actual workload of the airline. It is necessary, however, for airlines to provide capacity greater than the level of demand at any one point in time. Providing capacity above that needed to service fluctuating demand is part of an airline's business, and impacts on the airline's costs. Operating revenues per TKA and operating expenses per TKA are therefore used in this analysis to measure unit revenue and unit cost. Operating expenses per TKA is also considered an indicative measure of airline efficiency.

The performance measures used in this section are:

- real operating revenues per TKP and real operating expenses per TKP;
- real operating revenues per TKA and real operating expenses per TKA; and
- weight load factor.

There are some important factors that affect the following analysis. The airline comparisons should be viewed in the light of these factors. The first is that financial data published by ICAO were used in all comparisons so that a consistent set of revenues and costs were used in the calculation of operating profit. Differences in accounting methods between airlines, such as differential depreciation schedules, have not been adjusted for. This will affect operating profit recorded for airlines from the different regions, given that accounting practices vary significantly across regions and airlines (see chapter 7 for details).

Figure 6.11 Performance measures for world airlines 1974–1992



Notes *Preliminary data. See footnote 4 for notes associated with this figure. For supporting data see appendix table II.39.

Sources ICAO 1993c and earlier issues.

The examination of costs also has not been adjusted for differences in average stage length and variable wage levels in the different regions (see chapter 2 for details). Despite these caveats, comparing airlines is valuable in terms of a general overview of profitability in different regions and trends in revenues and costs across regions and airlines.

World overview

Figure 6.11 shows real operating revenues per TKP, real operating expenses per TKP, real operating revenues per TKA and real operating expenses per TKA for world scheduled airlines (international plus domestic services) in 1991 US dollars for the period 1974–1992. The trend has been towards decreases in all the measures over the period although the year on year growth rates have fluctuated. For example, operating expenses per TKP had its highest year on year growth rate in 1980 of just under 8 per cent and its lowest growth rate in 1984 of around –9 per cent. Over the period 1974–1992:

- real operating revenues per TKP decreased at an average annual rate of 1.9 per cent;
- real operating expenses per TKP decreased at an average annual rate of 1.7 per cent;
- real operating revenues per TKA decreased at an average annual rate of 1.3 per cent; and

- real operating expenses per TKA decreased at an average annual rate of 1.2 per cent.

The relationship between overall financial operating results for world airlines and real operating revenues and expenses per TKP is revealed by examining the changes in real operating revenues and expenses per TKP in 1989 and 1990 and comparing this with overall financial results for the airlines. For most of the second half of the 1980s real operating revenues per TKP were higher than real operating expenses per TKP. In 1989, however, both real operating revenues and expenses per TKP declined, but real operating revenues per TKP fell by a larger percentage than real operating expenses per TKP. This was reflected in the fall in real operating result for the world's airlines in 1989 compared with 1988. In 1990 real operating revenues and expenses both increased, but real operating expenses per TKP increased 6.4 per cent from the 1989 level whereas real operating revenues per TKP only increased 1.1 per cent. The changes in real operating revenues and expenses in these two years meant that real operating expenses per TKP exceeded real operating revenues per TKP in 1990, as reflected in the operating loss for the world's airlines in that year. Both operating measures fell slightly in 1991 and by just over 7 per cent in 1992 so the operating loss for the world's airlines was sustained in 1991 and 1992.

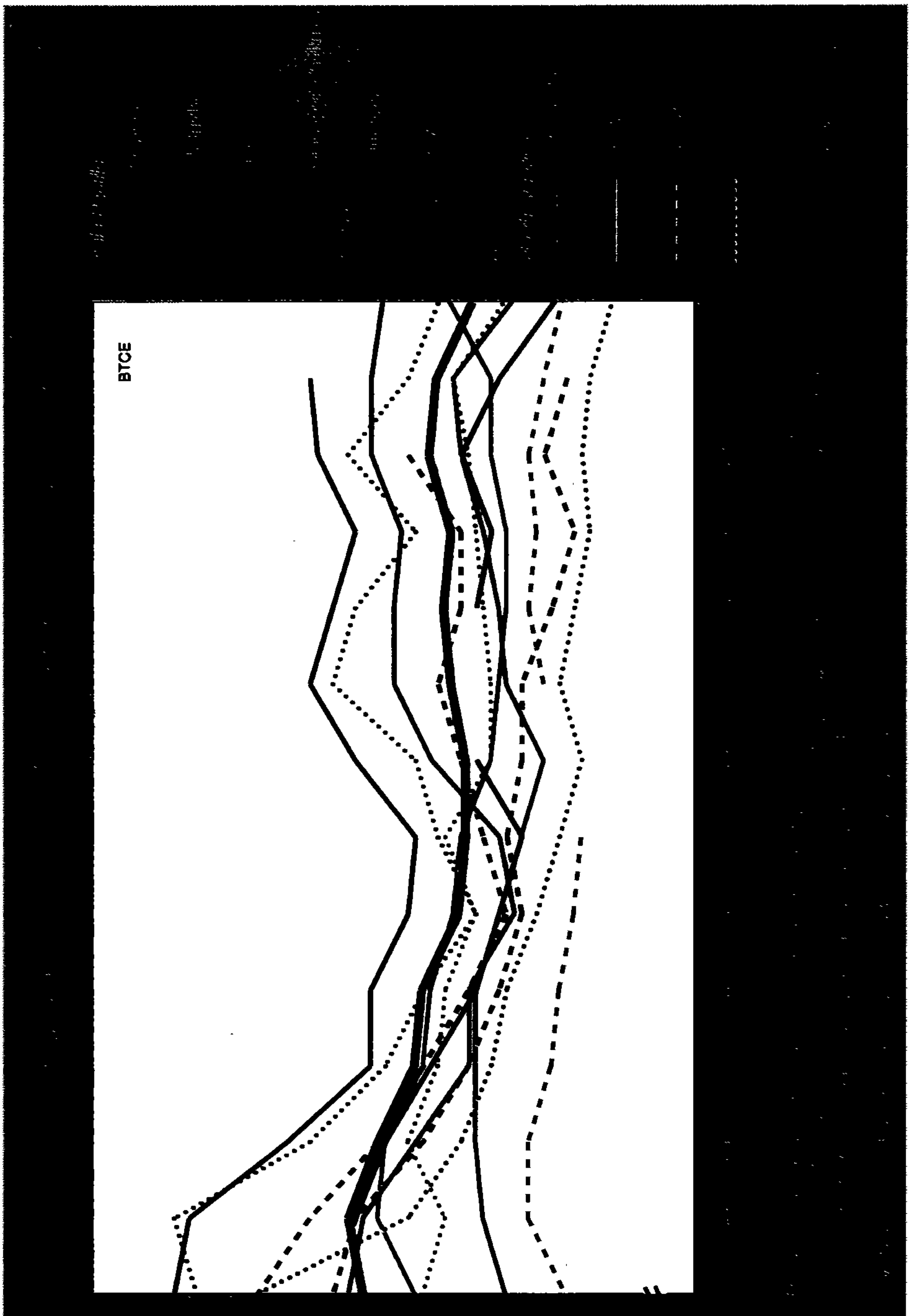
One of the interesting features of the world airline industry is that despite the fact that it is an international industry, the unit costs and unit revenues differ for airlines in varying regions (see chapter 2 for details).

Operating expenses

It is informative to compare the real operating expenses per TKA for the eleven airlines. Figure 6.12 depicts real operating expenses per TKA (in 1991 US dollars), for the period 1979–1992 and shows that:

- the selected European airlines have operating expenses per TKA in the high range;
- the selected North American airlines have operating expenses per TKA in the mid to low range; and
- the selected airlines of the Asia Pacific have operating expenses per TKA in the mid to low range.

This hierarchy reflects the shorter than average stage lengths in Europe and North America and the lower than average wage levels in the Asia Pacific. The trend in JAL's real operating expenses per TKA since the mid 1980s is an exception here, and again highlights that there are differences in airline performance within a region as well as differences between airlines from different regions. The trends in real operating expenses per TKA are of particular interest, as real operating expenses per TKA is frequently used as an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indicative measure of airline efficiency. It is a unit cost measure that takes into account the capacity supplied by airlines.

Over the period 1979–1992 the selected North American airlines do not seem to have been as successful as the selected airlines from the Asia Pacific and Europe in reducing real operating expenses per TKA, although the overall trend was towards a reduction in real operating expenses per TKA. The selected European airlines achieved some substantial improvements in their operating expenses per TKA in the first half of the 1980s but their success was not as marked in the second half of the 1980s and into the 1990s. The selected European carriers' operating expenses per TKA fluctuated more than airlines from other regions over the period.

The selected Asia Pacific airlines made substantial gains in reducing costs in the early 1980s as did the selected European carriers. Since the mid 1980s, however, the results for the different airlines selected from the Asia Pacific have been mixed. Some of the carriers, such as Singapore Airlines and Air India, have continued to reduce their unit costs, whereas Qantas has seen modest increases in its real operating expenses per TKA. JAL seems to be the exception to the Asia Pacific carriers. Its operating expenses per TKA (in 1991 dollars) have grown significantly since 1984. In 1984 it had the seventh highest level of operating expenses per TKA and this rose to the second highest level of operating expenses per TKA for the sample of eleven carriers in 1991.

Operating revenues

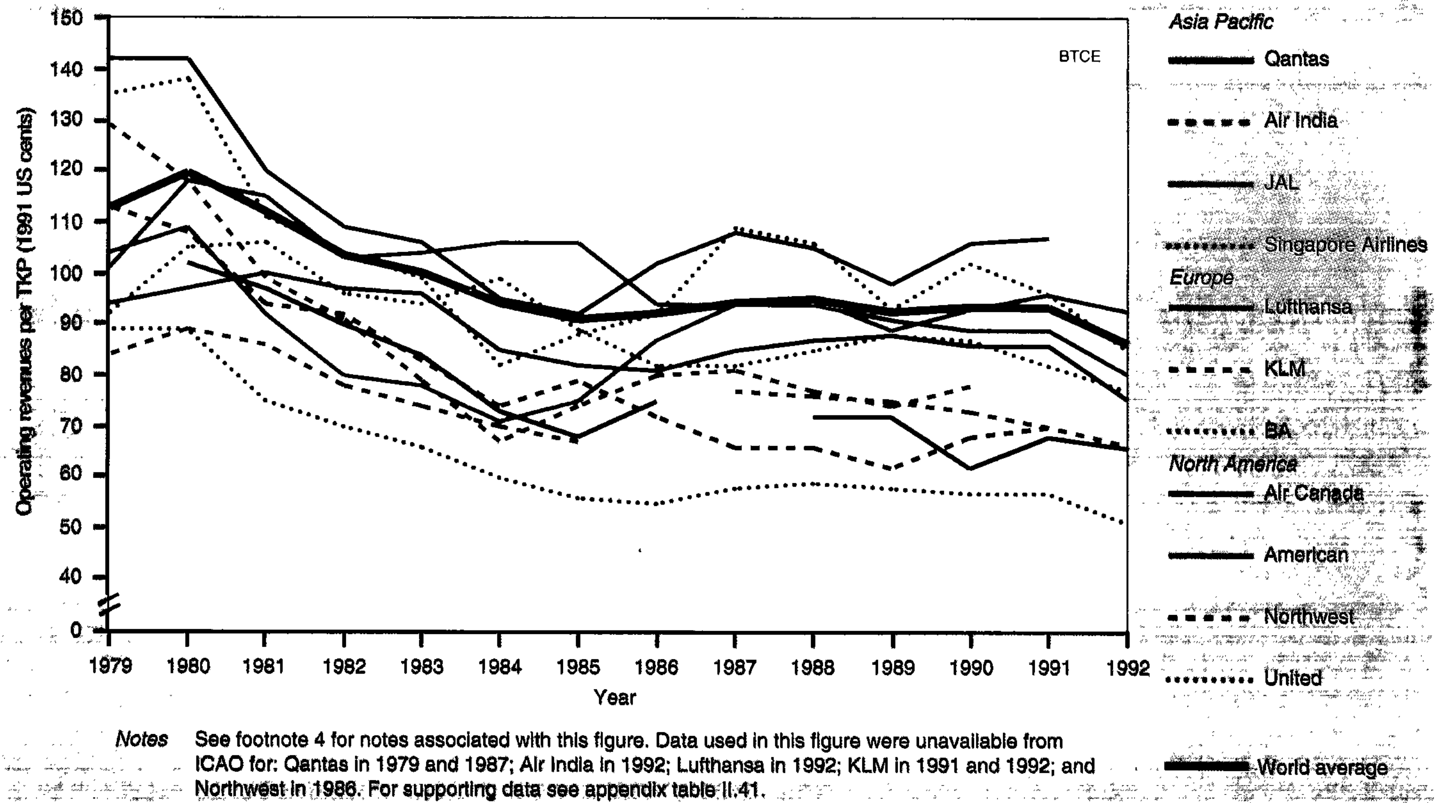
Figure 6.13 presents real operating revenues per TKP (in 1991 US dollars) for the selected airlines over the period 1979–1992 and reveals that:

- the selected European airlines have operating revenues per TKP in the mid to high range;
- the selected North American airlines have operating revenues per TKP in the mid to high range; and
- the selected airlines of the Asia Pacific tend to have operating revenues per TKP in the mid to low range.

The trend in JAL's real operating revenues per TKP is again an exception in the selected airlines of the Asia Pacific.

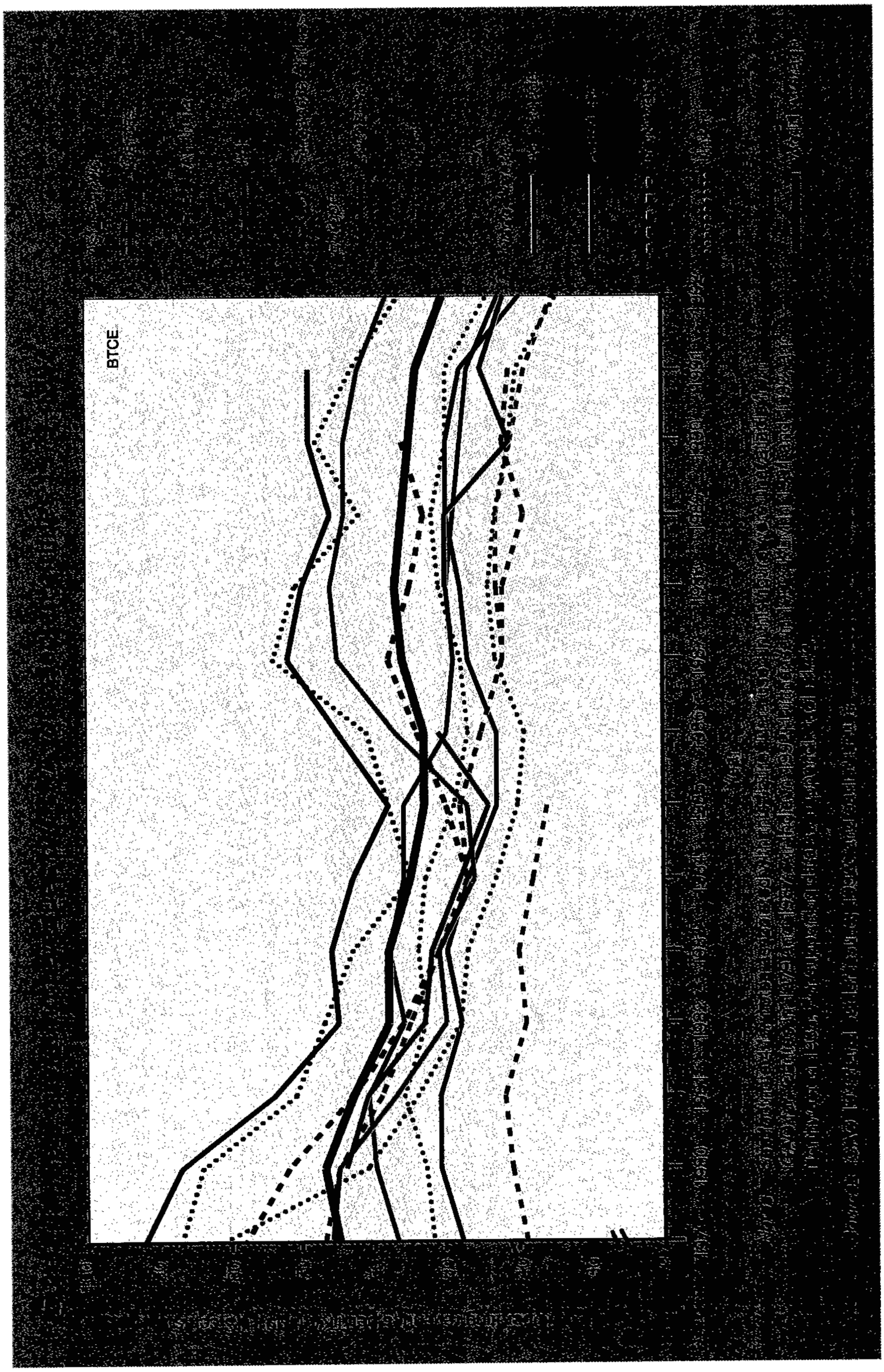
It is informative to compare the real operating revenues per TKP and real operating revenues per TKA for the eleven airlines. This comparison highlights the different capacity provided by the airlines in the analysis. The rank by real operating revenues per TKA in the different regions is similar to the ranking for real operating expenses per TKA (shown in figure 6.12). Comparing the ranking of airlines by real operating revenues per TKP (shown

Figure 6.13 Real operating revenues per TKP for selected airlines 1979–1992



Notes See footnote 4 for notes associated with this figure. Data used in this figure were unavailable from ICAO for: Qantas in 1979 and 1987; Air India in 1992; Lufthansa in 1992; KLM in 1991 and 1992; and Northwest in 1986. For supporting data see appendix table II.41.

Sources ICAO 1993f and earlier issues; 1992c and earlier issues.



in figure 6.13) with the ranking by real operating revenues per TKA shown in figure 6.14 provides an interesting contrast and shows that:

- the selected European airlines have operating revenues per TKA in the high range;
- the selected North American airlines have operating revenues per TKA in the mid to low range, which means they rank lower in terms of operating revenues per TKA than they did in terms of real operating revenues per TKP; and
- the selected airlines in the Asia Pacific have operating revenues per TKA in the mid to low range, similarly to their operating revenues per TKP.

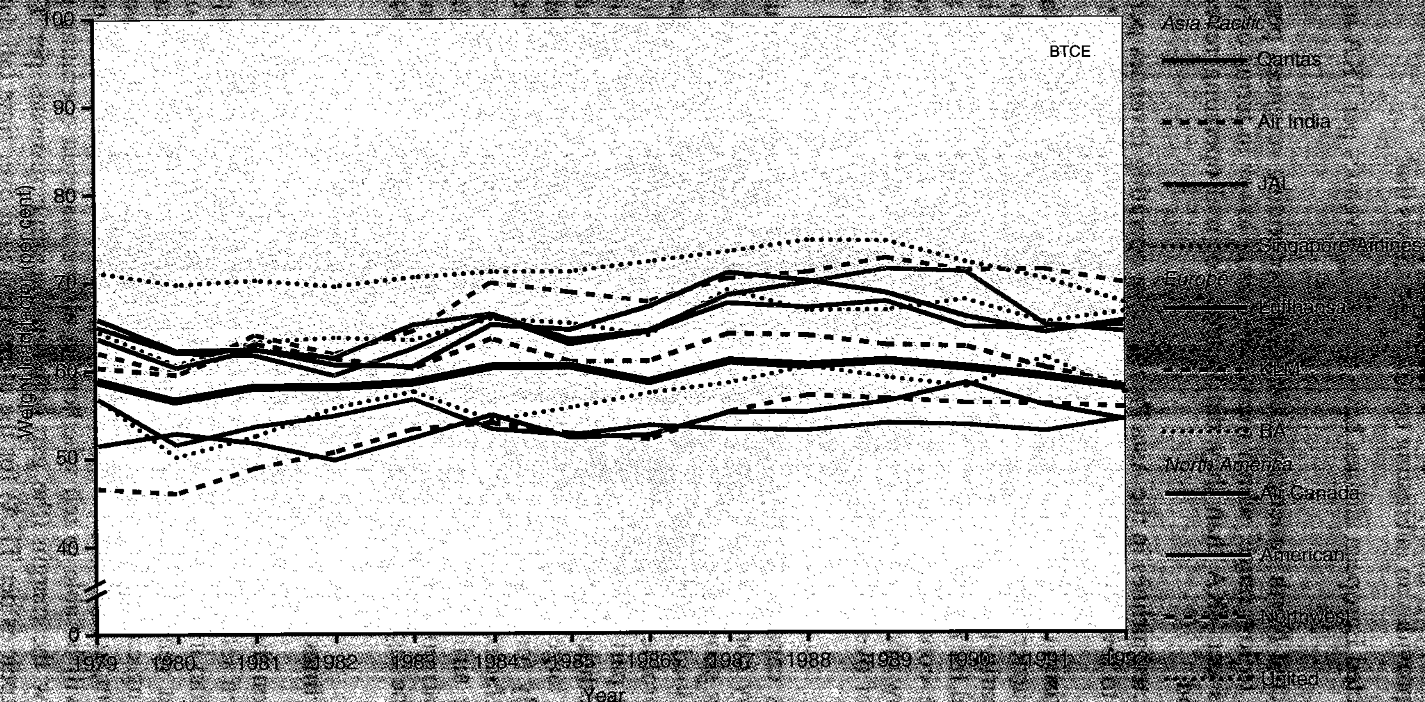
The comparison of figure 6.13 and figure 6.14 illustrates the problem that North American carriers have had in their attempts to gain market share in the late 1980s and early 1990s. These airlines have provided additional capacity above that required for normal operations in an attempt to gain market share and have had trouble controlling their costs. As a result, these airlines generated relatively low operating profits in the second half of the 1980s in relation to the proportion of overall revenues they generated, and recorded losses in the early 1990s.

The surplus capacity in relation to demand for North American airlines is illustrated by comparing the weight load factors (TKP/TKA) for the selected airlines. As shown in figure 6.15 the North American airlines had relatively low weight load factors for the period 1979–1992 indicating that these airlines have had problems providing the appropriate level of capacity to satisfy demand. In part this reflects the practice of some North American airlines of providing additional capacity in an attempt to increase their market share. The pursuit of a larger volume of traffic has not been entirely successful and it has proved costly for some carriers. The selected European airlines generally had higher load factors than the selected North American airlines, and the selected Asia Pacific airlines had load factors above the world average (similar to the European carriers). Apart from the last two years Singapore Airlines' load factor was the highest for the selected airlines over the period 1979–1992.

Selected airlines

In this section the real operating revenues and expenses per TKA are analysed for the eleven selected airlines. When an airline's operating revenues per TKA are higher than its operating expenses per TKA the carrier records an operating profit in that year. When an airline's operating revenues per TKA are lower than operating expenses per TKA the carrier records an operating loss in that year. By comparing the operating revenues and expenses per TKA in each year the reader will be able to tell whether the airline made an operating profit or loss and how the margin (the gap between operating revenues per TKA and operating expenses per TKA) for the airline changed over time (all data are in 1991 US dollars).

Figure 6.15 Weight load factor for selected airlines 1979–1992



Notes See footnote 4 notes associated with this figure. For supporting data see appendix table II.43.

Sources ICAO 1993c and earlier issues.

The world average (of scheduled airlines of ICAO contracting countries) for real operating expenses per TKA is included in the following figures so that the efficiency of each airline can be analysed and compared against the world average. As noted before, operating expenses per TKA is considered an indicative measure of efficiency in the airline industry. The efficiency of each airline can be assessed by examining trends in the individual airline's operating expenses per TKA compared to world average operating expenses per TKA.

All other things being equal, when operating expenses per TKA fall the airline's efficiency increases. If operating expenses per TKA fall and capacity (TKA) has remained fixed then the airline has provided the same amount of capacity as in the previous period but it has cost less — this is an improvement in efficiency. Alternatively, if operating expenses per TKA have fallen and total operating expenses have remained fixed then the airline has increased the capacity provided without increasing overall cost — this is also an improvement in efficiency.

The comparison of efficiency for the selected airlines in no way implies an evaluation of quality of service aspects for individual airlines. In addition it should be remembered that comparison of operating measures on a per unit basis helps give some understanding of an airline's performance, but it is not sufficient for a comprehensive evaluation.

The examination of performance measures for the selected airlines supports the idea that, although there may be similarities for airlines within the major markets, costs and revenues can vary between airlines within a region. One characteristic for the selected airlines (except North American airlines) is the notable decline in operating expenses per TKA from 1979 to the mid 1980s. The decline in operating expenses per TKA may have occurred as a result of the fall in the price of oil following a peak in the oil price in 1979, from airlines cutting costs in order to deal with the drop in profitability because of the recession in the early 1980s, and a general increase in the level of competition which provided an impetus for airlines to become more efficient.

The fall in operating expenses per TKA that began in the early 1980s ceased in the mid 1980s and some airlines recorded marginal increases in operating expenses per TKA in the mid to late 1980s. This slight increase may have been influenced by the record number of new aircraft delivered to airlines during this period. The introduction of new aircraft generally increases an airline's depreciation charges and may also increase other operating expenses such as staff training and maintenance.

The operating expenses per TKA for the selected airlines of North America declined marginally from 1979 to the mid 1980s, in line with the world average, but did not fall as much as the other selected airlines. In the mid to late 1980s operating expenses per TKA increased marginally for the selected airlines of

North America. Overall, the selected North American airlines operating expenses per TKA have not changed significantly over the period.

Although the actual operating revenues and expenses per TKA for the selected European airlines differed, the airlines surveyed had similar changes, possibly indicating some common incidents which affected costs for European airlines. The similarity in changes for European airlines is particularly noticeable in the period 1985–1987 when all the selected airlines had marked increases in operating expenses per TKA. This may reflect the appreciation of European currencies against the US dollar during the period.

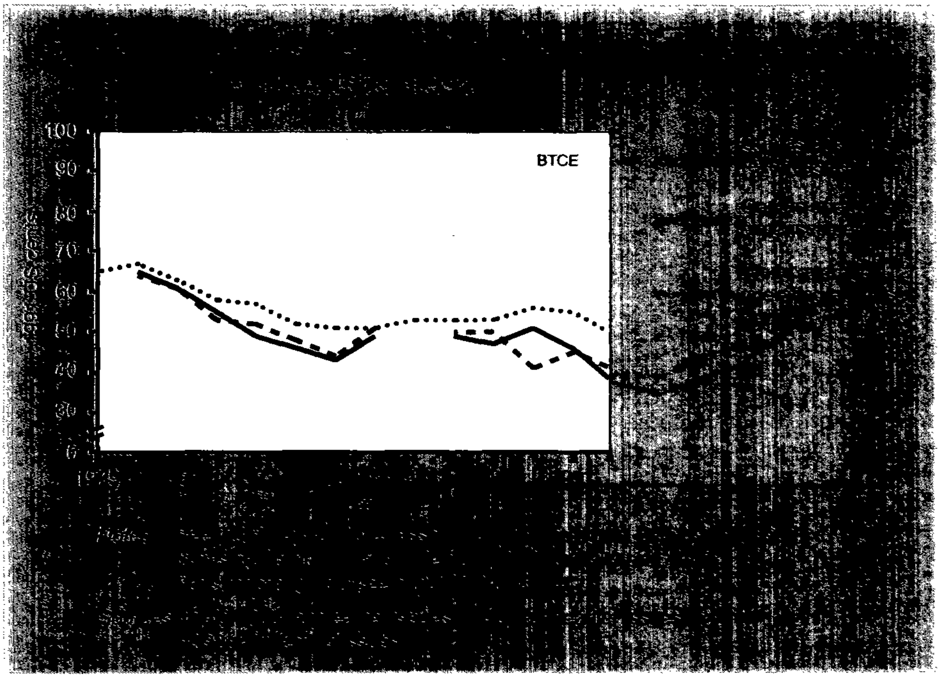
The selected Asia Pacific airlines show that differences in costs can occur between airlines within a region, as illustrated by operating expenses per TKA for JAL compared with the other selected airlines in the region. JAL's operating expenses per TKA followed the world trend in the first half of the period 1979–1992 but from 1985 to 1987 JAL's costs increased markedly. This change in operating expenses per TKA for JAL is similar to the European airlines and it may also reflect the rapid appreciation of the yen against the US dollar during this period. There may not have been a change in efficiency for the airline during this period in terms of inputs used, but the higher costs for the airline in terms of US dollars affected JAL's competitiveness in international markets. This example illustrates the need to be cautious in drawing conclusions from a limited set of data. The effect of a range of factors (such as changes in the exchange rate and terms of trade) on a comparison of the efficiency of individual international airlines is worthy of further study.

Qantas

Qantas' operating expenses per TKA were less than world average operating expenses per TKA for the entire period 1979–1992, as shown in figure 6.16. Qantas' lower than average costs are influenced by its average stage lengths, which are among the longest in the world (see chapter 2 for details of the relationship between airline costs and stage length).

In the first half of the 1980s, Qantas' efficiency improved in relation to the world average, as Qantas' operating expenses per TKA generally decreased faster than the world average operating expenses per TKA. After 1985, however, Qantas' efficiency fluctuated, with a noticeable spike in operating expenses per TKA in 1990. This spike occurred as operating expenses increased by 20 per cent in 1990 from the 1989 level. This was followed by a fall in operating expenses in 1991 and 1992 and a consequent decrease in operating expenses per TKA. Over the long term Qantas' efficiency has improved, as has the world average.

Qantas' operating result fluctuated throughout the period 1979–1992. Qantas achieved an operating profit for most of the period, but the margin (illustrated by the gap between operating revenues per TKA and operating expenses per TKA) was fairly small. Qantas' operating revenues per TKA decreased in



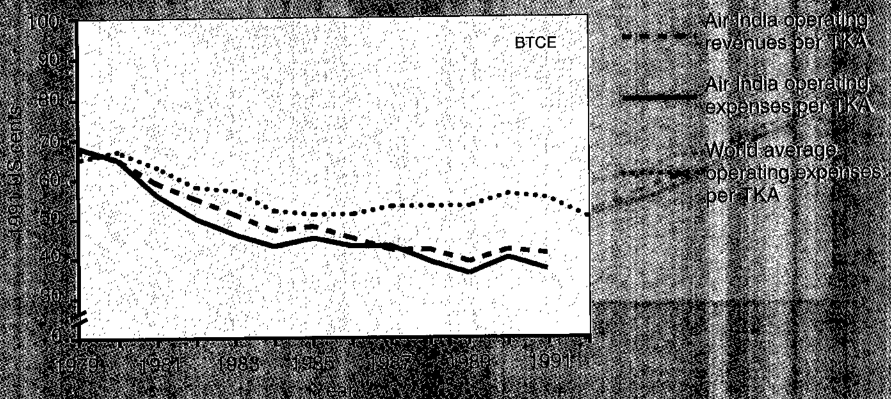
1990. This combined with the increase in operating expenses noted above led to the largest operating loss of the eleven selected airlines. A smaller operating loss was recorded in 1991, and the airline recorded a profit in 1992.

Air India

Air India's operating expenses per TKA were less than world average operating expenses per TKA for the entire period 1979–1991 except for 1979, as shown in figure 6.17. Air India's operating expenses per TKA decreased for all but two years in the period 1979–1991 (increases were recorded in 1985 and 1990). Over the long term Air India's efficiency has improved consistently in relation to the world average, as Air India's operating expenses per TKA decreased more rapidly than world average operating expenses per TKA.

Air India achieved a small real operating profit for most of the period 1979–1991 except for 1979 and 1987. The size of Air India's real operating profit was the most consistent of the eleven selected airlines over the period analysed. Air India's operating expenses per TKA increased by more than its operating revenues per TKA in 1990 (from the 1989 level), but the airline still made an operating profit in 1990 and 1991.

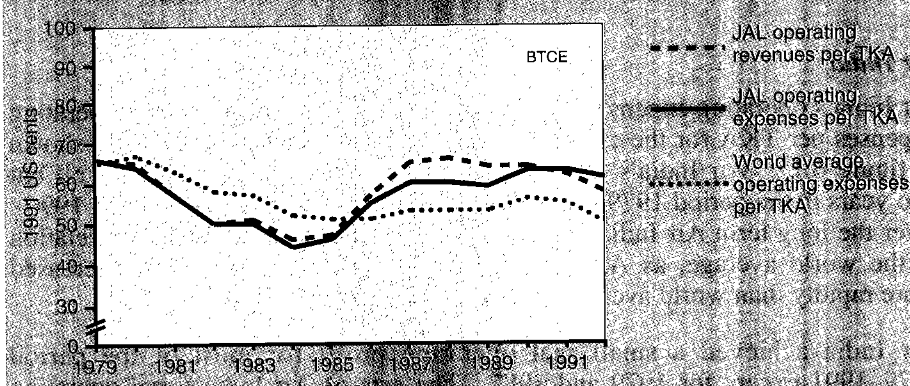
Figure 6.17 Air India: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure. Air India data used in this figure were unavailable from ICAO for 1992. For supporting data see appendix table II.45.

Sources ICAO 1993c and earlier issues; 1993b and earlier issues; 1993a and earlier issues.

Figure 6.18 Japan Airlines: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure. For supporting data see appendix table II.46.

Sources ICAO 1993f and earlier issues; 1993b and earlier issues; 1992c and earlier issues.

Japan Air Lines

JAL's operating expenses per TKA were less than world average operating expenses per TKA for the first half of the period 1979–1992 but have been higher than the world average since 1986, as shown in figure 6.18. In the first few years of the 1980s JAL's efficiency improved in relation to the world average, as JAL's operating expenses per TKA generally decreased faster than the world average. Between 1985 and 1987, however, JAL's efficiency declined as its operating expenses per TKA increased significantly as a result of some large increases in overall operating expenses.

JAL is the only Asia Pacific carrier from the selected airlines that recorded operating expenses per TKA higher than the world average for any length of time. JAL's operating expenses per TKA decreased slightly in the period 1987–1989 but increased again in 1990 and 1991. The airline recorded a slight decrease in operating expenses per TKA in 1992. Overall, JAL's efficiency has declined in relation to the world average and this could affect profit if the airline competes with lower cost carriers which are able to charge lower fares. Any erosion of JAL's revenue base could have serious implications for the airline.

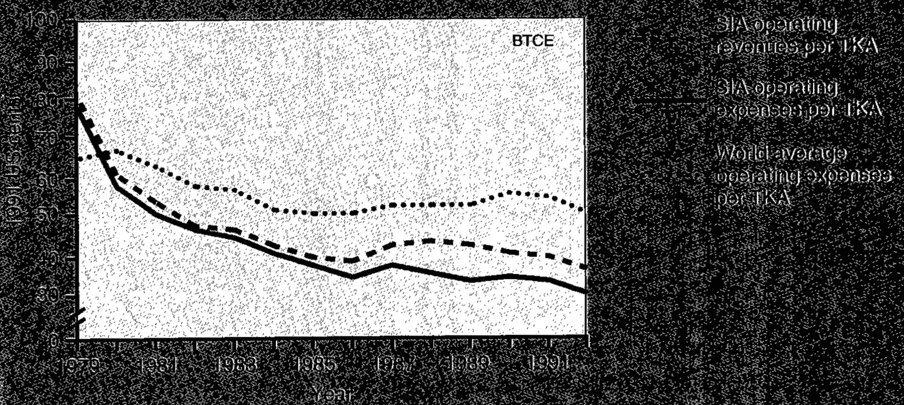
JAL's operating result was poor at the beginning and end of the period 1979–1992 but the airline had some relatively good operating profits during the period 1983–1990. It is interesting to note that despite the rapid increase in operating expenses per TKA in 1986 and 1987 (corresponding with a rapid appreciation of the yen against the US dollar), JAL's operating revenues per TKA increased more rapidly and the airline recorded its best operating results in 1988 and 1989. JAL's revenues per TKA were fairly constant over the period 1987–1991, but in 1992 operating revenues per TKA decreased while operating expenses per TKA increased in 1990 and 1991 and there was a slight fall in 1992 (as noted before). As a result of these movements the airline recorded an operating loss in 1991 and 1992.

Singapore Airlines

Singapore Airlines' operating expenses per TKA were less than world average operating expenses per TKA for the entire period 1979–1992 except for 1979, as shown in figure 6.19. Singapore Airlines' efficiency generally improved in relation to the world average, as its operating expenses per TKA decreased faster than world average operating expenses per TKA.

Singapore Airlines' operating expenses per TKA decreased in the 1980s like most of the other Asia Pacific airlines in the sample. However, Singapore Airlines was able to sustain the low level of operating expenses per TKA for the second half of the 1980s and the beginning of the 1990s while the other Asia Pacific airlines experienced fluctuations in operating expenses per TKA, particularly in 1990. Singapore Airlines recorded an increase in operating expenses per TKA in 1987, and operating expenses per TKA held at around 35

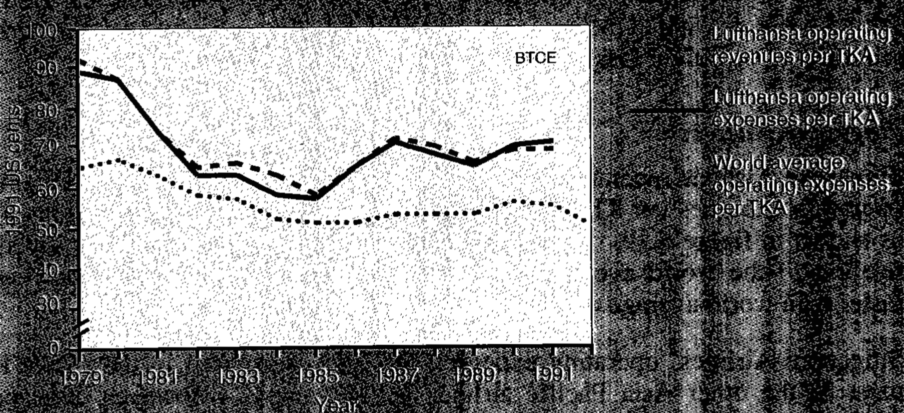
Figure 6.19 Singapore Airlines: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure. For supporting data see appendix table II.47.

Sources ICAO 1993f and earlier issues; 1993b and earlier issues; 1992c and earlier issues.

Figure 6.20 Lufthansa: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure. Lufthansa data used in this figure were unavailable from ICAO for 1992. For supporting data see appendix table II.48.

Sources ICAO 1993c and earlier issues; 1993b and earlier issues; 1993a and earlier issues.

cents (despite rising labour costs) until 1992 when both operating revenues and expenses per TKA decreased. Overall, Singapore Airlines' efficiency has improved over the long term.

Singapore Airlines recorded an operating profit throughout the period 1979–1992. Singapore Airlines' profit margin was small but consistent for the first half of the period, and it increased and remained significant after 1986. Operating revenues and expenses per TKA converged slightly in the period 1990–1992 but Singapore Airlines still made an operating profit.

Lufthansa

Lufthansa's operating expenses per TKA were higher than world average operating expenses per TKA for the entire period 1979–1991, and fluctuated noticeably over this period, as shown in figure 6.20. Over the period 1979–1982 Lufthansa's efficiency improved in relation to the world average, as Lufthansa's operating expenses per TKA declined faster than world average operating expenses per TKA. Over the period 1983–1985 Lufthansa's efficiency tracked world average operating expenses per TKA fairly closely (although operating expenses per TKA were still higher than the world average).

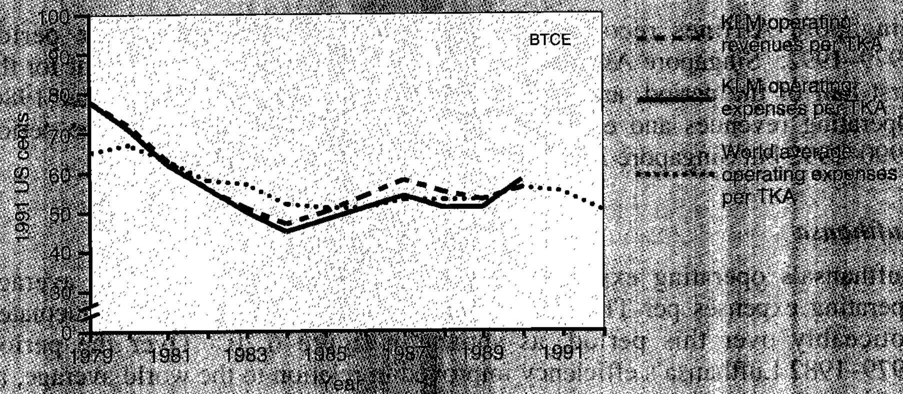
The period 1985–1987 saw a marked decline in Lufthansa's efficiency as operating expenses per TKA increased significantly. The increase in operating expenses per TKA came about as a result of increases of 29 and 22 per cent in real operating expenses in 1986 (on the 1985 level) and 1987 (on the 1986 level), respectively. Lufthansa's operating expenses per TKA remained fairly constant after 1987. Overall Lufthansa's efficiency has declined since the mid 1980s.

Lufthansa's operating result fluctuated throughout the period 1979–1991. Lufthansa achieved an operating profit for most of the period. The margin was fairly small for most of the period with the exception of 1983–1984. Operating revenues per TKA increased in 1990 but by less than operating expenses per TKA, and Lufthansa recorded operating losses in 1990 and 1991.

KLM

KLM's operating expenses per TKA fluctuated around world average operating expenses per TKA for the period 1979–1990, as shown in figure 6.21. KLM's operating expenses per TKA were closer to the world average compared with the other airlines in the sample, especially after the mid 1980s. In the first half of the 1980s KLM's efficiency improved in relation to the world average, as KLM's operating expenses per TKA decreased faster than world average operating expenses per TKA. After 1984, however, KLM's efficiency declined until 1987, and operating expenses per TKA has fluctuated around the world average since then. Overall, KLM's efficiency has declined in relation to the world average since the mid 1980s.

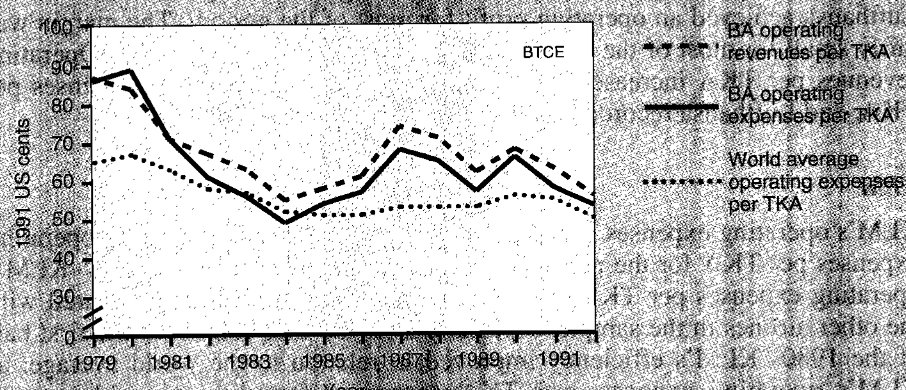
Figure 6.21 KLM: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure. KLM data used in this figure were unavailable from ICAO for 1991 and 1992. For supporting data see appendix table II.49.

Sources ICAO 1993c and earlier issues; 1993b and earlier issues; 1991c and earlier issues.

Figure 6.22 British Airways: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure. For supporting data see appendix table II.50.

Sources ICAO 1993f and earlier issues; 1993b and earlier issues; 1992c and earlier issues.

KLM's real operating profit generally improved throughout the period 1979–1990. KLM achieved an operating profit for most of the period and the trend was towards an increase in the margin between real operating revenues and real operating expenses up until 1988. Operating expenses per TKA increased by more than operating revenues per TKA in 1990 due to a 22 per cent increase in operating expenses, and KLM recorded a significant operating loss.

British Airways

BA's operating expenses per TKA were higher than world average operating expenses per TKA for most of the period 1979–1992, as shown in figure 6.22. In the first half of the 1980s BA's efficiency improved in relation to the world average, as BA's operating expenses per TKA decreased faster than world average. This decline was probably influenced by the preparation for sale after the privatisation of BA was announced in the late 1970s. After 1985, however, BA's efficiency declined, reflecting increases in its operating expenses in the period 1985–1987. BA's efficiency improved in the two years after privatisation in 1987, although this change in performance also occurred for Lufthansa and KLM, indicating a likely European trend (possibly related to exchange rate movements). BA's operating expenses per TKA have fluctuated since 1987, with a number of increases and decreases.

Overall the efficiency of the selected European airlines including BA has declined since the mid 1980s. This may cause problems for European carriers where they compete with lower cost carriers from other regions which are able to offer lower fares on the basis of their lower costs.

BA's operating result was a consistent but fluctuating profit throughout the period 1979–1992 except for 1980. BA achieved an operating profit with quite a significant margin, despite the fluctuations in its operating revenues and expenses per TKA. BA achieved profits in the period 1990–1992 although these results were of a smaller magnitude than results at the end of the 1980s. It is important to note that despite its comparatively poor showing in overall efficiency and large fluctuations in operating revenues and expenses per TKA, BA maintained its profit margin between operating revenues and expenses per TKA.

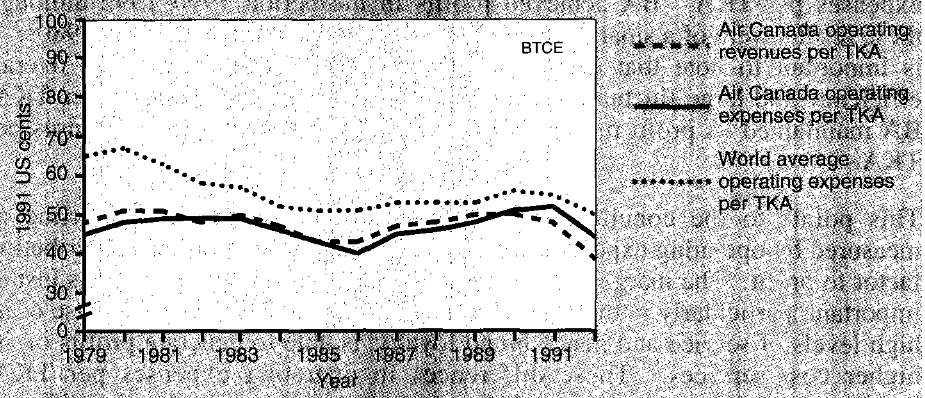
This points to the conclusion that the overall efficiency of an airline as measured by operating expenses per TKA is not the only important contributing factor to profit. The margin between expenses and expenses per TKA is just as important, particularly in the case of an airline such as BA which, because of its high levels of service and hence brand loyalty, is able to generate profits on its higher cost services. These differences in operating expenses per TKA, however, will have an impact which may not be overcome by the different quality of service levels when carriers from high cost locations such as Europe compete with airlines from low cost bases such as some of the Asia Pacific carriers. In this case the lower cost carriers will be able to offer lower fares, and this will affect the revenues of all airlines competing in that particular market.

Air Canada

Air Canada's operating expenses per TKA were less than world average operating expenses per TKA for the entire period 1979–1992, as shown in figure 6.23. In the first half of the 1980s Air Canada's efficiency declined in relation to the world average, as Air Canada's operating expenses per TKA increased relative to the world average. In 1985 and 1986 Air Canada's efficiency improved in relation to the world average, as its expenses per TKA decreased faster than the world average. From 1986 to 1991 efficiency declined in relation to the world average, as Air Canada's operating expenses per TKA increased relative to world operating expenses per TKA. Operating expenses per TKA were close to the world average in 1991. Over the long term Air Canada's efficiency has declined but a significant fall in operating expenses per TKA in 1992 may indicate a change in the trend.

Air Canada's operating result fluctuated throughout the period 1979–1992. It achieved an operating profit for most of the period but the margin was small. There was an increase in operating revenues per TKA in 1990, but the increase in operating expenses per TKA was greater and the airline recorded a loss in 1990. A decrease in operating revenues per TKA and a further increase in operating expenses per TKA led to an operating loss for the airline in 1991.

Figure 6.23 Air Canada: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure.
For supporting data see appendix table II.51.

Sources ICAO 1993f and earlier issues; 1993b and earlier issues; 1992c and earlier issues.

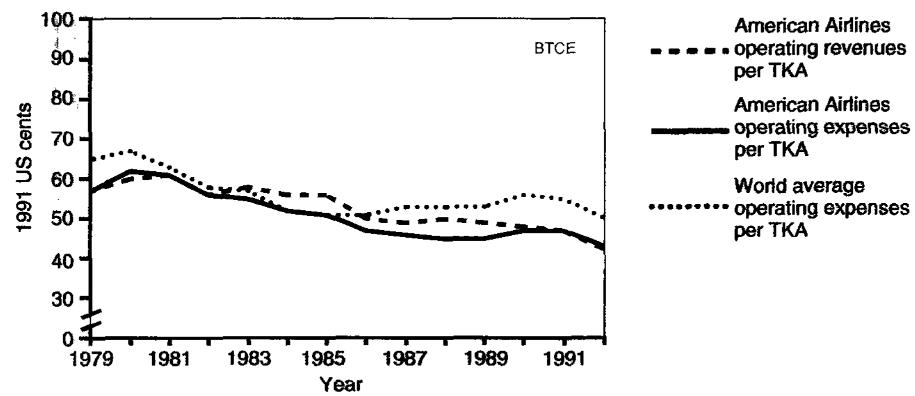
The gap between operating expenses and revenues per TKA was sustained in 1992 despite a fall in both measures.

American Airlines

American's operating expenses per TKA were less than the world average for most of the period 1979–1992, as shown in figure 6.24. In the first half of the 1980s American's efficiency generally declined in relation to the world average, as its operating expenses per TKA decreased but at a slower rate than the decrease in the world average. Over the period 1985–1988, however, American's efficiency improved as its operating expenses per TKA decreased in relation to world operating expenses per TKA. In 1989 and 1990 American's operating expenses per TKA increased, but fell again in 1991 and 1992. Overall American's efficiency has improved over the long term.

American's operating result fluctuated throughout the period 1979–1992. It achieved an operating profit for most of the period but the margin fluctuated significantly. American's operating revenues and expenses per TKA converged in 1990 and 1991. It recorded an operating profit in these two years but the results were lower than results achieved in the 1980s. In 1992 operating expenses per TKA were higher than operating revenues per TKA and the airline recorded a loss. It should be remembered here that operating profit does not take into account non operating items including interest, so statements by American's chief executive officer Robert Crandall that American made large

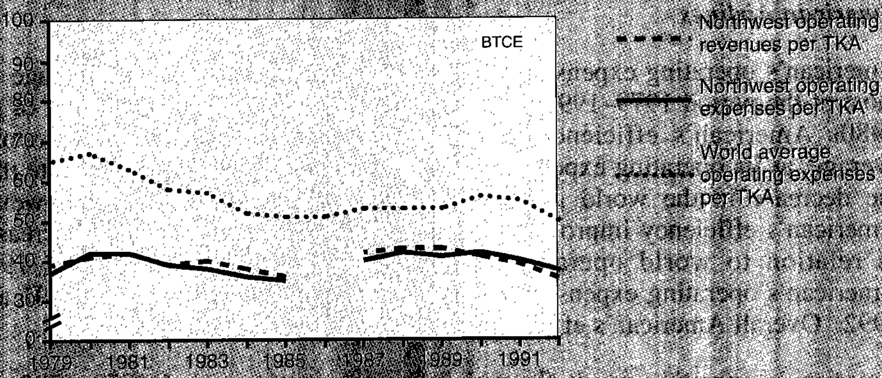
Figure 6.24 American Airlines: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure. For supporting data see appendix table II.52.

Sources ICAO 1993f and earlier issues; 1993b and earlier issues; 1992c and earlier issues.

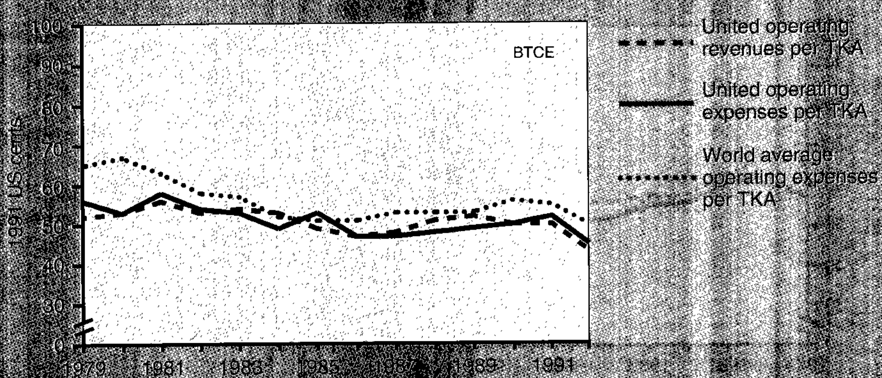
Figure 6.25 Northwest Airlines: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure.
Northwest data used in this figure were unavailable from ICAO for 1986.
For supporting data see appendix table II.53.

Sources ICAO 1993f and earlier issues; 1993b and earlier issues; 1992c and earlier issues.

Figure 6.26 United Airlines: real operating revenues and expenses per TKA 1979–1992



Notes See footnote 4 for notes associated with this figure.
For supporting data see appendix table II.54.

Sources ICAO 1993f and earlier issues; 1993b and earlier issues; 1992c and earlier issues.

losses in the early 1990s do not conflict with the comments above, because he was referring to American's net result.

Northwest

Northwest's operating expenses per TKA were well below world average for the entire period 1979–1992, as shown in figure 6.25. In the early 1980s Northwest's operating expenses did not fall as much as many of the other carriers in the sample, but its operating expenses per TKA were the lowest at the beginning of the period and there has been very little variation in Northwest's operating expenses per TKA over the period. There is one noticeable step up in the operating expenses per TKA for Northwest between 1985 and 1987. Northwest purchased Republican Airlines in 1986 and this may help explain the slightly higher level of operating expenses per TKA since 1987. As Northwest's operating expenses per TKA increased slightly over the period and the world average decreased overall, Northwest's efficiency declined in relation to the world average.

Northwest's operating result fluctuated throughout the period 1979–1992. It achieved operating profits in some years and its most consistent period of profitability occurred in the mid 1980s. It is interesting to note that relative efficiency does not guarantee profitability. Northwest consistently had low operating expenses per TKA but the margin between its operating revenues and operating expenses per TKA was not sufficient for it to achieve sustained profitability. Northwest's operating revenues per TKA decreased in 1990, 1991 and 1992 and the operating expenses per TKA for Northwest increased in 1990 and fell slightly in 1991 and 1992. Northwest recorded an operating loss in 1990, 1991 and 1992.

United Airlines

United's operating expenses per TKA were less than the world average for the period 1979–1992 except 1985, as shown in figure 6.26. United's operating expenses per TKA did not change significantly over the period apart from 1985, when operating expenses per TKA were higher than the world average, but dropped back below the world average again in the following year. In the late 1980s operating expenses per TKA for United generally increased by more than the world average. Over the long term United's efficiency has declined in relation to the world average, but a significant fall in operating expenses per TKA in 1992 may indicate a change in the trend.

United's operating result fluctuated significantly throughout the period 1979–1992. It achieved operating profits in some years but these were offset by operating losses in other years. United recorded operating losses in 1990, 1991 and 1992.

CONCLUSION

This chapter examined the aggregate financial operating performance of world airlines. During the period 1971–1992 aviation traffic carried by the world's airlines decreased once only. Despite the record of positive traffic growth, the world's airlines have recorded an aggregate operating loss six times. The analysis in chapter 3 of the cyclical nature of the aviation industry was extended to show that the profitability of the world's airlines moves in phase with changes in the rate of world economic growth and world air traffic growth. In addition, the ordering of turbojet aircraft moves in phase with economic cycles, but overlaying this trend are changes in response to technological developments, individual airlines' needs for capital replacement, and to meet new environmental standards. A fall in the rate of growth of world GDP has a significant affect on the operating result of world airlines. In general airlines are expected to start making profits again once growth in world GDP increases.

The chapter also examined the operating performance of eleven airlines in order to make a general comparison of unit costs and unit revenues between regions and airlines. The analysis showed that European carriers tend to have the highest levels of unit costs and revenues, due in part to short average stage lengths, relatively high wage levels and limited competition; North American carriers tend to have mid range unit costs and unit revenues due to relatively short average stage lengths and relatively high wage levels, countered by a higher level of competition particularly in domestic markets; and Asia Pacific carriers tend to have the lowest levels of unit costs and unit revenues, reflecting the longer average stage lengths for airlines in this region as well as relatively lower wage levels. The analysis also illustrated two important points. The first is that although there is a general level of unit costs and unit revenues that could be expected for an airline operating in a region there is variance between the unit costs and unit revenues for airlines within a region. The trends in JAL's unit costs and unit revenues illustrated this point. The second important point is that it is not only the overall level of unit costs that affects the profitability of an airline. An airline must be capable of maintaining the margin of its unit revenues over its unit costs in order to sustain profitability. Any comparison here is indicative only, as it is based on a limited data set and does not take into account differences in accounting practices, the stage length of flights in different regions, wage levels and movements in the exchange rate and terms of trade.

CHAPTER 7 AIRLINE CAPITAL STRUCTURES AND INVESTMENT PERFORMANCE[1]

Purpose: to examine a number of sources of capital common to the airline industry.

INTRODUCTION

The sources of capital which are common to the airline industry include the following:

- internal sources of finance such as
  - funds from operations;
  - sale of aircraft;
  - sale of routes; and
  - sale of non core assets;
- external sources of equity capital (including domestic and international equity investors, private individuals, employee equity participants and strategic investors); and
- debt markets and lease financing.

The key dynamics which influence the capital markets are discussed. This discussion includes the determinants of financial risk and investor preferences.

The chapter looks at: examples of capital raisings, such as government privatisations, which represent the most frequent opportunity for equity investment in the airline industry; examples of equity raisings from existing private companies in the airline industry; and another trend in equity raising from airlines — strategic cross ownership between airlines.

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1. Professor Michael Lawriwsky and Charles Kiefel, from ANZ McCaughan Corporate and Financial Services Ltd, contributed chapter 7.

With respect to measuring financial performance of airlines, the following issues are discussed:

- the key financial performance indicators used by companies and analysts;
- accounting policies peculiar to the airline industry; and
- the factors which differentiate the local and international equity and debt markets.

The chapter also provides an analysis of the relationship between equity valuations and capital structure, addressing optimal capital structure, the logic of commonly used performance ratios (for example, corporate value to earnings before depreciation, rentals, interest and tax (EBDRIT) ratio), and the key drivers of airline valuation in the recent stock markets.

PAST, PRESENT AND FUTURE CAPITAL STRUCTURES

This section begins with information demonstrating the 'capital intensive' nature of the airline industry. It follows with an examination of the capital structures (such as debt/equity ratios) of US airlines and international companies, providing some reasons for changes in recent years.

The data show that those US airlines which underperformed relative to the industry had lower ratios of internally generated funds as a percentage of capital expenditure, leaving them vulnerable to the downturn in the airline business. The importance of establishing more prudent financial strategies (with higher levels of equity) is the lesson learned over the past five years from the losses in the industry coupled with very high gearing levels and a weak aircraft resale market.

High capital expenditure requirements

Airlines are subject to cyclical movements in cashflows through the business cycle. The airline industry is also capital intensive, and unlike capital intensive gas or electricity utilities, airlines do not have the benefit of long term contracts to underwrite large and lumpy capital outlays.. Some protection, however, is achieved through options over future aircraft purchases. In 1992, for example, some $28 billion in scheduled purchases were cancelled by US airlines alone. Airlines such as Singapore Airlines and Qantas have considerable flexibility with regard to aircraft purchases because of the relatively young age of their fleets. As at 31 December 1992, the average age of their fleets were 5.1 and 5.5 years respectively, while some airlines maintain fleets with an average vintage of 11 years or more. For example, United's average fleet age stood at 11.5 years, while American's was 9.2 years and Delta's was 9.4 years, in 1992. This puts much more financing pressure on United's near term capital expenditure (CAPEX) requirements (Jennings 1992a, pp. 30–4). In 1992 United needed to raise $3 billion, mainly for fleet replacement.

TABLE 7.1 US AIRLINES CASHFLOW AND CAPITAL SPENDING 1978–1991

Airline	1978 to 1989 Net internal funds (million)	Capital spending (million)	Internal funds as percentage of spending (per cent)	1990 to 1991 Net internal funds (million)	Capital spending (million)	Internal funds as percentage of spending (per cent)
American	6 271	11 415	54.9	1 327	7 635	17.4
Continental	561	2 731	20.6	–1 166	381	na
Delta	5 162	10 224	50.5	483	4 903	9.8
Northwest	3 100	5 271	58.8	648	1 260	51.5
Pan Am	389	4 126	9.4	–594	258	na
TWA	1 816	3 158	57.5	84	157	53.2
United	6 509	13 049	49.9	926	5 083	18.2
USAir	2 017	5 642	35.8	–255	1 031	na
Total industry	28 336	63 440	44.7	740	22 347	3.3

na = not applicable.

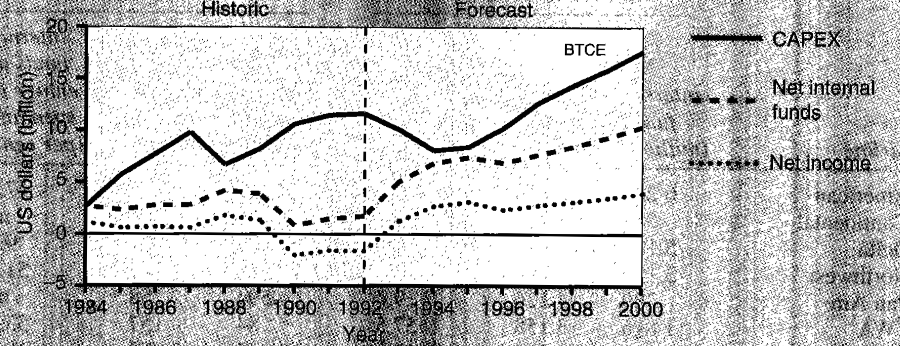
Source Greenslet 1992, p. 63.

Greenslet (1992, p. 63) published historical and projected forecasts of the capital expenditures of US airlines, and examined the implications of these funding requirements in the light of internally generated cashflows. It was argued that the internal funding of capital expenditure had traditionally fallen in the range of 50 to 60 per cent. Companies were able to raise the remainder through debt and equity sources because of profitable operations. The interesting point to emerge from an examination of table 7.1 is the temporal relationship between the extent of internal funding of capital expenditure requirements and long term survival in the industry. That is, Pan Am and Continental, which were respectively in default and under Chapter 11 protection in the latter period, were financing a low percentage of their capital requirements from internal sources in the earlier period.

Airline profits turned down sharply in 1990 following several years of growth. In 1991 and 1992 US airlines spent $22 billion on CAPEX. With greatly reduced internally generated cashflow, debt increased relative to equity. The debt/capital structure moved from a level of 47.7 per cent in 1989, to 68.4 per cent in 1991. It would appear that if debt includes operating leases, throughout the 1980s there was a gradual rise in the debt/capital ratio. The gap which has developed between net internal funding (defined as earnings before interest and tax (EBIT), less interest, less tax, less dividends, plus depreciation) and CAPEX requirements is shown in figure 7.1. Greenslet argued that the gap can be closed, and the debt/capital structure brought back to normal levels, through a combination of four factors:

- reorganisation under bankruptcy;
- rising profits increasing equity levels;

Figure 7.1 US airlines: net income and investment 1984–2000



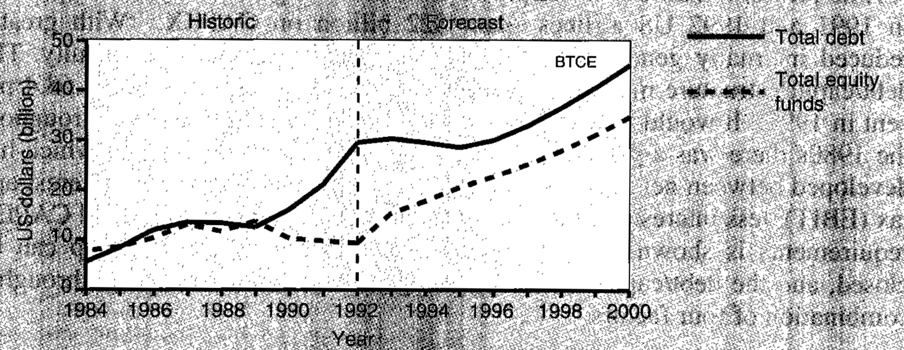
Notes CAPEX = capital expenditure.
For supporting data see appendix table II.55.

Source Greenslet 1992.

- reduced CAPEX; and
- raising new equity.

Forecasts for the US industry envisage a reduction in planned CAPEX through to 1995, and an increase in profits from 1993 onwards. These conditions would create a favourable environment for new equity raisings. The projections also assumed the reorganisation of bankrupt airlines which would involve debt for equity swaps, which partly explains the rise in equity after 1993 (see figure 7.2). The other reason is growth of equity raisings, particularly from the big

Figure 7.2 US airlines: debt and equity 1984–2000



Note For supporting data see appendix table II.56.

Source Greenslet 1992.

three (American, United, and Delta). A boom in US airline equity raisings is expected.

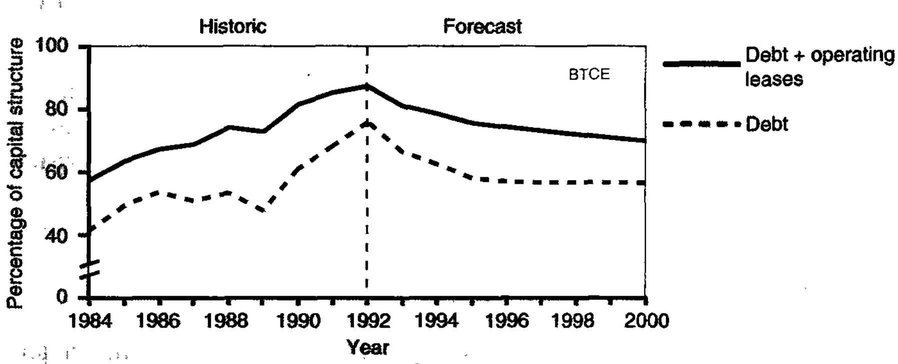
Greenslet (1992, p.65) makes the claim that 'the projected earnings for these three [large US] airlines ...[leave]... little doubt that equity would be available on reasonable terms. So these and other airlines will aggressively use any equity financing opportunities that arise.' A note of caution, however, is sounded: 'For all except Southwest, and perhaps USAir and Alaska, the magnitude of the need seems greater than even a very positive equity market could accommodate.'

Capital structures — US airlines

Figure 7.2 shows the parallel growth of total debt and total equity funds over the period 1984–1989, and the gap which developed from 1989 to 1992. By 1995 or 1996 the debt/capital ratio is expected to approach levels seen during the mid 1980s.

When capitalised operating leases are added to balance sheet debt (including capitalised finance leases), the relationship looks somewhat different, as is shown in figure 7.3. Although the two debt series are varying in tandem, the inclusion of operating leases raises the percentage of debt by 20 to 30 per cent. Equity markets and credit rating agencies will include all lease arrangements and other financial commitments in measuring financial risk.

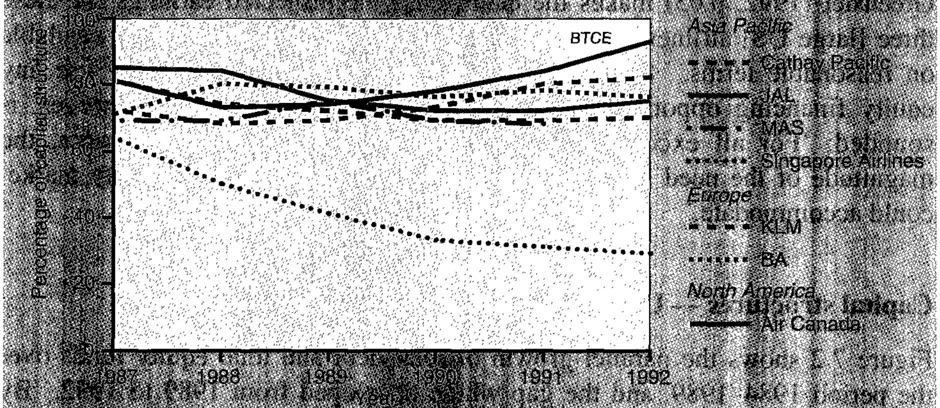
Figure 7.3 US airlines: debt/capital structure including operating leases 1984–2000



Note For supporting data see appendix table II.57.

Source Greenslet 1992.

Figure 7.4 Non US airlines' debt/debt plus book equity 1987–1992



Note For supporting data see appendix table II.58.

Source Bloomberg, 27 September 1993.

Capital structures — non US airlines

The capital structures of a selection of non US airlines are shown in figure 7.4. Here debt is defined as total liabilities appearing in the balance sheet, and is measured as a percentage of total assets (that is, total liabilities plus owners' equity). These numbers are book values and do not include capitalised operating leases. The major feature is the emerging dichotomy between Asian and other airlines. Cathay Pacific and Singapore Airlines have actually reduced their relative indebtedness over the period, the latter by a significant proportion. The debt component of other airlines has been rising, particularly in 1991 and 1992. At the same time the large losses suffered by most of these airlines were written off against retained earnings. The exception was BA: its equity rose along with its new debt issues.

Conversely, the Asian airlines' debt component expanded at a lower rate, while continuing profits added to shareholders' equity. Asian airlines have demonstrated a preference for lower financial risk than US counterparts in managing their businesses, as reflected in their strong balance sheets.

INTERNAL SOURCES OF FINANCE

This section outlines the internal sources of cash generated in an airline business, being: funds from operations, sale of aircraft, sale of routes and sale of non core assets (for example, hotel resorts).

The primary source of internal funds and the most attractive to equity investors, bankers and credit rating agencies is sustainable revenue generated from passenger and freight operations. Sale of airline routes is regarded as not common practice or desirable.

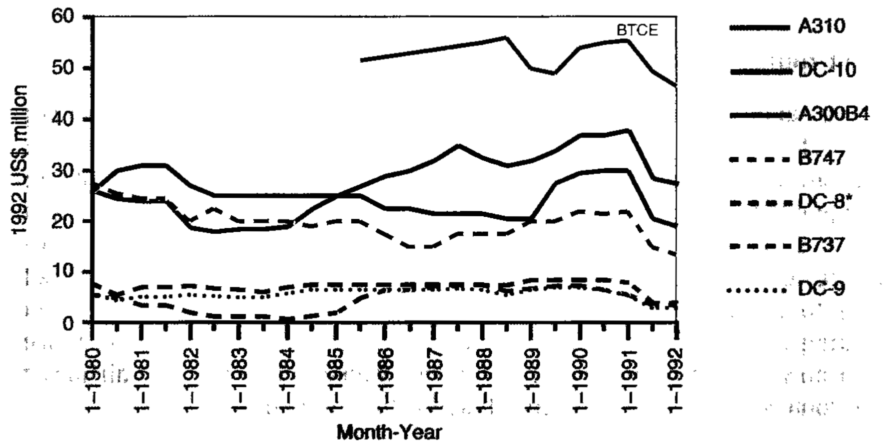
Funds from operations

In most industries the cashflows derived from business operations provide the primary source of funding needs. In the airline industry, operating cashflow is defined as earnings before depreciation, rentals, interest and tax (EBDRIT). This fundamental cashflow measure avoids many of the accounting inconsistencies identified below. Funds from operations, however, is the cash remaining after rentals, interest and tax have been deducted from EBDRIT. These are the funds which can be applied to pay dividends or purchase capital expenditure items such as new aircraft. While EBDRIT valuation multiples and their relationship to capital structure are examined later in this chapter, the fundamental drivers of cashflow in the airline industry have been considered in detail in other chapters.

Sale of aircraft

Figure 7.5 plots the behaviour of secondhand aircraft prices for a number of models over the 1980s. The prices are given in current US dollars for models

Figure 7.5 Historic aircraft values 1980–1992



Notes * Hush-kitting was installed on the DC-8 in July 1985.
These figures reflect Avmark's assessment of the 'fair market' value of various aircraft types from their inception. The aircraft are assumed to be in 'half-life' condition and the dollars are current.
For supporting data see appendix table II.59.

Source *Avmark Aviation Economist* 1992b.

with half their useful life remaining. The overall trend is for secondhand prices to fall in recessions and return to former levels once more buoyant trading conditions return. The decline in secondhand aircraft prices since 1990 has been accentuated by a reduction in the amount of credit being made available to the industry, which has imposed additional requirements for asset sales on firms.

Hill and Barker (1990, pp. 12–13) draw a correlation between a decline in the long term resale value in constant dollars of the Boeing 727-200 and the level of profitability in the industry. This correlation would make sense, since an aircraft's value must be related to its future earning power. In general there was no observable downward trend in secondhand prices up to 1990. Most aircraft values did fall in the period 1982–1984, but recovered once general economic conditions improved. There is also likely to be a differential price fall in a downturn between older and newer planes. The newer models are likely to be more fuel and maintenance efficient, making their prices less responsive to an economic downturn.

Almost all of the respondent companies in a KPMG survey of financing by 25 airline companies (Nuutinen 1992c, pp. 8–11) said they are active in the sale and leaseback market. The motivations are to realise cash for current requirements and to enhance flexibility. Hill and Barker also contend that many airlines have made good profits on these transactions. The fact that good profits are made on such transactions appears to demonstrate a marked divergence of perceived value, perhaps due to lessors adopting a longer term view of the industry. The disparity, however, also could be explained by the terms of the sale and leaseback transactions.

Sale of routes

Raising capital by sale of routes is rarely undertaken by airlines in the normal course of business. The sale of routes is not undertaken lightly by airlines, as routes are their lifeblood. In effect, the corporate value of a profitable airline will equal the net realisable value (NRV) of its assets plus the value of its brand name and the value of growth opportunities. An unprofitable airline, however (defined as one which cannot cover operating costs), will be better off selling routes to an airline which can cover costs on these routes, or can cover operating costs to a greater extent. Table 7.2 shows a number of instances in which now extinct or reorganising (under Chapter 11 in the US) airlines have made route sales in an attempt to salvage value for creditors.

An interesting question is posed by the actual ownership rights attached to airline routes as assets, in a world of bilateral air service agreements where governments allocate route rights and retain the ability to reclaim them in the future. It could be argued that such rights are valued by the market on the basis of a probability that the incumbent will be able to retain them unless

TABLE 7.2 SALES OF ROUTES BY AIRLINES 1990–1991

Purchaser	*Date*	*Route*	*Other assets*	*Price ($ million)*
American	Jan. 1990	TWA: Chicago–London (Heathrow)	Chicago slots	204
	Apr. 1990	Eastern: South American network Continental: Miami–London (Gatwick)	New York (JFK), Chicago (O'Hare), Washington (National) slots	492
	Dec. 1990	Continental: Seattle–Tokyo	Honolulu slots	140
	May 1991	3 TWA routes to London (Heathrow)	None	445
United	Oct. 1990	5 Pan Am routes to London (Heathrow)	2 Boeing 747s, facilities, 5th freedom	400
	Jan. 1991	None	Chicago (O'Hare) slots	54
Delta	Jan. 1991	Eastern: Canadian routes	10 Lockheed L10–11 slots and gates	97
		Pan Am: shuttle, US–Europe routes, Frankfurt hub routes	Slots, gates and 45 aircraft	380
	July 1991	Pan Am: New York–Mexico	None	25
Northwest	July 1991	Hawaiian: Pacific routes to Australia	25 per cent of airline	20
	1991	America West: Honolulu–Japan (Nagoya)	Option to purchase	10
Lufthansa	1990	Pan Am: internal service in Germany	Berlin and other gates	157

Note Prices are in 1991 US dollars.

Source Avmark Inc. pers. comm., 1991.

incompetence is displayed. Thus, while strict ownership may not be present, the routes are treated as assets which have a high probability of being retained.

Sale of non core businesses

The non core businesses of airlines generally consist of such assets as holiday resorts, hotels and car rental companies. These assets are accumulated in times of strong cashflow growth and divested when there is a cashflow shortage. Recent examples include Lufthansa's sale of some of its hotel interests. Another example is provided by BA, which sold engineering and maintenance assets to General Electric in 1992, and has contracted out these activities. In corporate restructuring, a non core assets sales program is often used for either capital returns to shareholders or for paydown of debt. While capital returns may be contemplated during a positive phase in the cycle, current practice is directed at debt retirement.

EXTERNAL SOURCES OF FINANCE: EQUITY CAPITAL

Equity capital can be sourced from a range of investors, such as government owners, professional international and domestic institutional investors (including mutual funds, life offices, banks), specialist airline investors, private individuals, employees and strategic investors (such as airlines).

The purpose of this section is not to examine each of these investors, but to look at the dynamics and characteristics which influence investor decisions and the risks associated with airline investments. It should be prefaced that airline investments have been traditionally fairly high risk investments offering the potential of high returns in a relatively shorter time frame than other equity investments which reflect average (lower) market risk.

Characteristics of equity investment in airlines

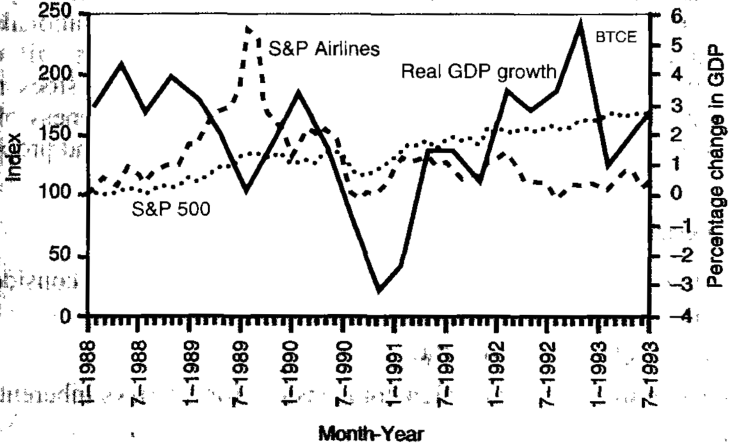
During the turbulent period 1990–91–92, the US airline industry, at least in nominal terms, lost more money than it made in all the years since commercial aviation began. The once widely known US international airline Pan Am has disappeared, while other airlines struggled in technical default of their debts, that is, operated under Chapter 11 bankruptcy protection. Debt levels have accumulated to high levels, yet the major US and international players still have positive equity value. Apparently the market believes that airlines have a profitable future which outweighs the risks.

Airline stock prices exhibit volatility relative to the rest of the economy, as displayed by the behaviour of the US Airlines Index relative to Standard and Poor's 500 Index (S&P 500) in figure 7.6. This prospect of more than a doubling in value within a short space of time makes airline stocks an exciting proposition for many investors. The movement in airline stock prices shows a highly positive sensitivity to short term changes in economic activity as measured by the quarterly percentage change in GDP which is calculated on an annual equivalent basis (see chapters 3 and 6 for details). The return to positive GDP growth in 1992 and 1993, however, has not had a positive effect on airline share prices as yet — because the sharemarket needs to be convinced that an economic recovery will be sustainable at a level which will improve business confidence. The market also will want to see a normalisation of the US domestic airline industry, following the intense fare cutting experienced over the past few years.

Based on the history of the listed airline sector the key to investment in airline stocks is the timing of entry. The importance of reading the cycle is highlighted by the fact that airline stocks usually double in price from the trough to the peak, as shown in table 7.3. The turning points in the cycles largely correspond with changing expectations about future airline profitability.

Based on US experiences, the typical bull cycle for airline stocks lasts 18 to 20 months. The first phase of the cycle usually commences six months before the

Figure 7.6 S&P Airlines Index versus S&P 500 Index and real GDP growth 1988 to 1993



Note For supporting data see appendix table II.60.

Sources Bloomberg, 27 September 1993 for share price data. Annualised quarterly percentage change in real GDP (seasonally adjusted), US Department of Commerce (Econdata).

TABLE 7.3 US AIRLINE BULL MARKETS SINCE 1971

Dates of airline bull market	*Percentage gain in airline stock prices*
6 Jan. 1971 – 6 July 1972	98
7 July 1972 – 7 Jan. 1974	165
8 Jan. 1974 – 8 July 1975	121
12 Jan. 1980 – 11 July 1981	109
12 July 1981 – 13 Jan. 1983	104
15 July 1984 – 15 Jan. 1986	81
18 Jan. 1989 – 18 July 1990	92

Note This table shows percentage gain in S&P 500 Airlines Index in 18-month periods.

Source Salomon Brothers pers. comm., 12 December 1993.

general economic recovery commences, with the average share price appreciation being 29 per cent. The second phase corresponds with growth in airline profits, which is a function of economic recovery. Most of the stock price gains are achieved during the second phase, as investors focus on the high operational leverage.

It should be noted, however, that investors will ultimately be attracted to stocks which generate relatively superior earnings growth rates and quality income streams. Relatively means in the context of comparable stocks and within a 1- to 3-year investment outlook. Accordingly, some airline stocks may prove more attractive to equity investors than other stocks because of a number of factors such as: superior tourism growth rates, significant productivity gains, increasing market share, brand name, corporate and industry rationalisation benefits, and excellence of management. In general terms, all equity investments will be influenced by investor sentiment toward the stock market and investor performance, giving regard to the relative attractiveness of other classes of investments — fixed interest securities, foreign assets and property.

Factors influencing valuation by equity investors

In assessing the potential value of an airline, it is important to consider two specific factors:

- the sustainability of cashflow; and
- the acceptable rate of return which compensates for the risks inherent in the industry.

These two factors in turn can be affected by several variables (ANZ McCaughan 1992, p. 152):

- economic conditions;
- tourism trends;
- fuel prices;
- competition;
- beta risk;
- gearing levels;
- labour market regulation;
- route access (air service agreements);
- peace/hostility;
- currency movements;
- capital expenditure programs;
- technological changes;
- taxation; and
- dividend policy.

Beta risk of airlines

The Capital Asset Pricing Model (CAPM) is the generally accepted methodology for measuring the cost of equity capital. The two central propositions of the CAPM are: first, that diversified investors will require a reward to accept systematic risk which can be related to marketwide movements, but not the nonsystematic risk which can be diversified; and second, that the rate of return required by investors will be equal to the risk free rate of return, plus the market risk premium weighted for the systematic risk of the security. A nonsystematic risk is one which is uncorrelated to the state of the market in general. For example, the risks of bad weather or aircraft accidents are nonsystematic. On the other hand, the risk that demand will collapse because of a recession in the economy is a systematic risk.

The beta coefficient relates the systematic risk of the returns obtained from investing in a particular business relative to the risk of returns obtained from investing in the market as a whole. The beta of a market is set at unity by definition. A beta which is less than one indicates that returns are less sensitive than marketwide movements, while a beta greater than one indicates that generally returns can be expected to outpace market movements in an upturn. For example, in a rising market the share price of a company with a beta of 1.5 would be expected to increase by 15 per cent if the general market rose by 10 per cent. Thus, the risk premium attaching to an investment which is considered more risky than the market as a whole should provide an expected return that is greater than the market rate of return.

International beta comparisons are difficult to make due to the fact that beta itself is a relative concept. That is, since beta measures risk relative to the risk of a given economy, identical companies might have different betas if they were located in countries with different market risk profiles. Nevertheless, it tends to be the case that the airline industry has higher than average risk in North American and European economies. In the Asian economies, airlines tend to have a lower than average beta risk due to low debt levels. Capital intensity, that is, high operating leverage, has been identified as one of the major determinants of high beta companies (Sudarsanam 1992, p.189). The same study found, however, that substitution of capital for labour reduced systematic risk. Another important factor increasing systematic risk was industry growth. When a firm has high growth options, as many airline companies do (see chapter 4 for details), it is expected that the beta of the growth options will be higher than that attaching to assets already in place (see Miles 1986).

Beta risk and capital structure

The equity (or levered) beta of a business is composed of its asset (or unlevered) beta plus an adjustment for the extent of financial risk undertaken. In other words, beta is expected to rise in direct proportion to the debt/capital ratio. Table 7.4 shows estimates of market debt/capital ratios for a range of airlines with international operations.

The measure of market debt to capital ratio (that is, debt plus equity) includes the effect of operating lease payments capitalised as a debt equivalent, and measures equity as market capitalisation. In recent years the rule of thumb most often applied by airline analysts to estimate the capitalised value of operating leases has been to multiply operating lease payments by a factor of 7.5 or 8. In most cases there is a reasonably close correspondence with book values. In cases such as USAir, however, where there are significant operating lease payments, the level of book gearing falls below economic values. This is reflected in the high beta and low financial strength of USAir (as rated by Value Line) prior to the infusion of equity by BA. A problem with several of these asset beta estimates is that they are driven by very high and unsustainable (in the long run) debt levels. Therefore, the debt tax shield effect is overestimated and asset beta underestimated.[2]

The intercept of the regression line in figure 7.7 suggests an asset beta of 0.51, which corresponds closely to the calculated average asset beta of 0.52 shown in table 7.4.[3] In a given market, airlines with a larger reliance on international traffic have lower beta risk. The addition of debt in more domestically orientated airlines also appears to raise beta risk faster than in more internationally orientated companies. One reason for this is that domestic airline revenues will tend to be more responsive to a domestic economic downturn, and hence show a higher correlation with the domestic stock market index. Since the revenue stream of international airlines also depends on the state of foreign economies, whose indices are not perfectly correlated with the home index, investors in an international airline will experience an international diversification effect. Presumably the higher betas of domestic airlines, particularly in the US, are also due to a more competitive environment outside the scope of bilateral air service agreements.

Good financial performance and a comfortable debt structure do not necessarily translate into a low cost of equity. The best performing US company, Southwest Airlines, has a relatively low debt/capital structure but a high beta relative to the US stock market. Southwest is a rapidly growing, low cost regional carrier with high growth options. US analysts speculate that the larger US carriers, which have spent billions of dollars building their market positions, will react to Southwest's incursions: 'At some point there is going to be a response on all fronts: regulatory, competitive and, perhaps, acquisition manoeuvring' (Jennings 1992b, p. 42).

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2. The asset beta (β_A) has been calculated from the following equation:

$$\beta_A = \beta_L \cdot \frac{S_L}{(V_L + tB)}$$

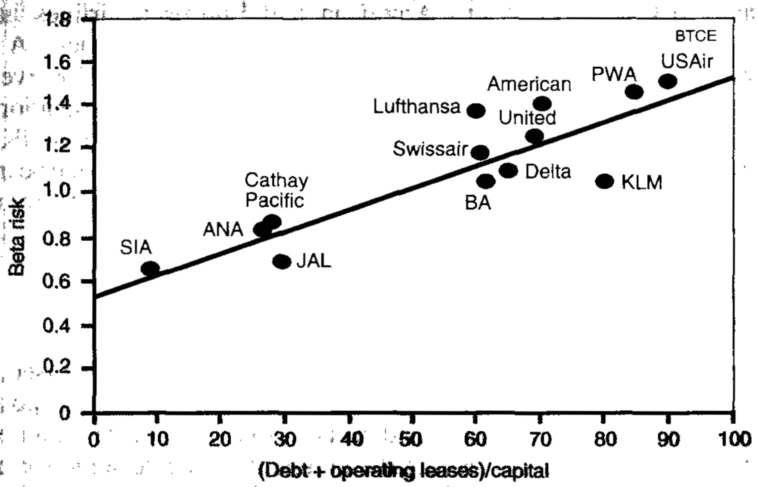
where β_L is levered beta, S_L is the firm's levered equity value, B is the market value of debt, V_L is the total corporate value (that is, S + B), and t is the corporate tax rate. The expression tB measures the value of the debt tax shield.

3. Figure 7.7 displays a direct empirical estimate of asset beta derived from the following simple regression equation.

$$\text{Beta} = \underset{(0.139)}{0.51} + \underset{(0.158)}{0.997}\ \text{Debt/Capital} \qquad R^2 = 0.783$$

A problem with this formulation is that it assumes that operating risks and tax effects are relatively constant between observations.

Figure 7.7 Beta risk versus capital structure 1992



Note For supporting data see appendix table II.61.
Sources Bloomberg; Value Line; ANZ McCaughan analysis.

TABLE 7.4 DEBT/CAPITAL STRUCTURES AND BETA RATIOS 1992

Airline	*Market debt/capital (per cent)*	*Levered beta*	*Asset beta*
Asia Pacific			
Cathay Pacific	27.1	0.85	0.65
All Nippon Airways	26.7	0.83	0.71
JAL	29.5	0.69	0.57
Singapore Airlines	9.0	0.65	0.61
Average	23.1	0.76	0.64
Europe			
Lufthansa	60.0	1.37	0.67
KLM	80.3	1.05	0.27
Swissair	60.8	1.17	0.56
BA	61.7	1.05	0.47
Average	65.7	1.16	0.49
North America			
PWA	85.0	1.45	0.31
American	70.7	1.40	0.55
Delta	65.0	1.10	0.50
United	69.5	1.25	0.52
USAir	90.1	1.50	0.21
Average	76.1	1.34	0.42
Overall average	*55.0*	*1.09*	*0.52*

Sources Value Line; Pont Data; ANZ McCaughan estimates.

Figure 7.7 also provides insight into the relationship between nondiversifiable risk (beta), debt/capital structure and debt ratings of airlines operating in international markets. The North American and European airlines have a higher debt/capital structure and higher betas than the Asian airlines. A 60 to 90 per cent debt structure is typical of the non Asian airlines. However, the variable effect of the debt tax shield in countries with full imputation (for example, Australia and New Zealand) and partial imputation (such as UK) will have an effect on optimal debt levels. Several of the North American and European airlines clearly need to restructure their debt in order to return to traditional ratings.

Effects of government regulation

When an industry is deregulated, or a regulated industry is privatised, it is desirable that any uncertainty about regulation be resolved as soon as possible. Uncertainty raises the cost of capital and reduces the value of debt and equity invested in the industry, thereby having the potential to negate some (or all) of the benefits which might normally be expected to flow from deregulation and privatisation policies.

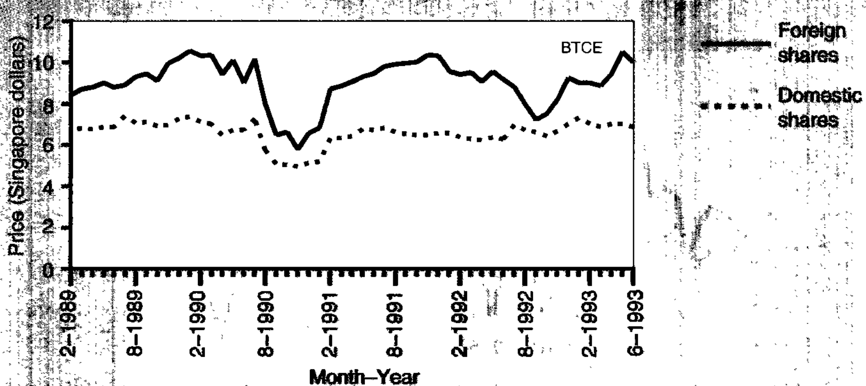
Peltzman (1976) has argued that tight regulation tends to reduce the volatility of earnings, and should therefore act to reduce risks. This issue was examined by Cunningham, Slovin, Wood and Zaima (1988), in the context of US airline industry deregulation during the early 1980s. They found that in the early years of deregulation the beta risks of airline stocks were raised, but that this was in fact a temporary phenomenon reflecting a period of industry shakeout. Beta risk was significantly reduced in the longer term compared with the pre-deregulation period. Employing the event study methodology for US data, Beneish (1991, p. 417) concluded that the airlines least adversely affected by announcements of changing government regulations were those which could reorganise operations around hubs, were differentiated in servicing first class passengers, and had strong balance sheets. In short, the stronger airlines were the least affected by government deregulation, as a more competitive environment would tend to favour their survival over weaker airlines.

It should be noted that many governments impose constraints over full voting ordinary shares through the use of 'golden shares'. Any constraint over shares will reduce overall corporate valuation. However, international equity airlines investors do not discriminate or heavily penalise the use of golden shares in airline privatisations, because most flag carriers have a form of golden share deterrent to hostile takeover under the regulatory regime and/or conventions between governments.

Domestic and foreign shares

Some airline stocks have capital structures which are influenced by alternative equity instruments, such as 'special' ordinary shares designated for

Figure 7.8 Share prices, Singapore Airlines 1989 to 1993



Note For supporting data see appendix table II.62.

Source Bloomberg, 27 September 1993.

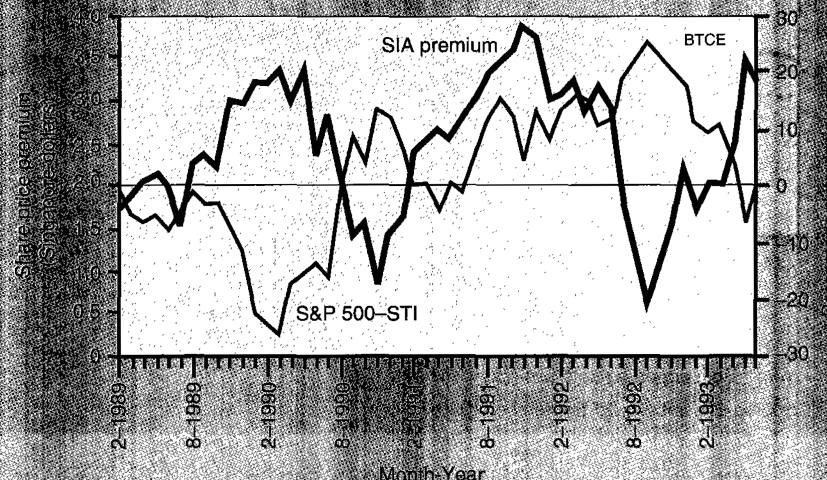
international investors. There are now a number of instances in which 'dual class' shares in airline companies have been issued in the course of privatisations, and more of these instruments are likely to be seen in the future. Examples include Singapore Airlines and Air New Zealand. In general, both domestic and foreign shareholders may purchase the foreign designated class of shares, which is set at a percentage limit of total share capital. Foreigners, however, may not purchase domestic designated shares. A premium invariably develops for the foreign shares, although its size varies with several factors. Figure 7.8 shows the premium attracted by foreign shares in Singapore Airlines.

A fundamental reason for the premium is the excess demand created by setting a foreign ownership limit. The level of that excess demand pressure is affected by relative returns prospects for foreign investors in other countries. If the relative prospects of investing in Singapore Airlines (via Singapore Airlines foreign shares (SIAF)) can be proxied by the differential performance of the US S&P 500 Index (S&P 500) and the Singapore Straights Times Index (STI), we find a statistically significant negative relationship between this differential (S&P 500 minus STI) and the SIA premium (price of foreign minus price of domestic shares).

A simple regression of 53 months of returns data gives an average premium of 2.51 when the index returns are equal, and a reduction of 2.3 cents (t ratio is 2.5)[4] in the premium for every 1 per cent increase in the S&P 500 relative to the

4. The t ratio shows the statistical significance of a point estimate. A t ratio of 2.0 or more generally means that the point estimate is, statistically, significantly different from zero

Figure 7.9 Foreign share premium: Singapore Airlines 1989 to 1993



Note See footnote 5 for notes associated with this figure.
For supporting data see appendix table II.62.

Source Bloomberg, 27 September 1993.

STI.[5] In other words, when opportunities in the world's major capital markets are high relative to Singapore's, foreign based demand is diverted away from Singapore Airlines foreign shares, which fall in value relative to its domestic shares. This relationship can be seen in figure 7.9. Relative international investment opportunities explain only 13.5 per cent of the variance in the premium. Other explanatory factors would include speculation about changes in the Singapore Government's policy regarding foreign shareholdings, changes in the Singapore and US dollar exchange rate, and the higher inherent volatility of the foreign shares.

EQUITY PARTICIPATION BY EMPLOYEES

A characteristic of an airline's ownership and capital structure is the involvement of employees, in the form of equity participation and, in some cases, employee profit sharing plans. For example, in the mid 1980s employees acquired 9 per cent of Continental, 11 per cent of TWA, 13 per cent of Pan Am,

5. STI is the Singapore Straights Times Index, which is the major index of stocks listed on the Singapore Stock Exchange. The S&P 500 Index is an index of the top 500 US stocks compiled by Standard and Poor's Corporation. S&P 500 minus STI measures the difference between the percentage returns earned on holding the S&P 500 Index as opposed to the Singapore Straights Times Index over monthly intervals.

15 per cent of Republic, 15 per cent of PSA, 25 per cent of Eastern and 33 per cent of Western. Southwest, which has had about 13 per cent employee ownership for years and considerable employee involvement, is consistently rated in the top tier in customer service and has generated profitable corporate performance.

Employee equity participation often has been encouraged as a government policy objective in privatisations. For example, in the privatisation of BA in February 1987, the British Government required the reservation of 9.5 per cent of the issued capital for employees and pensioners. Each eligible employee was offered 76 shares free of charge at the British Government's expense. The British Government also matched, two for one, purchases by employees for up to 120 shares per employee. All such shares are held by the trustees for the British Airways Profit Sharing Schemes. Up to 1600 shares purchased by each employee under the priority offer were offered at a 10 per cent discount (to the 125 pence per share issue price) if held until the final instalment (60 pence) was paid on 18 August 1987.

Special arrangements were also made for special offers to employees in the US and Canada. Following the privatisation, 95 per cent of BA's employees became shareholders. In addition, BA has an established employee profit sharing plan which provides each employee with an additional one week's pay for each audited £90 million in pre-tax profit above £230 million of pre-tax profit. It should be noted that since privatisation BA has consistently ranked in the top tier of customer surveys and produced significantly improving productivity growth rates (see table 7.5) .

In general, employee share ownership has not been employed by corporations as a financing tool, but rather established for a variety of other reasons (see table 7.6).

In the US, about 50 per cent of employee equity plans (that is, employee share ownership plans, commonly labelled ESOPs) are used to provide a market for the shares of a departing owner of a profitable, closely held company. Most of

TABLE 7.5 BRITISH AIRWAYS GROUP: EMPLOYEE NUMBERS AND PRODUCTIVITY 1984–1993

(year ended 31 March)

	1984	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*
Average number of employees	37 247	38 137	40 271	40 759	43 969	50 204	52 054	54 427	50 409	48 960
Total TKA(million)	7 194	7 837	8 601	8 751	10 083	11 868	12 445	13 351	13 818	15 424
TKA per employee (thousand)	193.1	205.5	213.6	214.7	229.3	236.4	239.1	245.3	274.1	315.0

Source British Airways 1993, p. 16.

TABLE 7.6 REASONS COMPANIES FORMED EMPLOYEE SHARE OWNERSHIP PLANS

Reason	*Percentage*
Provide an employee benefit	91
Tax advantages	74
Improve productivity	70
Buy shares of major owner	38
Reduce employee turnover	36
Transfer majority ownership	32
Raise capital	24
Decrease absenteeism	14
Avoid unionisation	8
Avoid hostile takeover	5
Save failing company	4
Exchange of wage concessions	3
Take company private	1

Note Percentages add to greater than 100 because respondents could list more than one reason.

Source US General Accounting Office 1986, p. 20.

the remainder are used as a supplementary employee benefit plan, or as a means of borrowing money in a tax effective manner. Less than five per cent of the plans are used either as a defence against a hostile takeover or to save a failing company.

There is compelling empirical evidence to support a clear correlation between improved corporate performance and ESOP participating companies with effective employee communication programs (see ANZ McCaughan 1993). For example, in the US there are over 10 000 ESOPs, with over 11 million participating employees controlling over $60 billion in corporate stock. Participative ESOP companies grow 8 to 11 per cent a year faster than they would have without employee ownership, and have productivity growth rates 52 per cent per year higher. Japan has enjoyed a relatively high level of employee ownership and also experienced substantial productivity growth rates for participating companies.

Employee equity participation is an important contribution to the ownership and capital structure of airlines, and airline privatisation. It is one of the policy objectives set by the Australian Government with respect to the privatisation of Qantas.

EQUITY OFFERINGS IN THE AIRLINE INDUSTRY

So far in this chapter the characteristics of equity returns in the airline industry, and the major determinants of the cost of equity, such as beta risk, capital structure and government policy have been discussed. In this section cases in which equity has been offered to public investors are reviewed. A major contribution to airline equity offerings is, and will probably continue to be, privatisations of government owned airlines. The building of cross ownership structures has generally not involved the issue of new equity; rather it has been accomplished by on-market purchases of existing shares. Another source of equity finance offerings will come from listed companies seeking to recapitalise their balance sheets as the outlook for airline profits improve.

Privatisation of airlines

Apart from the equity needs of US listed airlines, the largest source of airline equity offerings over the next decade will come from privatisation of government owned airlines around the world. A stimulus has been provided by BA, which has displayed exceptional performance in terms of share price appreciation, operating profits and employee productivity since its privatisation in 1987.

Privatisation of airlines provides a unique opportunity for airlines to make substantial adjustments to their capital structure. Government owned airlines often have a higher proportion of debt funding than would be advisable under private ownership. Government guarantees (either explicit or implicit) provide an incentive for more use of debt, as a higher debt rating is obtained and lower interest costs are incurred. The level of debt often needs to be reduced in order to provide financial flexibility for the management of the privatised airline. A recent example is provided by Qantas whose purchase of Australian Airlines in 1992 added $A973 (US$729) million debt to an already overburdened capital structure (Lawriwsky 1992). As part of the preparation for privatisation in 1993 the Australian Government recapitalised Qantas with a just over $1 billion equity injection. This resulted in a BBB investment grade rating being applied to the company by Standard and Poor's Corporation.

Privatisation also provides the opportunity to adjust the share ownership structure to promote various objectives. As we have seen, employees can be encouraged to purchase shares in order to promote productivity. A strategic shareholder can be introduced to add value through synergistic relationships. To continue the Qantas example, BA outbid Singapore Airlines for a 25 per cent strategic holding. In addition, the number and size distribution of shareholders can be affected by the share allocation policy pursued by the vendor government. For example, a wide spread of shareholdings and a strong domestic and international institutional presence can be achieved. Customer share ownership can be promoted through schemes which allow discounts on travel.

In order to provide a mechanism for government intervention under extreme circumstances a 'golden share' is generally employed. For example, in the 1989 privatisation of Air New Zealand a 'Kiwi share' was issued. The 'Kiwi share' provides for veto powers over ownership and control and certain

An examination is made of the factors which determine the price/earnings multiple and dividend yield, and the importance to the investor and debt markets of other key equity performance measurements such as cashflow multiples.

Accounting bias

In 1992 the extent of divergences in airline accounting practices was highlighted by a joint KPMG–IATA report of a survey of 25 airlines (KPMG & IATA 1992). Differences begin with the way that aircraft purchase transactions are accounted. For example, the extent and timing of capitalisation of interest on deposits, progress payments, and foreign exchange gains or losses differ. Aircraft depreciation policies have a large impact on reported profit, and distort comparisons between Asian and non Asian airlines.

The extent and treatment of operating leases on aircraft have a large distortionary effect on the apparent debt structure. Operating leases are invariably kept off balance sheet, which necessitates analysts and financiers making notional adjustments to arrive at comparable effective debt levels. Finance leases, however, can also reduce comparability and simultaneously 'improve' the balance sheet, as was demonstrated by Swissair, which reduced its 1991 debt/equity ratio from 0.9:1 to 0.5:1 by not capitalising its finance leases. It can be argued that an efficient market will 'see through' cosmetic accounting differences to value the underlying cashflow potential of airlines. This argument, however, does not comfort airline analysts, who need to do considerable 'surgery' on unadjusted airline accounting statements to render them comparable. If restrictive debt covenants can be circumvented, it could be argued that airlines thereby gain greater financial flexibility to take advantage of new opportunities. It should not be forgotten that some or all of this value might come as a wealth transfer from debt holders to equity holders, since the added risk exposure for debt holders may not have been anticipated.

TABLE 7.8 RANGE OF AIRCRAFT DEPRECIATION CHARGES

(percentage of purchase price per year given estimated useful lives and residual values)

	747	*767*	*737*	*A300*	*A310/320*	*DC-10*
Highest airline	8.0	6.0	9.0	6.9	8.0	7.5
Asian average	6.8	–	8.2	6.5	7.0	6.7
European average	5.1	5.4	5.6	5.6	6.3	6.7
North American average	4.2	4.5	4.2	4.8	4.2	4.2
Lowest airline	3.5	3.5	4.0	4.8	4.2	4.2

Note Leased and secondhand aircraft are excluded.

Source KPMG & IATA 1992, p. 13.

Table 7.8 shows the diversity of depreciation policies followed by various airline groups. In particular, it is the Asian carriers which have pursued a high depreciation charge policy, which tends to reduce operating profits but increase profits upon sale of aircraft. Unless depreciation policies are adjusted for, it is difficult to undertake international comparisons of performance on a profits after tax basis. Unfortunately, the reporting practices of many airlines make it difficult to incorporate the appropriate adjustments.

Relative share price performance

The share price of a company provides the market's implied rating of management performance and serves as a discipline over management to maximise corporate performance. A higher share price is an advantage to a corporation since it enables it to both raise equity capital and borrow on better terms.

The data shown in figures 7.10 to 7.12 are graphic evidence of the relative decline of airline stocks when compared against their local stock market index. The rate of return on holding shares of the airlines can be looked at in two ways. First, a rate of return on the initial investment (including share price growth and dividend) can be defined as follows:

$$R_t = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$$

where R_t is the rate of return earned by investors in period t, P_t is the share price at the end of period t, P_{t-1} is the share price at the beginning of period t, and D_t is the dividend per share paid during period.

A second approach is to consider the actual dollar share price accumulation and reinvestment of dividends from an investment of say, \$1000 in the company, and the local index, which in the case of the US is the S&P 500 index of the leading 500 stocks in the market. The share price return can be measured as the change in share prices after taking account of bonus issues and stock splits. Thus, an increase in price from \$10 per share to \$20 per share would raise the value of the airline investment to \$2000. Alternatively, if the index had risen from 1000 to 4000 over the same period, in relative terms a negative return of \$2000 (that is 2000 minus 4000) would have been realised. A negative return in this sense is unsatisfactory for airlines because they generally have a higher risk than the market as a whole and are expected to earn better than the market rate of return.

Figures 7.10 to 7.12 display the share price performances of airlines relative to local market indices in the Asian, European and North American regions.[6] It is evident that the downturn in airline business experienced in 1990 had a much more marked effect on airlines than on their local economies. It is also apparent that for the Asian and European carriers most of the relative decline was suffered in 1990, while the US airlines have experienced a more gradual but persistent fall in relative returns. Of these international carriers, only BA has more than kept pace with share price returns offered by the average alternative stock market investments in each airline's home economy. It should be noted that these returns do not include dividends, and on this basis the relative airline performance could be shown to be even worse.

Not all investors in airline stocks have been damaged by the recent downturn in the industry. Over the last three years BA has provided excellent returns to shareholders under the circumstances (a compound annual return of 21.9 per cent). BA has produced good share price returns for numerous reasons including investors' confidence in continued improving productivity growth rates, confidence in its global growth strategy, success in the adoption of new technologies, high levels of customer satisfaction, employee equity and profit participation, and relative stabililty of earnings.

Event studies of airline stock price performance

Several academic researchers have studied the reaction of airline stock prices in response to the release of new information to the market. They have employed the event study methodology, which establishes an empirical (historical) relationship between movements in general market prices and prices of the stocks being observed, and assumes that this relationship should hold in the future unless an event (that is, new information) of some significance occurs. Thus 'abnormal returns' are defined as the differential between returns expected on the basis of the historical evidence and the actual returns observed.

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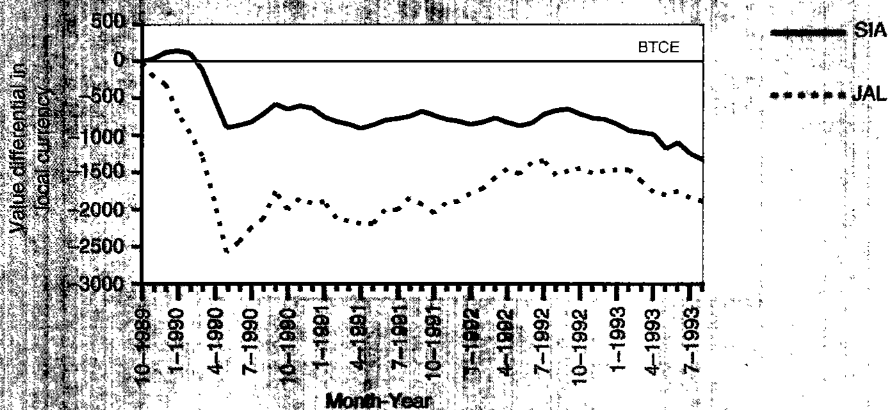
6. Relative share price performance is calculated by reference to an investment in airline shares of 1000 units (of domestic currency) and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1 + ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right) - \left(N^{I}_{t-1} \times \left(1 + ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stock market index at the time t – 1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

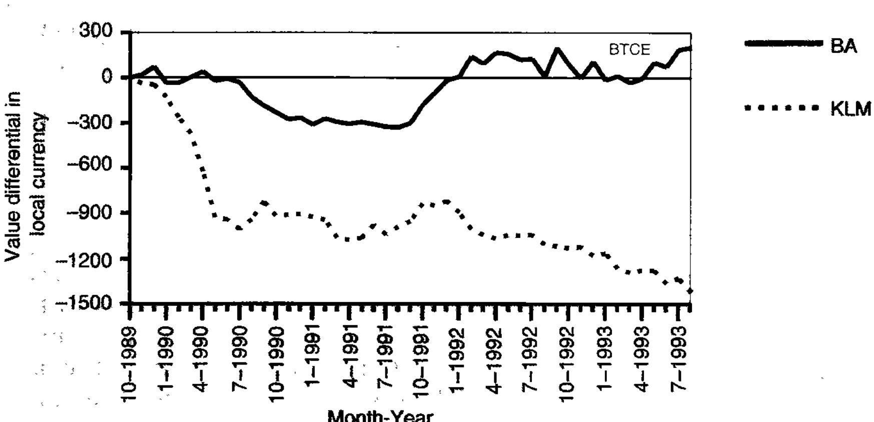
Figure 7.10 Share price returns relative to local index: Asia



Note See footnote 6 for notes associated with this figure.
For supporting data see appendix tables II.63 and II.64.

Source Bloomberg, 27 September 1993.

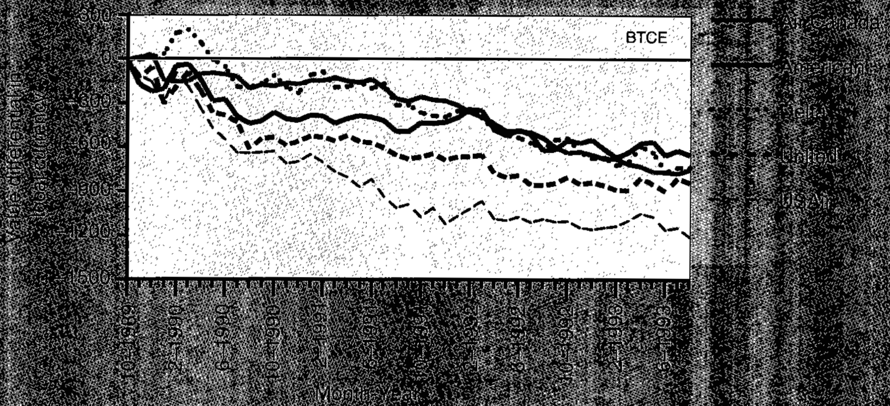
Figure 7.11 Share price returns relative to local index: Europe



Note See footnote 6 for notes associated with this figure.
For supporting data see appendix tables II.65 and II.66.

Source Bloomberg, 27 September 1993.

Figure 7.12 Share price returns relative to local index: North America



Note: See footnote 6 for notes associated with this figure.
For supporting data see appendix tables II.67, II.68, II.69, II.70 and II.71.

Source: Bloomberg, 27 September 1993.

In an event study of 24 airline mergers in the US, Kyle, Strickland and Fayissa (1992, p. 1101) found that both offeree and offeror shareholders benefit from restructuring. This is a relatively favourable result, considering that the bulk of research within this paradigm, for other industries, finds that while offerees gain substantially from takeover premiums, offeror shareholders are at best no worse off following the announcement of a successful bid. The rationale for airline mergers comes from the ability to reap economies of scale. Tretheway (1992), however, argues that most of the gains can be derived from marketing economies such as frequent flier networks rather than from operating economies of scale (also see Caves, Christensen and Tretheway 1984). If this is the case, it is possible that alliances involving partial ownership, rather than full scale mergers, will be the basis for globalisation in the future.

Another area which has attracted the attention of researchers is the share price effects on airline companies arising from fatal accidents. On this question, Chance and Ferris (1987, pp. 160 & 163) found that the market reacts swiftly in marking down the value of an airline on the day that a fatal accident occurs, but this effect is generally less than one per cent of stockholder wealth. The largest single proportional effect was a loss of 11.4 per cent sustained by Alaska Air in 1971. As an interesting contrast, the share prices of airline manufacturers were not at all affected by these accidents. This indicates that the market viewed accidents as being determined by an interaction of pilot error and/or natural phenomena such as inclement weather, rather than design faults in the planes.

MARKET/ACCOUNTING RATIO INVESTMENT INDICATORS

In practice, private and institutional investors, airline analysts, investment banks and stockbrokers view the valuation of airline stocks on the basis of a number of ratios. These ratios can be compared on an (airline) industry basis, and with the 'All Industrials' or a more general stock market index. These ratios, however, are not without problems.

Price/earnings multiples

The price/earnings (P/E) multiple approach to business valuation is widely used by financial analysts. All that is required is an estimate of the earnings (that is, profit after tax) that an airline can sustain in the future, and the price/earnings multiple.

$$\text{Share price} = \text{Earnings} \times \text{Price/earnings multiple}$$

As a rule, comparisons of P/E multiples are difficult to make due to different accounting procedures, leasing policies, tax regimes, ownership and debt structures. In the current market many senior airline analysts reject the P/E methodology outright. Other things being equal, the P/E multiple will be higher for companies:

- expecting faster growth in earnings;
- experiencing lower risk; and
- supporting less debt.

Due to recent losses and some unusual airline behaviour (for example, the US fare war), many of the P/E multiples are not meaningful (that is, not positive), and averages of the positive multiples are biased upwards by companies where the market is expecting strong profit recovery in coming years. It is apparent from table 7.9 that where historical P/E multiples are higher, there is an expectation of greater future earnings growth. That is why a company like Singapore Airlines, with an expected earnings per share (EPS) growth rate of 6 per cent in the financial year 1993–94, is trading at a historical P/E (that is, ratio of current price to actual 1993 earnings) of 10.08, while BA, with expected EPS growth of 41 per cent is trading at a 15.52 historical and 10.96 prospective 1994 P/E multiple (that is, current price to expected 1994 earnings.) The relative multiple for BA would be even higher compared with Singapore Airlines if it were not for BA's much higher relative debt levels.

In 1992, many analysts and observers of the global airline industry were expecting a turnaround in airline profits in financial year 1993–94. In the June quarter of 1993, analysts' expectations were revised downwards. While expectations of 1994–95 earnings results were generally maintained, expectations for 1993–94 for EPS in American reduced from $4 to $1.76, with even more dramatic reassessments of other companies (for example United, $6

TABLE 7.9 CONSENSUS EARNINGS PER SHARE AND PRICE/EARNINGS MULTIPLES 1993–1995

	Earnings per share			*Price/earnings multiple*		
Airline	*1993*	*1994E*	*1995E*	*1993*	*1994E*	*1995E*
Asia Pacific						
Cathay Pacific	1.05	0.87	1.07	10.00	12.07	9.81
Singapore Airlines	0.66	0.70	0.83	10.08	9.50	8.01
Europe						
KLM	–6.14	–0.03	2.73	nm	nm	7.05
BA	23.10	32.70	na	15.52	10.96	na
North America						
American	–4.02	1.76	5.07	nm	36.65	12.72
Delta	–10.54	2.18	na	nm	24.08	na
United	–14.41	–1.69	9.06	nm	nm	15.73
USAir	–9.96	–2.77	0.46	nm	nm	26.9

E = estimated.
nm = not meaningful.
na = not available.

Notes The 1993 earnings per share and P/E multiples are those current at September. Earnings per share are in units of local currency and are not adjusted for inflationary expectations.

Source Bloomberg, 27 September 1993.

to $1.69; and Singapore Airlines, $SD1.55 to $SD0.70). It was in the face of this consensus view of delayed recovery for the airline industry that the Australian Government deferred the float of Qantas to 1994–95.

Dividend yield

The dividend record of some major international airlines is examined in three dimensions: dividend yield, dividend payout ratio, and movements in cash dividend payments. Dividend yield is defined as dividend per share as a percentage of the current share price. Since the share price of many airlines fell in 1990, it is instructive to look at the absolute dividend paid, since a given dividend payment will imply a higher dividend yield in these circumstances.

The dividend payment record of several US and international airlines over the period 1988–1992 is represented in tables 7.10 and 7.11 and figure 7.13. Table 7.10 details the dividend payout ratios (size of dividends paid relative to the funds available for distribution to shareholders) for a number of international airlines. These companies may be divided into three groups including those which, by the end of the period 1988–1992: increased their dividend payout ratios or dividend payments (for example Singapore Airlines); reduced their dividend payments (for example USAir); and those which have not paid any dividends at all during the period (Air Canada, United and American).

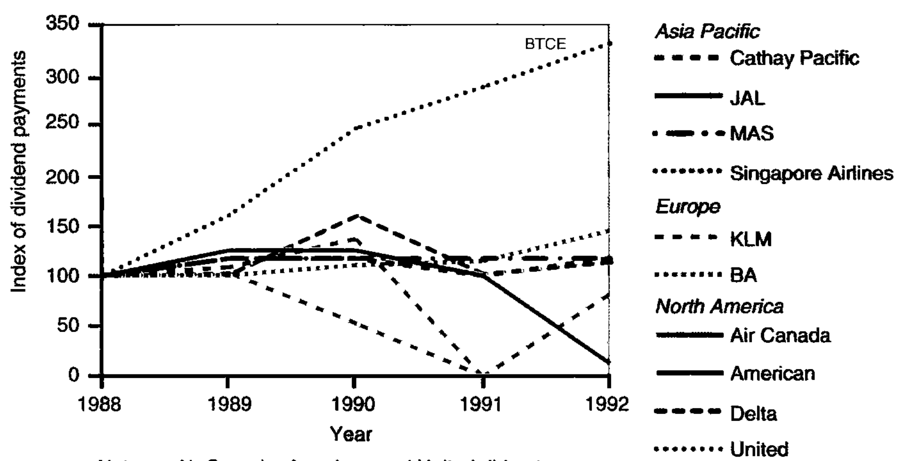
TABLE 7.10 DIVIDEND PAYOUT RATIOS 1988–1992

Airline	*1988*	*1989*	*1990*	*1991*	*1992*
Asia Pacific					
Cathay Pacific	0.36	0.36	0.40	0.41	0.40
JAL	0.33	0.45	0.50	0.62	–3.01
Malaysian Airlines (MAS)	0.16	0.18	0.15	0.15	0.26
Singapore Airlines	0.10	0.10	0.13	0.20	0.22
Europe					
KLM	0.28	0.26	0.29	–0.08	0.46
BA	0.35	0.30	0.24	0.62	0.29
North America					
Air Canada	0.00	0.00	0.00	0.00	0.00
American	0.00	0.00	0.00	0.00	0.00
Delta	0.19	0.13	0.30	–0.16	–0.11
United	0.00	0.00	0.00	0.00	0.00
USAir	0.03	–0.09	–0.01	0.00	0.00

Notes Dividend payout ratio = Dividends paid/Funds available for distribution to shareholders.
Negative values indicate payment of dividends in excess of current earnings.

Source Bloomberg, 27 September 1993.

Figure 7.13 Growth of dividend payments 1988–1992



Notes Air Canada, American and United did not pay dividends throughout the period. 1988 base = 100. For supporting data see appendix table II.72.

Source Bloomberg, 27 September 1993.

TABLE 7.11 DIVIDEND YIELDS FOR INTERNATIONAL AIRLINES 1993

(per cent)

Airline	*Dividend yield*
Asia Pacific	
Cathay Pacific	4.00
JAL	0.00
Singapore Airlines	3.38
Europe	
KLM	0.00
BA	3.94
North America	
American	0.00
Delta	0.38
United	0.00
USAir	0.00

Note $\text{Dividend yield} = \dfrac{\text{Dividend per share}}{\text{Current share price}} \times 100$

Source Bloomberg, 27 September 1993.

Figure 7.13 shows the growth in dividends paid to shareholders over the period 1988–1992. It should be noted that there is no direct correlation between payout ratios and dividend growth. Dividend payout ratios are generally lower in the airline industry than is the case in other industries. Airline companies generally aim to preserve cashflow to increase financial and operating leverage, and focus on maximising capital growth. The fall in earnings experienced in recent years has resulted in a further decline in dividend payout ratios.

Airline stocks are not, in brokers' parlance, a yield story. They are a growth story. This means that investors rely more heavily on capital gains through share price increases than on larger, more stable dividend payments. Dividend yields are currently variable and unstable, with many companies having reduced capacity to pay dividends. Table 7.11 shows that the average yield for profitable airlines is comparatively low; however, BA, Singapore Airlines and Cathay Pacific constitute exceptions, with yields of 3 to 4 per cent.

Price/book ratio

One check on valuation levels often referred to by analysts is the ratio of market price to book value of net assets (P/B ratio). Extreme caution must be exercised, as the P/B ratio can be highly sensitive to different accounting procedures. The 1993 ratios for a number of international airlines are shown in table 7.12. It may be noted that Qantas purchased Australian Airlines for

TABLE 7.12 PRICE/BOOK RATIOS FOR INTERNATIONAL AIRLINES MARCH 1993

Airline	*Price/book ratio*
Asia Pacific	
Singapore Airlines	1.28
Europe	
KLM	0.53
BA	1.48
North America	
American	1.46
Delta	1.40
United	2.31
USAir	1.80
Average	1.47

Note Price/book ratio = Market price/Book value of net assets.

Sources Bloomberg, March 1993; ANZ McCaughan analysis.

$A400 (US$299) million, which represented a P/B ratio of 1.33 times Australian's 1991 net assets.

Value/revenue

The value to revenue (V/REV) ratio or percentage in table 7.13 provides an indication of the corporate value (including debt and equity) supported by the revenues of the company. For example, if a company can reduce costs with a given revenue (that is increase its operating margin), value may be expected to increase. Again, care must be taken that the definition of 'value' includes capitalised operating leases and that the valuation of debt is at market values.

TABLE 7.13 VALUE/REVENUE RATIOS FOR INTERNATIONAL AIRLINES MARCH 1993

(per cent)

Airline	*Value/revenue*
Asia Pacific	
Singapore Airlines	138.2
Europe	
BA	127.2
KLM	174.9
North America	
American	138.8
Delta	99.8
United	99.5
USAir	136.8

Sources Bloomberg, March 1993; ANZ McCaughan analysis.

For example, this ratio could appear to rise if a company is failing, with declining revenues and a reduction in equity value, but the decline in the value of debt below book levels has not been considered. In summary, this is a relatively crude ratio for assessing value on its own. However, it does offer another perspective when used in conjunction with other measures.

Operating cashflow multiples

Operating cashflow is defined as earnings before depreciation, rentals, interest and tax (EBDRIT). This measure overcomes most of the major accounting problems which render other multiples unworkable in a period of depressed airline profits. The V/EBDRIT and S/EBDRIT multiples for several US and international airlines are displayed in table 7.14. The V/EBDRIT multiple is the ratio of total corporate value (market value of debt and equity) to EBDRIT, while S/EBDRIT relates the market value of equity to EBDRIT. Analysts recognise that differential capital structures of airlines will affect S/EBDRIT and its relationship to V/EBDRIT, but this is rarely spelled out in detail. For example, it is often maintained that the Singapore Airlines V/EBDRIT multiple is exceptionally low because of its low debt/capital structure. At the end of this chapter we offer a theoretical and empirical analysis of these relationships.

Performance relative to local market

Some US airline analysts, including Derchin and Orme (1993, p.12) believe that relative price/operating cashflow to the corresponding local market index is the best basis for value comparisons. They have constructed a subjective ranking of airlines derived from scores allocated to eight fundamentals:

- balance sheet;
- cost structure;

TABLE 7.14 CASHFLOW MULTIPLES FOR INTERNATIONAL AIRLINES MARCH 1993

Airline	*V/EBDRIT*	*S/EBDRIT*
Asia Pacific		
Singapore Airlines	4.34	4.09
Europe		
KLM	10.28	1.00
BA	8.38	2.60
North America		
American	8.02	1.88
Delta	6.11	1.29
United	7.24	1.54
USAir	6.58	0.52

Sources Bloomberg, March 1993; ANZ McCaughan analysis.

- labour relations;
- growth prospects;
- competitive position;
- fleet;
- service; and
- marketing.

On this basis, however, their relative subjective ranking did not fully accord with the relative rating of price/operating cashflow to local markets. For example, Singapore Airlines was rated number one but was trading at a 50 per cent discount to the local market index. Alaska Air was ranked number six and was trading at only a 41 per cent discount to the US index.

From this analysis it would be bold to conclude that Singapore Airlines is undervalued. Key players in the market would be fully aware of this apparent anomaly. Market valuation relative to current operating cashflow depends on relative improvement in the future cashflow position after considering risk. Thus, a relatively poorly performing company which is expected to improve substantially could earn a higher multiple than a company which is already operating efficiently and will continue to do so. In fact, it is difficult to see how the valuation of an airline based on comparisons with the price/operating cashflow multiple of airlines in other countries relative to their home stock markets can improve accuracy. Having largely eliminated accounting bias by focusing on operating cashflow (EBDRIT), this extra step appears to reintroduce a significant biasing factor in the noncomparability of markets. Just as in the international comparison of betas, it must be recognised that the basis of comparison (the market) is different in each case. In addition, the movements of share prices in individual stock markets are generally not highly correlated, so that an international airline domiciled in a country still experiencing recession may obtain a valuation boost if it operates services to a country which is in recovery.

DEBT AND LEASE FINANCE

This section examines the debt sources of funding from the capital markets. It examines the advantages and disadvantages of using debt finance instruments as against lease financial instruments. It also examines aircraft funding sources.

The major priorities of the credit rating agencies are listed together with the key financial ratios employed by lenders. Some case studies are presented, which examine the lessons learned from individual debt raising transactions and legal factors peculiar to the US airline industry (that is, Chapter 11 bankruptcy protection).

Debt finance

Financial institutions continue to reassess the risk factor in investing in airline activity, especially funding fleet expansion and/or re-equipment. Moves to increase competition in aviation (such as privatisation of airlines and deregulation of certain domestic aviation markets) are increasing the levels of risk for financiers. The level of risk was clearly revealed during the difficulties faced by the industry during the turbulent period 1990–91–92. Poupelle (1991, p. 5) from Credit Lyonnais, a leading European financial institution, believes these developments have created an unstable market and a level of uncertainty which banks would care to avoid. Those financial institutions which are prepared to invest funds in the airlines are tending to make the conditions of the loan (such as higher premiums) incorporate the risk factor (Flint 1991c, p. 64; Lundstrom 1991, p. 22; Verchere 1991b, p. 49). Many airlines have found it difficult to raise finance to undertake aircraft purchases/leases.

Tables 7.15 and 7.16 display the factors which are seen by airlines as affecting the investment financing decisions and the constraints on raising debt capital in the current environment. Clearly, there is a perception that international banks are less willing to invest in airlines because of increased risk, reduced profits and lower credit ratings. The KPMG & IATA (1992) survey also identified a rising relative cost of debt for airlines. In 1989 the average cost of borrowing was 8.84 per cent. By 1991 the average cost of borrowing had declined to 8.18 per cent — a fall of 7 per cent. In contrast, the London Inter Bank Offer Rate (LIBOR) fell from 8.3 per cent to 4.1 per cent during the same period — a fall of 51 per cent. Thus, while most companies have enjoyed a considerable decline in their borrowing cost, for airlines the cost has remained stationary and some airlines have reported increasing debt costs. It may take some time for these differences to affect the relative performances of airlines, however, as most airline debt tends to be long term and at fixed rates.

TABLE 7.15 FACTORS AFFECTING THE AVAILABILITY OF FINANCE

Factor	*Average score*[a]	*Rank*
Capital adequacy requirements of international banks	2.5	1
Uncertainty regarding the airline industry	2.8	2
Credit rating of the company	3.3	3
Overexposure by certain financiers to the airline industry	3.5	4
Foreign tax legislation	4.3	5
Domestic tax legislation	4.6	6

a. Airline executives were asked to rank, on a scale of 1 to 10 (with 1 being the most important), a list of factors in order of their importance to the availability of finance.

Source KPMG & IATA 1992, p. 9.

TABLE 7.16 FACTORS AFFECTING FLEET FINANCING DECISIONS

Factor	*Average score*[a]	*Rank*
Availability of debt and equity finance for lease transactions	3.6	1
Availability of debt and equity finance for outright purchase	3.9	2
Impact on operating income	4.6	3
Tax position of the company	4.7	4
Fleet flexibility	5.0	5
Balance sheet impact (that is, debt/equity ratio)	5.1	6
Currency risk	5.1	7
Risk of ownership	5.4	8
Interest rate risk	6.1	9
Government restrictions	6.8	10

a. Airline executives were asked to rank, on a scale of 1 to 10 (with 1 being the most important), a list of factors in order of their importance to fleet financing decisions.

Source KPMG & IATA 1992, p. 8.

Aircraft financing sources

Boeing in its *Current Market Outlook* (1993, p. 2.52) identified the main sources of finance for future fleet requirements. The main contrasts between sources of finance in the recent past and the near future are the significant decline in the Japanese market, plus the emergence of equity issues and the importance of public debt financing. While Boeing sees insurance companies and pension funds as remaining steady, other analysts have suggested that these institutions offer a potential growth area for capital, but that they are likely to wait before entering the market to any greater extent, to ensure security of loans made in the airline industry (Murray 1991a, p. 4; Murray 1991b, p. 34; Pickens 1991, p. 39). What is evident is that airlines need to diversify their sources of aircraft financing.

The aviation industry is undergoing restructuring. There are some indications that the assurance of the protection of a regulated market, and the level of government backing of previous decades, will not be available in the future. For example, while the EC Commission (Hilbrecht 1992, p. 72) has approved support packages for Air France, Iberia and Sabena, new criteria have been imposed, suggesting that the 'flag carrier' concept may one day come to an end as the implications of market distortions are recognised. In broader terms the airline industry has to compete with other capital intensive industries (many of which have a better historical record of profit performance) at a time when the industry's own performance cannot support its capital needs (Verchere 1991c, p. 5; Bailey 1991a, pp. 42–43).

Economics of lease finance

The benefits of leasing, which can be divided between lessor and lessee, are substantially derived from its ability to reduce the burden of taxation, and the existence of market imperfections (for a detailed account of aircraft leasing, see appendix VII). Even if airlines have identical borrowing costs and can purchase aircraft at identical prices, the typical airline's volatile earnings stream can provide a motive to lease rather than borrow and buy. Assuming a 'classical' taxation system involving taxation at both the corporate and personal levels, if the airline has no income to shield from taxation, the benefits of the depreciation tax shield are lost. On the other hand, if the aircraft were leased the lessor could utilise the tax depreciation shield. It is therefore tax efficient for the higher tax paying party to be the lessor.

Another motivation for leasing comes from the fact that manufacturers or leasing specialists have particular knowledge about the risk of technological obsolescence of specific aircraft, and have diversified this risk, or are willing to bear it. A major determinant of the rate of return earned by lessors is the ultimate sale price of the aircraft. Lessors may have a longer view of asset sale prices in the industry: that have been proven correct in the past (for example post 1983) when resale values of aircraft rebounded, as outlined earlier in this chapter.

For airline operators in a highly capital intensive industry it is desirable to increase the flexibility and variability of costs, while minimising maintenance costs. Operating leases that can be cancelled can achieve this, which accounts for the relative growth of operating leases. Under operating leases risks of ownership usually reside with the lessor, while the opposite is the case for finance leases. The transaction costs involved in arranging a lease could also be lower than for a similar sized public bond issue.

In the past it had been claimed that the debt equivalence of leases could be kept off balance sheet, perhaps in a note, thereby allowing companies to take on more debt. It is doubtful that this ever misled sophisticated investors, and is even less likely today because of the mandating of the capitalisation of finance leases and full reporting on the terms of operating leases in company annual reports in many countries. By contrast, a very real benefit was obtained in 1990 by those airline companies which could reduce capacity through cancelling operating leases at short notice in response to the economic downturn.

In the past, lessors aimed to have contracts for new deliveries in place 12 to 18 months in advance of delivery. In 1991 they were attempting to achieve a 6-month order–delivery cycle. If that target was missed, discounting to clients would follow (Kjelaard 1991, p. 5). In 1991 the lease rates on A320 and Boeing 737-300 aircraft had fallen by 20 per cent relative to the rates obtaining 15 months before. Bid rates in some instances were less than 80 per cent of 1989–1990 levels.

Taking a longer term view on the health of the industry, lessors have responded to short term downward pricing pressure by attempting to reduce the (discounted) leasing terms to 5 years or less. Prior to the problems of the early 1990s, longer term leases were preferred. The other approach has been to offer a stepped rental schedule, which increases rental rates in future years.

The most recent airline industry recession was differentiated from, and made worse than the 1983 recession by the large number of speculative orders which had been placed prior to the downturn by operating lessors and the airlines. It is proposed that some airlines accumulated excessive options as an insurance so that they would not be left waiting too long for aircraft if demand increased, and were confident that they could sell the options to other airlines which were at the end of the queue. As an example, American had been able to place 42 options as a result of placing firm orders for 8 MD11s.

Debt rating criteria

In its *Monthly Ratings Bulletin*, Standard & Poor's Australian Ratings (October 1991), began by stating that the airline industry is viewed as having higher than average risk. This is because of the cyclical nature of the airline industry (see chapter 3 and 6 for details), heavy capital requirements, and debt levels. The lower the debt rating the higher is the cost of debt to compensate for higher perceived risks. According to S&P Australian Ratings the major factors used to rate airline debt are:

- *Industry position*, including such factors as market share, entry barriers on routes, number and type of aircraft, and age of fleet;
- *Operations analysis*, comparing major trade statistics on
  - utilisation (load factor),
  - pricing yield,
  - revenue management efficiency,
  - productivity, available seat kilometres (ASKs) or revenue passenger kilometres (RPK) per employee,
  - operating cost structure,
  - level and trend of operating margins, and
  - operating return on assets (adjusted for leases);
- *Management*, for example, on financial management, acquisitions, and industrial relations skills;
- *Accounting quality*, for example, off balance sheet financing and depreciation policy;
- *Profitability*, examining the airline's vulnerability to an economic downturn, with the key ratios being gross margin, operating margin, and return on permanent capital;
- *Cashflow liquidity*, such as funds from operations divided by total debt, projected funds from operations relative to debt maturities, and funds flows relative to capital expenditure requirements;
- *Capitalisation*, measured by total debt divided by debt plus equity, and net debt divided by debt plus equity; and

TABLE 7.17 AIRLINE COMPANY SENIOR UNSECURED DEBT RATING HISTORY 1986–1993

	1986	1987	1988	1989	1990	1991	1992	1993
Asia Pacific								
Ansett					BB+	BB+	B	B–
Qantas								BBB+
JAL						AA–	A+	A+
Air New Zealand					BBB	BBB	BBB	BBB
Europe								
BA							A	A
North America								
American	A	A	A	A	A–	BBB+	BBB	BB+
Continental	B	B	B	B	D	D	D	nr
Delta	A	A–	A	A	A	BBB+	BBB–	BB
Northwest	A–	A–	A–	B+	B+	B+	B	B–
TWA	B+	B–	B–	B–	B–	D	D	D
USAir	A	BBB+	BBB+	BBB+	BBB–	BB	BB–	BB–

nr = not rated.

Source Bailey 1993, p. 7.

- *Financial flexibility*, which examines the company's options in meeting payments when under stress.

Table 7.17 shows the historical rating record of a number of airlines. The marked deterioration of the ratings of US airlines since 1990 is clearly visible. Of all US airlines, only the strong performing regional carrier, Southwest Air has retained an investment grade rating. The low debt ratings of airlines will further reduce the scope for restructuring because it raises their cost of debt capital. Sanborn (1993, p. 251) speculates that this will result in airlines further reducing their capital expenditure plans at the limit. However, maximising the debt rating (or minimising the cost of debt), does not necessarily serve shareholders' best interests. As an example, BA shareholders have experienced superior returns to those of JAL shareholders despite the latter's higher rating. On the other hand, JAL debt holders will feel more secure. Strong performance is the reason for BA's A rating, while low debt levels justify JAL's A+. It is interesting to note that S&P Ratings does not rate other Asia Pacific carriers, due to their low reliance on debt. If in the future these firms wish to make extensive use of debt, they will no doubt approach the debt rating agencies. In the case of government owned airlines, perceived to be (if not explicitly) guaranteed by the government, the market rating is higher than it would be on a stand alone basis.

Coverage ratios

In general, a conclusion on the optimal capital structure should not be arrived at before a thorough analysis of historical and comparative interest cover ratios is undertaken, and forecast income and cashflow statements are subjected to a sensitivity analysis. Sensitivities are often conducted on various fixed charges coverage ratios in order to determine how vulnerable companies are to a less favourable business environment. In the US, Morgan Stanley & Co's *Global Aviation Quarterly* produces a sophisticated statistical analysis of international airlines. The two debt coverage ratios employed are:

- EBDIT/interest expense; and
- EBDRIT/(interest expense + rentals expense).

The second ratio takes full account of leasing and is sometimes markedly different in its implications. It is clear from table 7.18 that both coverage ratios are lower for USAir, which also has higher debt/capital structures and a higher beta risk. It is clear, however, that considerable differences emerge when comparing certain airlines, depending on the measure. For example, on the basis of the ratio in column (a), JAL at 4.97 looks marginally riskier than BA at 5.23, but the ratio in column (b) indicates that in fact BA at 2.12 is a riskier proposition than JAL at 4.97 when lease rentals are brought into the picture. In table 7.18 we saw this reflected in the fact that JAL is rated A+ while BA is only an A.

TABLE 7.18 COVERAGE RATIOS: SELECTED INTERNATIONAL AIRLINES JUNE 1992

Airline	*Column (a)* *EBDIT/interest expense*	*Column (b)* *EBDRIT/(interest + rental expense)*
Asia Pacific		
Cathay Pacific	3.62	3.03
JAL	4.97	4.97
Singapore Airlines	42.99	27.46
Average	17.19	11. 82
Average (less Singapore Airlines)	4.30	4.00
Europe		
KLM	1.08	1.06
Swissair	3.37	2.13
BA	5.23	2.12
Average	3.23	1.77
North America		
Air Canada	0.03	0.51
PWA	0.33	0.73
American	1.76	1.30
Delta	1.68	1.15
United	1.02	1.00
USAir	0.40	0.82
Average	0.87	0.92

Source Murphy & Lim 1992, pp. 25–6.

It would appear from these ratios that stronger international airlines are covering interest and rentals expense at between 2 and 3 times earnings before depreciation, rentals, interest and tax. Also of interest, but expected on the basis of debt structures, is the fact that coverage is highest in Asia Pacific, followed by Europe and North America.

Recent debt raising experience

While equity raisings in the airline industry attract the attention of media and investment bank analysts, detailed accounts of debt raising are seen less frequently.

Northwest Airlines leveraged buy-out

The 1989 leveraged buy-out (LBO) of Northwest is an interesting case study of an equity for debt swap which proved costly for participating bankers, led by Bankers Trust. McMullan (1991d, p. 17) obtained the balance sheets of Northwest before and after the LBO (shown in table 7.19), as well as the financial projections from 1989 to 1993. While the forecast boldly predicted a threefold rise in net profit to over $400 million by 1993, the actual result was a loss of $465 million in 1990. While similar to other airlines at the operating level, the scale of Northwest's loss was magnified by its crippling debt burden. In a novel way the Arvai Group calculated that on the basis of interest burden

TABLE 7.19 NORTHWEST AIRLINES BALANCE SHEET

($ billion)

	Pre-LBO Northwest end 1988	*Post LBO Northwest end 1989*	*Wings Holdings July 1991*
Current assets	0.8	1.2	1.1
Net fixed assets	3.3	4.7	5.5
Others	0.3	0.6	0.5
Routes	–	0.9	0.8
Total assets	4.4	7.4	7.9
Current liabilities	1.2	1.6	2.0
Long-term debt/leases	0.9	3.6	3.8
Deferred credits	0.6	1.5	2.0
Total liabilities	2.7	6.7	7.8
Equity	1.7	0.7	0.1
Total debt plus equity	4.4	7.4	7.9
Long term debt/equity ratio	0.5/1	5/1	29/1

Notes These data are in US dollars unadjusted for inflation.
All three columns relate to Northwest and Wings after accounting and financing changes.

Source McMullan 1991d, p. 17.

per employee, in 1990 Wings (the LBO vehicle) had $7835, compared with $928 for Delta, $1611 for United, and $2533 at American. At the same time the balance sheet capitalisation was significantly expanded through such unusual measures as the inclusion of capitalised route values, increased secondhand values for the fleet, and premiums on option and firm order positions. Without this restatement the balance sheet would have had a large negative value.

GPA bond issue

The aircraft leasing company GPA made a successful placement of $500 million worth of seven-year 8.7 per cent notes in the US rated Baa by Moody's. GPA reportedly doubled the amount raised after receiving strong expressions of interest from financial institutions at presentations (McMullan 1991b). The interest rate offered was made more attractive by the coincident reduction in US bond rates. The success of the placement, however, raised GPA's debt/capital structure to 77.7 per cent, which was close to the 81 per cent limit imposed on GPA by debt covenants with financiers. At the time GPA had the technical capacity to exceed this limit through its corporate credit facility backed by 73 banks ($810 million available) and its associated companies facility ($780 million available). Not comfortable with the lack of flexibility in this tight capital structure, GPA decided that an equity flotation would be required early in 1992. As mentioned previously, this equity issue failed.

Bankruptcies and the influence of Chapter 11 protection in the US

US airline analysts (Derchin & Orme 1993) place considerable blame on the leniency of US bankruptcy law, specifically Chapter 11 of the bankruptcy code introduced in 1978, for keeping nonviable airlines flying for years after they should have been grounded. Chapter 11 allows a firm which has technically defaulted on debt payments to place itself under the supervision of a bankruptcy court while it draws up a plan to reorganise itself. It then negotiates a settlement with its creditors under judicial arbitration. Derchin and Orme (1993) claim that as a result in the US 'it takes a long time to kill an airline, they're dangerous when dying, and they rarely stay dead, much less extinct'. The authors refer specifically to the cases of Continental, TWA and America West, which have survived longer than a free market scenario may have tolerated. As a corollary, they have been able to conduct a continuous pricing war which US observers such as Robert Crandall of American maintain could not otherwise be considered rational (Jennings 1992b). Where the responsibility lies in the US for the early 1990s price war remains contentious.

Chapter 11 is currently being debated in US government, legal, business and academic circles. Bradley and Rosezweig (1992) have called for its repeal on the grounds that it is dysfunctional. They claimed it provides incentives for managers to place distressed companies under court supervised corporate reorganisation to serve their own interest. To support this contention they provided evidence which showed that prior to the 1978 Bankruptcy Act, stockholders of firms filing for bankruptcy lost about 50 cents in the dollar, while almost all of their investment was lost post 1978. Similarly, bondholders were shown to be relatively worse off after the 1978 legislation. Empirically, only a quarter of the companies filing for Chapter 11 ever emerge as viable companies. On these grounds and the deadweight costs (of the courts, lawyers and accountants involved) the authors called for a repeal of Chapter 11, but this is subject to strong criticism (see Warren 1992). Although Gilson (1991) argues that shareholders do better under workouts than Chapter 11, he also presents evidence that management turnover in Chapter 11 companies is high. The fact that only 20 to 30 per cent of senior managers survive more than two years runs contrary to Bradley and Rosezweig's argument. Yet, the question remains as to whether managers would have survived even two years if it were not for Chapter 11.

RELATIONSHIP BETWEEN EQUITY VALUATIONS AND DEBT/CAPITAL STRUCTURE

This section looks at the logic behind the determination of the optimal level of debt and equity vested in an airline company. It examines the factors which influence financial risk and the relationship between alternative gearing levels and the ultimate corporate valuation (notably cost of capital and price/cashflow multiples).

Optimal capital structure

A capital structure (that is, the ratio of debt to debt plus equity) is optimal in the sense that it maximises the total value of the corporation. In countries which have a 'classical' taxation system with high rates of corporate taxation, there is a bias toward debt due to the tax deductibility of interest. In countries with full tax imputation (for example, Australia and New Zealand), or partial imputation (for example, UK) the argument for debt is not as strong. Capital structure relative to earning capacity has a marked influence on the debt rating assigned to a company, and therefore on the cost of debt. The marked decline in debt ratings of airlines in the early 1990s was shown in table 7.17. It is clear that a number of airlines need to restructure their debt in order to return to traditional ratings.

The corporate value/EBDRIT ratio and capital structure

The relationship between V/EBDRIT and capital structure can be best understood in the context of a traditional valuation model in which firm value (V) is the sum of debt (B) and equity (S) values. Thus,

$$V = B + S$$

Dividing through by EBDRIT, it can be seen that V/EBDRIT is simply the sum of B/EBDRIT and S/EBDRIT,

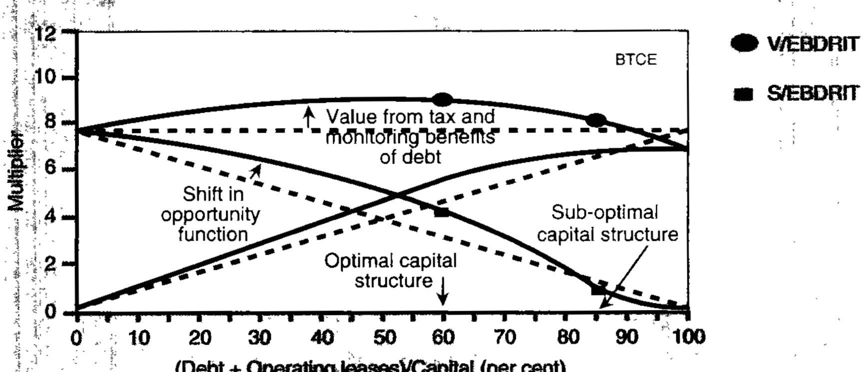
$$V/EBDRIT = B/EBDRIT + S/EBDRIT$$

The relationship between these three variables and capital structure is shown in figure 7.14. When the capital structure is all equity (that is, S/B+S = 1), S/EBDRIT equals V/EBDRIT, while an all debt capital structure implies that B/EBDRIT equals V/EBDRIT. The stylised figure assumes an investment opportunity function which reflects the operating profit potential of a specific company at a point in time. With a given EBDRIT, this function will be higher when future operating profit growth opportunities are high after relative risks have been considered. Therefore, it will be higher for companies with the best prospects, and will shift over time as recessions and booms in economic activity impact on a given firm. The S/EBDRIT multiple, like the P/E multiple, declines as more debt is taken on by the firm.

If there were no agency costs, risk or tax shield consequences arising from the introduction of debt, the relationship between V/EBDRIT, S/EBDRIT and B/EBDRIT would be described by the broken straight lines in figure 7.14. Capital structure would be a matter of indifference as the decline in S/EBDRIT would be matched exactly by the rise in B/EBDRIT. Thus, V/EBDRIT would remain constant.

Relaxing these assumptions, as soon as debt is introduced into the firm, value increases because of the impounding into share price of the present value of the tax shield on debt (in effect, the cost of capital falls). Another reason for the increased value is the expected future cashflow effects of increased monitoring of management by debtholders (that is, reduced agency costs). An optimal

Figure 7.14 V/EBDRIT and capital structure



Note This is a stylised representation.

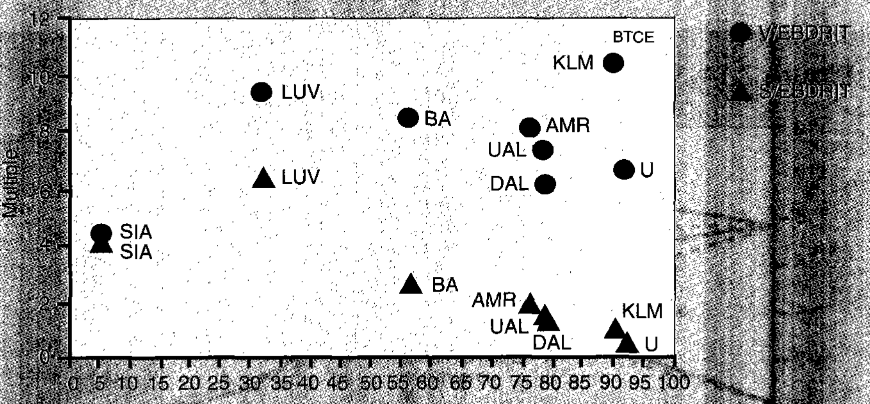
Source ANZ McCaughan analysis.

capital structure is reached when V/EBDRIT is a maximum. When too much debt is introduced, or the operating potential deteriorates markedly this will have negative effects on the S/EBDRIT multiple, since a rapidly rising probability of default will be factored into the share price. Similarly, the B/EBDRIT multiple will suffer as debtholders realise that the security, which had been assumed, is no longer available. Due to these costs, at a given operating potential, the firm value multiple (V/EBDRIT) is likely to be lower at close to a 100 per cent debt structure than for a 100 per cent equity structure.

Recent airline valuations and capital structures

The empirical values of V/EBDRIT and S/EBDRIT as at March 1993 are shown ranked by capital structure in figure 7.15, although it needs to be stressed that different tax environments make international comparisons difficult. The US regional operator, Southwest Airlines (LUV), is clearly considered by the market to have strong profit growth opportunities. Without debt it is likely that this multiple would have been lower. This raises the issue of whether Southwest is undergeared. Here it must be recalled that Southwest has a high beta risk (1.35), which, when taking account of its low debt level, implies a high degree of business risk. This means that Southwest's cost of equity capital is already high, and would be pushed up further if more debt were introduced. Singapore Airlines (SIA) has a lower V/EBDRIT multiple because its immediate profit growth opportunities were not considered as good

Figure 7.15 V/EBDRIT and S/EBDRIT multiples for selected airlines March 1993



Notes Southwest (LUV), Singapore Airlines (SIA), American (AMR), United (UAL), Delta (DAL), and USAir (U).
For supporting data see appendix table II.73.

Sources Bloomberg, March 1993; ANZ McCaughan analysis.

as Southwest's. Furthermore, it does not carry much debt (6 per cent in market terms) and would not receive much tax shield benefit because of its 53 per cent government ownership and low tax structure. It would be difficult to conclude that Singapore Airlines is undergeared.

At March 1993 the three large US airlines, American (AMR), United (UAL), and Delta (DAL) had very similar market based capital structures, although American was considered to have the best recovery potential. On the other hand, the USAir (U) multiples appeared to be restrained by its large debt burden, indicating a need for injections of equity.

This has recently been achieved by USAir through the capital raising associated with the alliance with BA. A potential problem in looking at these multiples, however, is that the debt values are book values, while the equity values are market values. For example, is the face value of debt in KLM above its economic value? To be more precise, market values of debt would need to be estimated.

CONCLUSION

Traditionally the capital structure of airlines has been composed of relatively equal proportions of debt and equity. Roughly half of capital expenditures were financed from internal sources. During the 1980s most airlines around the world allowed the debt component of their capital structure to drift upwards. Part of this growth in debt was composed of operating leases which were held off balance sheet. In these cases the real growth of indebtedness was visible only through an examination of operating cashflow coverage ratios. The industry enjoyed good profit growth during the mid 1980s and the optimism was translated into a rapid growth in aircraft orders.

The airline industry was attracting strong attention from equity investors. The successful privatisation of BA in 1987 provided a stimulus for other privatisations of state owned airlines. Throughout 1988 and 1989 the US airlines index soundly outperformed the S&P 500 Index, providing investors with exceptional returns. When world traffic fell in 1991, however, these equity gains were quickly dissipated, leaving many airlines with only a slim buffer of equity. For some the burden of debt was too great, forcing sales of assets such as aircraft and route structures, and resulting in liquidation or (in the US) restructuring under Chapter 11 bankruptcy protection.

The rising proportion of debt and poor trading results have been accompanied by credit agency downgradings, in many cases to below investment grade. This has had the effect of raising the cost of debt, and many bankers and other financial institutions have reassessed their perception of risks in the industry. It would appear that high debt, high beta risk companies are attracting low debt ratings, and therefore a high cost of capital. In the past debt holders have been attracted by the growth of the industry, which had been underpinned by the long term maintenance of aircraft values. Recently secondhand values have fallen significantly. Lessors are still taking a relatively long term view of the industry, providing staggered lease payment schedules or reducing the terms of (discounted) aircraft lease agreements.

The cost of equity also has increased through the volatility of stock prices relative to the market index (beta risk). In the US some have claimed that the Chapter 11 restructuring of airlines has prolonged their demise, creating incentives for irrational price cutting and investment behaviour to the detriment of relatively efficient airlines with long term futures. Nevertheless, investors have been attracted to some airline stocks earning exceptional returns even in these conditions. For example BA has earned a compound return of 21.9 per cent over the last three years. While not providing a high dividend yield, airline stocks continue to provide an attraction for investors through their ability to double in value during an 18-month period if entry is timed to lead the broader economic recovery.

CHAPTER 8 AIRLINE GROWTH

Purpose: to consider why and how airlines grow, and to assess the extent to which globalisation in international airlines exists.

INTRODUCTION

International air transport provides a network service. The complexity of the network has grown as international air services have grown. Growth, to achieve a competitive advantage, is seen as the key to an airline's success and can be achieved through internally and/or externally funded expansion of the firm. The first section of this chapter looks at the motivation for airline growth, how growth has occurred and examines some of the alliances which have been pursued as growth strategies. In the second half of this chapter, the evolution of international airlines is examined, in particular, the potential for globalisation of international airlines.

Motivation for growth

Airlines have demonstrated a keenness to operate in larger route networks, either by expanding their own route network or by linking with other airline networks. In the momentum to form bigger networks and/or airlines, the question which needs to be answered is: 'Why do it?' There appear to be a number of motivating factors:

- *To gain revenue* — based on the belief that being part of a bigger network will bring higher yield and improved profit. Experience has shown that a rise in total passenger revenue does not guarantee an improved net return (increased profit) but it can enhance cashflow, an important consideration for airlines.
- *To hold or expand market share* — based on the belief that to survive in the future airlines must have access to, and a significant share in, major (especially the growing) markets. This is a strong motivation for airlines in relatively mature markets and those operating in highly competitive markets with little growth potential. A number of growth strategies

(outlined below) have the advantage of offering quick access to a market, where an airline ordinarily might be denied access, or helping an airline gain better market penetration. With increased market share an airline can achieve greater market power which may be exploited to improve profitability. Tretheway and Oum (1992, pp. 17–18) reported that consumers prefer to deal with larger airlines due to convenience of service, better information on schedules, perceived better service quality and the existence of frequent flier programs, so that consumers often select services from carriers with an extensive route network.

- *To achieve unit cost reduction* — rather than for direct revenue gains. There are considerable additional costs incurred if airlines independently establish larger networks through internal growth using their own resources (especially as distance from the home base increases) which may not be offset by increased returns. Externally funded growth (for example through inter-airline alliances) can overcome some of these cost disadvantages, enabling an airline to offer services at a lower unit cost.
- *As a defensive strategy* — to protect the airline from competition, or a hostile takeover, or to position the airline to obtain cooperation and/or knowledge of the strategies of potential competitors. Small airlines often find a defensive tactic effective in protecting their investment (by protecting their market share) while they secure their position in a market.

Pathways to growth

Airlines have adopted a number of strategies to achieve growth and the following list includes pathways common amongst airlines:

- *Alliances* — such as popular marketing arrangements like code sharing, interlining, integrating frequent flier programs, offering joint fares and coordinated schedules, and the sharing of on-ground facilities and catering services. Qantas, for example, has had arrangements with British Airways, Air New Zealand and Canadian Airlines International. Ansett has entered into marketing arrangements with All Nippon Airways, Singapore Airlines, Cathay Pacific, Swissair, United Airlines, Malaysia Airlines and Austrian Airlines, giving Ansett links with Asia, Europe and North America. Alliances are one of the most commonly used pathways to growth in international aviation, and are discussed in detail later in this chapter.
- *Mergers and acquisitions* — for example, the merger of British Airways and British Caledonia in 1987 and the takeover by Air France of Air Inter and Union de Transport Aeriens (UTA) from 1990. Merger and acquisition are easier to achieve within the same country. Bankruptcy buy-outs of airlines or air transport routes have occurred involving US routes to London, Latin America and Asia Pacific (see chapter 7 for details). Internationally there have been attempts to initiate cross border mergers and acquisitions, but resistance has been to the fore in most instances. A

number have been abandoned (in the short term), while other 'successes' are limited by requirements not to exceed ownership and control thresholds. Cross border investment in carriers usually involves noncontrolling equity investment. Examples include links involving small amounts of shareholding, as in the up to 5 per cent interest held across Singapore Airlines – Delta Air Lines – Swissair, or larger holdings, such as KLM's 49 per cent stake in Northwest Airlines. The difficulty in successfully implementing cross border mergers and acquisitions in airlines has meant other growth strategies have been pursued, possibly more than in other less regulated industries.

- *Joint ventures* — usually involve the creation of a holding company, as proposed in the failed BA – KLM discussions. This approach generally offers a speedier solution than cross border mergers. It allows ownership and control to be well defined, and does not exclude the possibility of closer ties over time. It offers possibilities for cost sharing and marketing between two or more airlines.
- *Other carriers cease operations* — as Midway did in the US and Pan Am on international routes, which leaves the market more concentrated, with surviving carriers emerging as potential winners through route and/or hub expansion. Such consolidation has been a feature of the post US domestic deregulation period, and is forecast as a likely outcome of a more liberalised EC market.
- *Operational strategies* — that give significant influence to an airline, including the development of CRSs, hubs, frequent flier programs, and computerised yield management systems. These strategies assist some airlines to grow in the short to medium term, although in the long term the marketing advantage may be reduced as most airlines match the market leaders by creating their own systems or joining existing systems.

Consolidation of airlines

The effect of an increase in competition and growth in airlines has been the consolidation of airlines. If existing regulations are sufficiently relaxed then further consolidation of airlines could result in most of the world being served by perhaps a dozen megacarriers. Such consolidation would represent a major restructuring of the international airline industry, but it is doubtful whether all countries would be prepared to forgo the presence of their own carrier(s). A number of writers have attempted to predict which airlines are likely to become the future megacarriers. The list of carriers usually includes most of the following: American Airlines, United, Delta, British Airways (BA), Lufthansa, Japan Airlines (JAL), All Nippon Airways (ANA), and Singapore Airlines. Under this scenario the remaining carriers would either cease operations, form alliance partnerships as feeder airlines with the megacarriers, or remain as niche operators.

Concentration of international air services amongst a small number of airlines may have a significant detrimental impact on smaller operators (such as Qantas and Ansett), and on destinations geographically far removed from the world's major markets. Consolidation means countries have to examine whether they value having a domestically owned and/or located airline sufficiently to halt or impede the developments leading to the linking of carriers with the potential to form global carriers removed from a focus of serving a particular home country's traffic. The relaxation of national rules in favour of a regional bloc's unified rules (as is occurring in the EC) makes it possible for airlines to contemplate moving beyond alliances to a merger (such as Austrian Airlines, KLM, SAS and Swissair pursued prior to the collapse of the Alcazar project).

A more liberal regulatory environment may create a more oligopolistic industry structure, especially when the market is segmented on a route by route analysis. Concentration of ownership through consolidation of airlines seems the likely consequence of deregulating markets, given US experience and predictions for Europe. If international aviation develops a complex hub and spoke network, then there would be added pressure for airlines to consolidate. The effect on competition of the US hub and spoke system has been argued, without agreement.

In conclusion, the pathways to growth for existing airlines mean airlines may:

- gain access to a larger network (in their own right or as an affiliate of a network combining a number of airline routes); and/or
- achieve megacarrier status (that is, become a very large carrier in their own right); and/or
- further consolidate, reducing the number of international airlines operating; and/or
- achieve potentially global carrier status subject to the further removal of regulatory constraints.

ALLIANCES

In international aviation there is a high propensity to form alliances. It is because of the importance of alliances in international aviation that the following section specifically explores the development and effects of airline alliances. Alliances have been favoured over other growth strategies, in part because of the constraints imposed in international aviation by the regulatory regime, in particular the ownership and control provisions. Cross border alliances often work only on a bilateral basis (between two airlines), because of the influence of the traditional bilateral approach to air service negotiations.

Alliances are not new in the business world, but are being formed more frequently and across a wider range of enterprises. Salomon Brothers (1991, p. 3) in analysing the growth in alliances, concluded that the following aspects of the business environment helped drive this trend: global competitiveness, the rapid development and proliferation of technology, and rising demands for capital.

Alliances in aviation are not new. What is new is the increased recognition, by previously independent airlines, of the need to align, especially as alternative cross border growth strategies, such as merger and acquisition, are difficult to achieve. Jim McCrea, Managing Director of Air New Zealand, has described the airline's options as 'to club or be clubbed' (McCrea 1992, p. 7). In theory there is a wide range of choices, but competition legislation in various countries, foreign investment requirements, ownership and control provisions for airlines, and other regulations set limits to strategy choices — but not insurmountable limits.

Effects

Alliances can be used to achieve strategic, defensive or structural goals. There have been a variety of cross border alliances proposed and entered into in aviation. Many of those offering technical cooperation have proved successful, as have some of the more common marketing arrangements, such as code sharing and interlining. These successful alliances are usually *specific in purpose* and for a *fixed time* period. What have been more difficult to arrange, and are uncharted in terms of proven benefits in the published literature, are attempts to create *all encompassing corporate alliances*.

Perceived benefits and costs

Much of the literature expounds on the benefits, usually potential rather than actual, of alliances if not full globalisation of airlines. There is little public evidence that the assumed benefits (and frequently ignored or rarely referred to costs) have been rigorously analysed.

Various benefits have been stated in support of alliances. In aviation, competition for international routes and facilities is intense. One of the major arguments in support of entering into an alliance is the increased access to a larger route network and potentially better access to airports. Cresap, a US aviation consultancy group, released *Towards 2000*, detailing its findings from a survey of officials from 97 passenger and all cargo airlines. More than 75 per cent of the 230 survey respondents ranked international route expansion as critical to their company's future prosperity (*Aviation Daily* 1991a, p. 260).

Airlines see marketing benefits in being part of a large network, and consumers have demonstrated a preference for dealing with airlines with large service networks. It is important, however, that any added route network is complementary to, and not competitive with, an airline's existing route network, as such competition can weaken an alliance. Alliances between carriers with similar routes may reduce competition if the carriers cooperate (by code sharing or interlining, for example) on services.

At congested airports alliances can provide an airline with access to an airport where ordinarily it would encounter landing restrictions and other constraints. Alliances can improve an airline's capacity to raise finance and increase value to shareholders. Airlines which have alliances with European or US carriers usually hope they will lead to better access to intercontinental markets. This is evident in the Europe–US links in the following alliances: KLM–Northwest, BA–USAir, Air France – Continental, and Lufthansa–United. In addition, alliances can enable partners to reduce costs through cooperatively sharing costs, for example, maintenance, ground facilities, training, CRS, and the purchase of fuel and aircraft.

Alliances can create high transaction costs (contracting, negotiating, integrating, and policing new arrangements). The very nature of intangible assets, such as managerial skills and industry knowledge, makes integration of two or more airlines costly. Many analysts have attempted to formulate a recipe for successful alliances. The ability of management to invest the time and effort, and demonstrate commitment to the new arrangements, is crucial to success in alliances. Where there are multiple alliances between a number of airlines there is an increased chance for conflicts of interest to arise. These conflicts may cause airlines to reduce competition on some routes in order to accommodate one or more alliance partners, or raise sufficient issues to threaten the alliances. Each carrier's shareholding in other airlines makes it potentially difficult to determine which carrier owns and/or controls what and what level of competition is possible should a conflict of interest arise. BA, for example, has equity in a number of airlines, which in turn have equity in other airlines, and the impact of this complex structure of shareholding has not had the time to be fully revealed.

Growth of airlines, even within one country, is not achieved without considerable cost, and the benefits are at least questionable and take some years to achieve. The high cost for airlines establishing some form of an alliance with other airlines occurs even when the partnership involves 100 per cent ownership as in mergers and/or takeovers. For instance, this has been the experience of Northwest in its takeover of Republic Airlines, USAir's experience with Piedmont, and the Air France – UTA experience; all demonstrate how difficult it is to align previously separate companies. Qantas too has experienced some difficulties integrating Australian Airlines into the fold.

Airline alliances involving cross border equity purchases have also had varied success. For example: SAS is reported to have lost some $110 million in its investment in Continental; Ansett Transport Industries (Operations) has experienced difficulties with its investment in America West, and KLM has written off much of its early investment in Northwest. It is of interest to see, in the first instance, how the new Qantas (former Australian Airlines and Qantas) entity is able to perform. The benefits and costs realised by the new entity, as privatisation proceeds, including the equity holdings of foreign carrier(s) and possibly non airline investors, are worthy of further study.

In general, it would be reasonable to hypothesise that success will not be automatic as airlines move to join larger networks, grow, and potentially become global enterprises. Neither the net result nor the time frame required for the process to settle down is known. ANZ McCaughan states that, '... there is no clear evidence of success of these alliances to the benefit of shareholders' (ANZ McCaughan 1992, p. 8). This is important if the strategy is more than a defensive move. The stakes are high in international aviation, as estimates point to almost a doubling of passenger traffic by the year 2000.

For business in general, as well as aviation in particular, opinions on alliances are divided. Salomon Brothers (1991, p. 6) grouped opinions on alliances into two camps:

- the pro-alliance camp proposes that '... alliances allow companies to achieve strategic goals that are unattainable in a cost efficient fashion', while
- the anti-alliance argument proposes that 'alliances drain key managerial resources, eventually erode market position and leak proprietary advances'.

Successful alliances require considerable time, effort and resources, particularly from senior executives. The cost of this resource commitment can be significant, yet without it an alliance is unlikely to achieve the desired success.

The pressure to form alliances, to tap into larger route networks, and to form global enterprises exists and is likely to continue despite mixed results of wider corporate alliances. Airlines, however, do not universally support alliances as a way to grow. Some airlines are on record as opposing such moves, including American, Lufthansa and Delta, which emphasise going it alone, or at most only entering marketing arrangements. Other carriers (including BA, SAS, KLM, and Northwest) have shown a keen desire to grow through alliances involving cross border investment in other carriers. United Airlines perhaps best describes the approach of some airlines: they believe in globalisation but believe in 100 per cent ownership more (Hart, DTC, pers. comm. 1991). That is, they prefer to initiate growth from the firm's internal rather than external resources.

Most governments (tacitly) accept non equity alliances or take a neutral position in regard to alliances, leaving it to the commercial judgment of the carriers where there are no ownership or control issues.

Alliances are inherently unstable. It is not suprising that in a dynamic environment, alliances between different business entities usually 'live' for a relatively short period, as commitment by both parties to make the alliance work will require the alliance to remain mutually beneficial and better than other alternatives that may develop over time. For some airlines, alliances involve purchasing equity in an attempt to ensure greater commitment to the alliance and hence a greater chance of success, but such sentiment is not supported by all in the industry. Essentially alliances succeed only where, and as long as, there is mutual benefit in the arrangement.

Aviation trade journals provide opinions which are divided on the merits and costs of alliances. While alliances can benefit the members of the alliance, they may disadvantage carriers excluded from the arrangement, or a carrier can be tied to an arrangement that no longer provides an optimal solution for the carrier.

For airlines, as with many other enterprises, it is important to recognise that alliances are not an end in themselves; rather they are strategies for other outcomes. Consequently a well designed alliance provides flexibility for the partners to evolve and to change the nature of the alliance to meet changing circumstances. Changes can occur in any area of an alliance, so it needs to build in sufficiently robust arrangements for changes in legal and financial structures as well as to meet the vagaries of marketing needs. Failure to be flexible may mean the alliance, hence the firms, stagnates. Terminations of alliances are common, and should not be seen necessarily as failure. The following examples illustrate a range of airline alliances. Most have been entered into relatively recently, which limits the opportunity to fully evaluate the success (or not) of each alliance. In the interim, it appears that success (that is the achievement of anticipated benefits) has varied and remains to be tested over time.

British Airways

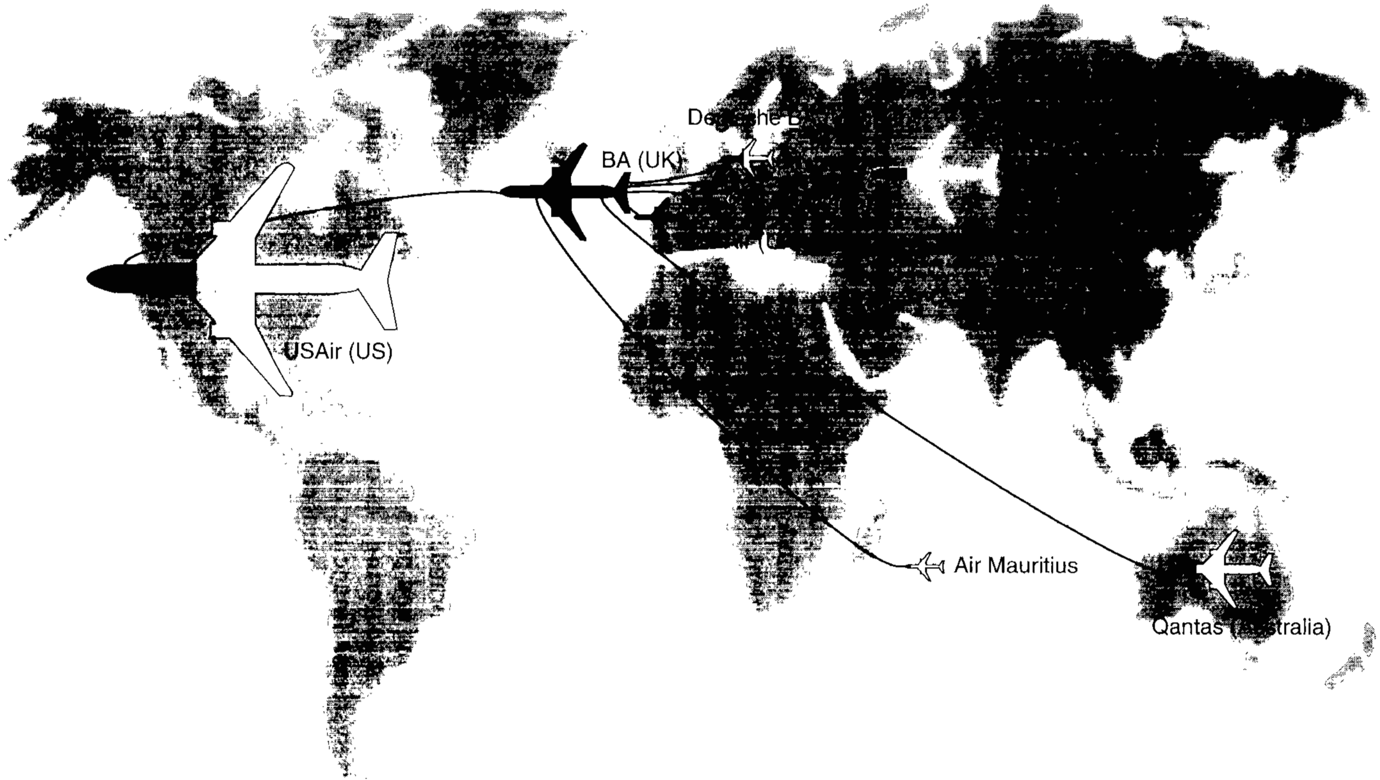
British Airways (BA) has vigorously pursued a number of alliances with international airlines in order to develop a stronghold in major markets and establish a comprehensive global network. BA Chairman, Sir Colin Marshall, said BA aimed to be the world's first global airline, and it spent around $1 billion in acquisitions in the 12 months to May 1993 (see figure 8.1).

By early 1993 BA had:

- 49 per cent of TAT (a French regional airline) with an option to purchase the remainder in 1997 under EC liberalisation of ownership laws;
- 49 per cent of Deutsche BA (remainder held by subsidiaries of three German businesses);
- 100 per cent of Dan-Air;
- 15 per cent of Air Mauritius (held by BA associates);
- 31 per cent in Air Russia agreed to in a protocol signed in October 1990 (it is a new carrier due to commence operations in 1994 or 1995);
- 25 per cent of Qantas; and

Figure 8.1 British Airways holdings in airlines 1993

BTCE



Note The size of each airplane is indicative of passenger numbers carried.
Source *Air Transport World* 1993c.

- proposed in 1992 to purchase 44 per cent of USAir, but reduced the bid in January 1993 to 19.9 per cent of total USAir equity, with plans to increase this equity over time subject to US approval.

BA–KLM. Prior to these purchases BA had explored alliances with other airlines. In late 1991 there had been discussions on a possible global carrier being formed with the union of BA and KLM, and indirectly with Northwest, given KLM's equity in it. While a full merger seemed unlikely, it would have been possible to jointly run parts of the operations under a holding company but maintain separate corporate identities. For example, a joint venture could have coordinated: maintenance, aircraft and fuel purchase, catering, staff training, CRS, route decisions, scheduling, fares, and the associated business of subsidiaries. Talks between the two carriers collapsed in February 1992, reputedly due to disagreement over the share that each airline would have in the new holding company and, therefore, in the distribution of profits between the two carriers. The proposal was abandoned, although this does not exclude similar proposals being raised at a future date.

BA–USAir. On 12 March 1992 the planned alliance between BA and USAir was announced. It held considerable potential consequences for international aviation and drew world attention. BA bid $750 million for 21 per cent of the voting stock and the remainder in common stock. US law permitted up to 49 per cent foreign investment, but only 25 per cent of voting rights in US carriers could be held by foreigners. For its investment BA would get four seats on USAir's board of 16 members, with two nonexecutive members on both boards. A key aspect of the proposal was that all major decisions (for example, on large investments and key personnel) required an 80 per cent agreement of the board. This could be seen as giving BA a veto or 'blocking position'. In the past the US has equated veto power with control (Feldman 1992b, p. 62).

The BA–USAir initial proposal aimed to integrate and coordinate all functions and activities as soon as possible, say in five years. Areas planned to be integrated included: brand, sales, planning and inventory control, network planning, advertising and promotion, frequent flier programs, ground handling, cargo operations, catering, information management, training, financial reporting systems, financing of capital equipment, facilities, purchasing, engineering, and quality assurance.

In January 1993 BA revised its bid and offered to pay $300 million for an initial 19.9 per cent voting share (rising to 21.8 per cent with approval from USAir shareholders) and three seats on the USAir board. The revised bid included a further phased investment of $200 million in the first three years and an additional $250 million in the following two years, bringing the investment to $750 million — the original investment figure — with a total 32.4 per cent equity stake, subject to the agreement of the US Department of Transportation. The so-called 'blocking position' for BA in the first bid did not survive in the second bid.

In March 1993 BA and USAir obtained approval from the US Department of Transportation for a code sharing arrangement, initially for one year. The alliance gives BA access to the largest volume of traffic by any foreign carrier (in excess of 200 US cities) in this key market. More importantly, the intercontinental alliance would provide a service extending over two of the world's major markets. Together Europe (excluding the states of the former USSR) plus the US account for some two-thirds of world (international plus domestic) scheduled revenue passenger kilometres (see chapter 3 for traffic details). In addition, BA's links in Europe, and now in the Asia Pacific through its Qantas investment, and other potential strategic links, place BA in a position to create a large global network through alliances with other carriers. See figure 8.2 for the route network established with the BA–Qantas alliance and the access to cities which the USAir network provides.

The potential for alliance-linked carriers to create complex hubs in major world markets, to use smaller aircraft as feeder carriers, and re-route and reschedule flights to reduce time of journey, thereby lowering operating costs while raising the quality of service, is significant. It is estimated that a hub in Moscow, linking say London to Tokyo via Moscow on the great circle route, would take around four hours off a BA flight. This alone would generate considerable savings, although any airline will incur some cost for exercising the right to fly over Russia.

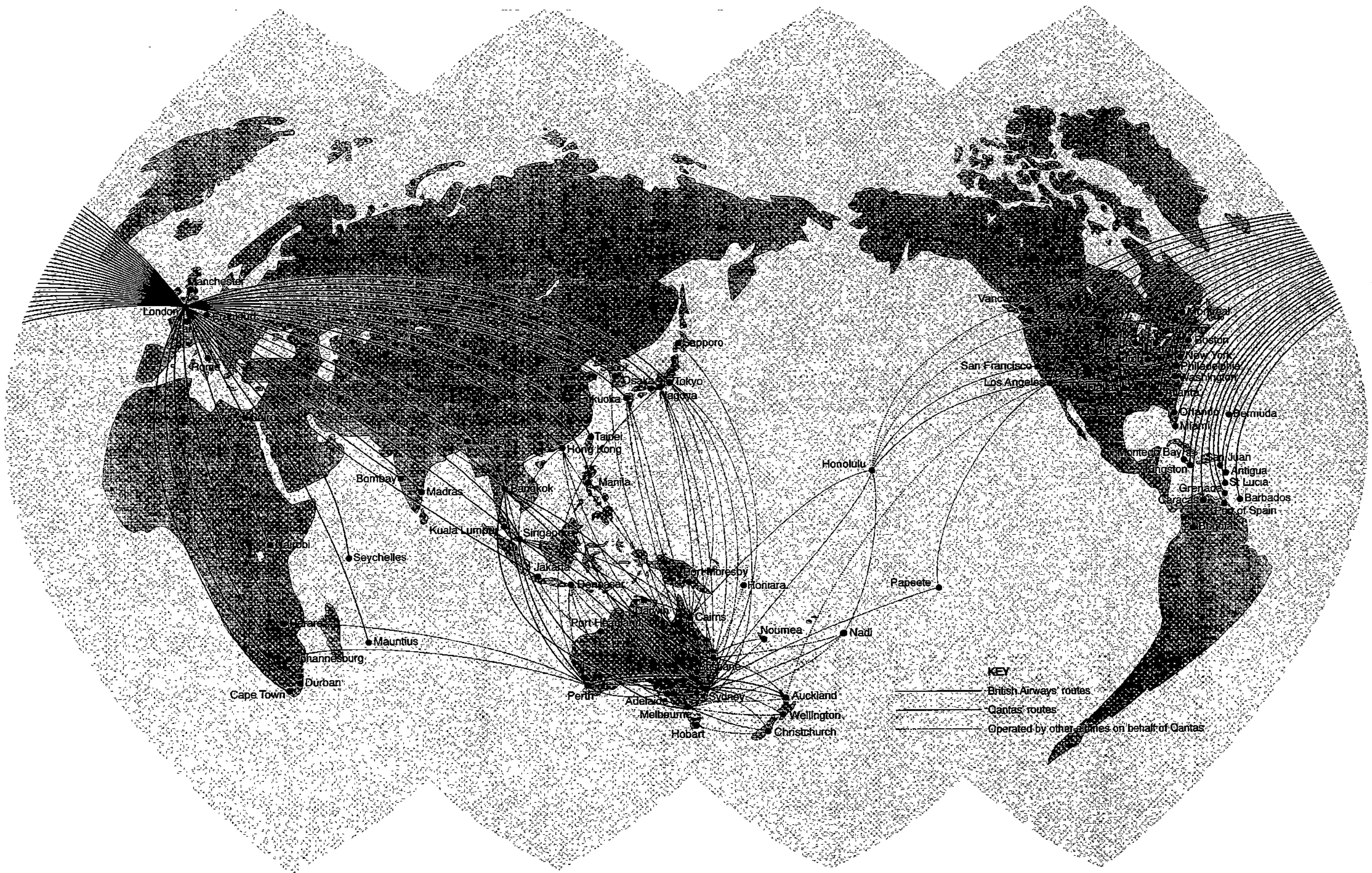
The BA–USAir alliance was not universally applauded. An unusual coalition of carriers, namely American, Delta, Federal Express and United, voiced disapproval of the first bid. This disapproval was tempered with suggestions by US carriers that the alliance should only be permitted if the US obtained major concessions from the UK in a renegotiation of its bilateral air service agreement, possibly negotiating an 'open skies' agreement. For example, US carriers were interested in concessions that would give them greater access to the highly valuable slots at London–Heathrow airport, and further beyond rights for US carriers, especially into continental Europe. While BA and USAir attempted to deal with the proposed alliance as a purely business strategy, some in the US were keen to use the proposal as a bargaining chip in government to government air service negotiations.

It could be argued that if BA controlled USAir, then there would be little incentive for the UK Government to grant any further rights of passage (see chapter 5 for details) to US carriers as BA would have full access to both the UK and US markets. Similarly this is why some nations oppose or reluctantly agree to code sharing between airlines. Code sharing can allow airlines to circumvent existing restrictions agreed to by governments in air service agreements and may jeopardise future negotiations by reducing bargaining power on reciprocal benefits in trade in air services.

By the end of 1992 attempts by the US and UK Governments to negotiate a new agreement on their bilateral air service arrangements had not been successful. Given the US Government's preference to link the US–UK bilateral

Figure 8.2 British Airways, Qantas and USAir networks

BRITISH AIRWAYS AND QANTAS NETWORKS



USAIR NETWORK

Note The detailed map of the US identifies all points served by USAir. These two maps illustrate how inter-airline alliances are able to give global coverage of points served.

Sources BA, pers. comm. 1992; USAir, pers. comm. 1992.

air service negotiations to any agreement on BA's proposal to buy into USAir, and the likely rejection of BA's proposal by the US Government, BA withdrew its original proposal in December 1992. BA followed this up with its modified bid in January 1993.

BA–Qantas. Prior to BA's purchase of 25 per cent of the Qantas group, the Australian Federal Government set in legislation a number of national interest safeguards to be included in the Company's Articles of Association:

- the name Qantas is to be retained for the airline's core activities;
- at least two-thirds of the board members are to be Australian citizens, as is the chairperson of the board;
- both the head office and the operational base are to be located in Australia; and
- a maximum of 35 per cent total equity can be held by foreign investors with a maximum of 25 per cent shareholding by any single foreign interest.

The Australian Federal Government agreed to recapitalise Qantas for just over $1 billion dollars as part of the privatisation process. BA paid $536 million for its 25 per cent share of the Qantas group. BA have three members on the 12-member Qantas board. BA is consulted on the choice of Qantas' chief executive officer and the chief financial officer. A two-thirds majority of the board members is required to approve major issues, including capital spending, borrowing, annual operating budget and joint ventures with other airlines. Coinciding with the deal, BA and Qantas have agreed to establish closer ties to exploit synergies in network and operational areas, entering into a ten-year commercial agreement. BA and Qantas have jointly advertised single fares for an extensive global network covering 'five continents, over 200 cities and six free stopovers' as part of a ten-year cooperative commercial agreement. Qantas includes 100 per cent ownership of the former Australian Airlines (a key domestic base for an international carrier), 19.9 per cent equity in Air New Zealand, and 10 per cent equity in Air Pacific.

BA – various companies. Apart from the airlines listed above, BA has equity in companies covering airline marketing, airline management services, package holidays, airline training, CRS software, airport terminal services, financial services, aircraft leasing, airline finance, and airline insurance.

BA continues to examine equity possibilities in other carriers throughout the world. In international aviation BA is an important carrier. In 1992, BA's international traffic accounted for 78 per cent of its total traffic and one in fifteen international air passengers travelled with BA (compared with one in sixty-three international passengers travelling with Qantas). The challenge for BA (and other airlines) in the 1990s will be integrating multiple alliances across many borders. Insufficient time has elapsed to assess whether any of these alliances will deliver net benefits to each of the carriers involved or consumers.

Other alliances

Other established and significant transnational alliances include the European Quality Alliance (EQA); Swissair – Singapore Airlines – Delta alliance of Global Excellence; SAS; and the integration of KLM and Northwest.

The 1990 founding members of the *European Quality Alliance* (EQA) were SAS, Swissair, Austrian Airlines and Finnair, but the last withdrew because it could not reach agreement on how revenue and costs would be distributed. EQA appears to have achieved limited benefit for its partners. Paul Maximillian Muller of Swissair believes the real question for this alliance is: 'Can we go beyond operational and technical assistance into sales and marketing?' (Cameron 1992b, p. 51). EQA highlights the problem facing a number of alliances. Success for specific purpose alliances, such as technical or marketing factors, can often be achieved quite readily but expanding the purpose of an alliance across a broad range of corporate goals is more difficult.

KLM considered the possibility of joining the three airlines in the Alcazar project to enhance KLM's European network. The Alcazar project highlights the complexity of multiple alliance partners. There are a number of interested parties beyond the proposed four airlines. After first trying to overcome the concerns raised by home based shareholders, airline boards and staff, and the European Commission, the group needed to answer concerns from their respective partners in other alliances, including Northwest (KLM), Delta (Swissair), and Continental (SAS), in the first instance, followed by a number of their interlocking airline alliances. In addition, other airlines could compete to align with any of the four airlines, such as Lufthansa's interest in striking an alliance with Austrian Airlines. In the end the project collapsed over the choice of a US airline partner. KLM wanted Northwest while the remaining European carriers favoured Delta.

The *Swissair – Singapore Airlines – Delta* alliance of Global Excellence began as a series of separate agreements, which were patched together and made public in 1989 to form a loosely arranged alliance based on small cross equity holdings. The cross equity holdings are based on equivalent dollar values but do not exceed a 5 per cent stake. The group has achieved some harmonisation of technical and marketing strategies, and continues to increase its range of agreements. These include reciprocal reservation and ticketing services, joint fares, through check-in, code sharing, joint promotions and advertising, frequent flier benefits, shared facilities, and cross company investment (*World Airline News* 1992b, p. 6).

One of the features of a broad based cross equity alliance is the time and effort needed before benefits and costs can be ascribed to the alliance; the adjustments across corporations are considerable and can not be achieved 'overnight'. Swissair as both a member of the EQA and the alliance of Global Excellence has expanded its access to destinations both within Europe and in the major markets of Asia and the US. Airlines tend to seek a number of alliances in order to strengthen ties within their own regional market, as well as expanding access to additional markets. There has been growth in cross equity investments between airlines similar to these alliances. The trend has been assisted in some countries with new or increased foreign ownership levels permitted in airlines, the move to partly or wholly privatise airlines, and the urgent need by some airlines for an injection of capital.

The *KLM – Northwest Airlines* alliance began in 1989 when KLM took equity in the US carrier. Since then KLM has virtually written off its $400 million investment, and contributed a further $50 million as a bridging loan to help the troubled Northwest. KLM has 49 per cent equity in Northwest but holds only 20 per cent voting equity. KLM and Northwest signed a Commercial Cooperation and Integration Agreement in September 1992. In January 1993 the US Government granted antitrust immunity and agreed to the integration of international operations (includes joint flights, code sharing, coordination of frequent flier operations and ground handling services). Finding in favour of the Agreement was made easier by the existence of the 'Open Skies' agreement between the Netherlands and the US. The 'seal of partnership' of the KLM–Northwest alliance will see a combined logo adopted as a symbol of the partnership. The acceptance of 'common branding' is an important strategic step in a move to form a global airline. This group could lead the way towards creating a global carrier, although this is still a potential development. In addition to the integration of the two airlines, each has other alliances. For example, KLM cooperates over the entire network of Air UK, ALM (Antillean Airlines), KLM cityhopper, Transavia, and on specific routes for Air Excel, Austrian Airlines, DAT (Delta Air Transport), Cyprus Airways, Tyrolean and Martinair.

SAS (a jointly owned airline involving Denmark, Sweden and Norway) has operated as a transnational company since 1946. The structure and ownership of this airline is quite different from the majority of designated carriers as it is based on significant equity holdings by companies and governments from the three countries. Its ownership structure is an exception, which is frequently identified as an example of what is possible if countries further free up their ownership and control provisions for international carriers. In addition to the firm's internal cross border alliance, SAS has pursued equity and/or marketing arrangements with other airlines and groups, including Continental Airlines (10 per cent), Airlines of Britain (24.9 per cent), Lan–Chile (30 per cent), All Nippon Airways, Varig, Thai Airways International, and the EQA group.

American Airlines and Canadian Airlines. American's proposed $200 million investment in Canadian Airlines would see American with one-third ownership, 25 per cent voting rights, two seats on the board of Canadian Airlines, and a 20-year contract for airline management and data processing services. The alliance, as proposed, illustrates the development of commercial agreements combined with equity alliances, arranged simultaneously to generate revenue from sales of non airline services, as well as pursuing linkages for airline specific services between the partners. Pacific Western Airlines (PWA), the parent company of Canadian Airlines, can buy out American's ownership at any time but Canadian Airlines cannot abrogate the 20-year commercial agreement which American believes will bring in $2 billion over the contract period, with $115 million in the first year. American is keen to use alliance strategies to expand its non airline activities for revenue raising purposes. The proposed alliance has faced opposition from Air Canada and United, as American requires Canadian to leave the Gemini CRS and join American's Sabre CRS. Gemini is a joint venture between Air Canada, Canadian and Covia (United's).

Air Canada, Air Partners and Continental Airlines' alliance was established in 1993. Air Canada and Air Partners (a Texan group of investors) each purchased a 27.5 per cent equity stake in Continental, giving the group 41 per cent voting rights with Air Canada's voting share limited to 24 per cent to meet US statutory requirements. Since this injection of capital, Continental has withdrawn from Chapter 11 bankruptcy protection. Continental welcomed the opportunity for equity investment, while Air Canada hopes to benefit from access to US destinations and traffic links. Further time needs to pass before the relative merits (and costs) can be assessed for this alliance.

Alliances change the nature of, and interaction within, the world aviation market and their impact in aviation is worthy of further study. Alliances have contributed to the internationalisation of airlines (that is, the expansion of carriers' cross border air services). Potentially the growth of alliances could assist globalisation of the industry in general, and carriers in particular, providing further changes are made to lessen the impact of regulatory constraints.

There is no shortage of new areas for entente — the striking of an alliance — between airlines. Opportunities for cross border alliances exist in the newly emerging nations previously part of the USSR and in rapidly growing countries in Asia Pacific and Latin America. What remains uncertain is whether alliances are a short term precursor to globalisation, or whether they will be a long term strategy of international airlines, even if many of the existing regulatory constraints (such as ownership and control provisions) are reduced or removed. The proliferation of airline alliances means many carriers now have multiple alliances, which may prove difficult to manage for both carriers and governments.

GLOBALISATION

Introduction

If globalisation emerges as a major feature of international aviation then it could reduce the power of individual countries in aviation. This could affect air transport services to, from, and over a country, as well as other strategic economic, defence, and community interests. With this in mind many countries have argued that bilateral air service agreements are necessary to protect the interests of individual countries (and carriers), but such protection would inhibit the globalisation process by limiting the freedom of carriers to offer services worldwide. Not all countries, carriers, and other key aviation players would support a move away from the current, or a modified, bilateral process to a global industry with considerably less government regulation.

Concern has been raised about the viability of a number of airlines if subjected to intensified competition, particularly for airlines serving markets of a small size with thin routes and/or newly developed economies. Many players are concerned that a globalised industry could result, through consolidation, in a high concentration of ownership in the hands of a dozen or so megacarriers, creating considerable difficulties for other carriers and governments.

Those supporting existing constraints on airline globalisation through the regulatory regime often support the continuation of an airline for other than direct commercial (profit maximisation) reasons. Strategic defence and political concerns can cause opposition to globalisation if it is likely to result in only a few mega airlines serving the world with other airlines, at best, limited to smaller niche markets or as second tier feeder airlines with little influence in their market. There are potential impacts on domestic policies (such as trade, travel and tourism) that some countries would reject; not the least is the earlier stated potential to forgo influence and control over air services to, from, and over the home country.

On the other hand, supporters of globalisation in aviation, in particular in airlines, argue it is essential for survival. Commercial imperatives are the key driving forces in globalisation. The attraction of a larger network with perceived economies to benefit from, together with anticipated growth and development opportunities, productivity gains and increased competition due to less regulation, are reasons stated in support of globalisation in aviation. Commercial factors have created a drive by airlines to be bigger; the ultimate goal would be to move from an international airline to a global airline.

Definition

Globalisation in industries, markets, and firms describes the *evolutionary process* of increasing interdependence in production, made possible as national barriers to production and trade are lowered. Global industries include construction, food and beverage, movie making, petroleum, film stock, print media, information technology, banking and financial advisory services, and the manufacture of aircraft and cars.

In considering whether international aviation has global markets and global firms, the dilemma is how best to define globalisation. The term globalisation in reference to the airline industry is arguably overused in aviation literature. There is no simple, standard, and widely accepted definition of globalisation for the airline industry. Overall, the literature presents a confusing picture. Media coverage of globalisation in aviation rarely attempts to define what globalisation encompasses and ignores differences between aviation (airlines in particular) and other global industries.

An *international airline* offers mainly point-to-point (city pairs) services. The majority of passengers and freight either originate or complete their journey in the country of registry of the airline. International airlines pursue strategies based on market segmenation (such as route by route for Australia–Japan, or by region such as Asia Pacific), although they face increasing interdependence between markets. Key production units are located in the home country as airlines are not free to locate production at least cost centres throughout the world, nor are they free to provide their services anywhere in the world, as changing demand and commercial circumstances might suggest. The airline may have links with other airlines and an operational presence in a number of countries, but each airline operates as an independent company.

A *global airline*, in contrast, can be defined as one free to offer an integrated network of services to most places throughout the world, including the major markets and associated feeder markets. A global airline's corporate strategies would treat the world as one market without segmentation. A global airline would be free to locate its production in the least cost centres and all subsidiaries of the firm would operates as one entity regardless of location.

For many carriers, operations always have been international, and some have extensive networks which appear global in scope. Fifth and additional freedoms (see box 5.1 for details) when combined with the traditional point-to-point service, allow airlines to offer more than a single city pair service. Nevertheless, the focal point of operations remains located in the country of registry, as seen in KLM's route network in figure 8.3. KLM's route network covers much of the globe but the focus of the routes is still the home country. This is not to deny exceptions to the trend; for some airlines the predominance of 'home' traffic is diminishing. It is likely that KLM's concentration to and from the home city, evident in figure 8.3, will change as KLM further integrates its route network with Northwest's route network.

International airlines are able to create opportunities to expand the traditional point-to-point service. The internationalisation of airlines can be seen in Qantas' extension of services which enable it to offer services between Bangkok, Singapore and Hong Kong. This apparent triangular service is possible as each section is part of a stage length of a flight to/from Australia. The current networks operated by international airlines are similar to the US's pre-deregulation point-to-point network, which changed to a complex hub and spoke network of services following deregulation of the home market (see chapter 2 for details). There are pressures by some airlines, notably the bigger US airlines, to create a world hub and spoke system, mentioned in chapter 5 and earlier in this chapter. In a less regulated environment, international air

Figure 8.3 KLM route network

Source KLM 1993.

transport networks are likely to be restructured, which will affect the conduct and performance of international airlines.

A presence throughout the globe does not qualify an airline as a global airline. The term globalisation has been used in the main by marketing and management analysts. Significant in their definition of globalisation is that decisions in one sector of the globe can affect firms operating in that sector, and operations elsewhere in the world. Such consequences are not new for international carriers.

International aviation markets demonstrate significant interdependence, transcending national borders. The characteristics of aviation markets and marketing are closer to globalisation than is the structure of individual firms (airlines). Airline marketing strategies reflect global development, while the production and delivery of airline services remain international rather than global. In defining what characterises an international airline and a global airline it is important to keep in mind the evolutionary nature of globalisation. In theory, the evolutionary path for a firm begins as a domestic firm, then can move through a number of phases, including international, multidomestic and then global firm. As noted by Porter (1986, p. 34) it is not unusual for segments and vertical stages of an industry to be at different stages in the development towards globalisation. This is true for the aviation industry.

Forces constraining and driving airline globalisation

The main constraints to globalisation in airlines are threefold: the first is institutional, and comes from the international aviation regulatory regime, in particular air service agreements; the second comes from conventional practices, which may or may not have legislative backing; and the third arises from existing foreign investment limitations set by individual countries.

Institutional. Air service agreements are able to limit whether a particular airline(s) may establish operations, where it may deliver services and how often the airline(s) can provide a service. This means the provision of airline services is determined by institutional as well as commercial factors. The degree of institutional influence depends on how free or prescriptive an air service agreement is, and this can vary significantly. Overall, air service agreements (see chapter 5 for details) either explicitly or implicitly limit an airline's freedom to establish and operate throughout the world.

Conventional practices in each country cover a range of possible constraints to airline globalisation. These include a country's procedures for granting licenses and setting standards, and the 'special' treatment of aviation for strategic defence and political reasons. The practice of requiring airlines serving an agreed destination to be substantially owned and effectively controlled by citizens in the country of registry is broadly followed, although not necessarily defined specifically in legislation or in an air service agreement. Governments can impose conditions on home based carriers, such as the requirement that Qantas' head office and operational base remain located in Australia. Such conditions limit an airline's ability to move production units to lower cost centres, a likely result if airlines were to operate from a global perspective, as exists, for example, in the manufacture of cars. Establishing offshore operations (that is, outside of the home country) and out-sourcing some corporate services have begun (evidenced in Cathay Pacific Airways' relocation of its international databases to Sydney in 1993) and out-sourcing is likely to increase. A designated airline fully relocating offshore is unlikely in the near future yet locating elsewhere would be a probable feature of a global airline.

Foreign investment limitations can prohibit or limit airline globalisation. A country's foreign investment provisions may be general, for all enterprises, or specific to airlines. When preparing to sell equity in Qantas to the private sector the Australian Government set a 35 per cent maximum for total foreign ownership of the airline (see chapter 5 for details). Such limitation on foreign ownership in airlines is not unusual. Once the principle allowing some foreign ownership in an airline is accepted then it is possible for the percentage of foreign ownership to be raised over time, opening up more opportunity for globalisation. Equally, as long as requirements to limit foreign ownership exist then globalisation can be limited.

Some airlines in their evolutionary steps towards globalisation have developed more interdependence, with characteristics typical of firms in a multidomestic industry. In a multidomestic industry, companies pursue strategies which differ across foreign markets, according to Hout, Porter and Rudden (1982, p. 103). Companies in different countries are strategically independent with largely autonomous operations. This autonomy does not preclude some centralisation of corporate finance and marketing policies, and other activities from being pursued, but each 'subsidiary' is managed as a separate profit centre.

In some instances carriers with close cross border alliances have moved beyond the traditional international firm by adopting closer links. The structure of the alliances between BA–USAir and BA–Qantas can be seen as a pre globalisation step, not quite achieving interdependent global production and service delivery, but going beyond the traditional complete separation of international airlines. It is BA's operations in Europe which may be seen as moving beyond a multidomestic strategy. TAT and Deutsche BA fly aircraft in BA colours, represent themselves as BA and share other BA services, including ground services. BA has also extended its 'brand' and associated services to include British Airways Express, Maersk Air, and Brymon Aviation. Successfully integrating previously separate airlines under the one brand identity (and its associated marketing integration) will be important in any attempt to establish a global carrier through alliances.

Amongst some airlines commercial pressures are creating strong motivational factors for globalisation. Porter (1986 p. 36) stated that the first movers to implement a global strategy are the ultimate winners in global industries. Such an effect provides a powerful incentive to the few airlines capable of becoming global in the near future.

Many international carriers have stated that they need better access to the major international markets to ensure survival. Airlines have pursued alliances to give them access to a bigger, global network while maintaining separate national ownership and control provisions. Another position held by many international carriers is that they must have access to their own domestic market to survive. This illustrates a fairly common business development: as enterprises grow in global markets with growing competition there is mounting pressure for these firms to enter domestic markets, and as domestic firms grow there is pressure for them to enter foreign markets. It is a question of becoming a bigger enterprise which may or may not reap higher financial rewards. A number of enterprises, including international airlines, seek to become bigger for marketing, distribution and competitive advantages.

Complex alliances, in particular those involving equity investments, have been entered into by carriers pursuing a global strategy. Such alliances draw a number of parts of a business together in order to integrate and plan operations that extend beyond any one country's market needs. In the process, some international airlines are losing their strong national identity, which has been a feature of international aviation since World War II. Maintaining a 'painted bird' (or flag carrier) has proved expensive for many carriers and governments; some would argue too costly. In the bigger markets, the days of a single designated national carrier may be in decline, but this does not mean that global megacarriers will automatically replace the existing flag carriers.

The future

As noted earlier in this chapter, the increasing global perspective in the strategies of international carriers has been achieved through alliances rather than the outright development of global carriers. What can be speculated about is whether the continued internationalisation of carriers will typify the structure of aviation in the long term or whether it is merely an interim step prior to globalisation of the major international carriers. Much depends on what governments do in regard to the regulatory regime. To date steps taken towards globalisation of airlines have been achieved within existing regulatory constraints, with some modification and/or reinterpretation of the regulatory requirements. Calls persist to further change the regulatory regime to permit the creation of global carriers.

In the medium term it is possible that some airlines may pursue their efforts to become global through further and closer alliances, although without substantial changes to the traditional regulatory regime, in particular the air service agreements, this approach is unlikely to open up the system to the formation of global airlines. It is possible that the stronghold of the bilateral tradition could be removed if a few countries jointly agreed to a standard agreement (yet to be developed), and this 'critical mass' of countries could form the basis of more global developments. Global firms operate within the food and beverage industry often using franchising as a means to establishing an extensive world service. It is possible that airlines could adopt franchising as an alternative to the existing marketing alliances. For example, BA could establish a worldwide corporate identity and structure, and allow airlines located around the world to join the group under a franchising arrangement, potentially creating a global entity.

Alternatively some airlines may become regional carriers, free to move production units and deliver services within member countries of a single (or regional) aviation bloc. If members in an aviation bloc maintained strong barriers against nonmembers (for example through most favoured nation principles), then the regionalisation of airlines could inhibit airline globalisation. On the other hand if countries and/or carriers perceived that there would be a competitive advantage if the regional bloc expanded, assisting airlines to evolve into a global carrier, then regionalisation might be a first step in removing some of the barriers to globalisation. It is too early in the development of regional aviation blocs to draw a conclusion on the impact on airlines of regionalisation versus globalisation, although some convergence of both developments would not be surprising.

If one or more airlines become global firms then this is likely to pressure other firms to follow suit. This was evident in the adoption of CRSs: a few airlines gained a competitive advantage through their CRS, leaving other airlines to develop their own or link into existing CRSs. The same process, where a few firms obtaining a competitive edge cause other firms to adopt similar strategies, can be seen in the introduction of frequent flier schemes in airlines in Europe and Asia Pacific, although these airlines had resisted the trend for some time, and in the case of Japan, the Government had initially banned such schemes. The growth and integration of CRSs and frequent flier schemes have been major driving factors in airline moves towards globalisation.

The provision of international air services, in theory, is ideally suited to globalisation because in its simplest form (the movement of people and parcels from point A to point B) it is a homogeneous product. Without limits any firm could treat the world as one entity offering the same or similar service anywhere. There are a number of additional factors which have assisted in developing the potential for globalisation in aviation, including: potential economies, competitive, distributional and marketing advantages; increased communications and technological developments; and the deregulation of a number industries, including capital markets in key economies.

Globalisation is a feature of some industries related to aviation, including the manufacture of engines and aircraft (see appendix VI for details). Developments within the airline industry (in particular commercial imperatives and the decline in direct government involvement) together with developments in other areas (including related industries, increased mobility of people and growing trade needs) provide strong pressures favouring globalisation of markets and firms in the aviation industry. This is juxtaposed with the constraints set by the international aviation regulatory regime and the keen desire of many countries to continue to treat the aviation industry as 'special', and worthy of some protective control, which is not a feature of many other worldwide industries.

In some instances aviation associated firms have embraced the globalisation process without the constraints facing carriers. CRSs have become more integrated, assisted by technology that now allows greater interface between systems. It is possible in the long term that most, if not all, carriers could be linked to one fully integrated CRS, thereby eliminating any CRS market edge attractions. Aircraft are now manufactured by international consortia. Increasingly the big three airframe manufacturers have sought joint ventures which transcend national boundaries. For example, Airbus and Boeing has explored the possibility of forming partnerships with Japanese companies, and McDonnell Douglas has sought to form a joint venture with Taiwan Aerospace. The parties to new leasing arrangements (see appendix VII for details) can all be domiciled in different countries, putting ownership into question, and the capital market in general operates globally. These developments, in related sectors to airlines, add pressure to the call by some to open up airlines to more competition with less government intervention and reduced transborder constraints.

In summary, the distinction between growing bigger and going global has to be made for international airlines. Airlines still have quite a way to go to move from operating globally to being global enterprises. International airlines have become more internationalised. A number of airlines have stated that they wish to be global firms, and they can be seen as moving towards globalisation. There is some irony in the fact that international air transport services have assisted the globalisation of other industries while the process itself is constrained in aviation.

CONCLUSION

Aviation is a dynamic industry characterised by a number of well defined cycles. These cycles include: the rate of growth in traffic, which moves in phase with world economic activity, as measured by gross domestic product (GDP); world airline industry profitability, which also moves in phase with GDP; yield (as measured by revenue); and fleet orders. Any analysis of aviation in general, and airlines in particular, should keep in mind the cyclical nature of the industry as well as the impact of exogenous factors such as peace and war and security. For example, an analysis of the turbulent period of 1990–91–92 would be flawed if its characteristics were examined as a stand alone period without an understanding of long term trends.

The history of aviation has been a remarkable story of growth in traffic in all but one year, for more than three decades. Despite this, the industry has struggled to be profitable. Major markets have shown a broad base of concern about the industry. Governments have instigated numerous reviews of the industry, including the US Government's National Commission to Ensure a Strong Competitive Airline Industry and the EC's Comite des Sages (Committee of Wisemen). Airlines have sought alliances to ensure survival and profitability. This trend is likely to continue in the near future.

In 1993 the industry awaited an improvement in economic activity to provide an impetus to the industry and better profitability. The interrelationship of cycles in world economic activity, traffic and profitability supports the notion that the industry can anticipate a return to better times. What is uncertain is when a sustainable upswing will occur. Historically there have been significant rewards for investors if they time their entry at the start of an airline bull market.

Not all markets have been equally affected by a cyclical downswing. The Asia Pacific market and its carriers continue to emerge strongly, challenging the traditional market power of Europe and North America, although the level of profitability in Asia Pacific airlines has been dampened by events in the early nineties. Growth in traffic is forecast for all markets, but the rate of growth will vary between markets.

In recent decades the industry has experienced considerable pressure to change. Recent changes include the growing trends to privatisation, deregulation, liberalisation, consolidation, regionalisation and potentially globalisation. The result has been the introduction of more competition in aviation and, importantly, there has been a decline in the role of governments and/or a change in their role in aviation in many countries.

In the future it is likely that some (but not all) countries will move away from treating aviation, especially airlines, as 'special' and worthy of a level of protection not provided to other industries. In turn this could mean the decline of 'flag' carriers, a characteristic of international aviation. Continued structural change to the industry has an impact on the conduct and performance of the industry, and important consequences for public policy. Traditional policy approaches of rigidity and protection still evident in many countries may need to be replaced with policies encouraging greater flexibility and competition. Future changes are likely to be evolutionary, continuing the practice of introducing gradual rather than radical change in international aviation.

Changes in the airline industry have been achieved by modifying the traditional regulatory regime established at the end of World War II. Governments established the legal parameters within which trade in air transport services was conducted. Sovereignty is the cornerstone of the international regulatory system. It gives each country the power to control all air services into, out of and over its territory. The supremacy of each country in its trade in air services has been supported by traditional requirements for substantial ownership and effective control of airlines. The result has been a strong nation by nation approach to air transport services based on reciprocity, not comparative advantage. In the 1990s the principles of substantial ownership and effective control need to be (re)defined and reassessed. Further, it is possible that sovereignty in aviation may be re-evaluated and redefined.

The airlines' drive to be bigger is challenging the history of legal arrangements. Initially the drive to be bigger has been achieved through inter-airline alliances, but commercial pressures offering the possibility of achieving cost and marketing advantages mean that these alliances or limited equity investments between airlines may not be sufficient to achieve desired commercial outcomes in the longer term. There is pressure by some airlines to form global airlines. Such a development would require significant changes to the conventional regulatory regime. There is some irony in the fact that gloablisation in other industries has been assisted by aviation yet the process is constrained in airlines.

There is no consensus on how a future regulatory regime should be structured, and there is an absence of an obvious leader to act as the change broker. The future direction of the regulatory regime is uncertain. Consequently, the future of aviation too is uncertain. Much will depend on how the balance is struck between the traditional dominance of legal arrangements and the growing pressure of commercial imperatives, especially in airlines.

APPENDIX I CONVERSION RATE BETWEEN US AND AUSTRALIAN DOLLARS

TABLE I.1 CONVERSION RATE BETWEEN US AND AUSTRALIAN DOLLARS

Year[a]	*US dollars per Australian dollar*
1970	1.1159
1971	1.1266
1972	1.1910
1973	1.4167
1974	1.4875
1975	1.3258
1976	1.2356
1977	1.1155
1978	1.1475
1979	1.1211
1980	1.1576
1981	1.1480
1982	1.0223
1983	0.8745
1984	0.8613
1985	0.6655
1986	0.6772
1987	0.7203
1988	0.7940
1989	0.7553
1990	0.7890
1991	0.7681
1992	0.7488

a. End of June

Sources Reserve Bank of Australia 1993; Department of the Parliamentary Library 1991.

APPENDIX II SUPPORTING DATA

TABLE II.1 COST PER ASK BY NUMBER OF SEATS

Type of aircraft	*Number of seats*	*Cost per ASK (US cents)*	*Aerocost defaults* *Stage length (km)*	*Age*
F28-3000	64	8.06	700	–
DC10-30	260	4.69	4 000	2nd (5 yrs)
B737-400	146	5.99	700	New (15 yrs)
B747-200	430	3.69	4 000	2nd (5 yrs)
B747-300	390	4.18	4 000	2nd (10 yrs)
B747-400	380	4.45	4 000	New (15 yrs)

Notes Relates to figure 2.1.
Estimated using AEROCOST (BTCE 1990).

TABLE II.2 COST PER ASK BY STAGE LENGTH FOR A B747-400

Stage length (km)	*Cost per ASK (US cents)*
1 000	8.06
2 000	5.66
3 000	4.85
4 000	4.45
5 000	4.21
6 000	4.05
7 000	3.94
8 000	3.86
9 000	3.80
10 000	3.76

Notes Relates to figure 2.2.
Estimated using AEROCOST (BTCE 1990) using the default settings in AEROCOST as shown in table II.1.

TABLE II.3 COST PER RPK BY LOAD FACTOR FOR A B747-400

Load factor (per cent)	*Cost per RPK (US cents)*
30	14.72
40	11.07
50	8.87
60	7.40
70	6.35
80	5.57
90	4.95
100	4.47

Notes Relates to figure 2.3.
Estimated using AEROCOST (BTCE 1990) using the default settings in AEROCOST as shown in table II.1.

TABLE II.4 INTERNATIONAL AIRLINE FUEL COSTS AS A PROPORTION OF TOTAL OPERATING COSTS 1971–1992

(per cent)

Year	*Aircraft fuel and oil*	*Other*
1971	11.1	88.9
1972	11.0	89.0
1973	12.0	88.0
1974	19.1	80.9
1975	19.4	80.6
1976	19.3	80.7
1977	19.2	80.8
1978	18.4	81.6
1979	22.8	77.2
1980	28.2	71.8
1981	29.2	70.8
1982	27.2	72.8
1983	24.5	75.5
1984	23.3	76.7
1985	22.0	78.0
1986	15.9	84.1
1987	14.9	85.1
1988	13.3	86.7
1989	13.6	86.4
1990	15.1	84.9
1991	13.2	86.8
1992[a]	12.4	87.6

a. Preliminary data.

Note Relates to figure 2.4.

Sources ICAO 1993c, p. 26; 1991b, p. 26; 1990b, p. 26, 1988b, p. 26; 1984c, p. 25; 1983b, p. 25: 1981b, p. 25.

TABLE II.5 DEMAND (RPKS) AND CAPACITY (ASKS) ON INTERNATIONAL SCHEDULED SERVICES 1971–1992

Year	*RPKs (billion)*	*ASKs (billion)*
1971	173	342
1972	206	383
1973	236	426
1974	250	448
1975	270	485
1976	302	529
1977	332	556
1978	385	624
1979	440	696
1980	466	761
1981	494	790
1982	497	796
1983	511	815
1984	555	851
1985	590	906
1986	603	956
1987	688	1 024
1988	761	1 117
1989	824	1 203
1990	893	1 304
1991	860	1 304
1992[a]	979	1 482

a. Preliminary data.

Note Relates to figure 3.1.

Sources ICAO 1993c, p. 19; 1992c, p. 19; 1991b, p. 19; 1990b, p. 19; 1988b, p. 19; 1984c, p. 19; 1983b, p. 19; 1981b, p. 19.

TABLE II.6 AVERAGE PASSENGER LOAD FACTOR ON INTERNATIONAL SCHEDULED SERVICES 1971–1992

Year	*Load factor (per cent)*
1971	51
1972	54
1973	55
1974	56
1975	56
1976	57
1977	60
1978	62
1979	63
1980	61
1981	63
1982	62
1983	63
1984	65
1985	65
1986	63
1987	67
1988	68
1989	68
1990	68
1991	66
1992[a]	66

a. Preliminary data.

Note Relates to figure 3.2.

Sources ICAO 1993c, p. 19; 1992c, p. 19; 1991b, p. 19; 1990b, p. 19; 1988b, p. 19; 1984c, p. 19; 1983b, p. 19; 1981b, p. 21.

TABLE II.7 THE CYCLICAL NATURE OF INTERNATIONAL AIR TRAFFIC GROWTH: GDP, RPK AND REAL YIELD GROWTH RATES 1971–1992

Year	*International RPK growth (per cent)*	*World GDP growth (per cent)*	*Growth in real yields (per cent)*
1971	6.8	4.3	na
1972	19.1	5.6	–2.8
1973	14.6	6.5	–1.3
1974	5.9	2.5	2.0
1975	8.0	1.4	2.2
1976	11.9	5.2	–4.2
1977	9.9	4.3	1.2
1978	16.0	4.5	–5.5
1979	14.3	3.6	–3.9
1980	5.9	2.2	6.6
1981	6.0	2.1	–6.9
1982	0.6	0.7	–7.1
1983	2.8	2.8	–3.0
1984	8.6	4.4	–6.7
1985	6.3	3.5	–4.7
1986	2.2	3.0	0.8
1987	14.1	3.5	2.8
1988	10.6	4.4	1.0
1989	8.3	3.2	–1.2
1990	8.4	2.5	0.3
1991	–3.7	0.1	0.1
1992[a]	13.8	1.1	–8.0

na = not available.

a. Preliminary data.

Notes Relates to figures 3.3 and 3.4.
Nominal figures have been converted to real figures (in 1991 US cents) using US CPI data obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993c and earlier issues; 1993b, pp. 1 & 164; IMF 1992, p. 93; UN 1991 and earlier issues.

TABLE II.8 COMPARISON OF SCHEDULED WORLD RPKS BY REGION OF AIRLINE REGISTRATION 1982 AND 1992

Region	*Year*	*International RPKs (billion)*	*Domestic RPKs (billion)*
Africa	1982	26	8
	1992	37	7
Asia Pacific	1982	128	59
	1992	272	135
Europe	1982	187	194
	1992	331	221
Middle East	1982	26	7
	1992	45	8
North America	1982	98	344
	1992	239	567
Latin America and the Caribbean	1982	32	28
	1992	56	35

Notes Relates to figure 3.5.
RPKs recorded for an ICAO region are aggregated from the number of RPKs flown by the airlines registered in that ICAO region. RPKs performed by the airlines registered in each ICAO region are not therefore a direct measure of RPKs flown in each region. However, given the generally restrictive nature of bilateral air service agreements in relation to fifth freedom and additional rights, and the fact that a high proportion of a carrier's traffic will be travellers from the carrier's home country, RPKs by region of airline registration are considered a good estimate of RPKs actually flown in a region.

Sources ICAO 1993c, pp. 34–5; 1984c, pp. 34–5.

TABLE II.9 PROPORTION OF SCHEDULED INTERNATIONAL RPKS CARRIED BY AIRLINES IN DIFFERENT REGIONS 1982 AND 1992

	1982		*1992*	
Region of airline registration	*RPKs (million)*	*Percentage of total per cent)*	*RPKs (million)*	*Percentage of total (per cent)*
Asia Pacific	128	25.8	272	27.8
Europe	187	37.6	331	33.8
North America	98	19.7	239	24.4
Other	84	16.9	137	14.0
Total	497	100	979	100

Note Relates to figure 3.6.

Sources ICAO 1993c, p. 35; 1984c, p. 35.

TABLE II.10 TOP TEN INTERREGIONAL PASSENGER ROUTES IN 1992

Route	*International passengers carried ('000)*	*International and domestic passengers carried ('000)*
North America–Europe	34 594	
North America–Asia	18 085	
North America–Central America	15 219	
Europe–Asia	12 676	
Africa–Europe	9 399	
Europe–Middle East	6 485	
Asia–Southwest Pacific	6 194	
North America–South America	5 249	
Middle East–Asia	4 959	
North America–Southwest Pacific	4 599	
Within North America		394 772
Within Europe		181 048
Within Asia		100 483
Within South America		23 180
Within Southwest Pacific		21 473
Within Middle East		14 647
Within Central America		11 949
Within Africa		8 147

Notes Relates to figure 3.7.
Does not include traffic of Aeroflot.
Figures used for which IATA is given as the source represent only the traffic of IATA member airlines. IATA member airlines accounted for 95 per cent of all scheduled international passengers carried worldwide in 1992 and 76 per cent of scheduled domestic passengers carried (IATA 1993b, pp. 6, 9, 15). The international data used (interregional traffic flows in figure 3.7) are considered a very good representation of all international traffic. The world (international plus domestic) data used (the boxes in figure 3.7) are considered representative of world (international plus domestic) traffic.

Source IATA 1993b, p.18.

TABLE II.11 TOTAL INTERNATIONAL RPKS PERFORMED ON SCHEDULED AND NONSCHEDULED SERVICES 1971–1992
(billion)

Year	*Scheduled international RPKs*	*Nonscheduled international RPKs*
1971	173.0	83.0
1972	206.0	92.3
1973	236.0	100.1
1974	250.0	92.7
1975	270.0	99.0
1976	302.0	99.9
1977	332.0	107.7
1978	385.0	111.7
1979	440.0	109.0
1980	466.0	102.7
1981	494.0	98.7
1982	496.5	105.5
1983	511.0	108.3
1984	555.0	115.8
1985	590.0	122.6
1986	603.0	134.3
1987	687.6	163.2
1988	761.0	172.5
1989	824.0	178.2
1990	893.0	192.2
1991	860.0	164.5
1992[a]	979.0	168.6

a. Preliminary data.

Notes Relates to figure 3.9.
Due to deficiencies in reporting by some nonscheduled air carriers, ICAO has estimated the total level of traffic carried on nonscheduled services on the basis of available data.

Sources ICAO 1993c, p. 19; 1993b, p. 170; 1992c, p. 19; 1992b, p. 15; 1991b, p. 19; 1991a, p. 15; 1990b, p. 19; 1990a, p. 15; 1989a, p. 12; 1988b, p. 19; 1988a, p. 11; 1987a, p. 11; 1986a, p. 11; 1985b, p. 11; 1984c, p. 19; 1984b, p. 11; 1983b, p. 19; 1983a, p. 12; 1982a, p. 12; 1981b, p. 19; 1981a, p. 14; 1980a, p. 12; 1979a, p. 13; 1978a, p. 12.

TABLE II.12 ESTIMATED NONSCHEDULED INTERNATIONAL RPKS: THE PROPORTION CARRIED ON SCHEDULED AND NONSCHEDULED CARRIERS 1971–1992

	Nonscheduled carriers		*Scheduled carriers*	
Year	*RPKs (billion)*	*Percentage of total non scheduled traffic (per cent)*	*RPKs (billion)*	*Percentage of total non scheduled traffic (per cent)*
1971	47.6	57.3	35.4	42.7
1972	53.9	58.4	38.4	41.6
1973	61.3	61.2	38.8	38.8
1974	57.7	62.2	35.0	37.8
1975	61.5	62.1	37.5	37.9
1976	60.0	60.1	39.9	39.9
1977	66.7	61.9	41.0	38.1
1978	70.6	63.2	41.1	36.8
1979	72.3	66.3	36.7	33.7
1980	59.6	58.0	43.1	42.0
1981	57.6	58.4	41.1	41.6
1982	64.9	61.5	40.6	38.5
1983	69.5	64.2	38.8	35.8
1984	75.2	64.9	40.6	35.1
1985	72.7	59.3	49.9	40.7
1986	63.9	47.6	70.4	52.4
1987	81.7	50.1	81.5	49.9
1988	84.2	48.8	88.3	51.2
1989	92.8	52.1	85.4	47.9
1990	104.6	54.4	87.6	45.6
1991	87.8	53.4	76.7	46.6
1992[a]	91.4	54.2	77.2	45.8

a. Preliminary data.

Notes Relates to figures 3.10 and 3.11.
Nonscheduled services and therefore nonscheduled RPKs are performed by both scheduled and non scheduled carriers.
Due to deficiencies in reporting by some nonscheduled air carriers, ICAO has estimated the level of international traffic carried on nonscheduled services on the basis of available data.

Sources ICAO 1993b, p. 170; 1992b, p. 15; 1991a, p. 15; 1990a, p. 15; 1989a, p. 12; 1988a, p. 11; 1987a, p. 11; 1986a, p. 11; 1985b, p. 11; 1984b, p. 11; 1983a, p. 12; 1982a, p. 12; 1981a, p. 14; 1980a, p. 12; 1979a, p. 13; 1978a, p. 12.

TABLE II.13 COMPARISON OF NONSCHEDULED INTERNATIONAL TKP BY AIRLINES IN DIFFERENT REGIONS 1971–1992

(billion)

Year	*Europe*	*North America*	*Other regions*
1971	4.730	4.180	0.540
1972	5.940	4.080	0.650
1973	6.300	3.600	0.860
1974	5.390	3.240	0.930
1975	6.380	3.160	0.970
1976	7.160	3.290	1.020
1977	7.770	3.480	1.450
1978	8.600	3.410	1.310
1979	8.300	3.120	1.350
1980	7.970	2.690	1.380
1981	7.500	2.620	1.450
1982	7.890	2.800	1.210
1983	8.300	2.600	1.200
1984	9.490	2.580	1.030
1985	10.210	2.490	1.150
1986	11.405	2.980	1.280
1987	13.385	3.675	1.395
1988	13.835	4.160	1.490
1989	14.880	3.280	1.360
1990	17.060	3.125	1.610
1991	14.680	3.360	1.665
1992[a]	15.650	2.540	1.670

a. Preliminary data.

Note Relates to figure 3.12.

Sources ICAO 1993c, p. 24; 1992c, p. 24; 1991b, p. 24; 1990b, p. 24; 1988b, p. 24; 1984c, p. 23; 1983b, p. 23; 1981b, p. 23.

TABLE II.14 COMPARISON OF INTERNATIONAL FREIGHT AND MAIL TONNE KILOMETRES 1971–1992

(billion)

Year	*Freight tonne kilometres*	*Mail tonne kilometres*
1971	7.14	1.21
1972	8.35	1.14
1973	9.97	1.20
1974	11.17	1.18
1975	11.63	1.21
1976	13.37	1.26
1977	15.06	1.32
1978	16.93	1.35
1979	18.94	1.41
1980	20.26	1.51
1981	21.70	1.57
1982	22.63	1.64
1983	25.20	1.70
1984	28.94	1.84
1985	29.38	1.86
1986	32.22	1.89
1987	36.70	1.96
1988	41.02	1.99
1989	44.92	2.08
1990	46.33	2.19
1991	46.41	2.21
1992[a]	50.06	2.26

a. Preliminary data.

Note Relates to figure 3.13.

Sources ICAO 1993c, p. 19; 1992c, p. 19; 1991b, p. 19; 1990b, p. 19; 1988b, p. 19; 1984c, p. 19; 1983b, p. 19; 1981b, p. 19.

TABLE II.15 FTKS PERFORMED ON INTERNATIONAL SCHEDULED SERVICES 1975–1992
(billion)

Year	*Dedicated freight services*	*Passenger services (includes combis)*
1975	4.396	7.234
1976	4.800	8.570
1977	6.235	8.825
1978	7.116	9.814
1979	7.708	11.232
1980	7.861	12.399
1981	7.941	13.759
1982	8.125	14.505
1983	8.742	16.458
1984	9.958	18.982
1985	8.951	20.429
1986	10.909	21.311
1987	12.822	23.878
1988	14.975	26.045
1989	17.348	27.572
1990	17.699	28.631
1991	17.309	29.101
1992[a]	18.355	31.705

a. Preliminary data.

Notes Relates to figure 3.14.
Dedicated freight services exclude operations in states of the former USSR.

Sources ICAO 1993c, pp. 19–20; 1992c, pp. 19–20; 1991b, pp. 19–20; 1990b, pp. 19–20; 1989b, p. 20; 1988b, pp. 19–20; 1987b, p. 20; 1986b, p. 20; 1985c, p. 20; 1984c, pp. 19–20; 1983b, pp. 19–20; 1982b, p. 20; 1981b, pp. 19–20; 1980b, p. 20; 1979b, p. 20; 1978b, p. 23; 1977a, p. 17, 1976, p. 17.

TABLE II.16 COMPARISON OF SCHEDULED WORLD FTKS BY REGION OF AIRLINE REGISTRATION 1982 AND 1992

(billion)

Region	*Year*	*International FTKs*	*Domestic FTKs*
Africa	1982	0.897	0.080
	1992	1.131	0.068
Asia Pacific	1982	6.225	0.747
	1992	16.782	1.648
Europe	1982	8.671	2.487
	1992	17.941	1.884
Middle East	1982	1.493	0.060
	1992	2.591	0.062
North America	1982	3.973	4.746
	1992	9.114	7.754
Latin America and the Caribbean	1982	1.364	0.492
	1992	2.501	0.574

Notes Relates to figure 3.15.
FTKs measured for each region are aggregated from the number of FTKs flown by the airlines registered in each ICAO region. FTKs performed by the airlines registered in each ICAO region are not therefore a direct measure of FTKs flown in each region. FTKs by region of airline registration, however, are considered a reasonable estimate of FTKs actually flown in a region.

Sources ICAO 1993c, pp. 34–5; 1984c, pp. 34–5.

TABLE II.17 PASSENGERS CARRIED ON INTERNATIONAL SCHEDULED SERVICES TO AND FROM AUSTRALIA 1973–1992

Year	*Japan*	*New Zealand*	*All other countries*	*Total passengers into and out of Australia*
1973	42 313	627 826	1 280 045	1 907 871
1974	43 170	783 959	1 487 060	2 271 019
1975	43 295	845 824	1 665 686	2 511 510
1976	48 870	872 698	1 997 142	2 869 840
1977	54 832	865 980	2 025 364	2 891 344
1978	61 081	947 194	2 202 915	3 150 109
1979	72 627	1 091 380	2 603 969	3 695 349
1980	86 301	1 192 716	2 841 159	4 033 875
1981	105 090	1 127 412	2 958 337	4 085 749
1982	127 679	1 225 727	3 004 534	4 230 261
1983	132 130	1 058 333	3 057 335	4 115 668
1984	161 253	1 142 225	3 417 104	4 559 329
1985	193 240	1 278 749	3 728 384	5 007 133
1986	240 606	1 598 679	3 979 152	5 577 831
1987	386 803	1 910 667	4 416 962	6 327 629
1988	630 136	2 098 594	5 038 052	7 136 646
1989	659 126	1 868 311	5 403 666	7 271 977
1990	927 404	1 861 447	5 731 713	8 520 564
1991	992 049	2 007 428	5 653 100	8 652 577
1992	1 179 204	1 991 265	6 131 583	9 302 052

Notes Relates to figure 3.16.
Data on an uplift–discharge basis.

Sources DTC 1993b, p. viii; 199 2b, pp. 1–2; 1991e, pp. 1–2; 1991d, pp. 1–2; 1991c, pp. 1–2; 1991b, pp. 1–2; 1991a, pp. 1–2; DoA 1986, p. 1; 1985, p. 1; 1984, p. 1; 1983, p. 1; DoT (Australia) 1982, p. 4; 1981, p. 4; 1980, p. 7; 1979, p. 7; 1978b, p. 7; 1978a, p. 7; 1976, p. 5; 1975, p. 5; 1974, p. 5; DCA 1973, p. 7; 1972, p. 7; 1971, p. 7.

TABLE II.18 COMPARISON OF AVERAGE ANNUAL PASSENGER GROWTH RATES 1977–1982, 1982–1987 AND 1987–1992

	International services into and out of Australia (per cent)	*Worldwide international services (per cent)*
1977–1982	8.1	5.7
1982–1987	9.0	5.5
1987–1992	6.7	6.2

Note Relates to figure 3.17.

Sources DTC 1993 Aviation Database; ICAO 1993c, p. 19; 1992c, p. 19; 1984c, p. 19.

TABLE II.19 PASSENGER NUMBERS IN MAJOR MARKETS TO AND FROM AUSTRALIA, YEAR ENDING 31 DECEMBER 1992

Country	*Total passenger numbers (000)*	*Growth on 1991 figures (per cent)*
New Zealand	1 991	–0.8
Singapore	1 271	9.0
Japan	1 179	18.9
US	1 093	0.0
Hong Kong	637	6.4
Indonesia	507	8.5
UK	482	15.1
Thailand	383	8.5
Malaysia	307	8.7
Fiji	214	–6.7

Notes Relates to figure 3.18.
Data on an uplift–discharge basis.

Source DTC 1993b, p. viii.

TABLE II.20 RESIDENT AND VISITOR COMPOSITION OF PASSENGERS ON INTERNATIONAL SCHEDULED SERVICES TO AND FROM AUSTRALIA 1992

	Passenger numbers			*Percentages*	
Country	*Australian residents*	*Overseas visitors*	*Total*	*Australian residents*	*Overseas visitors*
New Zealand	692 597	896 830	1 589 427	43.6	56.4
Japan	64 600	1 267 697	1 332 297	4.8	95.2
US	669 829	525 080	1 194 909	56.1	43.9
UK	511 551	590 441	110 199	46.4	53.6
Indonesia	365 969	95 689	461 658	79.3	20.7
Hong Kong	276 978	164 655	441 633	62.7	37.3
Singapore	198 616	238 833	437 449	45.4	54.6
Malaysia	156 561	129 941	286 502	54.6	45.4
Fiji	176 250	36 013	212 263	83.0	17.0
Thailand	141 506	69 927	211433	66.9	33.1

Notes Relates to figure 3.19.
The data in this table are origin–destination resident and visitor movements and will not necessarily match the data in table II.19.

Source DTC 1993a, pp. 11–12.

TABLE II.21 PASSENGERS BETWEEN MAJOR INTERNATIONAL AUSTRALIAN CITY PAIRS 1991 AND 1992

('000 passengers)

City pair	*1991*	*1992*
Sydney–Singapore	367.440	386.984
Sydney–Los Angeles	310.649	407.425
Sydney–Tokyo	480.575	471.013
Sydney–Auckland	638.743	649.921
London–Paris	3 125.000	na

na = not available.

Note Relates to figure 3.20 .

Sources DTC 1993b, p. vi; ICAO 1993c, p. 22.

TABLE II.22 AUSTRALIAN AIRPORTS INTERNATIONAL TRAFFIC: MARKET SHARE 1971–1992

	Number of passengers			*Percentage of total number of passengers*		
Year	*Sydney airport*	*Queensland airports*	*Other airports*	*Sydney airport*	*Queensland airports*	*Other airports*
1971	940 704	56 257	297 423	72.7	4.3	23.0
1972	1 093 923	71 049	420 287	69.0	4.5	26.5
1973	1 263 708	107 046	562 729	65.4	5.5	29.1
1974	1 524 270	133 917	656 002	65.9	5.8	28.3
1975	1 618 539	194 239	742 027	63.4	7.6	29.0
1976	1 763 945	267 009	887 756	60.4	9.1	30.4
1977	1 758 177	263 723	924 276	59.7	9.0	31.4
1978	1 919 631	288 244	1 003 315	59.8	9.0	31.2
1979	2 260 102	316 925	1 196 313	59.9	8.4	31.7
1980	2 412 152	357 790	1 350 234	58.5	8.7	32.8
1981	2 359 700	420 622	1 405 291	56.4	10.0	33.6
1982	2 416 280	471 695	1 476 204	55.4	10.8	33.8
1983	2 315 319	464 023	1 472 534	54.5	10.9	34.6
1984	2 505 427	517 720	1 667 082	53.4	11.0	35.5
1985	2 772 120	563 526	1 864 727	53.3	10.8	35.9
1986	3 086 337	669 721	2 062 379	53.0	11.5	35.4
1987	3 569 509	831 971	2 312 952	53.2	12.4	34.4
1988	4 106 460	1 140 564	2 519 758	52.9	14.7	32.4
1989	4 026 296	1 178 507	2 726 300	50.8	14.9	34.4
1990	4 263 928	1 358 680	2 897 956	50.0	15.9	34.0
1991	4 219 192	1 577 527	2 846 806	48.8	18.3	32.9
1992	4 505 656	1 840 057	2 956 339	48.4	19.8	31.8

Note Relates to figure 3.21.

Sources DTC 1993 Aviation Database; DTC 1993b, p. vii; 1992b, p. vii; 1991e, p. vii; 1991d, pp. 11–12; 1991c, pp. 11–12; 1991b, pp. 9–10; DoA 1986, pp. 5–6; 1985, pp. 2–3; 1984, pp. 2–3; 1983, pp. 2–3; DoT (Australia) 1981, pp. 1–2; 1980, p .1; 1979, p. 1; 1978b, p. 1; 1978a, p. 1; 1975, p. 2; 1974, p. 2.

TABLE II.23 FREIGHT CARRIED ON INTERNATIONAL SCHEDULED SERVICES TO AND FROM AUSTRALIA 1982–1992

('000 tonnes)

Year	*Singapore*	*New Zealand*	*All other countries*	*Total*
1982	17.670	36.043	106.729	160.441
1983	22.376	42.993	112.431	177.801
1984	25.077	48.598	134.860	208.534
1985	28.278	46.419	154.232	228.929
1986	46.053	55.110	147.576	248.739
1987	47.837	69.802	170.292	287.931
1988	51.004	73.195	184.685	308.884
1989	55.931	80.871	211.038	347.839
1990	61.475	77.319	219.108	357.902
1991	71.327	76.670	211.568	359.565
1992	81.028	86.436	238.405	405.870

Note Relates to figure 3.22.

Sources DTC 1993b, pp. 1–2; 1992b, pp. 1–2; 1991e, pp. 1–2; 1991d, pp. 1–2; 1991c, pp. 1–2; 1991b, pp. 1–2; 1991a, pp. 1–2; DoA 1986, p. 1; 1985, p. 1; 1984, p. 1; 1983, p. 1.

TABLE II.24 COMPARISON OF REGIONAL RPKS: 1992 AND FORECASTS FOR 2001

(billion)

Regions	*Year*	*International RPKs*	*Domestic RPKs*
Africa	1992	37	7
	2001	50	12
Asia Pacific	1992	272	135
	2001	590	230
Europe	1992	331	221
	2001	500	380
Middle East	1992	45	8
	2001	67	13
North America	1992	239	567
	2001	410	850
Latin America and the Caribbean	1992	56	35
	2001	80	50

Notes Relates to figure 4.2.
RPKs recorded for an ICAO region are aggregated from the number of RPKs flown by the airlines registered in that ICAO region. RPKs performed by the airlines registered in each ICAO region are not therefore a direct measure of RPKs flown in each region. However, given the generally restrictive nature of bilateral air service agreements in relation to fifth freedom and additional rights, and the fact that a high proportion of a carrier's traffic will be travellers from the carrier's home country, RPKs by region of airline registration are considered a good estimate of RPKs actually flown in a region.

Sources ICAO 1993c, pp. 34–5; 1992d, p. 3.

TABLE II.25 PASSENGER NUMBERS ON MAJOR INTERREGIONAL ROUTES: 1991 AND FORECASTS FOR 1996

(million passengers)

Route	*1991*	*1996*
North Atlantic	28.0967	38.5951
Trans-Pacific	16.6985	25.4544
Europe–Asia Pacific	12.3683	19.5874
Europe–Africa	10.0393	13.5315
North America–Central America	9.9439	13.2670
Europe–Middle East	6.2072	9.2141
Middle East–Asia Pacific	6.1470	8.2764
North America–South America	3.3326	5.0372

Notes Relates to figure 4.3.
Due to differing data sources the routes represented in this table do not necessarily correspond to the routes in table II.26.

Source IATA 1992b, pp. 121–8.

TABLE II.26 FORECAST RPK GROWTH RATES ON MAJOR INTERNATIONAL ROUTES 1992–2000

Market	*RPKs 1992 (billion)*	*RPKs2000 (billion)*	*Average annual growth rate (per cent)*
Intra Asia	72.810	150.604	9.5
Europe–Asia	57.567	115.085	9.0
Trans-Pacific	124.442	241.379	8.6
Europe–Africa	36.215	63.187	7.2
North America – Latin America	60.096	94.731	5.9
Europe–Middle East	37.121	58.255	5.8
North Atlantic	209.101	327.002	5.7
Intra Europe	204.388	313.068	5.5
Intra Africa	8.290	12.513	5.3
Intra Middle East	16.520	24.771	5.2
Intra Latin America	13.300	19.952	5.2
All international traffic	1 102.558	1 842.772	6.6

Notes Relates to figure 4.4 .
Boeing presents its forecasts in revenue passenger miles (RPMs). Boeing's figures have been converted at 1 mile = 1.609 km.
Average annual growth is compound growth and is based on the formula:

$$\text{Average annual growth} = \left\{ \left[\left(\frac{\text{RPKs in final year}}{\text{RPKs in first year}} \right)^{\left(\frac{1}{(\text{final year} - \text{first year})} \right)} \right] - 1 \right\} \times 100$$

Source Boeing 1993a, p. 2.28.

TABLE II.27 ASIA PACIFIC PASSENGERS: 1991 AND FORECASTS FOR 2000 AND 2010

(million passengers)

Traffic to and from	*1991*	*2000*	*2010*
Japan	30.6	70	150
Hong Kong	19.1	34	58
Singapore	14.9	28	58
Thailand	10.5	27	55
Taiwan	10.4	27	55
Australia	8.9	18	35

Note Relates to figure 4.5.

Sources IATA 1992b, pp. 60 & 82; 1992a, p. 8; 1991b, pp. 90 & 204.

TABLE II.28 COMPARISON OF REGIONAL FTKS: 1992 AND FORECASTS FOR 2001

(billion)

Region	*Year*	*International FTKs*	*Domestic FTKs*
Africa	1992	1.131	0.068
	2001	1.710	0.120
Asia Pacific	1992	16.782	1.648
	2001	42.500	3.300
Europe	1992	17.941	1.884
	2001	33.000	3.300
Middle East	1992	2.591	0.062
	2001	3.950	0.160
North America	1992	9.114	7.754
	2001	15.800	9.800
Latin America and the Caribbean	1992	2.501	0.574
	2001	3.960	0.840

Notes Relates to figure 4.7.

FTKs measured for each region are aggregated from the number of FTKs flown by the airlines registered in each ICAO region. FTKs performed by the airlines registered in each ICAO region are not therefore a direct measure of FTKs flown in each region. FTKs by region of airline registration, however, are considered a reasonable estimate of FTKs actually flown in a region.

Sources ICAO 1993c, pp. 34–5; 1992d, p. 3.

TABLE II.29 ESTIMATED GROSS OPERATING REVENUES OF WORLD (INTERNATIONAL PLUS DOMESTIC) AIRLINES 1992

Type of operator	*Type of service*	*Operating revenues 1992 (US$ million)*
Scheduled carriers	Passengers	161 850
	Mail	2 350
	Freight	19 600
	Non scheduled services	9 000
	Incidental[a]	19 200
Non scheduled carriers	Non scheduled services	7 500

a. Preliminary data.

Notes Relates to figure 6.1.
ICAO defines operating revenue as revenue arising from the operation of air transport services and any incidental services. The incidental item includes revenue generated from surface transportation, food services, service and maintenance sales, property, and other operating revenues which accrue to the airline from sources other than air transportation.

Source ICAO 1993c, pp. 26 & 28.

TABLE II.30 REAL AND NOMINAL WORLD SCHEDULED PASSENGER YIELD 1971–1992

Year	*Average real passenger yield (1991 US cents)*	*Average nominal passenger yield (US cents)*
1971	13.2	3.9
1972	12.8	3.9
1973	12.7	4.1
1974	12.9	4.7
1975	13.2	5.2
1976	12.7	5.3
1977	12.8	5.7
1978	12.1	5.8
1979	11.6	6.2
1980	12.4	7.5
1981	11.5	7.7
1982	10.7	7.6
1983	10.4	7.6
1984	9.7	7.4
1985	9.2	7.3
1986	9.3	7.5
1987	9.6	8.0
1988	9.7	8.4
1989	9.6	8.7
1990	9.6	9.2
1991	9.6	9.6
1992[a]	8.8	9.1

a. Preliminary data.

Notes Relates to figure 6.2.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993c, p. 27; 1992c, p. 27; 1991b, p. 27; 1990b, p. 27; 1988b, p. 27; 1984c, p. 26; 1981b, p. 26.

TABLE II.31 THE CYCLICAL NATURE OF AIRLINE PROFITABILITY 1971–1992

Year	*World TKP growth rates (per cent)*	*World GDP growth rate (per cent)*	*Operating result as a proportion of operating revenues (per cent)*
1971	6.7	4.3	3.0
1972	12.7	5.6	3.5
1973	11.2	6.5	4.4
1974	6.5	2.5	2.4
1975	5.1	1.4	1.9
1976	10.0	5.2	5.0
1977	7.7	4.3	5.2
1978	13.0	4.5	5.3
1979	11.7	3.6	1.0
1980	3.2	2.2	–0.7
1981	3.4	2.1	–0.7
1982	1.6	0.7	–0.2
1983	6.3	2.8	2.1
1984	8.7	4.4	4.8
1985	5.4	3.5	3.7
1986	6.6	3.0	3.7
1987	9.9	3.5	4.9
1988	8.0	4.4	6.1
1989	5.5	3.2	4.4
1990	5.1	2.5	–0.8
1991	–2.0	1.0	–0.2
1992[a]	5.8	1.1	–0.5

a. Preliminary data.

Note Relates to figure 6.3.

Sources ICAO 1993c, p. 19; 1993b, p. 1, p. 171; 1992c, p. 19; 1992b, p. 22; 1991b, p. 19; 1991a, p. 22; 1990b, p. 19; 1990a, p. 21; 1988b, p. 19; 1988a, p. 14; 1987a, p. 13; 1986a, p. 14; 1985b p. 13; 1984c, p. 19; 1984b, p. 13; 1983a, p. 15; 1982a, p. 14; 1981b, p. 19; 1981a, p. 18; 1979a, p. 17; 1978a, p. 17; 1977b, p. 17; 1976, p. 16; UN 1991 and earlier issues

TABLE II.32 COMPARISON OF TKP GROWTH, GDP GROWTH AND AIRCRAFT ORDERS 1971–1992

Year	*World GDP growth rates (per cent)*	*World TKP growth rates (per cent)*	*Announced orders*
1971	4.3	6.7	133
1972	5.6	12.7	303
1973	6.5	11.2	320
1974	2.5	6.5	268
1975	1.4	5.1	182
1976	5.2	10.0	231
1977	4.3	7.7	327
1978	4.5	13.0	706
1979	3.6	11.7	560
1980	2.2	3.2	443
1981	2.1	3.4	272
1982	0.7	1.6	206
1983	2.8	6.3	185
1984	4.4	8.7	357
1985	3.5	5.4	633
1986	3.0	6.6	669
1987	3.5	9.9	764
1988	4.4	8.0	1 115
1989	3.2	5.5	1 563
1990	2.5	5.1	1 039
1991	0.1	–2.0	397
1992[a]	1.1	5.8	362

a. Preliminary data for GDP and TKP growth rates.

Note Relates to figure 6.4.

Sources ICAO 1993c, p. 19; 1993b, p. 1, & p. 5; 1992c, p. 19; 1992b, p. 17; 1991b, p. 19; 1990b, p. 19; 1988b, p. 19; 1987a, p. 32; 1984c, p. 19; 1984b, p. 34; 1981b, p. 19; 1981a, p. 44: UN 1991 and earlier issues.

TABLE II.33 ORDERS AND DELIVERIES OF TURBOJET AIRCRAFT 1971–1992

Year	*Announced orders*	*Deliveries*
1971	133	256
1972	303	238
1973	320	294
1974	268	353
1975	182	303
1976	231	261
1977	327	201
1978	706	273
1979	560	404
1980	443	441
1981	272	434
1982	206	291
1983	185	314
1984	357	261
1985	633	343
1986	669	390
1987	764	413
1988	1 115	511
1989	1 563	560
1990	1 039	674
1991	397	821
1992	362	786

Note Relates to figure 6.5.

Sources ICAO 1993b, p. 5; 1992b, p. 17; 1987a, p. 32; 1984b, p. 34; 1981a, p. 44.

TABLE II.34 REAL OPERATING REVENUES AND REAL OPERATING EXPENSES OF WORLD SCHEDULED AIRLINES 1971–1992

(1991 US$ million)

Year	*Real operating revenues*	*Real operating expenses*
1971	67 731	65 680
1972	74 951	72 328
1973	84 108	80 445
1974	91 437	89 247
1975	96 998	95 150
1976	103 865	98 705
1977	113 207	107 295
1978	122 775	116 299
1979	132 705	131 325
1980	144 906	145 954
1981	139 323	140 360
1982	131 596	131 822
1983	134 393	131 522
1984	138 133	131 449
1985	142 045	136 855
1986	154 802	149 087
1987	176 066	167 443
1988	191 455	179 705
1989	196 714	188 142
1990	207 211	208 775
1991	204 500	205 000
1992[a]	205 822	206 793

a. Preliminary data.

Notes Relates to figure 6.6.

Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

These aggregate data include:

- the scheduled airlines of ICAO contracting countries;
- estimates for non reporting airlines — the estimates are considered reliable for operating items (between 10 to 14 per cent of revenues and expenses are attributed to non reporting airlines) but estimates for non operating items of non reporting airlines are considered very uncertain; and
- net results of the world's airlines — the net results are calculated from the operating result by allowing for non operating items (eg interest, direct subsidies and taxes) and are likely to have a substantial error component. Note that not all non operating items are shown in the table.

These aggregate figures exclude:

- the USSR and China in 1971 and 1972; and
- domestic operations in states of the former USSR for the entire period.

Sources ICAO 1993b, p. 171; 1992b, p. 22; 1991a, p. 22; 1990a, p. 21; 1988a, p. 14; 1987a, p. 13; 1986a, p. 14; 1985b p. 13; 1984b p. 13; 1983a, p. 15; 1982a, p. 14; 1981a, p. 18; 1979a, p. 17; 1978a, p. 17; 1977b, p. 17.

TABLE II.35 PERCENTAGES OF WORLD SCHEDULED AIRLINES REPORTING AN OPERATING PROFIT OR LOSS 1975–1991

Year	*Airlines that reported an operating profit (per cent)*	*Airlines that reported an operating loss (per cent)*
1975	66.5	33.5
1976	75.0	25.0
1977	83.0	17.0
1978	83.0	17.0
1979	66.5	33.5
1980	50.0	50.0
1981	58.0	42.0
1982	50.0	50.0
1983	66.5	33.5
1984	75.0	25.0
1985	75.0	25.0
1986	66.5	33.5
1987	66.5	33.5
1988	75.0	25.0
1989	75.0	25.0
1990	40.0	60.0
1991	45.0	55.0

Notes Relates to figure 6.7.
Approximate percentages.

Sources *ICAO Journal* 1993, p. 9; ICAO 1992b, p. 22; 1991a, p. 22; 1990a, p. 24; 1989a, p. 15; 1988a, p. 14; 1987a, p. 16; 1986a, p. 14; 1985b, p. 16; 1984b, p. 16; 1983a, p. 15; 1982a, p. 16; 1981a, p. 18; 1980a, p. 17; 1979a, p. 17; 1978a, p. 17; 1977b, p. 17.

TABLE II.36 REAL OPERATING RESULT FOR US AIRLINES AND AIRLINES OF THE REST OF THE WORLD 1974–1992

(1991 US$ million)

Year	*Operating result of US airlines*	*Operating result of the rest of the world's airlines*	*Overall operating result of world airlines*
1974	1801	387	2189
1975	162	1684	1848
1976	1543	3615	5160
1977	1867	4038	5909
1978	2733	3739	6476
1979	360	1019	1380
1980	–375	–674	–1049
1981	–697	–339	–1037
1982	–1016	790	–226
1983	410	2189	2871
1984	3014	3670	6684
1985	2000	3190	5191
1986	1602	4112	5715
1987	2898	5725	8624
1988	4090	7661	11750
1989	1868	6703	8352
1990	–2033	521	–1564
1991	–2000	1400	–500
1992[a]	–2136	1165	–971

a. Preliminary data.

Notes Relates to figure 6.8.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources *ICAO Journal* 1993, p. 11; ICAO 1993e, p. 34; 1993b, p. 171; 1992b, p. 22; 1991a, p. 25; 1990a, p. 24; 1989a, p. 15; 1988a, p. 14; 1987a, pp. 13, 16; 1986a, p. 14; 1985b, pp. 13, 16; 1984b, pp. 13, 16; 1983a, p. 15; 1982a, pp. 14, 16; 1981a, p. 18; 1980a, p. 17; 1979a, pp. 17, 20; 1978a, p. 17; 1977b, p. 17.

TABLE II.37 REAL OPERATING RESULT FOR SELECTED AIRLINES 1979–1992

(1991 US$ million)

Year	*Qantas*	*Air India*	*JAL*	*Singapore Airlines*	*Lufthansa*	*KLM*	*BA*	*Air Canada*	*American*	*Northwest*	*United*
1979	na	9.6	–2.4	46.3	125.5	3.2	65.5	161.5	9.2	105.3	–443.9
1980	–33.6	0.7	72.7	83.5	–2.5	42.8	–412.4	126.9	–186.3	–39.3	–112.2
1981	7.2	57.9	79.3	80.8	21.0	22.6	16.8	91.9	65.0	3.1	87.7
1982	–45.7	89.8	–47.0	46.7	79.1	21.3	405.6	–29.3	–25.7	–11.3	–96.6
1983	89.3	115.6	122.7	75.0	191.2	52.5	559.0	31.6	341.3	95.1	208.5
1984	67.9	77.9	204.5	69.9	326.5	105.6	494.6	43.8	444.4	126.9	720.8
1985	24.3	58.9	112.0	73.0	89.1	104.6	360.7	1.9	641.1	96.6	–415.2
1986	82.5	45.1	224.8	189.7	24.5	169.6	339.2	115.3	487.0	na	–12.4
1987	na	–5.5	477.4	238.3	126.6	193.7	532.7	98.0	566.7	245.6	181.1
1988	98.1	52.6	650.6	450.4	173.2	218.9	689.0	134.4	922.8	225.3	770.3
1989	139.7	83.5	567.5	562.1	80.5	166.9	714.2	99.9	803.1	318.8	502.1
1990	–541.3	42.2	201.8	384.4	–140.5	–161.8	316.3	–36.9	70.9	–147.8	–56.6
1991	–66.0	66.3	–97.3	409.1	–215.3	na	596.3	–208.9	17.5	–60.1	–490.6
1992	189.3	na	–377.0	317.4	na	na	500.6	–184.6	–75.0	–299.8	–482.0

na = not available.

Notes Relates to figure 6.9.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, pp. B7–B8;1993a, pp. B7–B8; 1992c, pp. 55–101; 1991c, pp. B7–B8; 1991b, pp. 54–102; 1990c, pp. B7–B8; 1990b, pp. 54–100; 1989b, pp. 64–108; 1988c, pp. B7–B8; 1988b, pp. 62–105; 1987b, pp. 63–105; 1986b, pp. 63–101; 1985c, pp. 62–102; 1984c, pp. 63–100; 1983b, pp. 63–101; 1982b, pp. 61–97; 1981b, pp. 61–98; 1980b, pp. 61–101.

TABLE II.38 OPERATING RESULT AS A PERCENTAGE OF OPERATING REVENUES FOR SELECTED AIRLINES 1979–1992

(per cent)

Year	*Qantas*	*Air India*	*JAL*	*Singapore Airlines*	*Lufthansa*	*KLM*	*BA*	*Air Canada*	*American*	*Northwest*	*United*
1979	na	–1.0	–0.1	2.8	2.6	0.1	1.0	6.3	0.2	4.3	–7.3
1980	–1.8	0.1	1.5	4.6	0.0	1.5	–6.0	4.7	–3.1	–1.5	–1.6
1981	0.4	5.7	1.7	4.5	0.5	0.9	0.3	3.4	1.1	0.1	1.3
1982	–2.7	8.8	–1.2	2.7	1.9	0.9	8.5	–1.2	–0.5	–0.4	–1.5
1983	5.5	11.2	2.9	4.2	4.3	2.4	12.3	1.3	5.5	3.1	2.9
1984	4.2	8.5	4.8	3.9	7.3	5.0	11.5	1.9	6.7	3.9	9.0
1985	1.5	6.7	2.4	4.1	2.0	4.5	7.3	0.1	8.6	2.9	–6.7
1986	3.9	5.2	3.9	10.1	0.4	6.1	6.5	4.9	6.7	na	–0.1
1987	na	–0.6	6.7	10.8	1.8	6.0	8.1	4.0	6.6	4.0	1.9
1988	3.5	5.8	8.1	18.1	2.4	6.8	8.7	5.0	9.4	3.5	7.6
1989	5.6	9.3	7.3	20.9	1.1	5.1	9.1	3.5	7.3	4.4	4.7
1990	–24.0	4.5	2.6	14.2	–1.6	–4.5	3.6	–1.3	0.6	–2.0	–0.5
1991	–2.6	8.3	–1.2	13.9	–2.4	na	7.2	–8.7	0.1	–0.8	–29.6
1992	7.5	na	–4.9	10.4	na	na	6.1	–8.5	–0.6	–3.9	–3.9

na = not available.

Notes Relates to figure 6.10 .

For world average figures for operating result as a percentage of operating revenues see appendix table II.31.

Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, pp. B7–B8; 1993a, pp. B7–B8; 1992c, pp. 55–101; 1991c, pp. B7–B8; 1991b, pp. 54–102; 1990c, pp. B7–B8; 1990b, pp. 54–100; 1989b, pp. 64–108; 1988c, pp. B7–B8; 1988b, pp. 62–105; 1987b, pp. 63–105; 1986b, pp. 63–101; 1985c, pp. 62–102; 1984c, pp. 63–100; 1983b, pp. 63–101; 1982b, pp. 61–97; 1981b, pp. 61–98; 1980b, pp. 61–101.

TABLE II.39 PERFORMANCE MEASURES FOR WORLD AIRLINES 1974–1992
(1991 US cents)

Year	*Operating revenues per TKP*	*Operating expenses per TKP*	*Operating revenues per TKA*	*Operating expenses per TKA*
1974	123.5	120.4	64.4	62.7
1975	125.3	123.0	64.1	62.8
1976	120.3	114.4	63:6	60.5
1977	120.9	114.6	65.2	61.8
1978	116.5	110.2	66.4	62.8
1979	112.8	111.6	65.1	64.5
1980	119.7	120.5	66.8	67.3
1981	112.0	112.7	63.0	63.4
1982	103.5	103.7	58.3	58.4
1983	100.1	98.1	57.6	56.8
1984	94.1	89.5	54.8	52.2
1985	91.0	87.6	53.0	51.1
1986	92.2	88.7	53.4	51.4
1987	94.3	89.7	56.0	53.4
1988	95.0	89.3	56.9	53.5
1989	92.5	88.6	55.7	53.3
1990	93.5	94.3	55.4	55.8
1991	93.3	93.5	54.3	54.5
1992[a]	86.3	86.7	50.1	50.3

a. Preliminary data.

Notes Relates to figure 6.11.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993c, p. 27; 1992c, p. 27; 1991b, p. 27; 1990b, p. 27; 1988b, p. 27; 1984c, p. 26.

TABLE II.40 REAL OPERATING EXPENSES PER TKA FOR SELECTED AIRLINES 1979–1992

(1991 US cents per TKA)

Year	*Qantas*	*Air India*	*JAL*	*Singapore Airlines*	*Lufthansa*	*KLM*	*BA*	*Air Canada*	*American*	*Northwest*	*United*
1979	na	67.7	65.7	78.4	89.5	78.0	86.3	45.2	56.8	37.3	55.9
1980	65.0	65.3	64.3	58.3	86.8	70.7	88.9	48.3	62.3	41.7	53.4
1981	60.6	55.9	56.5	51.4	73.6	62.2	70.6	49.2	60.7	41.8	57.7
1982	54.9	49.9	50.1	46.7	63.5	56.0	61.1	48.5	56.3	39.5	54.0
1983	48.7	45.6	49.8	44.6	63.3	50.3	55.7	49.0	54.9	38.3	52.5
1984	45.6	42.9	44.2	40.9	58.3	44.8	48.9	45.7	52.4	36.4	48.6
1985	43.4	44.6	46.1	38.5	56.6	47.8	53.7	42.7	51.0	34.6	52.5
1986	48.8	42.7	54.7	35.2	65.1	50.7	56.9	40.5	46.7	na	47.0
1987	na	42.5	60.5	38.0	71.1	54.3	68.1	44.9	46.1	40.4	46.8
1988	48.6	39.4	60.4	35.7	68.2	51.0	64.9	45.5	45.2	41.9	47.6
1989	46.8	35.6	59.1	34.2	65.4	50.7	56.7	48.0	45.3	40.8	49.2
1990	51.1	39.7	62.7	35.0	69.7	58.2	65.8	51.2	47.4	41.8	50.4
1991	45.7	37.2	63.2	34.3	70.5	na	58.3	51.9	46.6	39.6	52.0
1992	39.0	na	61.6	30.7	na	na	53.2	44.2	52.0	38.3	45.7

na = not available.

Notes Relates to figure 6.12.
For world average operating expenses per TKA data see appendix table II.39.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, pp. B29–B30; 1993a, pp. B29–B30; 1992e, pp. B29–B30; 1992c, pp. 55–101; 1991c, pp. B29–B30; 1991b, pp. 54–102; 1990c, pp. B29–B30; 1990b, pp. 54–100; 1989b, pp. 64–108; 1988c, pp. B29–B30; 1988b, pp. 62–105; 1987c, pp. B29–B30; 1987b, pp. 63–105; 1986c, pp. B29–B30; 1986b, pp. 63–101; 1985d, pp. B29–B30; 1985c, pp. 62–102; 1984d, pp. B29–B30; 1984c, pp. 63–100; 1983c, pp. B29–B30; 1983b, pp. 63–101; 1982c, pp. B29–B30; 1982b, pp. 61–97; 1981b, pp. 61–98; 1980b, pp. 61–101.

TABLE II.41 REAL OPERATING REVENUES PER TKP FOR SELECTED AIRLINES 1979–1992

(1991 US cents per TKP)

Year	*Qantas*	*Air India*	*JAL*	*Singapore Airlines*	*Lufthansa*	*KLM*	*BA*	*Air Canada*	*American*	*Northwest*	*United*
1979	na	112.9	103.9	89.5	142.0	129.3	135.1	94.2	100.8	84.1	92.5
1980	102.5	108.1	108.6	89.1	142.0	118.2	137.5	96.5	117.7	89.3	104.6
1981	97.0	93.7	92.1	75.3	120.1	98.7	111.4	100.1	115.3	85.9	106.4
1982	89.8	91.7	79.8	70.0	109.2	91.3	103.9	96.8	102.7	77.6	95.8
1983	83.9	83.4	77.7	66.1	106.3	78.5	98.6	95.6	103.8	74.1	94.3
1984	73.0	74.0	71.0	59.6	95.2	67.1	82.4	85.5	105.6	70.4	98.7
1985	67.8	79.2	74.9	56.5	91.8	73.7	88.2	82.4	106.3	67.5	88.9
1986	74.8	71.7	87.3	55.3	102.1	80.1	92.4	81.5	93.7	na	82.1
1987	na	66.3	93.8	57.7	107.8	81.3	108.6	84.7	93.8	76.5	82.0
1988	72.1	66.4	94.6	58.6	104.6	76.7	106.2	86.8	94.4	76.2	85.3
1989	71.8	62.4	89.2	57.7	97.7	74.1	93.2	88.1	91.0	75.3	87.6
1990	61.8	68.0	93.2	57.5	105.7	78.4	102.3	86.0	89.4	73.1	86.7
1991	68.4	69.6	95.5	57.2	107.0	na	95.7	85.6	88.6	70.2	81.6
1992	65.1	na	92.0	50.6	na	na	85.3	75.1	80.3	66.3	77.0

na = not available.

Notes Relates to figure 6.13.
For world average operating revenues per TKP data see appendix table II.39.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, pp. B21–B22; 1993a, pp. B21–B22; 1992e, pp. B21–B22; 1992c, pp. 55–101; 1991c, pp. B21–B22; 1991b, pp. 54–102; 1990c, pp. B21–B22; 1990b, pp. 54–100; 1989b, pp. 64–108; 1988c, pp. B21–B22; 1988b, pp. 62–105; 1987c, pp. B21–B22; 1987b, pp. 63–105; 1986c, pp. B21–B22; 1986b, pp. 63–101; 1985d, pp. B21–B22; 1985c, pp. 62–102; 1984d, pp. B21–B22; 1984c, pp. 63–100; 1983c, pp. B21–B22; 1983b, pp. 63–101; 1982c, pp. B21–B22; 1982b, pp. 61–97; 1981b, pp. 61–98; 1980b, pp. 61–101.

TABLE II.42 REAL OPERATING REVENUES PER TKA FOR SELECTED AIRLINES 1979–1992
(1991 US cents per TKA)

Year	*Qantas*	*Air India*	*JAL*	*Singapore Airlines*	*Lufthansa*	*KLM*	*BA*	*Air Canada*	*American*	*Northwest*	*United*
1979	na	67.0	65.7	80.7	91.9	78.0	87.1	48.2	56.8	39.0	52.2
1980	63.8	65.3	65.3	61.2	86.8	71.7	83.8	50.6	60.5	41.0	52.6
1981	60.9	59.2	57.4	53.8	74.1	62.8	70.8	50.8	61.5	42.0	55.8
1982	53.5	54.7	49.5	48.0	64.7	56.4	66.7	48.0	56.0	39.4	53.2
1983	51.6	51.3	51.2	46.5	66.2	51.4	63.5	49.7	58.0	39.5	54.2
1984	47.6	46.8	46.4	42.6	62.9	47.3	55.2	46.5	56.2	37.9	53.5
1985	44.1	47.7	47.2	40.1	57.7	50.1	58.0	42.7	55.8	35.6	49.2
1986	50.8	45.1	56.9	39.1	65.3	54.0	60.9	42.6	50.1	na	46.8
1987	na	42.3	64.8	42.5	72.5	57.7	74.1	46.8	49.3	42.2	47.8
1988	50.5	41.8	65.8	43.5	69.8	54.7	71.1	47.9	49.9	43.4	51.4
1989	49.7	39.2	63.8	43.2	66.0	53.4	62.3	49.8	48.9	42.6	51.6
1990	41.2	41.6	64.3	40.9	68.6	55.7	68.3	50.5	47.8	41.0	50.2
1991	44.6	40.6	62.4	39.8	68.9	na	62.8	47.7	46.7	39.3	49.9
1992	41.7	na	58.3	34.0	na	na	56.3	39.8	42.7	35.9	43.7

na = not available.

Notes Relates to figure 6.14.
For world average operating revenues per TKA data see appendix table II.39.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, pp. B21–B22; 1993a, pp. B21–B22; 1992e, pp. B21–B22; 1992c, pp. 55–101; 1991c, pp. B21–B22; 1991b, pp. 54–102; 1990c, pp. B21–B22; 1990b, pp. 54–100; 1989b, pp. 64–108; 1988c, pp. B21–B22; 1988b, pp. 62–105; 1987c, pp. B21–B22; 1987b, pp. 63–105; 1986c, pp. B21–B22; 1986b, pp. 63–101; 1985d, pp. B21–B22; 1985c, pp. 62–102; 1984d, pp. B21–B22; 1984c, pp. 63–100; 1983c, pp. B21–B22; 1983b, pp. 63–101; 1982c, pp. B21–B22; 1982b, pp. 61–97; 1981b, pp. 61–98; 1980b, pp. 61–101.

TABLE II.43 WEIGHT LOAD FACTOR FOR SELECTED AIRLINES 1979–1992

(per cent)

Year	*World average*	*Qantas*	*Air India*	*JAL*	*Singapore Airlines*	*Lufthansa*	*KLM*	*BA*	*Air Canada*	*American*	*Northwest*	*United*
1979	59.8	65.8	60.3	63.6	71.1	64.8	61.9	64.3	51.2	56.5	46.3	56.5
1980	57.8	62.2	59.5	60.3	69.7	61.9	59.5	60.5	52.6	51.3	45.8	49.9
1981	58.3	62.4	63.0	62.3	70.2	61.6	63.9	63.1	51.5	53.4	48.7	52.3
1982	58.3	60.6	61.3	61.4	69.5	59.3	61.7	63.6	49.6	54.6	50.5	55.5
1983	59.6	60.4	60.2	65.1	70.5	62.3	64.3	63.3	52.1	56.5	53.1	57.4
1984	60.2	65.1	63.5	66.3	71.1	66.1	69.8	65.7	54.7	53.1	53.8	54.1
1985	60.2	64.5	60.9	63.4	71.1	62.8	68.7	65.2	52.1	52.4	52.6	55.5
1986	59.6	67.1	60.9	64.4	72.2	64.2	67.6	63.8	52.4	53.5	51.9	57.2
1987	61.2	70.9	64.0	68.4	73.3	67.4	70.2	68.9	54.9	53.0	55.0	58.3
1988	60.7	70.0	63.8	69.8	74.6	66.9	70.9	66.6	55.0	52.9	56.9	60.2
1989	60.8	68.6	62.7	71.3	74.5	67.6	72.5	66.6	56.2	53.7	56.5	58.9
1990	60.0	65.9	62.5	71.0	72.1	64.7	71.1	67.8	58.3	53.5	56.0	57.9
1991	59.0	64.1	60.1	65.0	70.2	64.4	71.2	65.2	55.7	52.8	55.9	61.2
1992	58.2	65.4	58.1	64.2	67.5	64.9	69.7	66.4	54.1	54.2	55.5	57.2

Note Relates to figure 6.15.

Sources ICAO 1993c, p. 49–95; 1992c, pp. 55–101; 1991b, pp. 54–102; 1990b, pp. 54–100; 1989b, pp. 64–108; 1988b, pp. 62–105; 1987b, pp. 63–105; 1986b, pp. 63–101; 1985c, pp. 62–102; 1984c, pp. 63–100; 1983b, pp. 63–101; 1982b, pp. 61–97; 1981b, pp. 61–98; 1980b, pp. 61–101.

TABLE II.44 QANTAS: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		Qantas	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	na	na
1980	67.3	65.0	63.8
1981	63.7	60.6	60.9
1982	58.7	54.9	53.5
1983	56.8	48.7	51.6
1984	52.2	45.6	47.6
1985	51.1	43.4	44.1
1986	51.4	48.8	50.8
1987	53.4	na	na
1988	53.5	48.6	50.5
1989	53.5	46.8	49.7
1990	55.6	51.1	41.2
1991	53.9	45.7	44.6
1992	50.3	39.0	41.7

na = not available.

Notes Relates to figure 6.16.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B21, p. B29; 1993b, p. 3; 1993a, p. B21, p. B29; 1992c, p. 27; 1992e, p. B21, p. B29; 1992b, p. 24; 1991c, p. B21, p. B29; 1991a, p. 24; 1990c, p. B21, p. B29; 1990a, p. 23; 1989a, p. 17; 1988b, p. 62; 1988a, p. 16; 1987a, p. 14; 1986c, p. B21, p. B29; 1986b, p. 63; 1986a, p. 15; 1985c, p. 62; 1985b, p. 14; 1984c, p. 63; 1984b, p. 14; 1983b, p. 63; 1983a, p. 17; 1982b, p. 61; 1982a, p. 17; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.45 AIR INDIA: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		Air India	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	67.7	67.0
1980	67.3	65.3	65.3
1981	63.7	55.9	59.2
1982	58.7	49.9	54.7
1983	56.8	45.6	51.3
1984	52.2	42.9	46.8
1985	51.1	44.6	47.7
1986	51.4	42.7	45.1
1987	53.4	42.5	42.3
1988	53.5	39.4	41.8
1989	53.5	35.6	39.2
1990	55.6	39.7	41.6
1991	53.9	37.2	40.6
1992	50.3	na	na

na = not available

Notes Relates to figure 6.17.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993c, p. 27; 1993b, p. 3; 1993a, p. B21, p. B29; 1992e, p. B21, p.B29; 1992b, p. 24; 1991c, p. B21, p. B29; 1991a, p. 24; 1990c, p. B21, p. B29; 1990a, p. 23; 1989b, p. 80; 1989a, p. 17; 1988a, p. 16; 1987c, p. B21, p. B29; 1987b, p. 78; 1987a, p. 14; 1986a, p. 15; 1985d, p. B21, p. B29; 1985b, p. 14; 1984d, p. B21, p. B29; 1984c, p. 75; 1984b, p. 14; 1983a, p. 17; 1982c, p. B21, p. B29; 1982b, p. 71; 1982a, p. 17; 1981b, p. 72; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.46 JAPAN AIRLINES: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		JAL	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	65.7	65.7
1980	67.3	64.3	65.3
1981	63.7	56.5	57.4
1982	58.7	50.1	49.5
1983	56.8	49.8	51.2
1984	52.2	44.2	46.4
1985	51.1	46.1	47.2
1986	51.4	54.7	56.9
1987	53.4	60.5	64.8
1988	53.5	60.4	65.8
1989	53.5	59.1	63.8
1990	55.6	62.7	64.3
1991	53.9	63.2	62.4
1992	50.3	61.6	58.3

Notes Relates to figure 6.18.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B21, p. B29: 1993b, p. 3; 1993a, p. B21, p. B29; 1992e, p. B21, p. B29; 1992c, p. 27; 1992b, p. 24; 1991c, p. B21, p. B29; 1991a, p. 24; 1990c, p. B21, p. B29; 1990a, p. 23; 1989a, p. 17; 1988c, p. B21, p. B29; 1988a, p. 16; 1987c, p. B21, p. B29; 1987a, p. 14; 1986c, p. B21, p. B29; 1986a, p. 15; 1985d, p. B21, p. B29; 1985b, p. 14; 1984d, p. B21, p. B29; 1984b, p. 14; 1983c, p. B21, p. B29; 1983a, p. 17; 1982c, p. B21, p. B29; 1982b, p. 75; 1982a, p. 17; 1981b, p. 75; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.47 SINGAPORE AIRLINES: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		Singapore Airlines	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	78.4	80.7
1980	67.3	58.3	61.2
1981	63.7	51.4	53.8
1982	58.7	46.7	48.0
1983	56.8	44.6	46.5
1984	52.2	40.9	42.6
1985	51.1	38.5	40.1
1986	51.4	35.2	39.1
1987	53.4	38.0	42.5
1988	53.5	35.7	43.5
1989	53.5	34.2	43.2
1990	55.6	35.0	40.9
1991	53.9	34.3	39.8
1992	50.3	30.7	34.0

Notes Relates to figure 6.19.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B21, p. B29; 1993b, p. 3; 1993a, p. B21. p. B29; 1992e, p. B22, p. B30; 1992c, p. 27; 1992b, p. 24; 1991c, p. B22, p. B30; 1991a, p. 24; 1990c, p. B21, p. B29; 1990a, p. 23; 1989b, p. 95; 1989a, p. 17; 1988b, p. 91; 1988a, p. 16; 1987a, p. 14; 1986c, p. B22, p. B30; 1986a, p. 15; 1985d, p. B22, p. B30; 1985b, p. 14; 1984d, p. B22, p. B30; 1984b, p. 14; 1983c, p. B22, p. B30; 1983a, p. 17; 1982c, p. B22, p. B30; 1982b, p. 86; 1982a, p. 17; 1981b, p. 85; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.48 LUFTHANSA: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		Lufthansa	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	89.5	91.9
1980	67.3	86.8	86.8
1981	63.7	73.6	74.1
1982	58.7	63.5	64.7
1983	56.8	63.3	66.2
1984	52.2	58.3	62.9
1985	51.1	56.6	57.7
1986	51.4	65.1	65.3
1987	53.4	71.1	72.5
1988	53.5	68.2	69.8
1989	53.5	65.4	66.0
1990	55.6	69.7	68.6
1991	53.9	70.5	68.9
1992	50.3	na	na

na = not available

Notes Relates to figure 6.20.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics monthly* publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993c, p. 27; 1993b, p. 3; 1993a, p. B21, p. B29; 1992e, p. B21, p. B29; 1992b, p. 24; 1991c, p. B21, p. B29; 1991a, p. 24; 1990b, p. 69; 1990a, p. 23; 1989b, p. 78; 1989a, p. 17; 1988b, p. 76; 1988a, p. 16; 1987a, p. 14; 1986c, p. B21, p. B29; 1986b, p. 74; 1986a, p. 15; 1985c, p. 73; 1985b, p. 14; 1984b, p. 14; 1983c, p. B21, p. B29; 1983a, p. 17; 1982c, p. B21, p. B29; 1982b, p. 70; 1982a, p. 17; 1981b, p. 69; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.49 KLM: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		KLM	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	78.0	78.0
1980	67.3	70.7	71.7
1981	63.7	62.2	62.8
1982	58.7	56.0	56.4
1983	56.8	50.3	51.4
1984	52.2	44.8	47.3
1985	51.1	47.8	50.1
1986	51.4	50.7	54.0
1987	53.4	54.3	57.7
1988	53.5	51.0	54.7
1989	53.5	50.7	53.4
1990	55.6	58.2	55.7
1991	53.9	na	na
1992	50.3	na	na

na = not available.

Notes Relates to figure 6.21.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993c, p. 27; 1993b, p. 3; 1992c, p. 77; 1992b, p. 24; 1991c, p. B22, p. B30; 1991a, p. 24; 1990c, p. B21, p. B29; 1990a, p. 23; 1989b, p. 88; 1989a, p. 17; 1988a, p. 16; 1987c, p. B21, p. B29; 1987a, p. 14; 1986c, p. B21, p. B29; 1986a, p. 15; 1985d, p. B22, p. B30; 1985b, p. 14; 1984d, p. B21, p. B29; 1984b, p. 14; 1983c, p. B21, p. B29; 1983a, p. 17; 1982c, p. B21, p. B29; 1982b, p. 80; 1982a, p. 17; 1981b, p. 80; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.50 BRITISH AIRWAYS: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

Year	World average operating expenses per TKA	BA Operating expenses per TKA	BA Operating revenues per TKA
1979	64.5	86.3	87.1
1980	67.3	88.9	83.8
1981	63.7	70.6	70.8
1982	58.7	61.1	66.7
1983	56.8	55.7	63.5
1984	52.2	48.9	55.2
1985	51.1	53.7	58.0
1986	51.4	56.9	60.9
1987	53.4	68.1	74.1
1988	53.5	64.9	71.1
1989	53.5	56.7	62.3
1990	55.6	65.8	68.3
1991	53.9	58.3	62.8
1992	50.3	53.2	56.3

Notes Relates to figure 6.22.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B21, p. B29; 1993b, p. 3; 1993a, p. B22, p. B30; 1992c, p. 27, p. 92; 1992b, p. 24; 1992c, p. 27; 1991c, p. B22, p. B30; 1991a, p. 24; 1990c, p. B22, p. B30; 1990a, p. 23; 1989a, p. 17; 1988c, p. B22, p. B30; 1988a, p. 16; 1987c, p. B22, p. B30; 1987a, p. 14; 1986c, p. B22, p. B30; 1986b, p. 94; 1986a, p. 15; 1985c, p. 94; 1985b, p. 14; 1984c, p. 93; 1984b, p. 14; 1983b, p. 94; 1983a, p. 17; 1982b, p. 90; 1982a, p. 17; 1981b, p. 90; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.51 AIR CANADA: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		Air Canada	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	45.2	48.2
1980	67.3	48.3	50.6
1981	63.7	49.2	50.8
1982	58.7	48.5	48.0
1983	56.8	49.0	49.7
1984	52.2	45.7	46.5
1985	51.1	42.7	42.7
1986	51.4	40.5	42.6
1987	53.4	44.9	46.8
1988	53.5	45.5	47.9
1989	53.5	48.0	49.8
1990	55.6	51.2	50.5
1991	53.9	51.9	47.7
1992	50.3	44.2	39.8

Notes Relates to figure 6.23.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B21, p. B29; 1993b, p. 3; 1993a, p. B21, p. B29; 1992e, p. B21, p. B29; 1992c, p. 27; 1992b, p. 24; 1991b, p. 58; 1991a, p. 24; 1990c, p. B21, p. B29; 1990a, p. 23; 1989a, p. 17; 1988c, p. B21, p. B29; 1988a, p. 16; 1987c, p. B21, p. B29; 1987a, p. 14; 1986c, p. B21, p. B29; 1986a, p. 15; 1985d, p. B21, p. B29; 1985b, p. 14; 1984d, p. B21, p. B29; 1984b, p. 14; 1983a, p. 17; 1982c, p. B21, p. B29; 1982b, p. 63; 1982a, p. 17; 1981b, p. 63; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.52 AMERICAN AIRLINES: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		American	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	56.8	56.8
1980	67.3	62.3	60.5
1981	63.7	60.7	61.5
1982	58.7	56.3	56.0
1983	56.8	54.9	58.0
1984	52.2	52.4	56.2
1985	51.1	51.0	55.8
1986	51.4	46.7	50.1
1987	53.4	46.1	49.3
1988	53.5	45.2	49.9
1989	53.5	45.3	48.9
1990	55.6	47.4	47.8
1991	53.9	46.6	46.7
1992	50.3	43.8	42.7

Notes Relates to figure 6.24.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B22, p. B30; 1993b, p. 3; 1993a, p. B22, p. B30; 1992e, p. B22, p. B30; 1992c, p. 27; 1992b, p. 24; 1991c, p. B22, p. B30; 1991a, p. 24; 1990c, p. B22, p. B30; 1990a, p. 23; 1989a, p. 17; 1988c, p. B22, p. B30; 1988a, p. 16; 1987c, p. B22, p. B30; 1987a, p. 14; 1986c, p. B22, p. B30; 1986a, p. 15; 1985d, p. B22, p. B30; 1985b, p. 14; 1984d, p. B22, p. B30; 1984b, p. 14; 1983c, p. B22, p. B30; 1983a, p. 17; 1982c, p. B22, p. B30; 1982b, p. 93; 1982a, p. 17; 1981b, p. 93; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.53 NORTHWEST AIRLINES: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		Northwest	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	37.3	39.0
1980	67.3	41.7	41.0
1981	63.7	41.8	42.0
1982	58.7	39.5	39.4
1983	56.8	38.3	39.5
1984	52.2	36.4	37.9
1985	51.1	34.6	35.6
1986	51.4	na	na
1987	53.4	40.4	42.2
1988	53.5	41.9	43.4
1989	53.5	40.8	42.6
1990	55.6	41.8	41.0
1991	53.9	39.6	39.3
1992	50.3	38.3	35.9

na = not available.

Notes Relates to figure 6.25.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B22, p. B30; 1993b, p. 3; 1993a, p. B22, p. B30; 1992e, p. B22, p. B30; 1992c, p. 27; 1992b, p. 24; 1991c, p. B22, p. B30; 1991a, p. 24; 1990c, p. B22, p. B30; 1990a, p. 23; 1989a, p. 17; 1988c, p. B22, p. B30; 1988a, p. 16; 1987a, p. 14; 1986c, p. B22, p. B30; 1986a, p. 15; 1985d, p. B22, p. B30; 1985b, p. 14; 1984d, p. B22, p. B30; 1984b, p. 14; 1983c, p. B22, p. B30; 1983a, p. 17; 1982c, p. B22, p. B30; 1982b, p. 96; 1982a, p. 17; 1981b, p. 96; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.54 UNITED AIRLINES: REAL OPERATING REVENUES AND EXPENSES PER TKA 1979–1992

(1991 US cents)

		United	
Year	*World average operating expenses per TKA*	*Operating expenses per TKA*	*Operating revenues per TKA*
1979	64.5	55.9	52.2
1980	67.3	53.4	52.6
1981	63.7	57.7	55.8
1982	58.7	54.0	53.2
1983	56.8	52.5	54.2
1984	52.2	48.6	53.5
1985	51.1	52.5	49.2
1986	51.4	47.0	46.8
1987	53.4	46.8	47.8
1988	53.5	47.6	51.4
1989	53.5	49.2	51.6
1990	55.6	50.4	50.2
1991	53.9	52.0	49.9
1992	50.3	45.7	43.7

Notes Relates to figure 6.26.
Nominal data have been converted to real figures (in 1991 US cents) using US CPI figures obtained from Reserve Bank of Australia (1991, p. 289) (based on the IMF's *International Financial Statistics* monthly publication) and IMF (1993, p. 554) for 1990, 1991 and 1992.

Sources ICAO 1993f, p. B22, p. B30; 1993b, p. 3; 1993a, p. B22, p. B30; 1992e, p. B22, p. B30; 1992c, p. 27; 1992b, p. 24; 1991c, p. B22, p. B30; 1991a, p. 24; 1990c, p. B22, p. B30; 1990a, p. 23; 1989a, p. 17; 1988c, p. B22, p. B30; 1988a, p. 16; 1987c, p. B22, p. B30; 1987a, p. 14; 1986c, p. B22, p. B30; 1986a, p. 15; 1985d, p. B22, p. B30; 1985b, p. 14; 1984d, p. B22, p. B30; 1984b, p. 14; 1983c, p. B22, p. B30; 1983a, p. 17; 1982c, p. B22, p. B30; 1982b, p. 97; 1982a, p. 17; 1981b, p. 98; 1981a, p. 19; 1980a, p. 15; 1979a, p. 18; 1978a, p. 19; 1977b, p. 19.

TABLE II.55 US AIRLINES: NET INCOME AND INVESTMENT 1984–2000

(US$ billion)

Year	*CAPEX*	*Net internal funds*	*Net income*
1984	2 644	2 655	1 100
1985	5 663	2 306	578
1986	7 708	2 761	668
1987	9 768	2 774	572
1988	6 648	4 166	1 760
1989	8 194	3 842	1 309
1990	10 593	802	–2 048
1991	11 456	1 456	–1 611
1992	11 609	1 717	–1 644
1993	10 068	5 021	1 233
1994	8 040	6 816	2 671
1995	8 374	7 382	3 080
1996	10 184	6 847	2 331
1997	12 618	7 646	2 763
1998	14 301	8 413	3 081
1999	15 840	9 310	3 459
2000	17 593	10 330	3 897

CAPEX = capital expenditure.

Note Relates to figure 7.1.

Source Greenslet 1992, p. 63.

TABLE II.56 US AIRLINES: DEBT AND EQUITY 1984–2000

(US$ billion)

Year	*Total debt*	*Total equity funds*
1984	5 439	7 645
1985	8 311	8 521
1986	11 895	10 278
1987	13 439	12 972
1988	13 312	11 594
1989	12 472	13 697
1990	16 020	10 215
1991	21 093	9 723
1992	29 504	9 333
1993	30 284	15 308
1994	29 490	17 720
1995	28 516	20 540
1996	29 952	22 609
1997	32 927	25 108
1998	36 620	27 925
1999	40 710	31 117
2000	45 258	34 747

Note Relates to figure 7.2.

Source Greenslet 1992, p. 62.

TABLE II.57 US AIRLINES: DEBT/CAPITAL STRUCTURE INCLUDING OPERATING LEASES 1984–2000

(per cent)

Year	*Debt*	*Debt + operating leases*
1984	41.6	57.4
1985	49.4	63.5
1986	53.6	67.3
1987	50.9	68.9
1988	53.4	74.2
1989	47.7	72.9
1990	61.1	81.6
1991	68.4	85.4
1992	76.0	87.5
1993	66.4	81.2
1994	62.5	78.6
1995	58.1	75.7
1996	57.0	74.4
1997	56.7	73.2
1998	56.7	72.1
1999	56.7	71.0
2000	56.6	70.0

Note Relates to figure 7.3.

Source Greenslet 1992, p. 62.

TABLE II.58 NON US AIRLINES: DEBT TO DEBT PLUS BOOK EQUITY 1987–1992

(percentage of capital structure)

Year	*Cathay Pacific*	*JAL*	*MAS*	*Singapore Airlines*	*KLM*	*BA*	*Air Canada*
1987	81	85	69	64	72	71	81
1988	74	84	69	50	68	80	73
1989	72	75	75	41	69	79	74
1990	69	72	69	33	73	76	78
1991	69	72	68	31	80	78	84
1992	70	75	–	29	82	76	93

Note Relates to figure 7.4.

Source Bloomberg, 27 September 1993.

TABLE II.59 HISTORIC AIRCRAFT VALUES 1980–1992

(US dollars–thousand)

	B737	*DC-9*	*DC-8*[a]	*B747*	*DC-10*	*A300B4*	*A310*
Year of manufacture	*1971*	*1967*	*1967*	*1969*	*1972*	*1975*	*1985*
New price at delivery	*4 900*	*3 700*	*8 100*	*22 100*	*22 500*	*24 500*	*51 500*
Month–year							
1–1980	7 600	5 750	5 500	27 500	26 000	26 000	
7–1980	5 500	4 500	5 000	25 500	24 500	30 000	
1–1981	7 000	5 100	3 500	24 500	24 000	31 000	
7–1981	7 000	5 100	3 500	24 500	24 000	31 000	
1–1982	7 250	5 450	2 000	20 000	18 750	27 000	
7–1982	6 750	5 250	1 250	22 500	18 000	25 000	
1–1983	6 500	5 000	1 250	20 000	18 500	25 000	
7–1983	6 000	5 000	1 250	20 000	18 500	25 000	
1–1984	7 000	5 750	750	20 000	19 000	25 000	
7–1984	7 500	6 500	1 375	19 000	22 500	25 000	
1–1985	7 500	6 500	2 000	20 000	25 000	25 000	
7–1985	7 500	6 500	5 000	20 000	27 000	25 000	51 500
1–1986	7 500	6 500	6 500	17 500	29 000	22 500	52 200
7–1986	7 500	6 500	6 500	15 000	30 000	22 500	52 900
1–1987	7 500	6 500	7 000	15 000	32 000	21 500	53 600
7–1987	7 500	6 750	7 500	17 500	35 000	21 500	54 300
1–1988	7 500	6 500	7 500	17 500	32 500	21 500	55 000
7–1988	6 200	5 500	7 500	17 500	31 000	20 500	56 000
1–1989	6 750	6 500	8 500	20 000	32 000	20 500	50 000
7–1989	7 250	7 000	8 500	20 000	34 000	27 500	49 000
1–1990	7 300	7 000	8 500	22 000	37 000	29 500	54 000
7–1990	6 500	6 500	8 500	21 500	37 000	30 000	55 000
1–1991	5 500	5 500	8 000	22 000	38 000	30 000	50 000
7–1991	3 500	3 000	4 000	15 000	28 500	20 500	49 500
1–1992	3 500	3 000	4 000	13 500	27 500	19 000	46 500

a. Hush-kitting was installed on the DC-8 in July 1985.

Notes Relates to figure 7.5.
These figures reflect Avmark's assessment of the 'fair market' value of various aircraft types from their inception. The aircraft are assumed to be in 'half-life' condition and the dollars are current.

Source *Avmark Aviation Economist* 1992b, p. 22.

TABLE II.60 S&P AIRLINES INDEX VERSUS S&P 500 INDEX AND REAL GDP GROWTH 1988 TO 1993

Month–year	S&P 500[a]	S&P Airlines[a]	Real GDP growth (per cent)
1–1988	100.0000	100.0000	
2–1988	104.0967	108.2210	2.60
3–1988	100.5666	114.7569	
4–1988	101.5099	109.7785	
5–1988	101.8318	108.0723	4.32
6–1988	106.1441	124.6183	
7–1988	105.5681	118.8883	
8–1988	101.4125	110.2144	2.55
9–1988	105.3635	120.1773	
10–1988	108.0643	121.9303	
11–1988	106.0034	125.4618	3.87
12–1988	107.5413	125.3059	
1–1989	114.9372	142.5433	
2–1989	111.5613	141.6140	3.21
3–1989	113.8586	152.7432	
4–1989	119.4236	167.5016	
5–1989	122.9988	169.0271	1.79
6–1989	122.5856	172.8154	
7–1989	132.9663	193.7140	
8–1989	135.0137	237.2745	0
9–1989	134.1272	229.0971	
10–1989	130.7073	170.0933	
11–1989	132.8517	158.9220	1.47
12–1989	135.6669	155.4628	
1–1990	125.9939	131.5773	
2–1990	127.0652	144.9847	3.47
3–1990	130.1104	156.8085	
4–1990	126.5642	149.9142	
5–1990	137.7019	154.7158	1.54
6–1990	136.4728	148.8465	
7–1990	135.7581	130.8093	
8–1990	122.3095	99.7769	–0.86
9–1990	115.8833	96.8859	
10–1990	115.1045	101.3647	
11–1990	121.8043	101.0084	–3.17
12–1990	124.7915	104.4609	
1–1991	129.8679	120.1120	
2–1991	138.3242	131.6758	– 2.39
3–1991	141.3618	126.4500	
4–1991	141.4070	130.4381	
5–1991	146.7633	136.8384	1.48
6–1991	139.5605	123.3768	
7–1991	145.6848	128.1044	
8–1991	148.5195	118.9151	1.41
9–1991	145.6487	112.4727	
10–1991	147.3622	117.2725	
11–1991	140.7462	109.4571	0.58
12–1991	155.6357	127.0248	
1–1992	152.5035	129.4554	

2–1992	153.9590	135.6759	3.52
3–1992	150.5605	129.6911	
4–1992	154.7026	114.9317	
5–1992	154.8516	109.5394	2.83
6–1992	152.1400	108.6887	
7–1992	158.0190	109.8419	
8–1992	154.2494	96.2527	3.41
9–1992	155.5768	101.6545	
10–1992	155.9042	108.5454	
11–1992	160.5521	107.6209	5.73
12–1992	162.1668	110.3272	
1–1993	163.3054	107.4803	
2–1993	165.0085	103.1875	0.78
3–1993	168.0653	111.9770	
4–1993	163.7384	119.0127	
5–1993	167.4237	120.8477	1.90
6–1993	167.5427	104.9610	
7–1993	166.6478	112.2340	2.84

a. Base January 1988 = 100.

Note Relates to figure 7.6.

Sources Bloomberg, 27 September 1993 for share price data. Annualised quarterly percentage change in real GDP (seasonally adjusted), US Department of Commerce (Econdata).

TABLE II.61 BETA RISK VERSUS CAPITAL STRUCTURE 1992

Airline	*(Debt + operating lease)/capital*	*Beta risk*
All Nippon Airways (ANA)	26.7	0.83
JAL	29.5	0.69
Cathay Pacific	27.1	0.85
Singapore Airlines (SIA)	9.0	0.65
Lufthansa	60.0	1.37
KLM	80.3	1.05
Swissair	60.8	1.17
BA	61.7	1.05
PWA	85.0	1.45
American	70.7	1.40
Delta	65.0	1.10
United	69.5	1.25
USAir	90.1	1.5

Note Relates to figure 7.7.

Sources Bloomberg; Value Line; ANZ McCaughan analysis.

TABLE II.62 SHARE PRICES AND FOREIGN SHARE PREMIUM: SINGAPORE AIRLINES 1989 TO 1993

Month–year	*SIAF*	*SIAD*	*Premium of foreign over domestic price*	*STI Index*	*Percentage return on holding STI Index*	*STI minus Accumulation Index*	*S&P 500*	*Rate of return on S&P 500 Index*	*S&P 500 Accumulation Index*	*S&P rate of return minus STI rate of return*	*S&P 500 Accumulation Index Accumulation*
2–1989	8.40	6.70	1.70	1108	–0.0240760	97.59239	289	0.0273050	97.26946	–0.0032290	–0.322939
3–1989	8.70	6.80	1.90	1190	0.0713967	104.56017	295	0.0205487	99.26821	–0.0508480	–5.291958
4–1989	8.80	6.75	2.05	1259	0.0563644	110.45365	310	0.0495969	104.19161	–0.0067680	–6.262034
5–1989	9.00	6.85	2.15	1279	0.0157608	112.19448	319	0.0286188	107.17345	0.0128580	–5.021029
6–1989	8.80	6.85	1.95	1308	0.0224207	114.70996	318	–0.0031400	106.83696	–0.0255600	–7.873006
7–1989	8.90	7.40	1.50	1372	0.0477703	120.18969	346	0.0843874	115.85265	0.0366171	–4.337040
8–1989	9.30	7.05	2.25	1356	–0.0117300	118.77982	351	0.0143474	117.51484	0.0260778	–1.264985
9–1989	9.45	7.10	2.35	1375	0.0139145	120.43259	349	–0.0057140	116.84332	–0.0196290	–3.589267
10–1989	9.10	6.90	2.20	1332	–0.0317720	116.60619	340	–0.0261260	113.79064	0.0056459	–2.815547
11–1989	9.95	6.95	3.00	1411	0.0576171	123.32470	346	0.0174932	115.78120	–0.0401240	–7.543500
12–1989	10.2	7.25	2.95	1481	0.0484189	129.29594	353	0.0200293	118.10021	–0.0283900	–11.195730
1–1990	10.55	7.35	3.20	1515	0.0226979	132.23069	329	0.0704100	109.78474	–0.0931080	–22.445950
2–1990	10.30	7.10	3.20	1550	0.0228395	135.25077	332	0.0090772	110.78128	–0.0137620	–24.469490
3–1990	10.35	7.00	3.35	1581	0.0198026	137.92909	334	0.0060060	111.44663	–0.0137970	–26.482450
4–1990	9.40	6.45	2.95	1458	–0.0809920	126.75795	331	–0.0090230	110.44109	0.0719693	–16.316850
5–1990	10.10	6.70	3.40	1554	0.0637666	134.84087	361	0.0867596	120.02292	0.0229930	–14.817950
6–1990	9.00	6.70	2.30	1527	–0.0175270	132.47749	358	–0.0083450	119.02133	0.0091823	–13.456160
7–1990	10.15	7.25	2.90	1553	0.0168835	134.71417	356	–0.0056020	118.35454	–0.0224860	–16.359630
8–1990	7.95	5.70	2.25	1277	–0.1956750	108.35398	323	–0.0972780	106.84120	0.0983966	–1.512780
9–1990	6.45	5.05	1.40	1099	–0.1501130	92.08865	306	–0.0540670	101.06459	0.0960457	8.975944
10–1990	6.60	5.00	1.60	1154	0.0488335	96.58566	304	–0.0065570	100.40187	–0.0553910	3.816212
11–1990	5.75	4.93	0.82	1107	–0.0415810	92.56958	322	0.0575238	106.17737	0.0991044	13.607796
12–1990	6.55	5.10	1.45	1154	0.0415805	96.41867	330	0.0245411	108.78308	–0.0170390	12.364415
1–1991	6.80	5.15	1.65	1267	0.0934177	105.42588	344	0.0415490	113.30291	–0.0518690	7.877031
2–1991	8.70	6.30	2.40	1460	0.1417845	120.37364	367	0.0647202	120.63590	–0.0770640	0.262257
3–1991	8.85	6.30	2.55	1491	0.0210106	122.90277	375	0.0215642	123.23731	0.0005536	0.334549
4–1991	9.05	6.40	2.65	1554	0.0413852	127.98912	375	0	123.23731	–0.0413850	–4.751809

5–1991	9.30	6.75	2.55	1554	0	127.98912	390	0.0392207	128.07077	0.0392207	0.081646
6–1991	9.45	6.70	2.75	1490	–0.0420560	122.60640	371	–0.0499450	121.67432	–0.0078890	–0.932079
7–1991	9.80	6.80	3.00	1483	–0.0047090	122.02903	388	0.0448033	127.12572	0.0495123	5.096689
8–1991	9.90	6.60	3.30	1432	–0.0349950	117.75863	395	0.0178804	129.39879	0.0528754	11.640157
9–1991	9.95	6.50	3.45	1361	–0.0508520	111.77033	388	–0.0178800	127.08508	0.0329719	15.314754
10–1991	10.00	6.45	3.55	1407	0.0332401	115.48558	392	0.0102565	128.38853	–0.0229840	12.902950
11–1991	10.35	6.45	3.90	1453	0.0321706	119.20082	375	–0.0443360	122.69632	–0.0765060	3.495499
12–1991	10.30	6.55	3.75	1491	0.0258167	122.27819	417	0.1061602	135.72178	0.0803435	13.443598
1–1992	9.55	6.55	3.00	1530	0.0258207	125.43549	409	–0.0193710	133.09271	–0.0451920	7.657214
2–1992	9.40	6.35	3.05	1477	–0.0352550	121.01330	413	0.0097324	134.38802	0.0449872	13.374726
3–1992	9.50	6.25	3.25	1414	–0.0435900	115.73828	404	–0.0220330	131.42709	0.0215577	15.688815
4–1992	9.05	6.20	2.85	1466	0.0361150	119.91817	415	0.0268636	134.95770	–0.0092510	15.039533
5–1992	9.55	6.35	3.20	1525	0.0394568	124.64976	415	0	134.95770	–0.0394570	10.307945
6–1992	9.15	6.25	2.90	1481	–0.0292770	121.00040	408	–0.0170110	132.66189	0.0122655	11.661488
7–1992	8.80	6.95	1.85	1452	–0.0197760	118.60754	424	0.0384663	137.76490	0.0582419	19.157356
8–1992	7.95	6.70	1.25	1379	–0.0515830	112.48937	414	–0.0238670	134.47680	0.0277158	21.987425
9–1992	7.20	6.60	0.60	1351	–0.0205140	110.18182	418	0.0091369	135.70550	0.0296504	25.523678
10–1992	7.50	6.40	1.10	1387	0.0262981	113.07939	419	0.0028681	136.09471	–0.0234300	23.015321
11–1992	8.20	6.65	1.55	1469	0.0574388	119.57453	431	0.0282372	139.93764	–0.0292020	20.363111
12–1992	9.25	7.00	2.25	1524	0.0367566	123.96968	436	0.0115342	141.55170	–0.0252220	17.582025
1–1993	9.00	7.30	1.70	1620	0.0610877	131.54270	439	0.0068572	142.52234	–0.0542310	10.979647
2–1993	9.00	7.00	2.00	1665	0.0273990	135.14683	443	0.0090704	143.81507	– 0.0183290	8.668241
3–1993	8.85	6.85	2.00	1668	0.0018002	135.39012	452	0.0201124	146.70754	0.0183122	11.317420
4–1993	9.45	7.00	2.45	1708	0.0236978	138.59857	440	– 0.0269070	142.76001	– 0.0506050	4.161447
5–1993	10.50	7.00	3.50	1894	0.1033679	152.92521	450	0.0224729	145.96824	– 0.0808950	– 6.956971
6–1993	10.00	6.85	3.15	1803	–0.0492390	145.39532	450	0	145.96824	0.0492391	0.572921

Notes Relates to figures 7.8 and 7.9.
SIAF denotes the price (in $SD) of Singapore Airlines' foreign shares. SIAD refers to Singapore Airlines' domestic shares.
STI is the Singapore Straights Times Index which is the major index of stocks listed on the Singapore Stock Exchange. The S&P Index is an index of the top 500 US stocks compiled by Standard and Poor's Corporation. SIAF minus SIAD is the dollar difference (in $SD) between foreign (SIAF) and domestic (SIAD) shares in Singapore Airlines. S&P 500 minus STI measures the difference between the percentage returns earned on holding the S&P 500 Index as opposed to the Singapore Straights Times Index over monthly intervals.

Source Bloomberg, 27 September 1993.

TABLE II.63 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: ASIA (JAPAN AIRLINES)

Month–year	*JAL share price*	*Rate of return on share price*	*Accumulation index for JAL*	*Stock exchange index*	*Rate of return on stock exchange index*	*Accumulation index for stock exchange index*	*JAL accumulation index less stock exchange accumulation index*
10–1989	1 544		1 000.0	2 692.65		1 000.0	0
11–1989	1 627	0.052361	1 052.4	2 829.54	0.248951	1 249.0	–196.590
12–1989	1 794	0.097710	1 155.2	2 881.37	0.168015	1 458.8	–303.607
1–1990	1 563	–0.137841	996.0	2 737.57	0.155485	1 685.6	–689.659
2–1990	1 479	–0.055241	940.9	2 565.54	0.130106	1 904.9	–963.985
3–1990	1 362	–0.082412	863.4	2 227.48	0.120834	2 135.1	–1 271.710
4–1990	1 562	0.137013	981.7	2 205.96	0.339616	2 860.2	–1 878.529
5–1990	1 705	0.087598	1 067.7	2 435.74	0.271778	3 637.6	–2 569.881
6–1990	1 695	–0.005882	1 061.4	2 343.36	–0.038665	3 496.9	–2 435.516
7–1990	1 781	0.049492	1 113.9	2 252.55	–0.039523	3 358.7	–2 244.776
8–1990	1 343	–0.282269	799.5	1 973.95	–0.132026	2 915.3	–2 115.767
9–1990	923	–0.375032	499.7	1 570.74	–0.228490	2 249.2	–1 749.497
10–1990	1 190	0.254079	626.6	1 856.09	0.166925	2 624.6	–1 997.985
11–1990	934	–0.242232	474.8	1 652.01	–0.116479	2 318.9	–1 844.060
12–1990	1 029	0.096866	520.8	1 733.83	0.048340	2 431.0	–1 910.160
1–1991	1 010	–0.018637	511.1	1 710.93	–0.013296	2 398.7	–1 887.545
2–1991	1 229	0.196250	611.4	1 960.32	0.136071	2 725.1	–2 113.625
3–1991	1 190	–0.032248	591.7	1 970.73	0.005296	2 739.5	–2 147.775
4–1991	1 095	–0.083199	542.5	1 963.42	–0.003716	2 729.3	–2 186.824
5–1991	1 105	0.009091	547.4	1 964.77	0.000687	2 731.2	–2 183.769
6–1991	1 057	–0.044411	523.1	1 819.01	–0.077083	2 520.7	–1 997.552
7–1991	1 171	0.102423	576.7	1 859.12	0.021811	2 575.6	–1 998.952
8–1991	1 143	–0.024202	562.7	1 732.10	–0.070769	2 393.4	–1 830.635
9–1991	1 230	0.073358	604.0	1 832.20	0.056183	2 527.8	–1 923.820
10–1991	1 150	–0.067252	563.4	1 887.45	0.029709	2 602.9	–2 039.541
11–1991	986	–0.153861	476.7	1 731.30	–0.086354	2 378.2	–1 901.450
12–1991	980	–0.006104	473.8	1 714.68	–0.009646	2 355.2	–1 881.420
1–1992	961	–0.019578	464.5	1 630.94	–0.050070	2 237.3	–1 772.771

2–1992	876	–0.092608	421.5	1 554.49	–0.048009	2 129.9	–1 708.379
3–1992	778	–0.118640	371.5	1 418.52	–0.091533	1 934.9	–1 563.430
4–1992	725	–0.070555	345.3	1 317.46	–0.073908	1 791.9	–1 446.634
5–1992	757	0.043192	360.2	1 376.32	0.043708	1 870.2	–1 510.041
6–1992	661	–0.135609	311.3	1 236.20	–0.107371	1 669.4	–1 358.077
7–1992	670	0.013524	315.6	1 219.25	–0.013806	1 646.4	–1 330.818
8–1992	690	0.029414	324.8	1 385.51	0.127832	1 856.8	–1 531.996
9–1992	617	–0.111823	288.5	1 310.60	–0.055583	1 753.6	–1 465.112
10–1992	584	–0.054968	272.7	1 278.91	–0.024477	1 710.7	–1 438.048
11–1992	577	–0.012059	269.4	1 323.35	0.034158	1 769.1	–1 499.770
12–1992	595	0.030719	277.6	1 307.66	–0.011927	1 748.0	–1 470.395
1–1993	599	0.006700	279.5	1 298.88	–0.006737	1 736.3	–1 456.758
2–1993	557	–0.072696	259.2	1 284.21	–0.011359	1 716.5	–1 457.355
3–1993	628	0.119975	290.3	1 431.87	0.108838	1 903.4	–1 613.084
4–1993	860	0.314392	381.5	1 620.79	0.123932	2 139.3	–1 757.710
5–1993	828	–0.037919	367.1	1 636.60	0.009707	2 160.0	–1 792.944
6–1993	770	–0.072623	340.4	1 580.25	–0.035038	2 084.3	–1 743.920
7–1993	794	0.030693	350.9	1 659.91	0.049180	2 186.8	–1 835.980
8–1993	791	–0.003785	349.5	1 693.09	0.019792	2 230.1	–1 880.590

Notes Relates to figure 7.10.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1 + ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right) - \left(N^{I}_{t-1} \times \left(1 + ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.64 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: ASIA (SINGAPORE AIRLINES)

Month–year	*SIA share price*	*Rate of return on share price*	*Accumulation index for SIA*	*Stock exchange index*	*Rate of return on stock exchange exchange index*	*Accumulation index for stock exchange index*	*SIA index less stock exchange accumulation index*
10–1989	6.90		1 000.0	1 332.41		1 000.0	0
11–1989	6.95	0.007220	1 007.2	1 411.28	–0.032843	967.2	40.0631
12–1989	7.25	0.042260	1 049.8	1 481.33	–0.047660	921.1	128.7230
1–1990	7.35	0.013699	1 064.2	1 515.01	–0.007857	913.8	150.3404
2–1990	7.10	–0.034606	1 027.3	1 550.06	–0.001876	912.1	115.2283
3–1990	7.00	–0.014185	1 000.0	1 581.08	0.213814	1 107.1	–107.1338
4–1990	6.45	–0.081830	918.2	1 458.40	0.283230	1 420.7	–502.5378
5–1990	6.70	0.038027	953.1	1 553.64	0.297410	1 843.2	–890.1546
6–1990	6.70	0	953.1	1 526.96	–0.017322	1 811.3	–858.2264
7–1990	7.25	0.078894	1 028.3	1 552.97	0.016890	1 841.9	–813.6275
8–1990	5.70	–0.240535	780.9	1 276.72	–0.195875	1 481.1	–700.1816
9–1990	5.05	–0.121078	686.4	1 098.68	–0.150185	1 258.7	–572.2941
10–1990	5.00	–0.009950	679.6	1 153.95	0.049081	1 320.5	–640.9017
11–1990	4.93	–0.015114	669.3	1 106.59	–0.041908	1 265.1	–595.8350
12–1990	5.10	0.034916	692.7	1 154.48	0.042367	1 318.7	–626.0652
1–1991	5.15	0.009756	699.4	1 267.25	0.093199	1 441.6	–742.2111
2–1991	6.30	0.201553	840.4	1 459.57	0.141293	1 645.3	–804.9334
3–1991	6.30	0	840.4	1 490.83	0.021191	1 680.2	–839.7994
4–1991	6.40	0.015748	853.6	1 553.94	0.041461	1 749.8	–896.2262
5–1991	6.75	0.053245	899.1	1 554.18	0.000154	1 750.1	–851.0460
6–1991	6.70	–0.007435	892.4	1 489.89	–0.042246	1 676.2	–783.7957
7–1991	6.80	0.014815	905.6	1 482.87	–0.004723	1 668.3	–762.6586
8–1991	6.60	–0.029853	878.6	1 432.24	–0.034740	1 610.3	–731.7385
9–1991	6.50	–0.015267	865.2	1 360.63	–0.051292	1 527.7	–662.5565
10–1991	6.45	–0.007722	858.5	1 407.11	0.033590	1 579.0	–720.5533
11–1991	6.45	0	858.5	1 453.20	0.032230	1 629.9	–771.4454
12–1991	6.55	0.015385	871.7	1 490.70	0.025478	1 671.4	–799.7646
1–1992	6.55	0	871.7	1 529.69	0.025819	1 714.6	–842.9201

2–1992	6.35	–0.031010	844.6	1 477.43	–0.034761	1 655.0	–810.3499
3–1992	6.25	–0.015873	831.2	1 414.26	–0.043698	1 582.7	–751.4377
4–1992	6.20	–0.008032	824.6	1 465.95	0.035897	1 639.5	–814.9279
5–1992	6.35	0.023906	844.3	1 524.69	0.039288	1 703.9	–859.6281
6–1992	6.25	–0.015873	830.9	1 481.08	–0.029020	1 654.5	–823.5830
7–1992	6.95	0.106160	919.1	1 451.84	–0.019940	1 621.5	–702.3874
8–1992	6.70	–0.036634	885.4	1 378.54	–0.051807	1 537.5	–652.0541
9–1992	6.60	–0.015038	872.1	1 350.97	–0.020202	1 506.4	–634.3088
10–1992	6.40	–0.030772	845.3	1 387.00	0.026320	1 546.1	–700.7937
11–1992	6.65	0.038319	877.7	1 469.07	0.057486	1 634.9	–757.2814
12–1992	7.00	0.051293	922.7	1 524.40	0.036971	1 695.4	–772.7094
1–1993	7.30	0.041964	961.4	1 620.16	0.060924	1 798.7	–837.2796
2–1993	7.00	–0.041964	921.0	1 664.50	0.027000	1 847.2	–926.1873
3–1993	6.85	–0.021661	901.1	1 668.30	0.002280	1 851.4	–950.3508
4–1993	7.00	0.021661	920.6	1 707.84	0.023424	1 894.8	–974.2005
5–1993	7.00	0	920.6	1 894.44	0.103694	2 091.3	–1 170.6810
6–1993	6.85	–0.021661	900.7	1 802.78	–0.049593	1 987.6	–1 086.9080
7–1993	6.50	–0.052446	853.4	1 900.00	0.052524	2 092.0	–1 238.5410
8–1993	6.80	0.045120	891.9	2008.66	0.055614	2 208.3	–1 316.3770

Notes Relates to figure 7.10.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1+ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right)-\left(N^{I}_{t-1} \times \left(1+ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.65 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: EUROPE (BRITISH AIRWAYS)

Month–year	BA share price	Rate of return on share price	Accumulation index for BA	Stock exchange index	Rate of return on stock exchange index	Accumulation index for stock exchange index	BA accumulation index less stock exchange accumulation index
10–1989	190.0		1 000.0	2 142.6		1 000.0	0
11–1989	206.0	0.080852	1 080.9	2 276.8	0.060751	1 060.8	20.10119
12–1989	230.0	0.110203	1 200.0	2 422.7	0.062112	1 126.6	73.32948
1–1990	202.0	–0.129812	1 044.2	2 322.0	–0.042454	1 078.8	–34.61006
2–1990	196.0	–0.030153	1 012.7	2 255.4	–0.029102	1 047.4	–34.70082
3–1990	202.8	0.034106	1 047.2	2 247.9	–0.003331	1 043.9	3.32710
4–1990	197.0	–0.029017	1 016.9	2 103.4	–0.066441	974.6	42.29916
5–1990	205.5	0.042242	1 059.8	2 345.2	0.108816	1 080.6	–20.79388
6–1990	211.0	0.026412	1 087.8	2 374.7	0.012500	1 094.1	–6.30999
7–1990	202.0	–0.043590	1 040.4	2 326.4	–0.020549	1 071.6	–31.24488
8–1990	170.4	–0.170060	863.5	2 162.8	–0.072918	993.5	–130.03220
9–1990	145.0	–0.161474	724.0	1 990.3	–0.083118	910.9	–186.88090
10–1990	142.0	–0.020907	708.9	2 050.4	0.029750	938.0	–229.11740
11–1990	141.0	–0.007067	703.9	2 149.3	0.047107	982.2	–278.31460
12–1990	143.0	0.014085	713.8	2 143.4	–0.002749	979.5	–265.70060
1–1991	136.0	–0.050190	678.0	2 170.1	0.012380	991.6	–313.65230
2–1991	166.0	0.199333	813.1	2 380.8	0.092663	1 083.5	–270.39690
3–1991	168.0	0.011976	822.9	2 456.6	0.031342	1 117.5	–294.61810
4–1991	168.0	0	822.9	2486.3	0.012017	1 130.9	–308.04720
5–1991	172.0	0.023530	842.2	2 499.5	0.005295	1 136.9	–294.67320
6–1991	161.0	–0.066090	786.6	2 414.7	–0.034516	1 097.7	–311.09500
7–1991	174.0	0.077651	847.6	2 588.7	0.069581	1 174.0	–326.39350
8–1991	178.5	0.025533	869.3	2 645.7	0.021780	1 199.6	–330.32080
9–1991	182.0	0.019418	886.2	2 621.7	–0.009113	1 188.7	–302.50950
10–1991	203.0	0.109199	982.9	2 566.0	–0.021475	1 163.1	–180.21550
11–1991	205.5	0.012240	995.0	2 420.2	–0.058498	1 095.1	–100.14300
12–1991	231.0	0.116972	1 111.3	2 493.1	0.029677	1 127.6	–16.26034
1–1992	243.5	0.052699	1 169.9	2 571.2	0.030846	1 162.4	7.52464

2–1992	272.0	0.110685	1 299.4	2 562.1	–0.003545	1 158.3	141.13680
3–1992	251.0	–0.080349	1 195.0	2 440.1	–0.048788	1 101.7	93.24089
4–1992	288.5	0.139242	1 361.4	2 654.1	0.084067	1 194.4	167.01360
5–1992	292.0	0.012059	1 377.8	2 707.6	0.019957	1 218.2	159.59400
6–1992	266.5	–0.091380	1 251.9	2 521.2	–0.071328	1 131.3	120.58310
7–1992	256.0	–0.040197	1 201.6	2 399.6	–0.049433	1 075.4	126.18500
8–1992	224.0	–0.133531	1 041.1	2 312.6	–0.036930	1 035.7	5.45081
9–1992	298.0	0.285447	1 338.3	2 553.0	0.098897	1 138.1	200.21280
10–1992	283.5	–0.049881	1 271.6	2 658.3	0.040418	1 184.1	87.45648
11–1992	275.0	–0.030441	1 232.8	2 778.8	0.044332	1 236.6	–3.74493
12–1992	308.5	0.114951	1 374.6	2 846.5	0.024071	1 266.4	108.20590
1–1993	278.0	–0.104101	1 231.5	2 807.2	–0.013903	1 248.8	–17.28165
2–1993	291.0	0.045702	1 287.8	2 868.0	0.021427	1 275.5	12.24177
3–1993	281.5	–0.033087	1 245.1	2 878.7	0.003724	1 280.3	–35.11656
4–1993	281.5	–0.000103	1 245.0	2 813.1	–0.023052	1 250.7	–5.73303
5–1993	310.0	0.096440	1365.1	2840.7	0.009763	1263.0	102.12450
6–1993	309.0	–0.003231	1360.7	2900.0	0.020660	1289.1	71.62086
7–1993	339.0	0.092659	1486.8	2926.5	0.009096	1300.8	185.97360
8–1993	360.0	0.060104	1576.1	3100.0	0.057595	1375.7	200.41500

Notes Relates to figure 7.11.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1 + ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right) - \left(N^{I}_{t-1} \times \left(1 + ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.66 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: EUROPE (KLM)

Month–year	*KLM share price*	*Rate of return on share price*	*Accumulation index for KLM*	*Stock exchange index*	*Rate of return on stock exchange index*	*Accumulation index for stock exchange exchange index*	*KLM accumulation index less stock exchange accumulation index*
10–1989	46.4		1 000.0	290.20		1 000.0	0
11–1989	46.7	0.006445	1 006.4	293.83	0.044504	1 044.5	–38.0597
12–1989	48.4	0.035756	1 042.4	301.00	0.041237	1 087.6	–45.1462
1–1990	42.8	–0.122962	914.3	280.73	–0.041276	1 042.7	–128.4340
2–1990	34.1	–0.227241	706.5	265.47	–0.069899	969.8	–263.3065
3–1990	35.9	0.051440	742.8	288.77	0.149826	1 115.1	–372.2656
4–1990	35.6	–0.008392	736.6	281.04	0.220931	1 361.5	–624.8604
5–1990	35.2	–0.011300	728.3	288.84	0.218360	1 658.8	–930.4732
6–1990	35.6	0.011300	736.5	292.56	0.012797	1 680.0	–943.4708
7–1990	30.6	–0.151346	625.0	284.69	–0.027269	1 634.2	–1 009.1270
8–1990	23.9	–0.247122	470.6	248.59	–0.135596	1 412.6	–942.0021
9–1990	23.0	–0.038384	452.5	225.33	–0.098239	1 273.8	–821.2943
10–1990	20.1	–0.134774	391.5	232.18	0.029947	1 312.0	–920.4290
11–1990	19.6	–0.025190	381.7	229.10	–0.013354	1 294.4	–912.7714
12–1990	19.9	0.015190	387.5	229.21	0.000480	1 295.1	–907.5951
1–1991	20.2	0.014963	393.3	233.85	0.020041	1 321.0	–927.7522
2–1991	26.7	0.278981	503.0	257.33	0.095679	1 447.4	–944.4333
3–1991	26.4	–0.011300	497.3	278.28	0.078268	1 560.7	–1 063.4030
4–1991	26.2	–0.007605	493.5	280.11	0.006555	1 570.9	–1 077.4150
5–1991	27.5	0.048427	517.4	282.09	0.007044	1 582.0	–1 064.5810
6–1991	29.8	0.080322	559.0	274.43	–0.027530	1 538.4	–979.4691
7–1991	28.1	–0.058739	526.1	279.51	0.018342	1 566.7	–1040.5200
8–1991	30.6	0.085230	571.0	278.22	–0.004626	1 559.4	– 988.4301
9–1991	30.5	–0.003273	569.1	271.76	–0.023493	1 522.8	–953.6641
10–1991	38.3	0.227723	698.7	273.80	0.007479	1 534.2	–835.4527
11–1991	37.8	–0.013141	689.5	274.58	0.002845	1 538.5	–848.9986
12–1991	40.3	0.064042	733.7	277.05	0.008955	1 552.3	–818.6176
1–1992	41.3	0.024511	751.7	294.77	0.061997	1 648.5	–896.8731

2–1992	38.6	–0.067610	700.9	305.56	0.035951	1 707.8	–1 006.9600
3–1992	35.9	–0.072515	650.0	303.29	–0.007457	1 695.1	–1 045.0480
4–1992	38.1	0.059477	688.7	314.58	0.036549	1 757.0	–1 068.3390
5–1992	40.6	0.063554	732.5	318.35	0.011913	1 778.0	–1 045.5020
6–1992	35.7	–0.128617	638.3	302.57	–0.050839	1 687.6	–1 049.3190
7–1992	31.8	–0.115684	564.4	288.87	–0.046336	1 609.4	–1 044.9600
8–1992	25.4	–0.224717	437.6	277.74	–0.039291	1 546.1	–1 108.5590
9–1992	27.6	0.083067	473.9	286.40	0.030704	1 593.6	–1 119.6840
10–1992	23.0	–0.182322	387.5	273.36	–0.046600	1 519.4	–1 131.8290
11–1992	25.1	0.087374	421.4	278.16	0.017407	1 545.8	–1 124.4170
12–1992	24.1	–0.040656	404.3	285.84	0.027236	1 587.9	–1 183.6500
1–1993	27.3	0.124675	454.7	291.95	0.021150	1 621.5	–1 166.8350
2–1993	25.8	–0.056512	429.0	305.82	0.046414	1 696.7	–1 267.7880
3–1993	28.4	0.096015	470.1	318.49	0.040594	1 765.6	–1 295.4800
4–1993	27.8	–0.021353	460.1	314.02	–0.014134	1 740.7	–1 280.5630
5–1993	25.8	–0.074662	425.8	308.28	–0.018448	1 708.6	–1 282.8030
6–1993	25.9	0.003868	427.4	324.20	0.050352	1 794.6	–1 367.1850
7–1993	33.9	0.269172	542.4	338.92	0.044403	1 874.3	–1 331.8270
8–1993	37.0	0.087503	589.9	365.69	0.076022	2 016.8	–1 426.8470

Notes Relates to figure 7.11.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^S_{t-1} \times \left(1 + ln\left(P^S_t / P^S_{t-1}\right)\right)\right) - \left(N^I_{t-1} \times \left(1 + ln\left(P^I_t / P^I_{t-1}\right)\right)\right)\right]$$

where N^S_t is the value of the investment in the airline stock at time t, N^I_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^S_t is the price of the airline stock at time t, P^I_t is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.67 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: NORTH AMERICA (AIR CANADA)

Month–year	*Air Canada share price*	*Rate of return on share price*	*Accumulation index for Air Canada*	*Stock exchange index*	*Rate of return on stock exchange index*	*Accumulation index for stock index*	*Air Canada accumulation index less stock exchange accumulation*
10–1989	12.250		1 000.0	3 918.7		1 000.0	0
11–1989	12.500	0.020203	1 020.2	3 942.8	0.006131	1 006.1	14.07154
12–1989	12.875	0.029559	1 050.4	3 969.8	0.006825	1 013.0	37.36109
1–1990	10.125	–0.240280	798.0	3 704.5	–0.069167	942.9	–144.95250
2–1990	10.000	–0.012423	788.1	3 686.8	–0.004789	938.4	–150.34930
3–1990	9.875	–0.012579	778.2	3 639.6	–0.012885	926.3	–148.17070
4–1990	9.500	–0.038715	748.0	3341.0	–0.085604	847.0	–98.99981
5–1990	10.375	0.088107	813.9	3 582.0	0.069651	906.0	–92.08958
6–1990	10.125	–0.024391	794.1	3 544.0	–0.010665	896.4	–102.27960
7–1990	10.000	–0.012423	784.2	3 561.2	0.004842	900.7	–116.48390
8–1990	8.375	–0.177334	645.1	3 346.3	–0.062242	844.6	–199.49040
9–1990	8.125	–0.030305	625.6	3 159.4	–0.057473	796.1	–170.49780
10–1990	7.750	–0.047253	596.0	3 081.3	–0.025031	776.2	–180.13240
11–1990	8.250	0.062520	633.3	3 151.1	0.022400	793.6	–160.25420
12–1990	8.500	0.029853	652.2	3 256.8	0.032994	819.7	–167.53050
1–1991	8.875	0.043172	680.4	3 273.0	0.004962	823.8	–143.44080
2–1991	9.500	0.068053	726.7	3 462.0	0.056139	870.1	–143.38760
3–1991	9.875	0.038715	754.8	3 495.7	0.009687	878.5	–123.68360
4–1991	9.500	–0.038715	725.6	3 468.9	–0.007696	871.7	–146.14430
5–1991	9.625	0.013072	735.1	3 546.2	0.022039	890.9	–155.87140
6–1991	9.625	0	735.1	3 465.9	–0.022904	870.5	–135.46520
7–1991	9.125	–0.053346	695.8	3 539.7	0.021070	888.9	–193.01930
8–1991	8.125	–0.116072	615.1	3 517.9	–0.006181	883.4	–268.29410
9–1991	7.500	–0.080043	565.8	3 387.9	–0.037657	850.1	–284.26140
10–1991	8.375	0.110350	628.3	3 515.8	0.037051	881.6	–253.31910
11–1991	7.875	–0.061558	589.6	3 448.5	–0.019313	864.6	–274.96820
12–1991	8.000	0.015748	598.9	3 512.4	0.018346	880.4	–281.54430

1–1992	7.875	–0.015748	589.5	3 596.1	0.023567	901.2	–311.72550
2–1992	7.250	–0.082692	540.7	3 581.9	–0.003951	897.6	–356.90870
3–1992	6.250	–0.148420	460.5	3 412.1	–0.048577	854.0	–393.55860
4–1992	5.500	–0.127833	401.6	3 355.6	–0.016709	839.8	–438.15140
5–1992	4.950	–0.105361	359.3	3 387.9	0.009600	847.8	–488.52660
6–1992	4.950	0	359.3	3 387.7	–0.000068	847.8	–488.46900
7–1992	5.000	0.010050	362.9	3 443.4	0.016314	861.6	–498.68830
8–1992	4.400	–0.127833	316.5	3 402.9	–0.011831	851.4	–534.88550
9–1992	3.300	–0.287682	225.5	3 297.9	–0.031354	824.7	–599.24510
10–1992	2.900	–0.129212	196.3	3 336.1	0.011529	834.2	–637.88430
11–1992	2.800	–0.035091	189.4	3 282.8	–0.016103	820.8	–631.34070
12–1992	2.750	–0.018019	186.0	3 350.4	0.020386	837.5	–651.48620
1–1993	2.250	–0.200671	148.7	3 305.5	–0.013513	826.2	–677.49810
2–1993	2.840	0.232874	183.3	3 451.7	0.043285	862.0	–678.63340
3–1993	2.850	0.003515	184.0	3 602.4	0.042747	898.8	–714.83530
4–1993	3.350	0.161641	213.7	3 789.4	0.050599	944.3	–730.57740
5–1993	3.150	–0.061558	200.5	3 882.7	0.024315	967.2	–766.69270
6–1993	3.450	0.090972	218.8	3 966.4	0.021326	987.9	–769.07580
7–1993	3.300	–0.044452	209.1	3 967.2	0.000217	988.1	–779.01550
8–1993	4.550	0.321205	276.2	4 137.6	0.042036	1 029.6	–753.39800

Notes Relates to figure 7.12.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1+ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right)-\left(N^{I}_{t-1} \times \left(1+ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.68 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: NORTH AMERICA (AMERICAN AIRLINES)

Month–year	*AMR share price*	*Rate of return on share price*	*Accumulation index for AMR*	*Stock exchange index*	*Rate of return on stock exchange index*	*Accumulation index for stock exchange index*	*AMR accumulation index less stock exchange accumulation index*
10–1989	71.375		1 000.0	340.36		1 000.0	0
11–1989	63.000	–0.124813	875.2	345.99	0.044896	1 044.9	–169.7089
12–1989	58.000	–0.082692	802.8	353.40	–0.021914	1 022.0	–219.1814
1–1990	53.500	–0.080761	738.0	329.08	–0.084288	935.9	–197.8758
2–1990	60.375	0.120893	827.2	331.89	–0.070548	869.8	–42.6358
3–1990	64.500	0.066090	881.9	339.94	0.052480	915.5	–33.6150
4–1990	62.375	–0.033501	852.3	330.80	0.077765	986.7	–134.3510
5–1990	63.875	0.023763	872.6	361.23	0.172487	1 156.9	–284.2854
6–1990	64.125	0.003906	876.0	358.02	–0.008926	1 146.5	–270.5507
7–1990	55.500	–0.144451	749.4	356.15	–0.005237	1 140.5	–391.0838
8–1990	44.875	–0.212502	590.2	322.56	–0.099063	1 027.5	–437.3589
9–1990	42.250	–0.060276	554.6	306.05	–0.052541	973.6	–418.9453
10–1990	46.375	0.093156	606.3	304.00	–0.006721	967.0	–360.7365
11–1990	47.250	0.018692	617.6	322.22	0.058207	1 023.3	–405.6908
12–1990	48.375	0.023530	632.1	330.22	0.024525	1 048.4	–416.2541
1–1991	54.750	0.123794	710.4	343.93	0.040679	1 091.0	–380.6460
2–1991	60.125	0.093648	776.9	367.07	0.065114	1 162.1	–385.1610
3–1991	58.125	–0.033830	750.6	375.22	0.021960	1 187.6	–436.9639
4–1991	60.875	0.046227	785.3	375.34	0.000320	1 188.0	–402.6437
5–1991	66.000	0.080832	848.8	389.83	0.037878	1 233.0	–384.1617
6–1991	60.750	–0.082888	778.5	371.16	–0.049078	1 172.5	–394.0070
7–1991	63.000	0.036368	806.8	387.81	0.043882	1 223.9	–417.1469
8–1991	59.125	–0.063481	755.6	395.43	0.019458	1 247.7	–492.1776
9–1991	57.375	–0.030045	732.9	387.86	–0.019329	1 223.6	–490.7606
10–1991	63.500	0.101431	807.2	392.45	0.011765	1 238.0	–430.8208
11–1991	58.875	–0.075623	746.2	375.22	–0.044897	1 182.4	–436.2810
12–1991	70.500	0.180196	880.6	417.09	0.105790	1 307.5	–426.9159

1–1992	70.750	0.003540	883.7	408.78	–0.020125	1 281.2	–397.4849
2–1992	76.375	0.076503	951.3	412.70	0.009544	1 293.4	–342.1047
3–1992	73.750	–0.034974	918.1	403.69	–0.022074	1 264.9	–346.8262
4–1992	66.375	–0.105361	821.3	414.95	0.027511	1 299.7	–478.3520
5–1992	63.250	–0.048225	781.7	415.35	0.000964	1 300.9	–519.2135
6–1992	64.625	0.021506	798.5	408.14	–0.017511	1 278.2	–479.6204
7–1992	66.125	0.022946	816.9	424.22	0.038642	1 327.6	–510.6880
8–1992	55.500	–0.175164	673.8	414.03	–0.024314	1 295.3	–621.4950
9–1992	57.125	0.028859	693.2	417.80	0.009064	1 307.0	–613.7915
10–1992	62.750	0.093917	758.3	418.68	0.002104	1 309.8	–551.4364
11–1992	64.500	0.027507	779.2	431.35	0.029813	1 348.8	–569.6252
12–1992	67.500	0.045462	814.6	435.71	0.010057	1 362.4	–547.7667
1–1993	63.000	–0.068993	758.4	438.78	0.007021	1 371.9	–613.5345
2–1993	59.625	–0.055060	716.6	443.38	0.010429	1 386.3	–669.6003
3–1993	65.000	0.086312	778.5	451.67	0.018525	1 411.9	–633.4244
4–1993	67.125	0.032169	803.5	440.19	–0.025745	1 375.6	–572.0298
5–1993	70.750	0.052596	845.8	450.21	0.022508	1 406.5	–560.7274
6–1993	63.250	–0.112057	751.0	450.53	0.000711	1 407.5	–656.5064
7–1993	65.500	0.034955	777.3	448.13	–0.005341	1 400.0	–622.7359
8–1993	67.000	0.022642	794.9	463.56	0.033852	1 447.4	–652.5304

Notes Relates to figure 7.12.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1+ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right)-\left(N^{I}_{t-1} \times \left(1+ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *l*n is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.69 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: NORTH AMERICA (DELTA AIRLINES)

Month–year	*Delta share price*	*Rate of return on share price*	*Accumulation index for Delta*	*Stock exchange index*	*Rate of return on stock exchange index*	*Accumulation index for stock exchange index*	*Delta accumulation index less stock exchange accumulation index*
10–1989	66.000		1 000.0	340.36		1 000.0	0
11–1989	69.000	0.044452	1 044.5	345.99	0.044896	1 044.9	–0.44422
12–1989	68.250	–0.010929	1 033.0	353.40	–0.021914	1 022.0	11.0391
1–1990	64.625	–0.054576	976.7	329.08	–0.084288	935.9	40.8021
2–1990	69.625	0.074522	1 049.4	331.89	–0.070548	869.8	179.6081
3–1990	74.250	0.064314	1 116.9	339.94	0.052480	915.5	201.4531
4–1990	73.250	–0.013560	1 101.8	330.80	0.077765	986.7	115.1152
5–1990	76.875	0.048302	1 155.0	361.23	0.172487	1 156.9	–1.8543
6–1990	73.125	–0.050010	1 097.2	358.02	–0.008926	1 146.5	–49.2906
7–1990	64.125	–0.131336	953.1	356.15	–0.005237	1 140.5	–187.3942
8–1990	56.750	–0.122179	836.7	322.56	–0.099063	1 027.5	–190.8630
9–1990	55.000	–0.031322	810.5	306.05	–0.052541	973.6	–163.0820
10–1990	58.250	0.057411	857.0	304.00	–0.006721	967.0	–110.0086
11–1990	56.750	–0.026088	834.7	322.22	0.058207	1 023.3	–188.6536
12–1990	55.750	–0.017778	819.8	330.22	0.024525	1 048.4	–228.5883
1–1991	68.250	0.202300	985.7	343.93	0.040679	1 091.0	–105.3883
2–1991	75.125	0.095976	1 080.3	367.07	0.065114	1 162.1	–81.8316
3–1991	69.625	–0.076030	998.1	375.22	0.021960	1 187.6	–189.4829
4–1991	70.000	0.005372	1 003.5	375.34	0.000320	1 188.0	–184.5011
5–1991	75.375	0.073980	1 077.7	389.83	0.037878	1 233.0	–155.2618
6–1991	68.625	–0.093819	976.6	371.16	–0.049078	1 172.5	–195.8608
7–1991	74.750	0.085492	1 060.1	387.81	0.043882	1 223.9	–163.8186
8–1991	66.375	–0.118829	934.1	395.43	0.019458	1 247.7	–313.6056
9–1991	65.000	–0.020933	914.6	387.86	–0.019329	1 223.6	–309.0421
10–1991	62.375	–0.041223	876.9	392.45	0.011765	1 238.0	–361.1393
11–1991	57.120	–0.088010	799.7	375.22	–0.044897	1 182.4	–382.7309
12–1991	66.125	0.146393	916.8	417.09	0.105790	1 307.5	–390.7492
1–1992	67.125	0.015010	930.5	408.78	–0.020125	1 281.2	–350.6748

2–1992	68.875	0.025737	954.5	412.70	0.009544	1 293.4	–338.9535
3–1992	62.875	–0.091145	867.5	403.69	–0.022074	1 264.9	–397.3989
4–1992	59.375	–0.057275	817.8	414.95	0.027511	1 299.7	–481.8829
5–1992	57.000	–0.040822	784.4	415.35	0.000964	1 300.9	–516.5196
6–1992	54.250	–0.049448	745.6	408.14	–0.017511	1 278.2	–532.5268
7–1992	55.250	0.018265	759.3	424.22	0.038642	1 327.6	–568.2981
8–1992	50.000	–0.099845	683.4	414.03	–0.024314	1 295.3	–611.8282
9–1992	56.000	0.113329	760.9	417.80	0.009064	1 307.0	–546.1152
10–1992	56.750	0.013304	771.0	418.68	0.002104	1 309.8	–538.7423
11–1992	53.000	–0.068364	718.3	431.35	0.029813	1 348.8	–630.5000
12–1992	50.875	–0.040920	688.9	435.71	0.010057	1 362.4	–673.4586
1–1993	51.875	0.019465	702.3	438.78	0.007021	1 371.9	–669.6142
2–1993	49.250	–0.051928	665.9	443.38	0.010429	1 386.3	–720.3924
3–1993	52.875	0.071021	713.1	451.67	0.018525	1 411.9	–698.7822
4–1993	58.125	0.094665	780.7	440.19	–0.025745	1 375.6	–594.9212
5–1993	57.500	–0.010811	772.2	450.21	0.022508	1 406.5	–634.3219
6–1993	48.375	–0.172802	638.8	450.53	0.000711	1 407.5	–768.7620
7–1993	50.125	0.035537	661.5	448.13	–0.005341	1 400.0	–738.5439
8–1993	54.000	0.074464	710.7	463.56	0.033852	1 447.4	–736.6817

Notes Relates to figure 7.12.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1+ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right)-\left(N^{I}_{t-1} \times \left(1+ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.70 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: NORTH AMERICA (UNITED AIRLINES)

Month–year	*UAL share price*	*Rate of return on share price*	*Accumulation index for UAL*	*Stock exchange index*	*Rate of return on stock exchange index*	*Accumulation index for stock exchange index*	*UAL accumulation index less stock exchange accumulation index*
10–1989	175.500		1 000.0	340.36		1 000.0	0
11–1989	161.500	–0.083134	916.9	345.99	0.044896	1 044.9	–128.0298
12–1989	171.250	0.058619	970.6	353.40	–0.021914	1 022.0	–51.38555
1–1990	121.000	–0.347334	633.5	329.08	–0.084288	935.9	–302.3700
2–1990	131.000	0.079407	683.8	331.89	–0.070548	869.8	–186.0438
3–1990	162.000	0.212399	829.0	339.94	0.052480	915.5	–86.45655
4–1990	151.750	–0.065362	774.8	330.80	0.077765	986.7	–211.8360
5–1990	155.500	0.024411	793.8	361.23	0.172487	1 156.9	–363.1098
6–1990	150.000	–0.036010	765.2	358.02	–0.008926	1 146.5	–381.3671
7–1990	140.000	–0.068993	712.4	356.15	–0.005237	1 140.5	–428.1540
8–1990	92.000	–0.419854	413.3	322.56	–0.099063	1 027.5	–614.2644
9–1990	97.250	0.055496	436.2	306.05	–0.052541	973.6	–537.3406
10–1990	97.250	0	436.2	304.00	–0.006721	967.0	–530.7975
11–1990	97.500	0.002567	437.3	322.22	0.058207	1 023.3	–585.9646
12–1990	110.125	0.121764	490.6	330.22	0.024525	1 048.4	–557.8086
1–1991	128.750	0.156256	567.2	343.93	0.040679	1 091.0	–523.7985
2–1991	144.500	0.115407	632.7	367.07	0.065114	1 162.1	–529.3769
3–1991	144.500	0	632.7	375.22	0.021960	1 187.6	–554.8964
4–1991	153.375	0.059606	670.4	375.34	0.000320	1 188.0	–517.5623
5–1991	154.000	0.004067	673.2	389.83	0.037878	1 233.0	–559.8351
6–1991	138.750	–0.104279	603.0	371.16	–0.049078	1 172.5	–569.5188
7–1991	142.750	0.028421	620.1	387.81	0.043882	1 223.9	–603.8331
8–1991	137.000	–0.041114	594.6	395.43	0.019458	1 247.7	–653.1431
9–1991	126.375	–0.080727	546.6	387.86	–0.019329	1 223.6	–677.0255
10–1991	132.750	0.049214	573.5	392.45	0.011765	1 238.0	–664.5207
11–1991	125.250	–0.058156	540.1	375.22	–0.044897	1 182.4	–642.2902
12–1991	145.750	0.151581	622.0	417.09	0.105790	1 307.5	–685.5035

1–1992	144.750	–0.006885	617.7	408.78	–0.020125	1 281.2	–663.4721
2–1992	147.500	0.018820	629.4	412.70	0.009544	1 293.4	–664.0739
3–1992	143.625	–0.026622	612.6	403.69	–0.022074	1 264.9	–652.2781
4–1992	124.500	–0.142900	525.1	414.95	0.027511	1 299.7	–774.6186
5–1992	118.375	–0.050448	498.6	415.35	0.000964	1 300.9	–802.3597
6–1992	116.000	–0.020267	488.5	408.14	–0.017511	1 278.2	–789.6834
7–1992	112.625	–0.029526	474.1	424.22	0.038642	1 327.6	–853.4970
8–1992	104.125	–0.078472	436.9	414.03	–0.024314	1 295.3	–858.4190
9–1992	111.000	0.063938	464.8	417.80	0.009064	1 307.0	–842.2283
10–1992	121.500	0.090384	506.8	418.68	0.002104	1 309.8	–802.9691
11–1992	119.875	–0.013465	500.0	431.35	0.029813	1 348.8	–848.8409
12–1992	126.125	0.050824	525.4	435.71	0.010057	1 362.4	–836.9955
1–1993	123.500	–0.021032	514.3	438.78	0.007021	1 371.9	–857.6111
2–1993	119.500	–0.032925	497.4	443.38	0.010429	1 386.3	–888.8533
3–1993	125.000	0.044997	519.8	451.67	0.018525	1 411.9	–892.1516
4–1993	137.125	0.092579	567.9	440.19	–0.025745	1 375.6	–807.6803
5–1993	134.000	–0.023053	554.8	450.21	0.022508	1 406.5	–851.7332
6–1993	123.250	–0.083625	508.4	450.53	0.000711	1 407.5	–899.1283
7–1993	144.000	0.155598	587.5	448.13	–0.005341	1 400.0	–812.5022
8–1993	148.500	0.030772	605.6	463.56	0.033852	1 447.4	–841.8174

Notes Relates to figure 7.12.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1 + ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right) - \left(N^{I}_{t-1} \times \left(1 + ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.71 SHARE PRICE RETURNS RELATIVE TO LOCAL INDEX: NORTH AMERICA (USAIR)

Month–year	*USAir share price*	*Rate of return on share price*	*Accumulation index for USAir*	*Stock exchange index*	*Rate of return on stock exchange index*	*Accumulation index for stock exchange index*	*USAir accumulation index less stock exchange accumulation index*
10–1989	38.250		1 000.0	340.36		1 000.0	0
11–1989	36.000	–0.060625	939.4	345.99	0.044896	1 044.9	–105.5205
12–1989	33.375	–0.075712	868.3	353.40	–0.021914	1 022.0	–153.7442
1–1990	25.500	–0.269129	634.6	329.08	–0.084288	935.9	–301.2740
2–1990	32.000	0.227057	778.7	331.89	–0.070548	869.8	–91.1644
3–1990	30.000	–0.064539	728.4	339.94	0.052480	915.5	–187.0672
4–1990	27.125	–0.100742	655.0	330.80	0.077765	986.7	–331.6417
5–1990	28.500	0.049448	687.4	361.23	0.172487	1 156.9	–469.4401
6–1990	25.125	–0.126041	600.8	358.02	–0.008926	1 146.5	–545.7571
7–1990	21.375	–0.161641	503.7	356.15	–0.005237	1 140.5	–636.8637
8–1990	17.000	–0.229009	388.3	322.56	–0.099063	1 027.5	–639.2238
9–1990	15.000	–0.125163	339.7	306.05	–0.052541	973.6	–633.8396
10–1990	15.000	0	339.7	304.00	–0.006721	967.0	–627.2965
11–1990	13.875	–0.077962	313.2	322.22	0.058207	1 023.3	–710.0686
12–1990	15.750	0.126752	352.9	330.22	0.024525	1 048.4	–695.4616
1–1991	20.375	0.257468	443.8	343.93	0.040679	1 091.0	–647.2391
2–1991	21.250	0.042048	462.5	367.07	0.065114	1 162.1	–699.6207
3–1991	19.500	–0.085942	422.7	375.22	0.021960	1 187.6	–764.8859
4–1991	18.500	–0.085942	386.4	375.34	0.000320	1 188.0	–801.5956
5–1991	18.000	–0.052644	366.1	389.83	0.037878	1 233.0	–866.9361
6–1991	15.000	–0.027399	356.0	371.16	–0.049078	1 172.5	–816.4536
7–1991	12.500	–0.182322	291.1	387.81	0.043882	1 223.9	–932.8153
8–1991	12.500	–0.182322	238.0	395.43	0.019458	1 247.7	–1 009.7070
9–1991	9.250	0	238.0	387.86	–0.019329	1 223.6	–985.5889
10–1991	9.625	–0.301105	166.4	392.45	0.011765	1 238.0	–1 071.6590
11–1991	10.500	0.039740	173.0	375.22	–0.044897	1 182.4	–1 009.4640
12–1991	12.125	0.087011	188.0	417.09	0.105790	1 307.5	–1 119.5030

1–1992	16.125	0.143894	215.1	408.78	–0.020125	1 281.2	–1 066.1340
2–1992	17.500	0.285101	276.4	412.70	0.009544	1 293.4	–1 017.0420
3–1992	17.625	0.088947	301.0	403.69	–0.022074	1 264.9	–963.9055
4–1992	13.250	–0.285321	215.1	414.95	0.027511	1 299.7	–1 084.5810
5–1992	12.625	–0.048319	204.7	415.35	0.000964	1 300.9	–1 096.2270
6–1992	12.750	0.009852	206.7	408.14	–0.017511	1 278.2	–1 071.4290
7–1992	13.500	0.057158	218.5	424.22	0.038642	1 327.6	–1 109.0030
8–1992	12.875	–0.047402	208.2	414.03	–0.024314	1 295.3	–1 087.0850
9–1992	12.500	–0.029559	202.0	417.80	0.009064	1 307.0	–1 104.9800
10–1992	12.875	0.029559	208.0	418.68	0.002104	1 309.8	–1 101.7580
11–1992	12.750	–0.009756	206.0	431.35	0.029813	1 348.8	–1 142.8350
12–1992	12.750	0	206.0	435.71	0.010057	1 362.4	–1 156.4000
1–1993	14.125	0.102415	227.1	438.78	0.007021	1 371.9	–1 144.8700
2–1993	15.750	0.108894	251.8	443.38	0.010429	1 386.3	–1 134.4520
3–1993	20.250	0.251314	315.1	451.67	0.018525	1 411.9	–1 096.8510
4–1993	21.000	0.036368	326.5	440.19	–0.025745	1 375.6	–1 049.0420
5–1993	21.500	0.023530	334.2	450.21	0.022508	1 406.5	–1 072.3190
6–1993	16.500	–0.264693	245.8	450.53	0.000711	1 407.5	–1 161.7840
7–1993	17.000	0.029853	253.1	448.13	–0.005341	1 400.0	–1 146.9300
8–1993	16.000	–0.060625	237.7	463.56	0.033852	1 447.4	–1 209.6680

Notes Relates to figure 7.12.

Relative share price performance is calculated by reference to a 1000 units (of domestic currency) investment in airline shares and the major stock market index of the country in question. The value of the performance differential at time t can be expressed as:

$$\left[\left(N^{S}_{t-1} \times \left(1+ln\left(P^{S}_{t} / P^{S}_{t-1}\right)\right)\right)-\left(N^{I}_{t-1} \times \left(1+ln\left(P^{I}_{t} / P^{I}_{t-1}\right)\right)\right)\right]$$

where N^{S}_{t} is the value of the investment in the airline stock at time t, N^{I}_{t-1} is the value of the investment in the stockmarket index at the time t-1, P^{S}_{t} is the price of the airline stock at time t, P^{I}_{t} is the value of the stock market index at time t, and *ln* is the natural logarithm.

Source Bloomberg, 27 September 1993.

TABLE II.72 GROWTH OF DIVIDEND PAYMENTS 1988-1992

Year	*Cathay Pacific*	*JAL*	*MAS*	*Singapore Airlines*	*KLM*	*BA*	*Air Canada*	*American*	*Delta*	*United*	*USAir*
1988	100	100	100	100	100	100	0	0	100	0	100
1989	117	125	117	160	108	100	0	0	101	0	102
1990	117	125	117	247	136	110	0	0	159	0	52
1991	100	100	117	288	0	114	0	0	101	0	0
1992	117	13	117	331	81	144	0	0	113	0	0

Notes Relates to figure 7.13.
Air Canada, American, and United did not pay any dividends throughout the period.
1988 base = 100.

Source Bloomberg, 27 September 1993.

TABLE II.73 V/EBDRIT AND S/EBDRIT MULTIPLES FOR SELECTED AIRLINES MARCH 1993

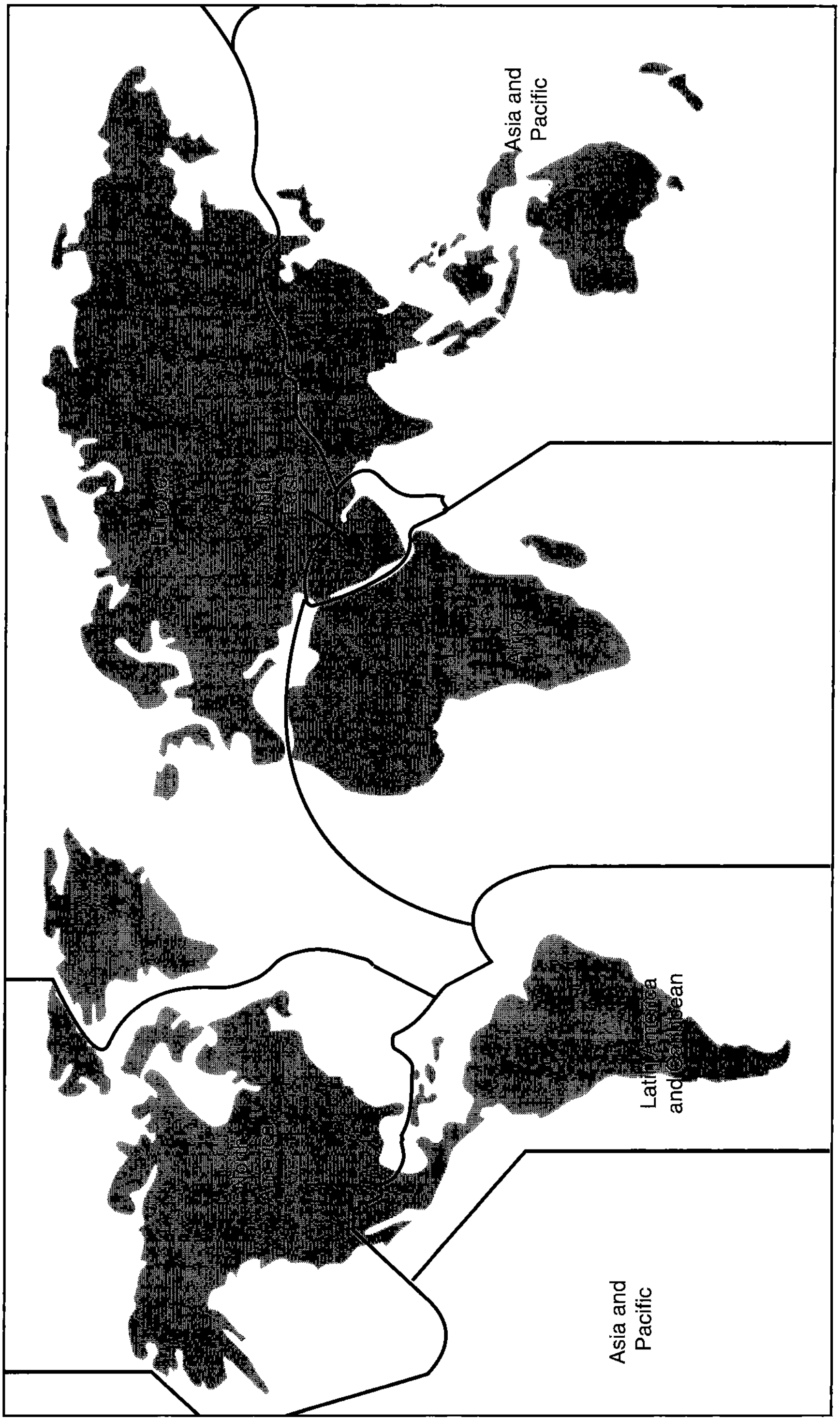
Airline	*S/EBDRIT*	*V/EBDRIT*	*Market Debt/Capital %*
Singapore Airlines	4.09	4.34	5.9
KLM	1.00	10.28	90.2
BA	2.60	8.38	56.6
AMR	1.88	8.02	76.6
DAL	1.29	6.11	78.9
LUV	6.35	9.35	32.1
UAL	1.54	7.24	78.7
U	0.52	6.58	92.1

Notes Relates to figure 7.15.
Southwest (LUV), Singapore Airlines (SIA), American (AMR), United (UAL), Delta (DAL), USAir (U).

Source Bloomberg, March 1993; ANZ McCaughan analysis.

APPENDIX III ICAO STATISTICAL REGIONS

Figure III.1 ICAO statistical regions



Source IACO 1993c, p.6.

APPENDIX IV STEPS TOWARDS A SINGLE MARKET IN EUROPE

Peter Sutherland (1990, p. 233), European Community (EC) Commissioner for Competition between 1985 and 1989, suggested that the basic characteristic of the EC is that it is a supra-national entity, not merely in its political and philosophical structure but also in its legal framework. One of the fundamental aspects of this framework is the supremacy of community law over national law whenever the two conflict. Sutherland further suggested that in the 1980s the area of economic activity which had been least affected by the EC was air transport. The reason given by Sutherland was that the basis of the EC was shared sovereignty with a role for the EC's autonomous institutions. This was in direct conflict with the traditional approach in air transport, which is based upon the principle that each country has complete and exclusive sovereignty over its own air space (see chapter 5 for further details).

HISTORICAL OVERVIEW

Airlines within the EC face stiff competition on shorter routes from surface transport, particularly the high speed rail network (Luebker 1990, p 602). For freight, particularly for heavier, less time sensitive shipments, land transport is the most efficient transport mode due in part to delays in air freight caused by official procedures. Competition between the different modes is affected by the nature and level of regulation (especially economic and environmental regulation) which is imposed upon the different modes and the level of government support provided to each, both directly and in areas such as infrastructure provision.

Air transport within the EC traditionally had been regulated in a manner typical of international aviation. This regulation took the form of control over fares, capacity and access, either through bilateral air service agreements between individual countries or by concerted practices between air carriers. Air service agreements typically restricted the freedom of providing services, restricted price competition by allowing disapproval of fares by either government, and fixed capacity sharing rates, generally on a fifty–fifty basis. Fixed capacity agreements usually incorporated a revenue pooling scheme to provide for transfer of revenues from an airline which had increased its patronage beyond its agreed capacity limit to the other airline sharing the route (Luebker 1990, pp. 602–4). Luebker suggested that this type of scheme discouraged not only price competition but also competition in quality of service, as an airline could not reap any reward through increasing its share of the market. Market access was further restricted for those airlines which were not designated carriers under an agreement, by denial of access to scheduled international routes. Licensing requirements imposed by individual countries further constrained operations within their national airspace. In addition, the increasing congestion of air transport and the allocation of slots to established airlines under 'grandfather' provisions tended to restrict newcomers from gaining a foothold in airports (Luebker 1990, pp. 602–4).

If the concept of a common market in aviation services in the EC was to be viable, the underlying regulatory framework would need to change from that typifying international aviation to one more relevant to a domestic market. This would require at least partial transfer of control of intra EC transport from the individual member countries to an EC authority. In addition, if that common market was to be a deregulated one, then the regulatory framework would require further liberalisation; that is, supervision and control should be minimised, eliminating as far as possible economic controls.

With the experience of US deregulation before it, the EC rejected an instantaneous deregulation approach. It argued that reform should proceed by 'introducing more flexibility and competition into the existing system without destroying it', and outlined its proposals in the *Civil Aviation Memorandum No. 2, 1984* (Doganis 1991, p. 82; McGowan & Seabright 1989, pp. 294–5). These included:

- the removal of the obligation to participate in revenue pooling, and tighter limits on transfer of revenues;
- the reduction of capacity controls; and
- a greater price flexibility through the adoption of fare zones.

Conditional exemption from EC competition rules would be possible in some circumstances for these areas of activity.

At about the same time as the EC formally outlined its proposals for EC aviation reform, changes in aviation regulation within Europe occurred through the renegotiation of bilateral air service agreements between member countries (Doganis 1991, p. 79). The most liberal of these agreements was renegotiated between the United Kingdom and the Netherlands in June 1984, with modification in 1985. This new air service agreement (ASA) effectively deregulated air services between the two countries by providing for the entry of new carriers, access by designated airlines to any point in either country, no capacity controls and a double disapproval regime for fares. This ASA was followed by other ASAs, which while often not as liberal, started a trend away from the previous high level of regulation in the European aviation market.

In 1985 the European Commission set out a comprehensive program for the completion of an internal market in the White Paper entitled *Completing the Internal Market*. In this paper the Commission outlined its objective to remove physical, technical and fiscal barriers, with a completion date of 31 December 1992. These objectives were formally ratified in the *Single European Act 1985*.

First package

A landmark decision was reached in the European Court of Justice in 1986 (*Ministere Public v. Asjes*, commonly known as *Nouvelles Frontiers*), which determined that air transport in the EC was subject to EC competition law and that approval of air fares by a member country was in contravention of that law (Luebker 1990, p. 609; Doganis 1991, p. 83). As a result of this and subsequent action by the EC Commissioner for Competition, in December 1987 the EC Council issued a series of directives applying the EC Treaty's competition rules to areas of aviation activity such as pricing, access to routes and capacity sharing.

This initiative was to become the first phase (later known as the first package) of a plan to progressively reduce member countries' jurisdiction to regulate competition in aviation. Under it:

- Existing capacity sharing arrangements on a fifty–fifty basis were to be relaxed to allow capacity sharing within a forty–sixty range to be introduced in two five-percentile increments over two years.
- Airlines' rights to discount air fares down to defined limits, within set zones and according to ticket conditions, or even below them in circumstances where they reflected fully allocated costs, were introduced.
- Multiple access was to be allowed on routes with traffic levels above certain thresholds. The threshold levels would be reduced over time. Combination rights, which allow two destinations for the same flight, and fifth freedom rights, were introduced, together with traffic rights between regional and main airports.
- Anti-competitive behaviour by formal or informal agreement was prohibited. (McGowan & Seabright 1989, p. 295; Luebker 1990, pp. 610–12; Doganis 1991, p. 86.)

The package utilised temporary exemptions to constrain the application of the competition rules in order to alleviate difficulties during the adjustment to more liberal arrangements (Luebker 1990, pp. 612–3). Exemptions were allowed for slot allocation, CRSs, revenue pooling (limited to 1 per cent of revenue earned on the route), tariff agreements and capacity. The exemptions were conditional on voluntary participation by airlines and the ability to withdraw from capacity agreements on three months notice. The granting of exemptions from the competition rules was a further indication that the EC recognised that the competition articles of the Treaty of Rome did apply to air transport (Doganis 1991, p. 87).

Second package

In June 1990 the second phase of the liberalisation plan was announced. This provided for the complete phasing out of revenue and capacity sharing agreements by 1 January 1993. In the interim it required the then current limits (sixty–forty) on the range for capacity sharing between member countries' airlines to be further relaxed in two, seven-and-a-half percentile increments, to a seventy-five–twenty-five split in 1992. Safeguards were provided for routes with excess charter capacity. From 1992 it also allowed airlines more freedom in setting both discount fares and general fares, with an application for a lower general fare to be rejected only if both governments disapproved, compared with the previous veto power by either government. The competition rules were to be applied also to air transport between member countries and foreign countries, subject to exemptions.

Multiple designation, introduced in the first package for routes with traffic above certain thresholds, was further liberalised with a reduction in the thresholds. Complete freedom to operate third and fourth freedom services subject to infrastructure constraints was introduced, and fifth freedom rights were extended to allow 50 per cent of an aircraft's capacity to be used for fifth freedom passengers, compared with the previous 30 per cent. Cabotage by other EC airlines was to be permitted, subject to limitations, and all member countries were required to license any airline from any member country, subject to technical, financial and economic criteria (Balfour 1990a, p. 2; Doganis 1991, p. 89).

Third package

The third package of measures to liberalise air transport was approved by the Council of Ministers on 22 June 1992 (Nuutinen 1992a, pp. 2–4; *Interavia Air Letter* 1992, p. 2; Council of the European Communities 1992).

Common licensing standards were introduced from 1993 covering minimum start-up capital, operating standards and proven viability for new carriers. Licences of existing carriers are to remain valid for three years, after which requirements for new airlines must be satisfied by all carriers. All licences are to be reviewed after five years.

National ownership rules have been abolished and replaced with Community ownership criteria, with automatic approval for a carrier licensed in one EC member country to operate in other member countries. Ownership and control criteria specify that an airline must be majority owned and effectively controlled by EC nationals and its principal place of business located in the licensing member country.

Airlines have been given freedom to set fares, with safeguards against predatory pricing through the competition rules. Both the EC Commission and member countries have been given power to withdraw fares considered excessively high on the basis of long term fully allocated costs, and to stop fare decreases where fares take a sustained decline in a way that deviates significantly from ordinary seasonal pricing movements and is contrary to the well-being of the industry. Appeal provisions are included. These provisions are not to apply to non EC carriers or fares established under public service obligations. Charter services are to remain free of intervention. Although there are restrictions on setting fares, there is still scope for some intervention. Such action now could be unilateral, without the previous need for double disapproval.

Market access has been extended, without distinction between scheduled and nonscheduled services, to allow unrestricted access for all EC carriers to all intra EC routes apart from domestic routes. The exception is where a member country requests the EC to investigate whether unrestricted access would cause 'serious financial damage' to airlines. If this is established the EC may freeze capacity for a limited period. Provision has been made for the first time for seventh freedom and consecutive cabotage (a service which includes a domestic sector) access for all EC carriers. For example, seventh freedom access would allow KLM to provide services between Britain and Spain without returning to the Netherlands. Consecutive cabotage would allow KLM to provide a service from Paris to Marseilles provided the service starts or ends in the Netherlands.

The French, with representatives from southern European countries, argued for a six-year transition period before introducing free access to member countries' markets, while the British, Irish and Dutch negotiators wanted the third package to provide full cabotage from the end of 1993. A compromise implementation date for full cabotage rights for all EC carriers was set for 1 April 1997, and consecutive cabotage access was limited to 50 per cent service capacity. Until 1 April 1997 member countries are to have full power to regulate access by their own licensed carriers and other carriers to their domestic routes. Provision is included for public service obligations, and continued regulation of thin routes and routes to peripheral or development regions.

As Reed (1992b, pp. 66–70) commented, the cabotage restrictions were not insurmountable, as from 1 January 1993 an airline could set up a subsidiary airline in another EC member country (allowable under the new ownership rules) which would be able to operate as a domestic airline. Although the subsidiary would still be subject to control by the government of the country in which it operates, operations would be less restricted than under the consecutive cabotage rules. In line with this approach, BA announced plans in September 1992 to buy a 49.9 per cent share in Transport Aerien Transregional (TAT), a French regional airline with a French and European network, with a five-year option to buy the rest. Reed reported that BA was interested in operating a Paris–Nice service, a busy and profitable route with spare airport capacity at both ends. Approval for the purchase was granted by the EC Commission in late 1992, with some concessions required of BA: surrender of up to 12 daily slots to a carrier wishing to start or increase services between Gatwick and Charles De Gaulle airports (Reed 1992b, pp. 66–70).

Provision was included in the third package to limit access and capacity under operational or traffic distribution rules of the EC, country or region. Such rules may relate to safety, environmental protection or traffic distribution, including congestion and the allocation of slots. Under these provisions a member country may refuse or place conditions on traffic rights where environmental or congestion problems exist, particularly where alternative modes of transport exist. Any such actions must occur in a nondiscriminatory manner and can be applied for a maximum of three years. The EC retained extensive powers of investigation and enforcement of these requirements.

A related provision states that where a member country denies or limits access to an airport by another EC country's airline on the basis of slot allocation rules, the first country cannot authorise its own airlines to provide services from that airport to the second country without that country's permission. This would limit the ability of any country to discriminate in a market in favour of its own carriers.

Given the congested nature of civil aviation operations in Europe, some form of operational regulation was inevitable. EC proposals for the allocation of landing and take-off slots to break flag carriers' dominance of hub airports were not included in the package, with individual members retaining control. As with the fare setting provisions, the potential for intervention in airline operations by regional and national governments could restrict airlines from proposing new services which might be acceptable under environmental and capacity requirements.

Exemptions to the liberalisation rules were included in the third package to allow airlines to 'cooperate in order to reduce costs and to improve service'. These exemptions, with a life of five years, were concerned with schedule and time slot allocation coordination, financial aid from a major to a minor airline to open new routes (three years) and CRS exemption from EC rules prior to introduction of a final code of conduct. These exemptions were put into effect by the Commission in mid 1993 (*ITA Press* 1993e, p. 3).

Negotiation of access by foreign carriers to EC member countries is to remain with individual members of the community for the present, with a proposal for conduct of such negotiations by the EC excluded from this package. It was significant that in the period prior to approval of the third package, when EC control over external negotiations for air traffic was considered likely, a number of EC members negotiated new bilateral air service agreements, particularly with the US, on the basis that such agreements would be retained after the EC took over. Roz Ellingsworth, a former US negotiator, suggested this action was taken because those member countries believe that the EC is not competent to perform the task and that it would be more liberal than they want to be (Creedy 1992, p. 22).

Application of the third package regulations

European airlines asserted their new found rights to set fares and conduct consecutive cabotage services early in 1993. Lufthansa led the way with short term fare discounts on intra European flights in early January, a move which was followed by a number of other European airlines; Air France introduced discounted air passes, available to US travellers for the network serviced by Air France and its affiliated airlines. At the same time Lufthansa commenced domestic services within Italy as extensions of flights originating in Germany, Alitalia launched consecutive cabotage services within Portugal and Madrid, and Air France introduced a service within Greece. BA and SAS subsequently applied to fly domestic legs within Germany. SAS also extended its fifth freedom routes, and EuroBelgian Airlines, a nonscheduled airline, commenced nonscheduled services based in a number of EC countries, as allowed under the third package regulations. Dutch airline Transavia proposed a service between Greece and France and another between Italy and Greece without stops in Amsterdam.

The third package also facilitated the introduction of new services through the liberalisation of ownership and control provisions. This proved particularly useful for BA: its 49 per cent ownership of both TAT and Deutsche BA allowed the introduction of intra EC services and cabotage services outside of the UK by those airlines, without the 50 per cent capacity and consecutive cabotage restrictions.

Potential conflict over the exercise of such rights arose early. In February 1993 Lufthansa found difficulty in obtaining Italian approval to provide domestic services within Italy under consecutive cabotage; at the same time the French Government considered extending Air Inter's monopoly on 42 out of its 50 domestic routes to April 1997, explaining that the eight routes already deregulated accounted for 60 per cent of Air Inter's traffic (Cameron 1993a, p. 16).

Fare reductions of the magnitude evidenced in the US deregulation experience did not appear in mid 1993. The trend was more toward targeted price competition of limited scope and duration, although there were regional variations, with much price competition appearing to come from the smaller airlines. The Airlines of Britain group, which includes British Midland, surveyed 15 European routes for the lowest available fully flexible fare offered between October 1992 and June 1993. It found significant reductions were offered by other airlines for only three routes, all of which were serviced by British Midland. Two other routes serviced by British Midland did not attract fare reductions by other airlines despite British Midland offering a significantly lower fare on each (Reed 1993b, pp. 53, 54 & 59).

The initial effects of the introduction of the third package were difficult to isolate and analyse, due to the effects on European airlines of the worldwide aviation industry recession. This recession affected the competitive behaviour of carriers, on the one hand increasing competition as they sought to fill excess capacity but on the other hand limiting discounting (Reed 1993b, pp. 53–59).

In June 1993 the European Commission established 'Le Comite des Sages' (the Committee of Wisemen) to conduct a wide ranging review of European aviation. The 12 members were drawn from public and private sectors in aviation and transport industries. The Committee is reviewing infrastructure, the internal marketplace, external relations, costs and charges, and social and environmental problems. The Committee was due to report in early 1994.

Other European groupings

In addition to the EC, other groupings of nations within Europe are significant in aviation. The largest grouping of nations comes under the European Civil Aviation Conference (ECAC). ECAC comprises thirty-one European nations, including the 12 EC nations and the seven nations of the European Free Trade Area (EFTA). The non EC members of ECAC were seeking to keep pace with aviation developments in the EC. ECAC adopted a number of measures similar to, although not as liberal as, measures adopted by the EC. These include liberalisation of capacity sharing and freedom of fare setting within agreed fare zones, and a CRS code of conduct (Doganis 1991, p. 93). One of ECAC's major areas of involvement is in improvement of air traffic control across Europe.

A number of the seven EFTA nations, Austria, Finland, Iceland, Lichtenstein, Norway, Sweden and Switzerland, were to be incorporated into the third package proposals through the European Economic Area (EEA) agreement signed in April 1992, which created a free trade area between the EC and EFTA. Five of the EFTA nations, Austria, Finland, Sweden, Norway and Switzerland, were considered potential future members of the EC; however, in 1992 Switzerland, in a referendum, decided not to participate in the EEA and decided to negotiate a separate aviation arrangement with the EC. Sweden and Norway subsequently joined the EC aviation market and are subject to the third package provisions. The remainder of the EFTA nations (excluding Switzerland) attempted to renegotiate gradual inclusion in the EC aviation market.

Eastern European countries have also expressed interest in moving towards a liberalised common aviation market. General-association agreements between the EC and Hungary, Czechoslovakia, and Poland were signed, providing for the development of future transport agreements under conditions of mutual market access (Reed 1992b, pp. 66–70). Morocco also sought access to the EC through a free trade agreement. However, MacLeod (1993, p. 10) suggests that free access to the EC's markets for Moroccan agricultural products and to the Moroccan market for European industrial products is unlikely and this, together with human rights issues in Morocco, could create difficulties for the implementation of such an agreement.

The membership of these groups and the interrelationships between them are subject to change in the current dynamic political environment in Europe.

UNRESOLVED ISSUES

Although many developments have taken place in the EC aviation market, a number of issues remain unresolved.

- Infrastructure constraints in the areas of air space, aircraft access to airports and airport terminal operations are of sufficient magnitude that they may reduce the effectiveness of moves to open up the market (see chapter 4 for details):

  – Air traffic control in Europe is currently a fragmented system facing a slow and difficult integration through ECAC. The difficulties are due more to political, financial and social pressures than technical problems.

  – Landing and take-off slot availability for expansion or new entrants is limited due to long term congestion in many European airports and the tradition of slot allocation under grandfather provisions. The EC Commission had proposed regulations to pool all unused slots and allocate at least half to new entrants, but this proposal was not included in the third package. In December 1992 the Council of Transport Ministers approved an amendment of the slot allocation rules which tightened up the 'use it or lose it provisions' to require airlines to use slots at least 80 per cent of the time. Slots not used to this level would be forfeited and 50 per cent would be pooled for allocation to new and small carriers (ITA Press 1993a, p. 3). This measure is of limited effectiveness as incumbent airlines may manipulate operational arrangements to ensure that slots remain 'used'.

  – Terminal design and operation required modification to allow the separate processing of intra EC travellers and those travelling to or from the EC. The EC Council of Interior Ministers decided that airports would have to carry out modifications by December 1993, but a number of airports claimed this goal to be unachievable (*ITA Press* 1993b, p. 12).

  – Competition in ground handling received attention from the EC Commission as it drew up guidelines for ground handling. This followed a number of complaints, such as one against the tendering process for the awarding of the handling franchise at Spanish airports to Iberia in 1991, and Iberia's operation of the service. The issues centre on the existence of competition for the provision of ground handling services: whether the airport itself should be the logical monopoly supplier, should the flag carrier be the sole supplier, should other airlines have the right to provide their own handling services, and whether they should have also the right to supply such services to other airlines, or whether outside contractors should be able to supply such services. The matter is further complicated by the differences between airports with respect to size and market concentration among user airlines, making a single strategy suitable for all EC airports difficult to develop (Cameron 1993b, pp. 20–1).

The adequacy of infrastructure is of critical importance in opening up the aviation market in the EC. With the inclusion in the third package of provisions to allow countries to control capacity and access where congestion constraints exist there was scope for countries to at least attempt to limit competition by new entrants or expansion of other airlines against their own flag carriers. Such actions, even if ultimately unsuccessful, could be used to delay access and restrict competition. Competition from high speed rail could have a significant impact upon intra EC aviation; the level of cost recovery for infrastructure by each mode would affect the nature of that competition.

While the provision of adequate infrastructure is critical, a study carried out by the London Business School for an Airlines of Britain survey found a direct correlation between an increase in competition on a route and an improvement in on-time performance (Reed 1993a, p. 64). This may indicate scope for operational improvements within the existing limitations of infrastructure.

- External relations between the EC and other nations, particularly those outside ECAC, are yet to be clarified. In October 1992 the European Commission published a proposal that the Commission increase its involvement in the negotiation of air service agreements between member and nonmember nations, including representations at negotiations, to ensure compliance with EC rules and a consistency of approach to external negotiations (Commission of the European Communities 1992, p. 57). The Commission was concerned that individual members in negotiations with nonmember nations could grant access to the EC in a manner which was unfavourable to the EC as a whole. For example, a nation could seek to become a gateway to the EC by granting access on favourable terms to other nations, including the provision of valuable beyond rights. The US–Netherlands 'open skies' agreement finalised in September 1992 may have triggered the Commission's response.

  At a meeting of the EC Council in March 1993, the Council rejected the Commission's request for a supervisory role, although it did agree to a formal consultation mechanism between member countries when negotiating international relations. The Council also accepted that individual member countries could propose negotiations be carried out on the EC's behalf where they are in the member countries' common interest. It reaffirmed the right of individual member countries to negotiate air service agreements (ASAs) with third countries provided there is no infringement of EC rules. It left the possibility of the Commission negotiating ASAs on behalf of the EC provided there was a clearly defined Community interest and negotiations at Community level would provide a better result for all member countries; in such cases the Council could authorise the Commission to negotiate on behalf of the Community (Adamantopoulos 1993, pp. 18–19). The Commission reserved the right to refer the matter to the European Court of Justice, claiming that aviation negotiations are a part of commercial policy and therefore under the Commission's jurisdiction (*ITA Press* 1993c, p. 3). These developments suggest that bloc negotiations by the EC will not occur in the short term.

Under the existing arrangements, where individual member countries rather than a central EC body control external relations, a number of significant issues remain:

– The application of competition rules to international aviation and foreign airlines is unclear. Decisions of the European Court of Justice indicate that they can apply to foreign airlines operating in the EC (Doganis 1991, p. 90), but the extent of such coverage is untested. Whether EC member action which disadvantages nonmember carriers is covered, is also unclear.

– Ownership and control provisions of air service agreements may create problems where EC carriers have cross EC shareholdings that are within EC guidelines but potentially in conflict with traditional air service agreement conditions (Nuutinen 1992a, pp. 2–4). Existing air service agreements allowing these EC carriers access to non EC nations may need revision, to cover situations such as Air France's shareholding in Sabena. An additional problem might arise where an airline was established whose shareholding and operational control was so diverse that it could not easily be identified (apart perhaps from country of registration) with any one EC nation. Such problems could arise as long as the EC does not negotiate international access as a bloc. The EC majority ownership requirements (51 per cent) also allow a larger proportion of foreign (non EC) ownership than allowed for in some air service agreements; any such variance with existing air service agreements on ownership provisions would need to be renegotiated.

– The willingness of foreign nations to allow EC airlines to operate international services from an EC country that is not their home country is still to be tested. Such rights might have to be granted with tradeoffs, which EC member countries may be reluctant to give. Where there was a perceived imbalance in the way such rights were negotiated, with consequent disadvantage to one EC carrier over another, conflict could arise within the EC itself.

Even if the EC does gain control of international negotiations for air service agreements, further issues will arise:

– Replacement of air service agreements between member countries and external governments by EC agreements would be a major administrative and policy task. Selection of airlines to be designated for particular international services might initially occur on the basis of existing rights. However, this would not cover liberalisation of access for EC airlines to different airports within the EC, with a consequent desire by airlines to provide international services from those newly accessed airports, nor would it cover new airlines.

– The attitude which the EC takes towards negotiations with other countries and other blocs. The EC could choose to take a more liberal approach to such negotiations, in an attempt to create some form of open skies policy, or it could seek benefit for its own carriers in the short term, with a restrictive approach to negotiations. Given the EC's size and influence, its approach to this question would have a major effect upon the direction of international aviation regulation in the short to medium term.

– Continued access by foreign airlines to fifth freedom routes within the EC might be considered de facto cabotage if the EC negotiated as one entity with foreign countries, with the possibility of restrictions being imposed. Foreign airlines would be reluctant to give up these rights and would consider it a reversal of liberalisation if previous rights were removed.

- A factor which will affect aviation within the EC is the imposition of value added taxation (VAT). VAT was to be imposed on air fares, but following pressure from the Association of European Airlines (AEA) the VAT on intra EC flights was set at zero (Air Transport World 1992d, p. 14). Duty free sales for intra EC journeys are also to remain until 1999 (Jassogne 1993, p. 4). Airline costs would be increased through imposition of VAT charges on intra EC purchases and changes to airline operations to bring them to the same standard (Brogden 1991, p. 9). Current internal variations in the level of VAT and excise charges of between 0 and 17 per cent (Putzger 1992, p. 37), and administrative arrangements for their levying and collection, which will probably remain for some time, will create problems in administration and possible biases in trade. For international trade, VAT is charged at the destination country's rate, whereas for intra EC trade, VAT is charged at the origin country's rate (Pocock 1991, p. 17).

- Mergers between airlines are subject to the EC's antitrust rules. However, the strength of these rules and the power of the EC to control mergers is unclear. Balfour (1990b, p. 250) suggests that the rules do not appear to apply to mergers between airlines domiciled in the same member country, such as between Air France and UTA. In some instances the EC might be forced to choose between merger proposals where a number of proposals enacted simultaneously would create excessive concentration but individual plans would not. Such an action of choosing could create conflict among the parties involved. This issue could become increasingly important with the trend towards mergers and equity alliances.

  An additional dilemma for the EC occurs when separate merger proposals require the imposition of different conditions prior to approval. Such a situation existed with respect to the Air France – UTA purchase and the BA–TAT purchase; it is probable (as happened there) for one or more of the parties involved to claim that they received unfavourable treatment compared with the other. This issue may become less relevant, however, following the indications of a possible modification of merger policy in early 1993. The new Commissioner for Industrial Affairs, Martin Bangemann, commented that the EC must 'forget about artificial competition ... competition does not exist at the European level, but at the world level'. Such comments may mean that future merger proposals will be considered in terms of strengthening the enterprises for international competition beyond the EC rather than for maintaining competition within the EC (*ITA Press* 1993b, p. 2).

- Application of EC competition rules, not only to non EC carriers but also to EC carriers, may create difficulties, particularly in areas where the EC carriers are competing with non EC carriers. An area where this may arise is the proliferation of frequent flier programs. The EC Commission has indicated it might act to control the spread of these and other loyalty programs due to their potential to distort competition. Odell (1993a, p. 16) comments that such control could be difficult due both to the popularity of such schemes and the problems EC carriers have when competing with US airlines that operate frequent flier programs. He suggests that the EC might have to consider differentiating between the impact of the schemes on intra EC markets and the impact on international markets.

  Another area which may be affected is that of CRSs. The EC issued a draft code of conduct early in 1993, designed to minimise bias among users, prevent discrimination and ensure an equitable interchange of information between rival CRSs. The major area of criticism related to the issue of whether airlines which own CRSs should be required to divest themselves of their CRSs. The draft code of conduct did not require this action, but there was some concern expressed that it was necessary, to prevent bias and protect confidentiality of airline data. Interaction with non EC owned CRSs and with non EC users of EC owned CRSs, particularly where non EC owned CRSs do not follow a similar code of conduct, could present difficulties in enforcing competition rules.

- Negotiations with EFTA countries on inclusion in the EC market are ongoing, with Switzerland the only EFTA nation to refuse to join the European Economic Area. This raises the question of whether partial incorporation of Switzerland or other countries into the EC air transport system can be achieved or should be pursued.

Possibly the most fundamental aspect of European aviation which stands as a barrier to liberalisation is the existence of national flag carriers, sometimes subsidised and often protected by the national government.[1] The existence of these flag carriers has slowed the pace of liberalisation and may encourage member nations to further hinder liberalisation. Their existence also discourages moves to make the EC a single international aviation market, as this would remove member nations' ability to protect their flag carriers. There is something of a catch 22 here, as while it is difficult to introduce a single aviation market in the presence of flag carriers, it would also be difficult to get rid of flag carriers without a single international aviation market, as air service agreements with non EC nations need to designate national carriers. The

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1. Reed (1993b, p. 59) reports that the government operated airports in Spain offer 65 per cent discounts on charges to Spanish airlines.

difficult step appears to be breaking the relationship between nations and their flag carriers.

The EC has no policy on privatisation of airlines, but it does have competition rules to encourage fair competition. These appear to be of limited value in preventing member nations from providing financial support, judging by the EC's approval of financial assistance for three carriers, Air France, Iberia and Sabena in 1992. According to *Flight International* (1992b, p. 3) two of these were illegal but were approved as 'last chance restructuring', a precedent which would be available whenever a national carrier finds itself in major financial difficulties. In the case of Air France, the assistance not only supported the airline in time of difficulty but allowed it to purchase a stake in Sabena. In March 1993 the EC approved an aid package to the national carrier TAP Air Portugal, on the basis that the airline had operated services to the Azores and Madiera at a loss as a public service. The planned privatisation of the airline may also have been instrumental in the decision. By mid 1993 the airline was experiencing major financial problems, and further financial aid was considered necessary to prevent the airline closing. At the same time the EC instructed the Portuguese Government to withdraw the airline's tax exemption.

The EC also received requests for approval of aid to Aer Lingus as a rescue plan and for approval of a bond issue by Air France to a nationally owned financial institution. Aer Lingus received approval for its request in December 1993, with the condition that capacity to the UK be frozen until 1995. The EC's decision on the Air France application, particularly given the previous approvals for financial assistance and a futher request by Air France for a government capital injection, may give an indication of the EC's resolve in the encouragement of competition. The EC Commission undertook to update its guidelines for national assistance for airlines by late 1993 following criticism.

Such support for national companies is common in Europe. Even Air France's attempts at personnel cuts of 5 per cent over two years could have created conflict with the French Government, with the former French Prime Minister stating that 'state-owned companies should have social goals'. As Bertrand d'Yvoire, president of Consultair, stated, 'Social issues are generally very important to Europeans and radical changes, or even wholesale generalisation of rules within the Community could be destabilising in this respect if carried out too quickly' (Crumley 1992, pp. 42–6). This point was reinforced in October 1993 when a cost cutting program for Air France was suspended following strong industrial action by Air France employees.

The liberalisation of aviation in Europe, while set down in regulatory guidelines, still faces a number of difficulties during the implementation phase.

APPENDIX V ENVIRONMENTAL REGULATION

A new aspect of aviation regulation has emerged in the last two decades. As in many other areas of industrial activity, environmental concerns are becoming an important issue for aviation planning, investment and operations, through direct regulation, public pressure and industry concern.

Environmental concerns have arisen in the design and operation of airports, with many airports facing differing environmental problems, including water quality management systems for runoff water (some airports also purify runoff from de-icing chemicals used on aircraft and runways), the control of exhaust emissions from aircraft and ground service vehicles, the reduction of noise pollution from aircraft, and the management of wildlife populations in the airport vicinity (O'Lone 1991, p. 86). New airports have the opportunity to design facilities around such requirements, whereas at many older, often congested airports, technical solutions must be superimposed on the existing facilities. Sydney's Kingsford Smith Airport third runway project has faced major opposition on environmental grounds and steps taken include plans for the management of wildlife habitats and Aboriginal sites during runway construction.

Environmental issues also have arisen in the aircraft manufacturing industry and in airline ground operations. For example, in aircraft maintenance, cleaning agents and processes are subject to regulation. Environmental concern has led to the use of recycled materials for paper napkins, stationery and containers, and oil recycling has increased. Lufthansa introduced a new form of catering for shorter flights by setting up a gate buffet service with passengers selecting their food and carrying it on board in paper bags. This reduced waste by 3760 tonnes per year (Martin 1991a, pp. 19–23). Phelan reports (1992, p. 56) that Qantas has introduced an environmental policy affecting most areas of the company's operations: engineering, flight operations, catering, administration and contracted services as well as business partners, suppliers and contractors. The policy is administered by a committee drawn from each division, with all managers required to consider environmental issues in every area of operation. Although airlines may be concerned about the cost of environmental awareness, according to Pilling (1992a, p. 5) many measures are self-financing. He quoted a machine used by British Airways to remove water from hydraulic fluid, allowing the hydraulic fluid to be recycled. The machine was expected to pay for itself within twelve months.

The ICAO Secretariat has listed environmental problems associated with civil aviation under seven categories: aircraft noise, air pollution near airports, global phenomena, airport/infrastructure construction, water/soil pollution near airports, airport waste management, and aircraft accidents/incidents. Environmental conditions within the aircraft and environmental impacts of aircraft manufacture were excluded (Crayston 1992, pp. 4–5).

AIRCRAFT POLLUTION

Noise

Noise pollution (together with chemical pollution) is a critical issue for airlines. Noise pollution has been subject to regulation since the early 1970s when the first noise standards (known as chapter 2 in ICAO Annex 16, and stage 2 by US regulators) were introduced for jet aircraft (Smith 1990, p. 12). A small number of aircraft which do not meet these standards still exist, but are largely limited to African countries.

In 1977 chapter 3 noise standards were developed, with all aircraft designed after this date to comply (Lyle 1990, p. 7), although the manufacture of aircraft which did not comply with these standards continued until 1988 (Fotos 1991, p. 62).

In 1990 ICAO adopted a resolution that subsonic jet aircraft not complying with the chapter 3 requirements of Annex 16 should be phased out over a seven-year period commencing on or after April 1995 (ICAO 1991a, p. 2). The resolution also encouraged countries imposing such phasing out restrictions to take into account the problems of operators in developing countries where they are unable to replace chapter 2 aircraft before the end of the period but there is evidence of an intention to introduce chapter 3 aircraft. Many countries have introduced or are introducing compatible legislation, although specific provisions for phasing out chapter 2 aircraft may vary.

In addition to the ICAO provisions, Australia included a requirement that jet aircraft added to the Australian register after 1 January 1991 must satisfy chapter 3 requirements to be allowed to operate. The US adopted a 'phasing in' approach whereby the airlines may increase the chapter 3 component of their fleets by purchasing new, or newer, aircraft to increase their fleet sizes as an alternative to the initially proposed 'phasing out' approach which would have required them to reduce the actual numbers of chapter 2 aircraft during the transition phase (Fotos 1991, pp. 62–3). The end result in both cases is total compliance with noise pollution requirements, but under the phasing in approach airlines can fly their older aircraft for a longer period during the transition period. The US introduced a shorter compliance period than ICAO, requiring 100 per cent compliance by the year 2000 by both foreign and national carriers, with limited provision for exemptions.

Young (1991) raised the possibility that as there are differences between the US and ICAO provisions, there is potential for conflict where aircraft approved under the regulations of the country of origin (such as an EC member) seek to fly under existing air service agreements to the US, where they are illegal. Of significance is an EC package of environmental directives under consideration for application in late 1995 or early 1996: this package includes a three-decibel cut in noise limits below current ICAO chapter 3 requirements. Many aircraft types currently meeting chapter 3 requirements would be unable to meet this more stringent regulation and would eventually require modification or phasing out; new aircraft types would need to meet the requirement.

Airlines have three options for aircraft which do not comply with chapter 3 requirements: to re-engine them with new, quieter, cleaner and more efficient engines with reduced maintenance, 'hush-kitting' the aircraft,[1] or to remove them from the fleet. The aircraft concerned range from newer aircraft which nearly comply with the standards to old ones which only comply with chapter 2 requirements after re-engining or hush-kitting. These aircraft numbered between 3800 and 4000 in 1992 (Nelms 1993, p. 47), excluding the Soviet-built fleet of chapter 2 aircraft which numbered around 3400 (*Airline Business* 1992a, p. 76). The decision will be influenced by the relative costs and benefits of each option in relation to individual aircraft and operational requirements, and the financial position of the airline. How they are phased out will have a significant impact upon the airlines, hush-kitting suppliers, airframe and engine manufacturers, and the environment (Ott 1991, p. 48).

In the longer term, the advantages to the environment from the introduction of quieter aircraft may be reduced, or even outweighed, by increases in overall noise pollution arising from the expected increase in traffic levels and the size of aircraft. More stringent noise standards are under consideration, but in the absence of a major technological advance, designing engines to meet such standards, without penalties in efficiency and exhaust emissions, may be difficult. Smith (1992, pp. 11–13) notes that this increased 'fine-tuning' of aircraft engines is made more difficult when optimisation is sought under different working conditions: at low altitude take-off and landing conditions where the aircraft's environmental impact is more immediately felt, and at high altitude cruising conditions where most of the impact occurs. Also, as engine noise decreases, airframe noise from the aircraft passing through the air becomes more prominent. This airframe noise may provide a ceiling to the practical level of engine noise reduction.

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1. Hush-kitting is essentially a muffling operation which is cheaper than re-engining, but according to Smith reduces engine efficiency, may increase pollution emission and may not be as quiet as a newer engine (Smith 1990, p. 12).

Political pressure for further reductions in the effects of aircraft noise may be expected, and a possible alternative to further engine noise reductions may be changes in land use patterns around airports to reduce the impact of noise. This itself would be controversial, however, given the effects of major dislocation on populations around existing airports. Continued pressure on the source of the noise emissions therefore may be expected to continue.

Emissions

Pollution by emission is another environmental issue which concerns the aviation industry. Jet engines emit several pollutants: carbon monoxide, unburnt hydrocarbons, smoke, sulphur oxides and nitrogen oxides (Martin 1991a, p. 20). Carbon dioxide and water vapour are also significant pollution emissions. The first three have been reduced by the introduction of more efficient engines, while sulphur oxide emissions have been reduced by the use of fuels with a lower sulphur content. Production of nitrogen oxides in jet engines, however, has increased as efficiency has increased, due to higher temperature combustion. Emissions of nitrogen oxides at lower altitude contribute to the greenhouse effect by increasing atmospheric heat retention while at higher altitude they deplete the ozone layer. They also contribute to acid rain. Thame (1992, pp. 7–10) comments that difficulties arise in determining both the levels of nitrogen oxides emissions produced at high altitude and their effects, due to a lack of understanding of the chemical reactions which occur upon emission into the atmosphere.

New technology is required to reduce nitrogen oxides and maintain efficiency without increasing other pollutants. Engine manufacturers are developing engines to comply with these requirements, with General Electric (GE) developing an advanced combustor for its GE90 engine to be used with the Boeing 777, and the GE-Société Nationale d'Étude et de Construction de Moteurs d'Aviation (SNECMA) venture equipping its CFM56-5B engine with a scaled down version of the combustor. Airbus Industrie was forced to consider including the latter engine as an option for its proposed A319 due to interest from airlines, particularly European airlines, which are increasingly aware of the nitrogen oxides issue (*Flight International* 1992a, p. 11).

Legislative limits on emissions were first introduced in the US in 1973 (Gould 1991, p. 34). ICAO subsequently adopted international standards with their latest international emission standards being adopted in 1981, in Annex 16, vol. II (Beech 1991, p. 34). Modern aircraft meet the standards easily. The ICAO Committee on Aviation Environmental Protection (CAEP), at its second meeting in December 1991 proposed amendments to Annex 16, vol. II which require a 20 per cent reduction in nitrogen oxides emissions.

Individual countries are considering or have implemented their own, often diverse, measures. Sweden introduced a pollution tax on the emission of nitrogen oxides, hydrocarbons and carbon dioxide by its domestic airline

(Beech 1991, p. 35). Martin reports (1991a, p. 19) that this has resulted in a \$215 tax on the domestic carrier for a 40 minute flight with an 85-seater Fokker. This tax is confined to domestic aviation and does not cover other modes of transport or international aviation. The EC's package of environmental directives, under development for introduction in 1996, includes a 40 per cent cut in aircraft emission levels, double the ICAO proposal.

In 1992 the EC also proposed to introduce a tax on carbon dioxide emissions from 1993 with the rate of tax increasing over time, from \$3 per barrel of oil in 1993 to \$10 per barrel by the year 2000. Pilling (1992b, p. 15) suggested that the EC may not proceed with the tax without support from other nations, particularly the US and Japan. The US has revised its Clean Air legislation, with particular emphasis on pollution sources such as airports. Russia also is taking steps to reduce levels of pollution produced by aircraft and production processes, prompted by the expected increases in air travel of up to 100 per cent over the next ten years (Bratukhin 1993, p. 9).

ICAO, believing that aviation pollution might be highlighted at the UN conference on Environment and Development in June 1992, established a working party to provide recommendations for addressing aviation environmental issues (Martin 1991a, p. 19). The UN conference did not address aviation environmental impacts specifically, but called for reductions in emissions from the transport sector generally (*ICAO Journal* 1992, p. 31).

The International Air Transport Association and the Air Transport Action Group (IATA & ATAG 1992, p. 4) report that aviation consumes 5 per cent of the world's total oil consumption and 12 per cent of total oil consumption by transport, with aircraft fuel efficiency having doubled over the last 20 years. According to Moxon (1992b, p. 66), civil aviation produces less than 5 per cent of the total emissions by transport. He suggested that aviation is attracting attention from environmentalists due to its high profile and that it produces more pollution per passenger than private cars. McGowan (1991, pp. 8–9) suggested that aviation is also drawing attention due to the fact that its pollution is emitted directly into the upper atmosphere where its overall impact may be disproportionate to its quantity.

As with noise pollution, the question of reducing the level of emissions is complicated by the fact that overall emission levels are affected by total traffic levels. Gains made per aircraft will be offset by increases in traffic levels; consequently the pressure to improve emission levels will continue. On the other hand, the technological difficulties inherent in continued 'fine-tuning' of aircraft performance over a wide range of operating conditions, in the absence of a significant technological advance, will increase.

Although not an environmental impact of civil aviation, Endres (1992, pp. 44–5) suggests that cabin air quality may be another environmental issue, with airlines reducing the amount of fresh air being introduced into the cabin in the search for reductions in fuel consumption. He suggested that the ban on smoking in aircraft cabins may disguise the effects of such practices on the quality of air in the cabin, and that with continued pressure to cut costs, airlines are unlikely to improve air quality on their own initiative. Swissair has been undertaking some research to improve recirculated air. In 1993 the issue of transmission of infectious diseases among aircraft passengers received more attention, at a time of increasing spread of some diseases such as tuberculosis. Boeing defended its aircraft, stating that they are equipped with high efficiency filters to remove microscopic particles from recirculated air. The 1992 World Health Organisation Conference on Tobacco and Health recommended the introduction of a ban on smoking on all commercial passenger flights, citing a number of direct and indirect effects on passenger and crew health, on aircrew operational efficiency and on aircraft equipment (Finkelstein 1992, pp. 22–3). Such bans are being implemented.

Environmental regulation can be implemented either on the basis of paying for pollution, as with carbon dioxide taxes, or through direct regulation, as with the introduction of chapter 3 noise requirements. In both instances the result is a direct cost to the airline industry, either through an increase in operating costs or through increased capital costs. Complying with more stringent environmental requirements, particularly in re-equipping with new airframes and engines, will increase costs and raise the demand for capital funds. A representative of the consulting firm Simat, Helliesen & Eichner (SH&E) (*World Airline News* 1992c, p. 6) expressed concern that the cumulative effects of increasing user charges and environmental charges could cause the airline industry to collapse. He was concerned also whether revenue raised would be used to improve the industry's environmental impact, for example by investing in improved air traffic control to cut fuel usage and pollution. One possibility is that third world nations may seek assistance and/or exemptions from regulatory requirements in the near future to overcome the considerable costs these environmental regulations will create.

While it is unlikely that environmental regulation will have fundamental effects upon the directions of the aviation industry, nevertheless its impact will be significant in a number of areas. For many airlines in financial difficulties, environmental requirements for the aircraft they operate, requiring modification or replacement of aircraft may be the difference between survival and bankruptcy, particularly as the time limit for operating Stage 2 aircraft approaches. For providers of infrastructure, environmental requirements will increase costs and delays for expanding infrastructure, with further impact on congestion. Environmental regulation is here to stay, and will become stricter in its requirements in future years, making environmental planning an important facet of strategic planning in the aviation industry in the future.

APPENDIX VI AIRFRAME MANUFACTURERS

THE COMPANIES

The main jet airframe manufacturers are:

- *Boeing*, which holds the majority share of the jet airframe market. It is located in the US and manufactures four basic aircraft types. In addition it is developing the B777, a long range aircraft with twin engines capable of carrying around 400 passengers. In some markets it may replace the Boeing 747, which since its launch in 1969 has dominated the market in large aircraft.
- *Airbus Industrie*, founded in the 1950s, a consortium of European companies including Aerospatiale (France), Deutsche Airbus (Germany), British Aerospace and Constucciones Aeronauticas (Spain). The member companies are responsible for the manufacture of the airframes' different parts. Final assembly is usually performed at Toulouse in France. Airbus Industrie has a family of six aircraft with the Airbus A330/A340, the most recent addition to compete with Boeing's 747 and new B777.
- *McDonnell Douglas*, the second largest airframe manufacturer in the US. It manufactures the MD80/90 and MD11.
- *Fokker*, a Netherlands company manufacturing the F100 jet and F70 variant.
- *British Aerospace*, introducing the 50-115 passenger RJ series based on the BAe 146.
- *Canadair*, producing jets for regional operations.

Orders and market share in the 1990s

The poor performance of the airlines during 1991 resulted in significant reductions in new orders from airlines. The results for 1991 compared with 1990 are presented in table VI.1.

TABLE VI.1 MARKET SHARE — AIRFRAME MANUFACTURERS

	Deliveries		*Net orders*		*Outstanding orders (31 Dec.)*	
Company	*1991*	*1990*	*1991*	*1990*	*1991*	*1990*
Airbus Industrie	163	95	77	359	952	1 038
Boeing	441	385	222	551	1 637	1 856
McDonnell Douglas	174	142	–28	182	372	574
British Aerospace	26	24	24	25	38	40
Canadair	0	0	25	13	38	13
Fokker	43	25	9	32	145	179
Total	847	671	329	1 162	3 182	3 700

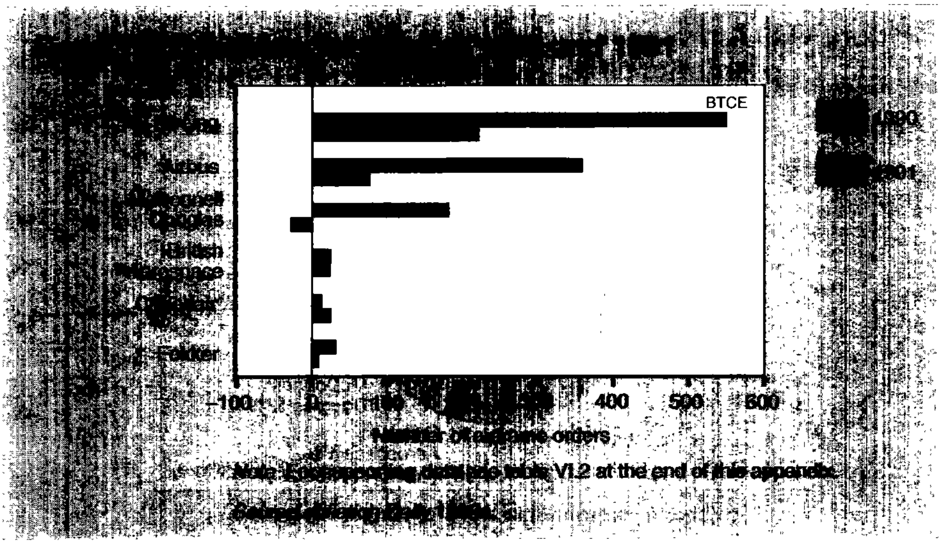
Source *Aviation Daily* 1992a, p. 227.

In 1991 there was a major reduction in the total number of orders for all jet airframe manufacturers (467 compared with 1218 in 1990). In that year 138 existing orders were cancelled, compared with 56 cancellations in 1990 (*Aviation Daily* 1992a, p. 227). The value of commercial jet airframe orders for the year was $32 billion, compared with $71 billion in 1990 (*Aviation Daily* 1992c, p. 381).

Overall net orders fell from 1162 in 1990 to 329 in 1991. As figure VI.1 shows, all the major manufacturers of airframes with the exception of Canadair received fewer orders in 1991 compared with 1990. McDonnell Douglas finished the year with a net negative 28 orders as a result of having more cancellations than orders during the year.

The percentage change in net orders is illustrated in figure VI.2, which shows the magnitude of the reductions for the companies between 1990 and 1991. Airbus Industrie, Boeing and Fokker all experienced reductions in net orders of more than 50 per cent in 1991 over 1990; over the same period net orders for McDonnell Douglas fell more than 115 per cent. Canadair was the only manufacturer with increased orders in 1991 from its relatively small base in 1990, due mainly to orders for its newly released aircraft. British Aerospace had a minor reduction in orders.

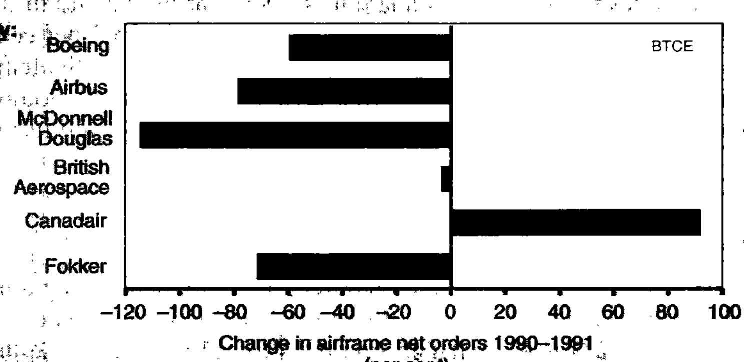
The problems faced by the industry in 1991 were not reversed in 1992. In the first half of 1992 total 'firm' orders placed for all airframes were down by approximately 20 per cent over the same period in 1991. Orders placed with Boeing declined by 7.5 per cent, Airbus Industrie by 18 per cent, McDonnell Douglas by 65 per cent and British Aerospace by 8 per cent. Fokker had the only increase of the major manufacturers, of 266 per cent. There were some increases in orders for individual airframes: Airbus Industrie had an increase in orders for its A310 while Boeing had increased orders for the B737 and the forthcoming B777 (Goold 1992b, p. 8). *Aviation Daily* (1992g, p. 307) suggested that the third quarter of 1992 was the worst quarter since 1985. For 1992 McDonnell Douglas recorded a total of 36 airframe orders after cancellations, 35 for the MD 80/90, while Airbus received orders for 40



airframes after cancellations (*Air Transport World* 1993a, p. 9; Sparaco 1993, p. 117). Total outstanding orders declined by around 13 per cent between the end of 1991 and the end of 1992 (ICAO 1993e, p. 28).

In 1993 the decline continued. Airbus recorded a net loss of 31 orders after cancellations, while Boeing recorded 37 orders after cancellations. Both companies suffered a drop in outstanding orders of around 20 per cent over the year (*Asian Aviation* 1994, p. 22). McDonnell Douglas recorded a net loss of 6

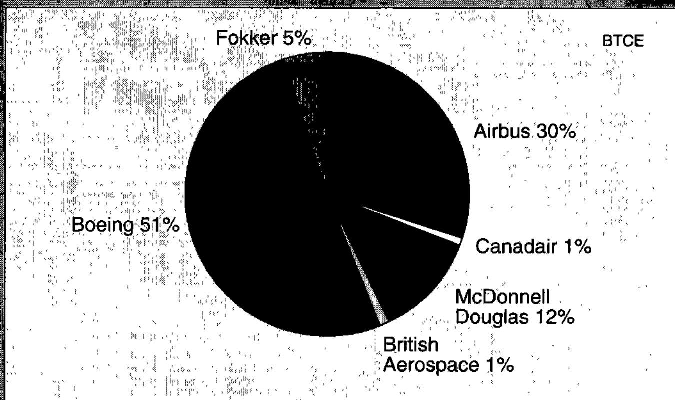
Figure VI.2 Percentage change in airframe net orders 1990–1991



Note For supporting data see table VI.3 at the end of this appendix.

Source *Aviation Daily* 1992a.

Figure VI.3 Airframe manufacturers market shares: aircraft orders outstanding 1991



Note For supporting data see table VI.4 at the end of this appendix.

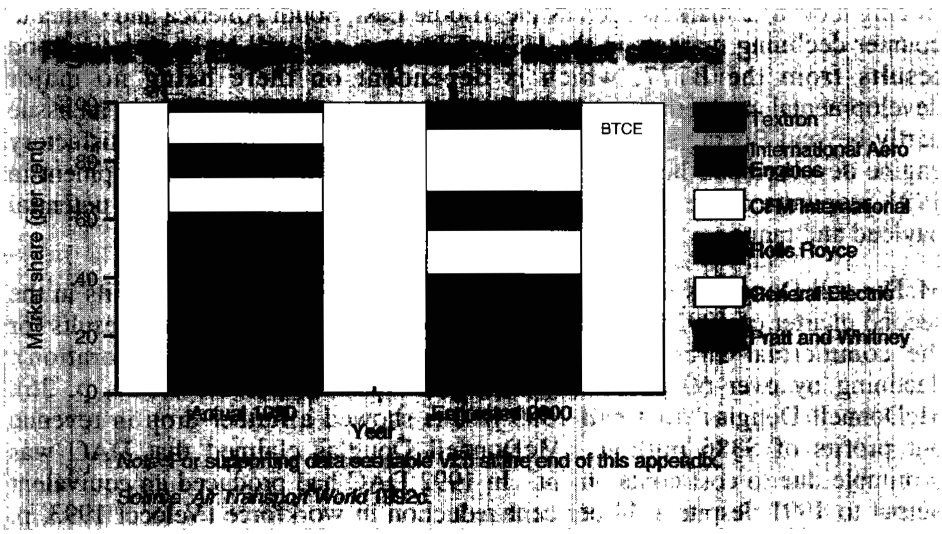
Source *Aviation Daily* 1992a.

orders in the first eight months of 1993 (O'Toole 1993b, p. 50). A number of industry analysts have suggested that the airframe manufacturing industry will continue to decline until 1995–1996 (Velocci 1992c, pp 26–7; *Flight International* 1992c, p. 14; O'Toole 1993b, p. 50). For an analysis of historical cycles in fleet orders see chapter 6.

Figure VI.3 shows the percentage market share the major airframe manufacturers held in outstanding orders at the end of 1991. This indicates the historical preferences shown by airlines towards airframe manufacturers, and shows which manufacturers will be producing more in the immediate future. It highlights the strong position which Boeing held in the market, with just over 50 per cent of the outstanding orders. Airbus Industrie, its closest rival, held 30 per cent and hopes to increase this share to 40 per cent by the end of the decade (Pierson 1991, p. 22). Among the big three, Boeing held 55.3 per cent, Airbus 32.1 per cent and McDonnell Douglas held 12.6 per cent. By September 1993 Boeing held 54.6 per cent, Airbus 34.4 per cent and McDonnell Douglas 11 per cent (O'Toole 1993b, p. 50), suggesting Airbus slightly improved its position in a market which had declined by around 30 per cent.

Engine manufacturers

As with the airframe market, engine manufacture is divided among a number of companies, each producing a range of engines suitable for a number of aircraft. Choice of an engine for a particular aircraft is usually made by the purchasing airline from among those engines which have been certified for the particular aircraft. Figure VI.4 shows the market share breakdown for engine manufacturers, with Pratt and Whitney dominating the market. As with



airframe manufacturers, development costs and declining demand is resulting in the creation of alliances between engine manufacturers (Sweetman 1992, pp. 16–18). The economic effects of the decline in airline travel in the early 1990s filtered through to the engine manufacturers; during 1992 Pratt and Whitney laid off 2400 workers and planned to reduce its workforce by a further 4800 workers in the first half of 1993.

Financial and strategic position of the major manufacturers

All of the major manufacturers face the high risks inherent in developing and introducing new aircraft. This difficulty is increased during times of declining orders. Boeing enjoyed good sales revenue from deliveries through 1991 and 1992 despite reduced orders. Operating profits for the commercial transport sector declined by 11.4 per cent in 1992 from 1991, caused in part by an accounting change (Norris & Daly 1993, p. 25). Profits declined further in the first half of 1993. Boeing's chairman forecast revenue for Boeing for 1993 of around \$26 billion, compared with \$30.2 billion in 1992. Industry analysts predicted revenue would drop further, to less than \$22 billion in 1994, with no recovery expected until 1995 upon commencement of deliveries of the B777 (*Asian Aviation* 1993b, p. 20). Overall deliveries were expected to decline through 1993, with planned production levels of all Boeing aircraft being reduced over 40 per cent by 1994 from 1992 levels, due to declining orders, cancellations and deferments. Sandilands suggested (1992, pp 52–3) that Boeing also suffered the consequences of not developing a new aircraft in the 150 seat range, relying instead on a revised version of the B737. He noted that United Airlines, a long time Boeing customer, ordered 100 A320s instead of the B737 in July 1992. Boeing reduced its workforce by around 6000 in 1992, out of a total payroll of 146 000, and in February 1993 announced planned cuts of around 28 000 by mid 1994.

Boeing looked to markets such as the Middle East, South America and China to counter declining markets in the US and Europe, and will be hoping for good results from the B777, which is dependent on there being no major developmental problems and it performing to expectation. This is an issue partly beyond Boeing's control, with performance dependent upon satisfactory engine development; however, weight problems arising during development in 1993 jeopardised the attractiveness of the aircraft by reducing its potential payload and range.

McDonnell Douglas's position appeared precarious in 1992, with profits in the second quarter of 1992 half those of the second quarter of 1991, and results for the commercial aircraft segment, DAC (Douglas Aircraft Corporation), declining by over 60 per cent for the same period (Velocci 1992a, p. 26). McDonnell Douglas' first half 1993 results showed a further drop in revenue but profits of $386 million. McDonnell Douglas claimed that DAC was profitable due to cost containment. In 1992 DAC had produced an equivalent output to 1991 despite a 44 per cent reduction in workforce (Velocci 1993, p. 45).

The new MD11 aircraft has not been the success McDonnell Douglas expected, with initial performance below expectation, low orders, and costs which had not declined as quickly as expected. Cuts in production levels were proposed, down to 25 airframes per year by 1994 from 42 in 1992 (*Asian Aviation* 1993a, p. 26). The company also had to defer development of the MD12 due to a lack of interest and lack of new equity; a stretch version of the MD11 was subsequently considered to boost popularity of the aircraft. The company had more success with its smaller aircraft, the MD80/90 series; however, even here production rates were cut from 139 airframes in 1990 to 45 in 1993 (*Australian Aviation* 1992, p. 7). A proposal made by Air Canada in 1993 to upgrade old DC-9s in order to save the cost of replacing them would be a mixed blessing to McDonnell Douglas; the company would lose the possibility of new sales of MD80/90s but would participate in the upgrading program. This strategy could be followed by other companies with DC-9s, affecting the market for MD80/90s.

Job reductions of 4000 to 5000 were expected in the commercial aircraft segment in 1993, bringing total staff to around 15 000 at DAC. A major reorganisation of the group was announced in August 1992, including a separation of the military air transport program from the commercial aircraft segment. The chairman and chief executive officer John McDonnell also announced that the company would concentrate only on businesses which have the potential to become no. 1 or no. 2 in their market. Velocci (1992b, pp. 20–2) speculated that as McDonnell Douglas appeared to have conclusively lost its no. 2 spot to Airbus Industrie, the company might be preparing for the possibility of selling, in part or in whole, its commercial aircraft division. This possibility was reinforced by Moody's reduction of McDonnell Douglas' credit rating in early 1993, with a concurrent public questioning whether the company had a future in commercial airframe production. Moody's conclusion was based upon McDonnell Douglas' limited range of aircraft and its financial problems, which in turn reduce its ability to offer aircraft financing (*Aviation Daily* 1993a, p. 189). In February 1993 John McDonnell stated that no time limit was set for the company to reach the no. 2 spot; the company's executive vice-president, John Wolf at the same time announced that the company could reduce its level of production to below 30 airframe per year for each of the MD11 and the MD80/90 series and remain viable (*Interavia Air Letter* 1993c, p. 5). The search for equity partners supported the proposition that McDonnell Douglas would remain involved in civil airframe productions (see below).

Airbus Industrie's position is more difficult to ascertain as it provides little public information, and in the past has provided financial support to its customers (see 'subsidisation within the manufacturing sector' below), leading to uncertainty as to the profitability of its operations despite its rapid rise in market share. Airbus Industrie also anticipated reductions in the production rate of the A300/310 and the A320/321 (*Australian Aviation* 1992, p. 7). Commencement of production of the A330/340 series would to some extent counteract these reductions, but one of the consortium members, Deutsche Airbus, in early 1993 sought to reduce working hours and the workforce as part of a reduction in production brought on largely by cancellations of orders for Airbus Industrie airframes (*Interavia Air Letter* 1993b, p. 7). Airbus Industrie admitted to 95 cancellations of all airframe types in 1992 (*Interavia Air Letter* 1993d, p. 1). Demisch (1992, pp. 7–8) suggested that the military research effort, which had been so prominent in US industry, had poor carryover benefits to civilian aviation, and product liability litigation had discouraged innovation in the US, with Airbus Industrie leading in such innovations as glass cockpits, fly-by-wire and composite fins. Airbus Industrie may need to concentrate more on profitability in the future, due to the agreement for reductions in subsidy (see below) and the trend toward privatisation of its consortium members.

The effect on the manufacturing industry of the decline in demand for aircraft was sufficiently significant for Moody's Investor Service to publicly question the industry's credit rating in December 1992 (*Aviation Daily* 1992h, p. 423). The decline in demand for aircraft also has flow-on effects to subcontractors and suppliers of components for aircraft. For example, the cuts in production of MD11 airframe resulted in layoffs of 1700 out of a total of 4200 staff by the subcontractor who supplied the fuselage sections (*Australian Aviation* 1992, p. 7). The decline in demand for civilian aircraft mirrors a reduction in military production, arising from declining military budgets. With the same or related companies involved in both the civilian and military sectors of the industry, there has been a widespread restructuring within the industry.

Alliances, consolidations and new players

The high cost of development of new aircraft, the current decline in demand for aircraft, and the introduction of offset requirements in international trade have meant that the manufacturers have had to consider alliances and fresh equity injections. All manufacturers outsource various components for their airframes, often from foreign manufacturers. The Airbus Industrie consortium is an example of joint manufacture. In 1985 McDonnell Douglas followed this path and entered into an agreement with the Shanghai Aviation Industrial Company for the assembly of MD80 series aircraft. The deal provided for sale of aircraft to Chinese airlines and some manufacture for export. In 1992 the agreement was extended to include production of the MD90 'Trunkliner', defeating a proposal by Boeing to manufacture B737s in China (Bailey 1992a, p. 16, Bailey 1992b, p. 8). At the same time the Chinese sought an expression of interest from Boeing for the manufacture of B757s in China (O'Lone 1992a, p. 30).

In November 1991 McDonnell Douglas announced plans to sell 40 per cent of the company for $2 billion in order to develop its new MD12 (Frankel 1992, p. 66). The Taiwan Aerospace Corporation (TAC) was the expected buyer; the deal, however, collapsed. In May 1992 TAC announced an alternative possibility of manufacturing parts of the MD12 under a commercial offsets arrangement. Other options for involvement by TAC were considered and in 1993 the company entered into negotiations with British Aerospace on joint manufacture of the regional jet series based on the BAe146. McDonnell Douglas subsequently was reported to be seeking a number of partners rather than one major partner for its civil aircraft division (*ITA Press* 1993d, p. 10). Both Boeing and Airbus Industrie have considered bringing in partners, particularly from Asia, for their large aircraft programs. Boeing has a number of Japanese companies involved in its B777 project (Bailey & Norris 1992, p. 6) and the Japanese government has expressed interest to Boeing in Japanese participation in the development of the B737-X series, a derivation of the current B737 range of aircraft.

Airbus Industrie had a change in its ownership arrangement in 1992, with the German Government granting its 20 per cent shareholding in Deutsche Airbus (a 37.9 per cent partner in Airbus Industrie) to Deutsche Aerospace (DASA), part of the Daimler Benz group, which gave DASA full control of Deutsche Aerospace. The grant was in exchange for the German Government ending its exchange rate subsidies, a constant source of friction with the US. DASA also took a controlling interest in the Dutch manufacturer Fokker in 1993, and showed interest in joint ventures with a number of Asia Pacific and US companies (Sengupta 1992, p. 26; Barrie 1992, p. 19).

The former states of the USSR have often been overlooked as participants in aircraft manufacture. Initially they were seen as markets rather than as potential competitors. In June 1992 the Airbus Industrie managing director Jean Pierson said that Russia, with government-built facilities, experience in both airframe and engine production, and a large potential domestic market could, through global alliances, enter into the domain of Airbus Industrie, Boeing and McDonnell Douglas. He announced that Airbus Industrie would consider collaboration with Russian manufacturers, particularly for the forthcoming large aircraft program (*Aviation Week & Space Technology* 1992a, p. 35). Equipment of existing Russian-manufactured airframes with Western engines and avionics was the first step in such cooperation, with the first examples demonstrated in mid 1993. Large Russian cargo aircraft have also had an impact upon air cargo transport outside of the former USSR.

In June 1993 *Flight International* (1993b, p. 3) commented that following the collapse of the Soviet Union and most military production, many military and transport manufacturing facilities in the former states of the USSR were seeking alternative production projects, mostly in the civilian aircraft market. It warned that they would face the same problem as the Western manufacturers: too many suppliers chasing too few buyers.

Subsidisation within the manufacturing sector

Manufacturers face the difficulty of needing both orders and long term funding to operate, due to the long lag time between order, delivery and payment for the product. Airlines operate within a marked cyclical industry (see chapter 6 for details); they are sensitive to outside influences, including world political and economic developments which affect their buying or leasing strategies. Some manufacturers, such as Airbus Industrie, have offered assistance to airlines purchasing their aircraft. Boeing, on the other hand, refused to offer direct financial packages to customers, but Boeing, together with McDonnell Douglas, has had the advantage of the US Foreign Sales Corporation (FSC) lease, which acted as an export promotion scheme for US manufacturers (*Aerospace* 1991, p. 30). See appendix VII for details of aircraft leasing.

The major airframe manufacturers were involved in controversy over alleged subsidies for their operations for several years, each accusing the other of having an unfair advantage (Verchere 1991a, pp. 35–6). Airbus Industrie, it was claimed, had been supported by the governments of its European manufacturing consortium members from France, Germany, Britain and Spain. On the other hand, the US manufacturers were alleged to have had significant support from their government through indirect subsidies in military and space contracts as well as the FSC scheme.

In July 1992 the US and the EC signed an agreement limiting both direct and indirect subsidies on civil air transports of more than 100 seats. The pact initially applied to Airbus Industrie, Boeing and McDonnell Douglas, with the expectation of broadening the agreement to include all major aircraft manufacturing countries (*Aviation Daily* 1992e, p. 109). The interpretation of the agreement, however, was itself subject to controversy over finance assistance provided to Northwest Airlines for purchase of A320 aircraft (*Commercial Aviation Report* 1992b, p. 14). US manufacturers subsequently objected to the use by Airbus Industrie of 'walk-away leases', ironically introduced by McDonnell Douglas. These leases allow the aircraft to be returned to the manufacturer after one year, with the aircraft value being able to remain an off balance sheet item. The EC counterclaimed that FSC financing allowed parties to avoid tax. While the pact was not threatened, both the US and the EC alleged breaches by the other. Airbus Industrie also claimed that the US Federal Aviation Administration (FAA) discriminated in favour of US manufacturers by selectively designing certification requirements to favour aircraft such as the B777 (Daly 1993, p. 5). The Rolls Royce chairman also alleged that US engine manufacturers received more than $700 million per annum in support from the US Government and called for engines, previously excluded at the insistence of US engine manufacturers, to be included in any future trade agreement (*Interavia Aerospace World* 1993, p. 17).

In mid 1993 there were indications that the dispute might be brought under the General Agreement on Tariffs and Trade (GATT), with the possibility of a new multilateral agreement replacing the US–EC agreement. A number of disputed issues required resolution, however, including a definition of government support (many forms of subsidy to aircraft manufacturers are outside GATT guidelines), and the acceptance of restrictions by other nations with developing industries (Odell 1993b, p. 11). At the same time the German Government was reported as planning to reduce its level of financial support for civil aircraft development, from $584 million in 1992 to $237 million in 1993 and $136 million in 1994 (Dornheim 1993, p. 13).

DESIGN DEVELOPMENTS

Major aircraft developments have been one of the important influences behind the success and rapid growth of air transport. As aircraft became more reliable, more efficient, and capable of longer range travel, route developments have followed closely behind. In turn market developments (and consequent route developments) provided incentive for further design developments.

Congestion of international airways, runways, and terminals at airports, and the expected strong growth in international travel are key aspects which aircraft designers must consider. Solutions under consideration include the Boeing 777 and Airbus A340. These aircraft are designed to be fuel efficient and long range in the hope of reducing the number of aircraft movements required at airports, as well as obtaining gains from increased operational efficiency. The A340 in particular may provide airlines with the opportunity to operate nonstop services on long range routes considered too 'thin' to justify use of a B747.

In 1991 both Airbus Industrie and Boeing conducted surveys which established a significant demand for a 600-plus seat aircraft, particularly in the Asia Pacific market (*Asian Aviation* 1991, p. 11). McDonnell Douglas considered the development of an aircraft of up to 600 seats; however, in mid 1992 McDonnell Douglas deferred development due to financial hardship, a lack of firm orders and lack of progress in negotiations for an injection of new equity (*Aviation Report* 1992a, p. 6). In early 1993 Boeing and the Airbus Industrie consortium members commenced a joint feasibility study for manufacturing a 600-plus seat aircraft, on the basis that no single company could afford to finance such a venture given the difficult economic climate and limited market for the aircraft.

In mid 1993 Boeing announced that the preliminary study had confirmed a market for 400 to 500 aircraft of this type in the first decade of the 21st century (*Australian Aviation* 1993a, p. 6).

Questions have been raised about the technical feasibility of a very large aircraft and the desirability of allowing the major aircraft manufacturers to cooperate on such a venture. The *Economist* (1993b, p. 20) suggested that such a cooperative venture would allow the manufacturers to reduce competition. An alternative would be for individual manufacturers to build larger aircraft according to demand, possibly in partnership with alternative companies. The feasibility of manufacturing a very large aircraft in viable numbers is open to question. The level of demand will be dependent upon the nature of the market at the time of launch, the capacity and range of the aircraft, and the price and operating cost. The purchase price will be dependent in part upon the costs of development, with an aircraft developed from an existing aircraft, such as the B747, possibly cheaper than a completely new aircraft.

Although the current emphasis is on developing aircraft with higher capacity and a longer range, there has been additional development work on a high speed commercial transport (HSCT). This aircraft would be a successor to the Concorde, providing supersonic transport for about 250 passengers at speeds of around Mach 2 with a range of around 7000 nautical miles. The commercial viability of the aircraft is, however, open to question. A technological leap of a similar scale to the introduction of commercial jet aircraft appears unlikely in this decade.

MARKET FORECASTS

Each of the major airframe manufacturers produces an annual long term market forecast covering a 20-year period. Boeing (1993a, p. 1.5), Airbus Industrie (1993, p. 14) and McDonnell Douglas (1992, p. 16) provided forecasts which predict sustained average annual growth in air passenger travel of 5 to 6.5 per cent until the year 2010 (see chapter 4 for further details of air traffic forecasts). Consequent upon this and the need to replace old (chapter 2) aircraft (see appendix V for detail), Boeing predicted a demand for aircraft for the period 1992–2010 of over 12 000 aircraft worth $815 billion (1993 dollars), Airbus Industrie predicted a total demand for aircraft until the year 2011 of 11 600, whereas McDonnell Douglas expected demand for the period of over 14 000 aircraft. All three forecasts saw the Asia Pacific region as being the major area for growth. All three also anticipated continued growth coupled with increasing congestion leading to a demand for larger aircraft and an increase in the average aircraft size over the 20-year period.

Whatever its level, traffic growth, together with ageing world fleets and increasing environmental regulation requiring retirement or modification of existing aircraft, will mean a continuing demand for aircraft. The demand for older narrow body aircraft has plummeted while demand for newer wide body aircraft (with the advantages of greater fuel efficiency, bigger payload capacity and greater environmental acceptability) has been maintained. The big challenge for airlines will be to fund their aircraft needs in order to meet these demands (see chapters 6 and 7 for more detail on financial aspects).

SUPPORTING DATA FOR FIGURES

TABLE VI.2 AIRFRAME NET ORDERS 1990 AND 1991

Company	*Number of airframes* *1990*	*1991*
Boeing	551	222
Airbus Industrie	359	77
McDonnell Douglas	182	–28
British Aerospace	25	24
Canadair	13	25
Fokker	32	9

Source *Aviation Daily* 1992a, p. 227.

TABLE VI.3 PERCENTAGE CHANGE IN AIRFRAME NET ORDERS 1990–1991

Company	*Percentage change 1990–1991*
Boeing	–60
Airbus Industrie	–79
McDonnell Douglas	–115
British Aerospace	–4
Canadair	92
Fokker	–72

Source *Aviation Daily* 1992a, p. 227.

TABLE VI.4 MARKET SHARE — AIRFRAME MANUFACTURERS: AIRFRAME ORDERS OUTSTANDING 1991

(number of airframes)

Company	*Airframe orders outstanding 1991*
Boeing	1637
Airbus Industrie	952
McDonnell Douglas	372
British Aerospace	38
Canadair	38
Fokker	145

Source *Aviation Daily* 1992a, p. 227.

TABLE VI.5 MARKET SHARE — ENGINE MANUFACTURERS

(per cent)

Company	Actual 1990	Estimated 2000
Pratt and Whitney	62.3	41.1
General Electric	12.3	15.4
Rolls Royce	11.3	13.1
CFM International	10.8	21.4
International Aero Engines	0.5	5.0
Textron	2.8	4.0

Source *Air Transport World* 1992c, p. 1.

APPENDIX VII AIRCRAFT LEASING

TYPES OF LEASES

The range of available leasing contracts is unlimited. Each contract can be created to suit each circumstance. The distinction between lease and debt finance is often blurred, but from a legal perspective a lease separates the ownership of the asset (aircraft) from its use, while debt finance means the airline borrows the funds, usually against a mortgage or secured deposits, and is both the owner and user of the aircraft. Some of the more common forms of aircraft leasing are outlined below.

Operating lease

An operating lease is defined as a lease where the risks and benefits associated with ownership of the leased aircraft (or property) remain with the lessor. An operating lease means the lessee essentially rents an aircraft for a specific period of time, which is usually of shorter duration than a finance lease (see below for details). It can assist companies in uncertain financial times or support airlines in meeting seasonal and cyclical peak traffic demand periods. Alternatively, by initially leasing, airlines can obtain delivery of new aircraft in times of backlog from order to delivery.

Usually the aircraft is expected to be returned to the lessor at the end of the lease, consequently the terms of the operating lease are strict regarding the lessee's (the airline) obligations on such matters as maintenance and insurance. This is in an effort to protect the residual value of the aircraft, which is of greater importance to the lessor than in a finance lease.

In addition, other short term excess demand periods can be filled by 'wet leases' where the aircraft, together with (or part of) the crew and maintenance, are provided. For example wet leases have been provided by Qantas for JAL and Ansett World Wide Aviation for ANA.

An operating lease is attractive to many airlines because it is an off-balance sheet transaction and may have tax benefits. From the lessor's perspective operating leases provide a higher return, as the rental is set higher than in a finance lease, reflecting perceived higher risk for an operating lease. The lessor has the advantages of having an asset which can be re-leased a number of times. The lessor would hope to benefit from changing economic circumstances, although this flexibility can work both to the lessor's advantage and disadvantage. To achieve a good return on each aircraft requires the lessor to anticipate market trends and to effectively organise lease and sale arrangements to maximise the return on the investment.

In recent years a number of airlines have engaged in the practice of sale and lease back. The lease arrangements can be either an operating or finance lease. This is another way of raising funds for immediate use by airlines while still maintaining the fleet through rental payments. It assists in realising a return on older aircraft in order to finance newer chapter 3 aircraft (see appendix V for details).

Finance lease

In a finance lease the risks and benefits associated with ownership of the leased aircraft (or property) is passed to the lessee (airline).

Finance leasing can be a leverage lease, which means two or more players jointly buy the aircraft and then lease it to an airline. Usually the players include one who provides the equity component (generally around 10 to 20 per cent of total value) while one or more players, such as banks, provide the rest as debt finance.

A finance lease typically involves making monthly rental payments, with the lessee (the airline) having an option to own the aircraft at the end of the lease. Usually the lease is for a longer period than for an operational lease and the residual is less important to the lessor than in an operational lease. A finance lease usually has a lower rental level than an operational lease, as the risk for a finance lease is usually perceived to be lower than for an operational lease.

Japanese and US aircraft leasing

Japanese leverage lease

In the late 1980s the Japanese market was a major source of aircraft finance. The Japanese leverage lease (JLL) was particularly popular. It provided a number of advantages, including tax benefits to the lessee. In 1990 the JLL market virtually collapsed, although since then there has been a small growth in the market. Newer JLLs are being offered under revised conditions, including more selective requirements by the lender and new tax laws. This has made JLLs less attractive to foreign airlines. Japanese lenders ceased being the leading lenders to the aviation industry as had been the case in the eighties.

US Foreign Sales Corporation lease

The US Government's initiative on Foreign Sales Corporation (FSC) leasing is one of the more complex cross border, long term leases to emerge. The first FSC aircraft leasing deal was signed in 1989. It is only available to purchasers of US manufactures as part of an export promotion package.

The simplest method is a commission FSC, where the US manufactured unit is owned by the parent of the FSC for majority use out of the US. The FSC arranges the transaction and receives a commission from the lease payment. The more complex version is the ownership FSC lease. It can involve leverage arrangements on debt funds and a third party to ensure certain benefits are not forgone.

The ownership FSC was often preferred to a Japanese leveraged lease (JLL) because it was usually offered at a few percentage points less (in a hundred million dollar transaction a few extra points can affect the cost significantly), and potentially, had other benefits when compared with a JLL. The complexity of the FSC lease means that they are usually only undertaken for bigger purchases. The B747-400s at more than $130 million per aircraft account, by value, for more than half of all FSCs.

GROWTH IN LEASING

The trend shows many airlines are leasing rather than buying their aircraft. Factors contributing to this trend include: deregulation of a number of domestic markets, permitting new airlines entry to the market with little or no aviation history; growing demand for aviation services at times outstripping the supply of aircraft; privatisation of some airlines, providing less financial guarantees for airlines and causing airlines to focus on profit levels, hence the attractiveness of shifting the debt off balance sheet; using capital needs, creating a favourable environment for sale and leaseback arrangements; potential advantages (in particular the tax benefits) of leasing over the purchasing of aircraft; and the enhanced management and financial flexibility leasing can give an airline. In summary the growth of leasing occurred because of tax and finance gains for airlines, and the trend is creating a fundamental change in how airlines are financed. Aircraft leasing is a major element of fleet expansion.

At the beginning of the 1980s only 6 per cent of the world's jet fleet was on operational leases, by 1991 it had reached about 20 per cent, and by the end of the 1990s it is expected to rise to approximately 36 per cent.

The use of leasing by airlines does vary between the major markets. US airlines lease more than 40 per cent of their fleet, while European airlines lease just over 25 per cent of their fleet. Some individual US carriers significantly exceed this level of leasing. For example, Continental at the time of filing for Chapter 11 bankruptcy protection in late 1990 had a fleet size of 365 aircraft, of which 259 aircraft were leased, giving it an off-balance sheet lease obligation in excess of $4 billion (Rice 1991, p. 1069). America West in mid 1991 had about 115 aircraft, of which some 80 per cent were leased (Mychasuk 1991, p. 34).

According to *World Airline News* (1992a, p. 6) the top 25 carriers worldwide leased 2169 aircraft, valued at $52 billion in 1992. This represented about 57 per cent of all leased aircraft but accounted for 70 per cent of the total value of leased aircraft. The total number of leased aircraft in the US carriers' fleets exceeds the number of leased aircraft in the rest of the world. American Airlines with 328 leased aircraft valued at $8.39 billion is the first in terms of number and value. KLM is the only European carrier to have more than half its fleet leased. Singapore Airlines is the first in leasehold among Asian carriers. It has 26 aircraft leased, valued at $1.78 billion. Most Asian carriers only have a small proportion of their fleet on lease. On average Asia Pacific carriers have only around 15 per cent of their fleet on lease. Some carriers including Indian Airlines and Pakistan International usually do not lease aircraft. Qantas has only a small proportion of its fleet under lease arrangements.

Benefits accruing from cross border leasing are mainly the result of tax advantages, such as deductions for depreciation or other expenses associated with ownership. Where 'double dipping' is possible the benefits can be considerable for both the lessee and the lessor.

These benefits have been reduced in recent times in some countries including the US, Britain, Ireland, Hong Kong and Japan, making such leasing less favourable, although France, Germany and Sweden still offer tax advantage in cross border leasing (*Aerospace* 1991, pp. 28-30). The problem with cross border leasing is that it is highly complex, as the funds for the transaction are arranged on a global basis and the collateral can move globally but the legal requirements are locally based and can involve a number of local jurisdictions.

Some airlines have found leasing attractive because it frees up considerable capital for use in non aircraft purchase activities; it allows an airline to replace older aircraft with newer aircraft, an important consideration for meeting commercial needs and new environmental requirements; it enables airlines to respond to short term fluctuations in demand; it removes the risk of uncertainty about the value for future resale of the aircraft; and it can assist new entrants into the market to establish their fleet and begin operations earlier than might be possible if left to purchase the aircraft.

Problems associated with leasing include the difficulty an airline (as lessee) faces in trying to meet ongoing obligations for rental payments during downturns in the airline industry. As noted in chapter 2, airlines with a higher proportion of their fleet on leases (or subject to debt financing) may be more vulnerable to cyclical downturns in the industry as they need an adequate and ongoing cash flow to meet their lease rental (or debt) payments. The lessor carries the risk regarding the residual value, which for older narrow body aircraft has all but collapsed (see chapters 6 and 7).

Legal difficulties with leasing have been considered by Merryweather and Kelly (1992 p. 9). They identified that it is possible for the owner of an aircraft to be held responsible for some liabilities incurred through the use of the aircraft by the lessee (for example landing charges). In Australia, the Civil Aviation Authority (CAA) has priority over the lessor's interests in the case of unpaid statutory charges, including landing charges. The owner or lessor could find it is in debt to the CAA should the lessor need to repossess a debt encumbered aircraft. After six months the CAA could deregister the aircraft. Once a debt is nine months overdue the CAA as a last resort may seize and/or sell the aircraft. It is an offence to export an aircraft with a lien on it without prior approval from the CAA.

Lease rates overall have dropped in the early 1990s, as have interest rates. US Department of Transportation data reveals that lease rates in September 1991 for aircraft like the A320 and the B737-300 dropped 20 per cent on rates paid at the end of 1989 and early 1990. In some cases the rate dropped by up to 80 per cent in 1991 based on the previous 12 months' charge. The result of this uncertain and falling lease rate has been for lessors to negotiate short term leases (around five years) in the expectation that demand will rise again relative to supply, creating conditions for a higher lease rate, possibly by the mid 1990s.

LEASING COMPANIES

Leasing companies are relative new players of influence in the aviation industry. The growth of leasing companies reflects many airlines' attempts to raise capital through sale – lease back deals or to gain financial advantages (including tax benefits), and a way to obtain aircraft to start up, and/or re-equip, and/or expand services. The mega leasing companies servicing world aviation include:

- Guiness Peat Aviation (GPA), located in Shannon, Irish Republic, and commenced business in 1975.
- International Lease Finance Corporation (ILFC), based in California, and commenced business in 1973.

GPA and ILFC in the five years to 1991 enjoyed a net profit of 20 per cent and a return on equity of more than 30 per cent. In the aviation industry this was a remarkable achievement. Beyond these two there are a number of medium to small sized companies offering aircraft for lease. Given the rise in the tendency to lease rather than own aircraft and the airlines' gap between capital needs to meet aircraft orders compared with their ability to raise funds from their own resources (see chapter 7 for details), it appears that leasing companies, especially the mega lessors, will have enough business to survive even though the high profits have peaked and levels have dropped and are likely not to rise to the highs of the late 1980s in the near future. As noted in chapter 6 the turbulent period of 1990–91–92 has meant the cancellation and/or postponement of billions of dollars worth of aircraft orders. This not only affects the actual manufacturers but affects leasing companies as well. Leasing companies are undergoing some restructuring with consolidation of existing leasing companies likely and/or new alliances with other enterprises possible.

Leasing companies have to raise funds themselves. They usually have close links with banks and financiers and some are associated with bigger conglomerates. For example, ILFC was acquired in 1990 by the big American International Group (AIG, an insurance and financial services organisation); Ansett Worldwide Aviation Services (AWAS) is jointly owned by TNT and News Corporation; Polaris is a General Electric Capital Corporation subsidiary; and US Airlease is part of the Ford Motor Company. GPA hoped to raise equity finance through a stock market float. In March 1992 the company announced it had scheduled the GPA float for June 1992 on the New York, London, Dublin and Tokyo exchanges and private placements elsewhere. It placed its share offer for more than $800 million but it was undersubscribed by about 40 per cent. GPA withdrew the offer on the 18 June just before the offer was due to close. It noted the generally low equity market activity as creating a timing problem. The company may return to the equity market at a later date (O'Toole 1992, p. 5).

There is a wide range of possible leasing arrangements, and different companies do specialise in different types of leases. Important to GPA is its sale of aircraft. In the fiscal year 1991 it raised 60 per cent of its revenues in this manner (Flint 1992, p. 25).

The global nature of leasing companies can be seen in GPA's operations. On 1 January 1992 its aircraft portfolio consisted of 392 commercial aircraft, and the enterprise serviced 100 airline customers in 47 countries (*Aviation Daily* 1992b, p. 260). Also, its shareholders at that time reflected its international nature. The shareholders included: Mitsubishi Trust and Banking Corporation; Air Canada; Aer Lingus; The Prudential Insurance Company of America; Long-Term Credit Bank of Japan Limited; and Irish Life Assurance; plus staff. Approximately one-third of GPA's shares were held in Japan, one-third in Europe and one-third in North America (*Aviation Daily* 1991b, p. 458; 1992b, p. 260; 1992d, p. 465).

Leasing companies usually place block orders well ahead of many airlines, consequently they can corner the market by taking a number of future delivery slots, forcing some airlines to lease aircraft at least in the short term. The practice of leasing rather than owning aircraft, while not new, has been growing and this is a trend which is likely to continue. Operational leasing continues to be a popular way for raising funds to obtain aircraft and in 1992 operating lessors owned some 20 to 25 per cent of all civil aircraft (excluding the previous Soviet Union's aircraft). Kjelaard (1992, p. 38) reports that major lessors account for 25 per cent of the orders with the major airframe manufacturers. The expansion of leasing is another point of pressure for change in the way the conventional aviation system will operate in the future. The growth of the importance of leasing companies means they can influence the conduct of manufacturers, airline companies, aircraft investment funding markets, and indirectly aviation policy.

GLOSSARY

Aerocost An aircraft operating cost model developed by the Bureau of Transport and Communications Economics.

Agency costs These are costs associated with the agent–principal relationship. For example, a principal may incur monitoring costs to ensure that the principal's interests are being pursued by the agent. As an example, managers are the agents of shareholders (principals).

Air cargo This Report adopts the ICAO (1985b, p. 24) definition of air cargo: any property carried on an aircraft other than mail, baggage or stores, including express and diplomatic bags. The terms cargo and freight are used interchangeably. In contrast, Boeing (1992b, p. 6) defines air cargo as freight plus mail.

Air service agreement (ASA) A government to government negotiated agreement governing the conduct of trade in international air services. Most air service agreements are bilateral air service agreements negotiated between two countries. The provisions addressed in each air service agreement vary, but can include market access, routes, freedoms granted, capacity, flight frequency and methods for determining tariffs.

Airline A registered commercial company carrying passengers and/or freight. Airlines can be classified as scheduled or nonscheduled (charter) carriers.

- *Scheduled airline* is any air transport enterprise offering or operating a regular air service according to a timetable (published or not).
- *Nonscheduled (charter) airline* is any air transport enterprise that offers air transport services to the public that are not performed according to a regular timetable.

Airlines also can be categorised as domestic, international, multidomestic, or global carriers.

- *Domestic airline* carries passengers and/or freight between points within a single country.
- *International airline* operates cross border services largely on a point-to-point basis. The majority of passengers and freight either commence or complete the journey in the home country. The airline pursues strategies based on market segmentation, and the airline is not free

to locate production at least cost centres nor provide services anywhere throughout the world.

- *Multidomestic airline* operates largely independent services in a number of different markets. Some centralisation of corporate finance, marketing policies and other activities may occur between associated airlines but each 'subsidiary' is managed largely as a separate profit centre.
- *Global airline* would be free to operate an integrated network of services throughout the world, including the major and associated feeder markets. A global airline would treat the world as one market without segmentation. It would be free to locate its production in least cost centres and all 'subsidiaries' of the firm would operate as one entity regardless of location.

Airline network All points, usually cities, served by an airline. (*See* **hub and spoke system.**)

All Industrials Index A general index of stock market listed companies with industrial activities, as opposed to resources activities.

Americas North, Central and South America.

Asset beta The level of systematic risk associated with the business operations of a company exclusive of financial risks — that is, if the company's capital structure did not include any debt. (*See* **beta risk**).

Available seat kilometres (ASKs) The total number of seats offered multiplied by the distance flown. ASKs may be measured for a single flight, an airline or industry wide. ASKs are a measure of air transport passenger capacity.

Average annual growth Year on year percentage change, averaged over a number of years.

Barriers to entry and/or exit The legal, institutional and/or economic factors that limit the ability of (both new and existing) airlines to enter and/or exit a particular market. Barriers to entry and/or exit may allow incumbent firms the opportunity to exploit their market power, through increased prices and decreased service levels, at the expense of consumers.

B/EBDRIT This multiplier relates the market value of debt to earnings before depreciation, rentals, interest and tax. It is not used in practice since it is difficult to value debt instruments unless they are traded bonds. Generally it is assumed that the market value of debt is equal to its book value.

Bermuda I The bilateral air service agreement negotiated between the United Kingdom and the United States in 1946. This agreement was used as a model for most bilateral air service agreements negotiated over the following thirty years. The key features were that: government authorities of each country have the right to designate carriers; the designated carriers of the two countries would have the discretion to set capacity; the routes and designation of carriers authorised to operate on those routes would be identified in the agreement; and fares would be set by IATA (International Air Transport Association).

Beta (systematic) risk The expected change in the rate of return earned on a given asset where there is a change in the rate of return earned by the market in general (that is, the 'market portfolio'). The market is defined as having a beta of unity while more (less) risky investments have higher (lower) betas.

Beyond rights The right of designated airlines to fly services from one foreign country to another foreign country. Fifth freedom rights are one type of beyond right. (*See* **freedoms**.)

Bilateral agreement Formal arrangement between two governments covering trade in air services. The phrase is often used to refer to an air service agreement. (*See* **air service agreement**.)

Billion One thousand million (1×10^9 or 1 000 000 000).

Block time Total flight time; measured from when the aircraft moves from the loading point before take-off until it stops at the unloading point after the flight.

Bonus issue Where a firm awards existing shareholders with additional shares (at no cost) in proportion to those already held. The company does not raise any funds, but there is a dilutive effect on the share price.

Cabotage The right of a foreign owned airline(s) to provide commercial domestic air services in a host country. Cabotage rights are classified as either consecutive cabotage or full cabotage.

- Consecutive cabotage is the right of foreign owned airline(s) to fly a domestic flight stage within the host country as a continuation of an international service.
- Full cabotage is the unrestricted right of foreign owned airline(s) to provide domestic air services in the host country (a right rarely given).

Capacity The maximum amount of traffic (passenger and/or freight) that an aircraft can carry.

CAPEX The level of capital expenditure on aircraft and terminals, for example, undertaken by airlines each year. CAPEX is an important feature of the airline industry, which must be funded by retained cashflow or externally through new debt and equity issues.

Capital intensive A capital intensive industry requires large amounts of capital relative to other inputs in the productive process. This increases the problems of raising capital in 'lumpy' amounts, and increases the operating risk because a high proportion of total costs are fixed.

Capital structure The capital structure of a company relates to the proportion of value contributed by different funding sources. For example a company may be funded by equity in the form of ordinary (or common) shares, preference (preferred) shares and/or debt. Capital structure can be measured in book terms (that is, balance sheet values) or in market terms.

CAPM The Capital Asset Pricing Model (CAPM) is the generally accepted model used for determining the required rate of return on equity (or cost of equity capital). The fundamental premise of the CAPM is that the rate of return required is the risk free return plus a risk premium which is linearly related to beta risk.

Cashflow Cashflow from operations may be broadly defined as earnings before tax, interest payments and depreciation. Cashflows may also enter a company through inflows of new debt or equity raisings.

Category 1 member of governing council of ICAO Countries (currently ten) elected to the governing council of ICAO that are of chief importance to the conduct of international aviation.

Chapter 2/chapter 3 (stage 2/stage 3) noise pollution standards Agreed levels set to restrict the amount of noise produced by aircraft. Chapter 2 (stage 2) noise pollution standards for jet aircraft were introduced in the early 1970s, while chapter 3 (stage 3) noise pollution standards were introduced in 1977. Chapter 2/chapter 3 is the ICAO reference to noise pollution standards, and stage 2/stage 3 is the US terminology.

Chapter 11 bankruptcy provisions (US) Allows firms declared bankrupt, in the US, an opportunity to be reorganised and recapitalised to remain operating, in an effort to trade out of difficulties.

Charter *See* **nonscheduled services.**

City pair An air route linking two cities.

'Classical' taxation system Under the classical taxation system there is a double taxation of dividends. First, the company is taxed at the corporate tax rate, and then the individual is taxed on dividend income, usually at their marginal personal rate. This tends to create a bias towards retention of earnings and debt financing.

Code sharing A marketing arrangement between two or more airlines allowing a connecting flight on two or more different carriers to be displayed on the CRS as a single carrier service. This is advantageous to code sharing airlines, as a 'single carrier' service has a higher priority on the CRS display.

Combi A commercial aircraft configuration for carrying both passengers and cargo on the main deck of the aircraft. This is in contrast with a dedicated passenger aircraft, in which the main deck is set up to carry passengers only, and the lower deck is set up as a cargo bay for carrying luggage and cargo items.

Computer reservation system (CRS) The electronic data management system employed by airlines to manage the price and booking status of each seat on each flight.

Consolidation Reduction in the number of airlines serving a market either through airline closure, allowing remaining airlines an opportunity to increase their market share, or through the acquisition of an airline by another airline. Airline consolidation results in an increase in market concentration amongst airlines remaining in the market.

Contestability An economic theory which states that, under certain conditions, potential entry by new firms can lead to more efficient price and service outcomes in the airline industry. Theoretically, the more effective the threat of entry (that is, the more contestable the market) the smaller will be any rents accruing to existing airlines serving the market.

Costs Airline expenses. Total airline costs can be divided into a number of categories and components:

- *Operating costs* All expenses incurred in providing air transport services. Operating costs include fuel costs, flight crew costs, and passenger service costs.
- *Nonoperating costs* All expenses incurred by an airline not directly related to the production of airline services. Non operating costs include interest expenses, subsidies, and gains (or losses) on the sale of aircraft.
- *Direct operating costs* All expenses associated with flight activity, maintenance and the capital costs of the airline.
- *Indirect operating costs* All expenses not associated with flight activity, maintenance and capital costs of the airline. Indirect operating costs include user charges and station expenses; passenger services; ticketing, sales and promotion; and general and administrative expenses (ICAO 1993a, pp. X-13 to X-15).
- *Variable costs* All expenses which are directly proportional to the amount of the service provided. Variable costs would include flight costs and user charges, amongst other costs.
- *Fixed costs* All expenses which do not vary as the quantity of services produced changes. Examples of fixed costs would include depreciation and amortisation expenses, flight crew training, and station expenses.

Coterminalization Right to serve any two or more points on one flight.

Coverage ratios Relates an earnings or cashflow variable to fixed charges over these flows. Debt rating agencies employ coverage ratios to test the current and expected future ability of a company to meet its debt and leasing commitments. For example, if earnings were covered twice, then a halving of earnings could be absorbed without affecting the ability to repay debt. This, however, would also depend on the company's cash position.

Debt covenant A contract between a company and providers of debt which protects the position of the debt holders. Typical constraints in a debt covenant include the requirement to achieve specified coverage ratios and to maintain a maximum debt position.

Debt/equity The ratio of debt to equity shows the proportions of funding by holders of debt and equity securities, and is used as a measure of financial risk. Debt and equity can be measured in book (that is, balance sheet) or market values.

Debt tax shield effect When a firm finances its operations with equity it does not obtain a tax deduction for dividend payments going to shareholders. In contrast, interest payments to debt holders are tax deductible to the company and so provide a tax shield. This makes the after tax cost of debt cheaper than equity financing. Too much debt, however, will increase the financial risk of a company, placing a limit on the tax shield benefit. The benefit of debt tax shields is also lowered in countries operating a dividend imputation tax system.

Dedicated freight aircraft An aircraft set up to transport freight only.

Deregulation In this Report it refers to reduced economic regulation in a *domestic* aviation market. It is distinguished in this Report from liberalisation, which refers to reduced economic regulation of trade in international (cross border) air services.

Direct operating costs *See* **costs**.

Dividend franking In countries with a dividend imputation system, such as Australia and New Zealand, dividend franking refers to the extent to which dividends paid to shareholders have been drawn from income on which the company has already paid tax to the government. Franked dividends can then be used by investors to offset their personal tax liability.

Dividend payout ratio The proportion of earnings after tax paid to shareholders as dividends. It can be measured as the ratio of dividends per share to earnings per share.

Dividend yield The percentage rate of return on an investment earned through dividends. For a stock market listed company, gross dividend yield can be measured as dividend per share divided by price per share.

Double disapproval Arrangements in bilateral air service agreements whereby fares can be disallowed only if rejected by both contracting countries.

Earnings per share (EPS) Profit after tax divided by the number of issued shares. Expected EPS growth is seen by many in the market as a major determinant of corporate value. However, it needs to be viewed with caution due to the potential for distortions introduced by accounting changes.

EBDRIT Earnings before depreciation, rentals, interest, and taxes. It is a basic indicator of the operating cashflow of a business. It is an important indicator in the airline business due to the impact of differences in operating leases and accounting policy between companies. It provides a fundamental indication of the cashflow from which the company must satisfy claims for the government and providers of finance.

Economies of scale Average unit cost of production declines as airline output increases.

Economies of scope One airline can produce two or more services more cheaply than if those same services were produced separately by different airlines.

Economies of traffic density Average unit cost of production declines as the amount of (passenger or freight) traffic increases between any given set of points served.

Economies of network size Average unit cost of production declines as the number of city points served by an airline's network increases.

Effective control Principle that the managerial influence of an airline should rest with citizens in the country of registration. There is no internationally agreed standard, so each country can determine what it accepts as effective control.

Efficiency Economic measure of the best use of resources. In this Report the term is used to refer to both allocative and productive efficiency. Allocative efficiency refers to the optimum allocation of scarce resources between end uses in order to produce a combination of goods and services which best meets the pattern of consumer demand. Productive efficiency refers to the least cost combination of inputs used by an airline to produce a given set of airline services.

Elasticity The responsiveness of demand to changes in factors such as price and income. For example, the own price elasticity of air passenger demand measures the proportionate change in demand for air passenger travel resulting from a proportionate change in the price of air travel.

Equity The equity component of a balance sheet represents the claims of shareholders over the assets and earnings flow of the company. The claims of equity holders are residual since the claims of debt holders rank more highly in the event of a winding up of a company. In market terms the shareholders' equity value is measured by the current share price multiplied by the number of shares on issue.

Equity beta The equity beta of a company is equal to its asset beta if no debt is held in the company. When debt is introduced the equity beta will incorporate both business and financial risk. (*See* **beta risk**.)

Exclusive sovereignty Phrase used in international air law to describe a country's sole ownership of the air space over its territory.

Factor inputs Refers to resources used to produce airline services.

Fifth freedom rights Rights of passage granted to designated airlines to fly from one foreign country to another foreign country provided that the flight originates or terminates in the home country, sometimes called 'beyond rights'. For example, the Australia–Thailand and Australia–UK bilateral air service agreements provide Australian carriers with fifth freedom rights to fly from Bangkok to London and vice versa, providing the journey begins or ends in Australia. (*See* **freedoms**.)

Fixed costs *See* **costs.**

Flag carrier A country's national airline. Countries with only a government owned airline often identify the airline as the national or flag carrier.

Freedoms International aviation rights of passage which define the rights of international aviation services as a matter of aviation law. (For details on types of freedoms see box 5.1.)

Freight tonne kilometres (FTKs) The number of tonnes of air freight times the distance carried. FTKs may be measured for a single flight, an airline, or industry wide.

Frequent flier Usually a passenger who takes more than twelve air trips per year.

Frequent flier program A scheme offering flights or other benefits to travellers who fly long distances and/or often. The qualification criteria can be based on the distance travelled or the number of trips taken, and are usually weighted by the class of ticket purchased.

Funds from operations *See* **EBDRIT**.

Gauge, change of The right of an airline to change the size of its aircraft operating on a given route. The airline is still required not to exceed its authorised capacity.

Global airline *See* **airline**.

'Golden share' A 'golden share' enables a government to retain an influence or veto rights over certain conditions or circumstances (such as hostile takeover of a privatised company). These veto rights are normally vested as part of the Articles of Association or constitution of the company. For example, a 'golden share' could provide the government with the power to veto any share purchases greater than a certain percentage of the total stock. 'Golden shares' were widely used to protect the interests of society in the process of privatisation in Britain during the 1980s.

Gross domestic product (GDP) The value of all output produced within a particular country usually over a period of one year. *Nominal GDP* is a current price measure of a country's output. *Real GDP* adjusts the value of output for the effects of changes in the general level of prices to provide a constant price measure of the value of a country's output over time.

Grandfather rights The allocation of airport landing and take-off slots based on past and/or current access.

Gross operating revenues Airline earnings obtained from the operation of scheduled and nonscheduled air passenger services, and freight and mail services.

High density rule (HDR) airports In four US airports (Washington National, La Guardia, Kennedy and Chicago) the level of demand for airport landing and take-off space resulted in the need to set limits on the number of authorised flights into and out of these airports. The high density rule restricts by hour or half-hour increments the number of operations at these four highly congested airports. Slots are allocated according to current use, although there are 'use-or-lose' provisions which require that slots be utilised for a certain percentage of each period or a carrier may lose its rights to the slot.

Horizontal integration *See* **integration**.

Hub and spoke network An airline operating structure where airport(s), usually centrally located, act as the focus of an airline's operations. In a hub and spoke network air passenger and/or freight traffic is collected from a number of 'spoke' or feeder points and consolidated at the hub point prior to redistributing traffic out of the hub to connect with flights to another destination.

- A *simple hub* is usually a single 'centrally' located airport which serves a limited number of independent feeder routes (or spokes). Flights into and out of a simple hub are not coordinated. The hub can be large or small.
- A *complex hub* is identified by the connection of a number of hubs or centres which in turn serve an array of feeder routes. The importance of the interdependence of flights in a complex hub affects the scheduling of services. Arrivals and departures are timed in batches to minimise connection time for passengers and to maximise the potential connections.

The effect is to create peaks and troughs in airport activity which can prove expensive due to the low utilisation of resources between activity peaks. This is balanced against other efficiency benefits, including higher load factors, shorter waiting time between connections for passengers, and greater passenger volumes between hub points with related economies of traffic density.

Hub and spoke networks are most prevalent in the US domestic airline industry.

Hush-kitting A muffling operation that reduces the noise emitted by aircraft engines. Hush-kitting is most frequently used to reduce the amount of noise emitted by older aircraft, so that these aircraft meet noise emission standards.

Imputation An imputation system of taxation has the potential to eliminate double taxation of dividends by 'imputing' the tax paid on dividends (as well as income earned) at the corporate level to the individual shareholder. If the shareholder's personal marginal tax rate is higher than the company's, additional tax will be paid. Shareholders with a lower tax rate can use excess credits to offset their tax liability on other investments.

Indirect operating costs *See* **costs.**

Infrastructure (aviation) Air traffic control facilities, runways, and airport passenger terminals. Airport landing facilities and passenger terminals are major investments with considerable sunk costs and long lead time. This makes achieving optimal airport infrastructure investment difficult for planners.

Integration The two main categories are:

- *Horizontal integration* is where a firm merges with another firm in the same business to realise cost and/or marketing advantages. One example of horizontal integration is the US domestic airline industry where, after deregulation, a number of the major trunk airlines bought stakes in smaller airlines servicing trunk routes to consolidate the market share of the majors.
- *Vertical integration* is where a firm links with upstream or downstream businesses, which provide complementary services or products, to obtain cost or marketing advantages. Examples of vertical integration include airline links with hotels, tourist resorts and car rental firms.

Interlining Carriage of passengers and/or freight by one airline on behalf of another airline, based on a formal arrangement (an interline agreement) between the airlines. Carriers involved in an interlining agreement are required to honour tickets issued by other carriers in the agreement. The identity of each carrier is maintained.

International airline *See* **airline.**

Investment ratings A credit rating is an expert opinion of the likelihood that a debtor will pay principal and interest on time. The major ratings agencies worldwide are Standard and Poor's Corporation and Moody's Investors Services:

- *Standard and Poor's* long term ratings range from AAA, AA, A, BBB, BB, B, C to D, with a plus or minus sign providing refinements to the ratings. For Standard and Poor's ratings, investment grade is at BBB– or above, which means the debtor is adjudged likely to pay off the debt within the specified time.
- *Moody's* long term ratings range from Aaa, Aa, A, Baa, Ba, B, Caa, Ca to C with a 1, 2 or 3 providing refinements to the ratings. For Moody's ratings, investment grade is at Baa3 or above.

'Kiwi share' A 'Kiwi share' was employed by the Government of New Zealand as a form of 'golden share' when it privatised Air New Zealand (*see* **'golden share'**).

Lateral separation standards The minimum distance that must be maintained between aircraft in flight.

Lease A rental agreement that involves a series of fixed payments. Airlines lease aircraft as an alternative to outright purchase. There are a number of different types of aircraft lease arrangements:

- *Operating lease* is a shorter term aircraft rental agreement under which the aircraft reverts to the lessor at the end of the lease. Operating leases are distinguished from finance leases by the fact that the lessee does not bear the risks and benefits of ownership of the asset. Generally, the sum of the lease payments is less than the purchase price, the initial lease period is substantially less than the useful life of the asset, and the agreement can be cancelled, though at some penalty to the lessee.
- *Finance lease* is a longer term aircraft rental agreement, usually extending for the economic life of the aircraft, often with an option for the lessee to purchase the aircraft at the end of the lease.
- A *wet lease* involves the provision of an aircraft and the operating crew.
- A *dry lease* involves the provision of an aircraft, but the operating crew is supplied by the lessee.

Leveraged buy-out (LBO) In a leveraged buy-out a small group of investors takes control of a company employing a high degree of debt funding relative to equity. When key figures in the investor group are managers this is known as a management buy-out (MBO). The objective of a leveraged buy-out is to increase profitability and pay down debt within a relatively small period.

Liberalisation In this Report it refers to reduced economic regulation of trade in *international* (cross border) air services. It is distinguished in this Report from deregulation, which refers to reduced economic regulation in a domestic aviation market.

Load factor A percentage measure of airline traffic as a proportion of airline capacity. Passenger load factor is the number of passengers carried as a percentage of the number of seats available. Weight load factor is the number of tonne kilometres performed as a percentage of tonne kilometres available. Load factor may be measured for a single flight, an airline, or industry wide.

Mail tonne kilometres A measure of tonnes of mail carried times the distance flown. Mail tonne kilometres may be measured for a single flight, an airline, or industry wide.

Market In economic terms, the market for international aviation services encompasses any interaction between buyers and sellers of international aviation services. The Australian *Trade Practices Act 1974* (Cwlth), s. 4E, defines a 'market' as a market in Australia, and including all goods and services that are close substitutes for each other, or otherwise in close competition. The Trade Practices Commission recognises that a market is capable of delineation by geographic, product, functional and/or time dimensions.

Market debt The market value of debt is determined by the future interest (coupon) payments discounted at the rate of interest currently required to attract debt finance to a company with this level of risk. If interest payments are fixed, the market value of debt can be considerably different from its nominal book value.

Market price to book value The ratio of share price to the book value of net assets of a company. Sometimes used as a multiplier to establish value. While the share price is obtained from recent market transactions, the book value of net assets can be obtained from the balance sheet.

Multidomestic airline *See* **airline**.

Multidesignation Nomination of more than one airline to operate international air services from the home country to a particular country.

Net realisable value (NRV) The amount that can be realised by selling all of a businesses' assets on a disaggregated basis after extinguishing all liabilities and paying transaction costs.

Net result Airline financial profit (or loss) after taking non operating costs and revenues into account.

Nominal value A current period currency measure of the value of a variable. For example, nominal GDP measures the value of the output of an economy for one year using the prices for that year, and differs from real value.

Non core business Non core businesses are those which are not essential to the continued successful operations of the major business of a company.

Non operating costs *See* **costs**.

Nonscheduled (or charter) services Flights performed for remuneration on an irregular basis. Nonscheduled services are provided by both scheduled and nonscheduled carriers.

Non systematic risk The risk which is not related to the overall economy. As an example, the operations of airlines may be affected by the weather, which is a non systematic risk.

North America United States and Canada.

Offeree In a takeover, the offeree is the seller.

Offeror In a takeover, the offeror is the bidder.

Open skies In this Report refers to the full liberalisation of trade in international air transport, including cabotage. This differs from the US DOT's definition of 'open skies' which reduces much of the economic regulation of international air services but does not include cabotage rights for foreign carriers in the US domestic market, nor a relaxation of US foreign ownership restrictions.

Operating costs *See* **costs**.

Operating result The difference between total operating revenues and total operating expenses (may be a positive or a negative figure).

Operating revenues All earnings from the conduct of air transport services and related activities, including scheduled and nonscheduled passenger, freight and mail services.

Operational leverage Operational leverage results from a cost base which has a high proportion of fixed costs. As the level of demand expands beyond the break even level of operations most of the extra revenue adds to profits. High operational leverage contributes to earnings instability, and may be reduced by increasing the variability of the cost structure.

Orders, aircraft Number of new aircraft commissioned to be built, usually measured per year. Aircraft orders are an important part of airline strategic planning, as it can take a number of years from order to delivery of an aircraft.

Origin–destination traffic A measure of airline (passenger) traffic between the commencement point of an air passenger's journey and the end point of the journey, to be distinguished from uplift–discharge traffic.

Passenger facilitation Support activities that assist in the conveyance of passengers undertaking air travel. This includes passenger terminal facilities, booking and ticketing facilities, baggage handling, customs, quarantine, immigration, and health and security facilities.

Passenger traffic Measure of people travelling by air transport. This Report distinguishes domestic, international and world passenger traffic.

- *Domestic passenger traffic* All passengers carried within one country's borders.
- *International passenger traffic* All passengers carried on cross border air services.
- *World passenger traffic* International plus domestic passenger traffic.

Price/book ratio *See* **Market price to book value.**

Price earnings multiple (price/earnings ratio) The ratio of current market price to profit after tax. This multiple is used to compare the valuation of different firms in the market. Using this technique a company without a market price can be valued on the basis of its reported profit and comparability with stock market listed companies.

Principal–agent Refers to the economic relationship between the owner (principal) and the manager (agent) of a firm (airline) where the owner and the manager are different entities. This term describes the situation where the manager of an airline may have a different set of objectives to the owner(s), and may not act as the owners would prefer. Differences in the information available to the owner and the manager may allow this situation to continue for an extended period.

Privatisation The sale of publicly owned assets or businesses (for example airlines) to the private sector.

Pro-cyclical A variable is said to be pro-cyclical if its periodic behaviour moves in phase with aggregate economic activity. A variable that moves out of phase with aggregate economic activity is said to be counter-cyclical. This Report shows that airline passenger traffic demand is not only pro-cyclical but grows twice as fast, on average, as economic activity.

Real value A constant currency measure of the value of a variable. For example, real GDP measures the value of the output of an economy for a number of years using a given year's prices. In real terms, one dollar in 1970 will purchase the same bundle of goods as one dollar in 1990.

Recapitalisation A financial recapitalisation usually involves a swap of equity for debt in a company in order for it to achieve performance ratios acceptable to the remaining debt and equity holders.

Regional bloc *See* **single aviation market.**

Rent In this Report refers to the return to a resource, for example labour or capital, over and above that which would be required to keep the resource in its present use. This concept is often elsewhere referred to as economic rent.

Revenue passenger kilometres (RPKs) The number of paying passengers on an aircraft times the number of kilometres flown. RPKs may be measured for a single flight, an airline, or industry wide. RPKs are a measure of demand for air passenger travel services.

Rights issue In a rights issue, the company's existing shareholders are given the opportunity to subscribe to new shares in proportion to their existing shareholding. For example, a '1 for 2' issue allows shareholders to purchase an extra share for every two already held. The rights to new shares may be issued at a discount from the current market price (that is, contain a bonus element) or may be traded.

Route At its simplest level, a route means an air service between two points (usually cities). A single route can be considered as a market; however, a market can consist of one or more routes.

Scheduled services Flights listed in a published timetable, or so regular and frequent as to constitute a recognisably systematic series, and performed for remuneration.

S/EBDRIT The ratio of equity value to earnings before depreciation, rentals, interest, and taxes. A commonly used multiplier in the airline industry, particularly when making international comparisons.

Share price accumulation A share price accumulation index shows the cumulative value of a given investment in a company under the assumption that all dividends paid to shareholders are immediately reinvested in purchasing further shares in the company. Transaction costs associated with the theoretical purchases and sales of shares in this exercise are assumed to be zero.

Single aviation market (or regional aviation bloc) Two or more countries that have a formal agreement that fosters less restricted trade in air services between member countries. Examples in aviation include the EC, Australia – New Zealand, and potentially Canada–US–Mexico. So far aviation blocs have been created on a regional basis.

Slots The right to land and/or take off from an airport at a specified time. The large number of aircraft movements at particular airports can make slot availability scarce and slot access quite valuable.

Stage length The distance flown between take-off and landing.

Station expenses Costs of airline airport operations. Station expenses include: the salaries and expenses of all airport staff involved in handling and servicing aircraft; airport accommodation costs; maintenance and insurance of airport facilities; traffic handling fees charged by third parties for handling the air services of the airline; and airport stores charges, including duties on equipment, rental and storekeepers pay, allowance and salaries. Note that station expenses exclude parking and hangar charges.

Stock split In a stock split the company increases the number of shares on issue in proportion to those held. For example, a '1 for 1' issue would double the number of shares and, other things being equal, halve the share price.

Substantial ownership Principle that all or majority ownership of an airline should rest with citizens in the country of registration. There is no internationally agreed standard, so each country can determine what it accepts as substantial ownership.

Systematic risk *See* **beta risk.**

Tariff Passenger air fare and/or cargo rate.

Tonne kilometres available (TKA) A measure of tonnes available for the carriage of freight, mail and passengers, times the distance flown. TKA may be measured for a single flight, an airline, or industry wide, and is a measure of tonnage capacity. Cost per TKA is often used as a measure of airline efficiency.

Tonne kilometres performed (TKP) A measure of tonnes of freight, mail and passengers actually carried times the distance flown. TKP may be measured for a single flight, an airline or industry wide.

Total debt The sum of all long term and short term debt which has an explicit interest cost. Thus, liabilities such as provisions are not included.

Total equity Refers to ordinary shareholders' interest in a company. In balance sheet terms this is the sum of paid in capital, share premium reserve and retained earnings. The market value of equity is the product of share price and the number of shares on issue.

Traffic, airline Measure of passengers, freight and mail carried by airlines.

Trans-Pacific In this Report refers to all air routes between North America and Asia. In contrast, IATA uses trans-Pacific to mean all routes between North, South and Central America and Asia, which this Report refers to as the Asia–Americas route.

Trans-Tasman All air routes between Australia and New Zealand.

Travel packages (or price bundling) The joint sale of air transport, accommodation, tours, and/or other services, such as car rental. Many travel packages sell each of the travel items at a discount on what they would sell for individually.

Undergeared An undergeared (or underleveraged) investment is one which is not maximising the benefits of debt financing. Such benefits include the debt tax shield effect and monitoring benefits.

Uplift–discharge traffic A measure of airline (passenger) traffic between point of take-off and landing, and to be distinguished from origin–destination traffic.

User charges Fees levied for the use of route facility services, and landing and associated airport services. Landing and associated airport services include all services provided at airports such as runway slots, passenger and cargo facilities, and parking and hangar space. Route facilities are those services that assist the movement of an aircraft between two points, such as navigation services.

Variable costs *See* **costs**.

V/EBDRIT The ratio of total corporate value to earnings before depreciation, rentals, interest, and taxes. This multiplier may be employed to estimate the total value of a company. The market value of equity could then be calculated by subtracting the market value of debt.

Vertical integration *See* **integration**.

V/REV The ratio of the total value of the company to its annual revenues. Usually this is expressed as a percentage and indicates the corporate value which is supported by revenues.

World In this Report refers to international plus domestic, usually in reference to airline traffic.

X-efficiency Refers to the managerial or organisational elements that affect the production capacity of a firm. As a concept, X-efficiency is similar to productive efficiency. (*See* **efficiency**.)

Year In this Report each year is a calender year unless otherwise indicated.

Yield Airline revenue per unit of traffic. Passenger yield is airline revenue per passenger kilometre.

Yield management Manipulation of prices to obtain the most revenue from each flight. Yield management systems are based on estimating the number of full fare tickets that would be sold on a particular flight and then offering the remaining tickets at varying discounts to induce demand from more price sensitive passengers. The discounted tickets generally have strict conditions to make these tickets less attractive to those passengers who are willing to pay full fare.

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ABBREVIATIONS

ABS	Australian Bureau of Statistics
AGPS	Australian Government Publishing Service
BDW	Blake Dawson Waldron
BIE	Bureau of Industry Economics
BTCE	Bureau of Transport and Communications Economics
BTR	Bureau of Tourism Research
CIE	Centre for International Economics
DCA	Department of Civil Aviation
DCN	Daily Commercial News
DoA	Department of Aviation
DoT	Department of Transport, Australia
DTC	Department of Transport and Communications
EDR	European Data and Research Limited
FAC	Federal Airports Corporation, Australia
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ILO	International Labour Organisation
IMF	International Monetary Fund
ITA	Institute du Transport Aerien [Institute of Air Transport]
JNTO	Japan National Tourist Organisation
KLM	Koninklijke Luchtvaart Maatschaappij NV (national airline of the Netherlands)
OECD	Organisation for Economic Cooperation and Development
UN	United Nations
WTO	World Tourism Organisation
WTTC	World Travel and Tourism Council

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ABBREVIATIONS

1971–1992	The period 1971 to 1992 inclusive
1990–91–92	Calendar years 1990, 1991 and 1992
1991–92	Financial year spanning 1991 and 1992
ABS	Australian Bureau of Statistics
ACF	Associated companies facility
AEA	Association of European Airlines
AIG	American International Group
ALM	Antillean Airlines
AMR	American Airlines
AN	Antonov
ANA	All Nippon Airways
APEC	Asia Pacific Economic Cooperation
ASA	Air service agreement
ASEAN	Association of South East Asian Nations
ASK	Available seat kilometre
ATAG	Air Transport Action Group
ATB	Automated Ticket and Boarding Pass
ATC	Air traffic control
ATPR	Australian Trade Practices Reporter
AWAS	Ansett Worldwide Aviation Services
BA	British Airways (also BAB in figure 7.15)
BDW	Blake Dawson Waldron
BIE	Bureau of Industry Economics
BTCE	Bureau of Transport and Communications Economics
BTR	Bureau of Tourism Research
B/EBDRIT	Debt divided by earnings before depreciation, rentals, interest and tax
CAA	Civil Aviation Authority, Australia
CAAC	Civil Aviation Administration of China
CAEP	Committee on Aviation Environmental Protection, ICAO
CAPEX	Capital expenditure
CAPM	Capital asset pricing model
CBD	Central business district
CCF	Corporate credit facility
CEO	Chief executive officer
CER	Closer Economic Relations

CIE	Centre for International Economics
CPI	Consumer price index
CRS	Computer reservations system
CSA	Ceskoslovenske Aerolinie [Czechoslovakian Airlines]
DAC	Douglas Aircraft Corporation
DAL	Delta Airlines
DASA	Deutsche Aerospace
DAT	Delta Air Transport
DCA	Department of Civil Aviation, Australia
DoA	Department of Aviation, Australia
DoT	Department of Transport, Australia
DOT	Department of Transportation, US
DPS	Dividend per share
DTC	Department of Transport and Communications, Australia
EBDIT	Earnings before depreciation, interest and tax
EBDRIT	Earnings before depreciation, rentals, interest and tax
EBIT	Earnings before interest and tax
EC	European Community
ECAC	European Civil Aviation Conference
ECJ	European Court of Justice
EDI	Electronic data interchange
EDR	European Data and Research Limited
EEA	European Economic Area
EFTA	European Free Trade Area
EIU	Economist Intelligence Unit
EPS	Earnings per share
EQA	European Quality Alliance
ESOP	Employee share ownership plan
FAA	Federal Aviation Administration, US
FAC	Federal Airports Corporation, Australia
FANS	Future Air Navigation System
FSC	Foreign Sales Corporation, US
FTK	Freight tonne kilometre
GA	General aviation
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GE	General Electric
GNS	Group of Negotiations on Services
GNP	Gross national product
GPA	Guinness Peat Aviation
HDR	High density rule (US airports)
HMSO	Her Majesty's Stationery Office
HSCT	High speed commercial transport
IASC	International Air Services Commission, Australia
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization

ICC	International Chamber of Commerce
ILFC	International Lease Finance Corporation
ILO	International Labour Organisation
IMF	International Monetary Fund
ITA	Institute du Transport Aerien [Institute of Air Transport]
JAL	Japan Airlines
JLL	Japanese leverage lease
JNTO	Japan National Tourist Organisation
KLM	Koninklijke Luchtvaart Maatschaappij NV (Netherlands national airline)
km	kilometre
KPMG	Klynveld Peat Marwick Goerdeler
LBO	Leveraged buy-out
LIBOR	London interbank offered rate
LOT	Polish Airlines
LUV	Southwest Airlines
MAS	Malaysian Airline System
MBO	Management buy-out
NRV	Net realisable value
OAA	Orient Airlines Association
OECD	Organisation for Economic Cooperation and Development
PLUNA	Primeras Lineas Uruguayas de Navegacion Aerea (Uruguay national airline)
PSA	Pacific Southwest Airlines
PWA	Pacific Western Airlines, holding company for Canadian Airlines International
P/B	Price divided by book value
P/E	Price divided by earnings
RBA	Reserve Bank of Australia
RPK	Revenue passenger kilometre(s)
RPM	Revenue passenger mile(s)
RPT	Regular public transport
SAS	Scandinavian Airlines Systems
SH&E	Simat, Helliesen & Eichner
SIA	Singapore Airlines
SIAD	Singapore Airlines domestic shares
SIAF	Singapore Airlines foreign shares
SNECMA	Societe Nationale d'Etude et de Construction de Moteurs d'Aviation
SRI	Strategic Research Institute
STI	Singapore Straights Times Index
S/EBDRIT	Share price divided by earnings before depreciation, rentals, interest and tax
S&P	Standard and Poor's Corporation
S&P 500 Index	Standard and Poor's 500 Index
TAC	Taiwan Aerospace Corporation
TAP	Air Portugal

TAT	Transport Aerien Transregional
TEA	Trans European Airways
THY	Turk Hava Yollari [Turkish Airlines]
TKA	Tonne kilometres available
TKP	Tonne kilometres performed
TNT	Thomas Nationwide Transport
TPC	Trade Practices Commission, Australia
TWA	Trans World Airlines, US
U	USAir
UAL	United Airlines
UK	United Kingdom
UN	United Nations
UPS	United Parcel Service
US	United States of America
USSR	Union of Soviet Socialist Republics
US$	United States dollars
UTA	Union de Transport Aeriens
VASP	Viacao Aerea Sao Paulo
VAT	Value added tax
VFR	Visiting friends or relatives
V/EBDRIT	Value divided by earnings before depreciation, rentals, interest and tax
V/REV	Value divided by revenue
WTO	World Tourism Organisation
WTTC	World Travel and Tourism Council
$A	Australian dollars
$SD	Singapore dollars