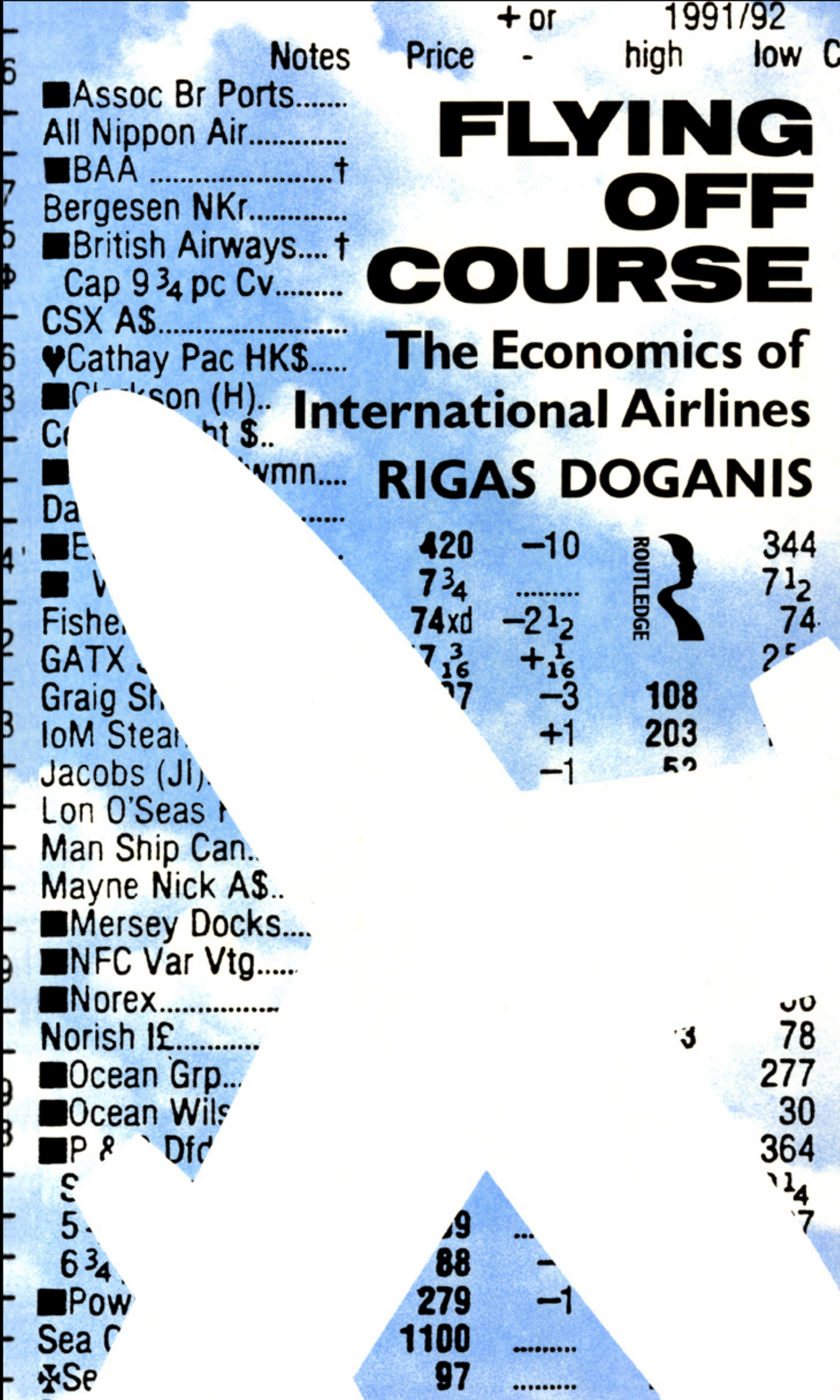

FLYING OFF COURSE

The Economics of International Airlines

RIGAS DOGANIS

ROUTLEDGE

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The Economics of International Airlines

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RIGAS DOGANIS

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Contents

Acknowledgements

The international airline industry is complex, dynamic and subject to rapid change and innovation. To understand its economic and operational features one must be close to its pulse-beat. In this I have been fortunate: for over 15 years I have been lecturing at the Royal Aeronautical Society's Air Transport Course held annually at Oxford and at the similar course in Manila organized for the Orient Airlines Association by the Asian Institute of Management. These courses bring together each year a group of managers with wide international experience from various fields of air transport. They provide an open forum for frank discussion of airline trends and problems, where established truths are constantly questioned. I am indebted to the numerous participants at Oxford and Manila who, through their comments and questions, have helped me gain a deeper insight into the workings of the airline business. For the same reasons I would like to thank my former students at the Polytechnic of Central London and the participants of the various in-house air transport courses I have taught for airlines such as SIA, Malaysia Airlines, Thai International and others.

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Lastly, I am grateful to my wife Sally, who, with her television journalist's flair and abandon—'don't let the facts get in the way of a good story'—has always encouraged me in writing this book. I am also thankful to Dimitri and Chloe for their understanding and for not taking me too seriously.

Introduction

In the five years since the first edition of this book appeared the international airline industry has changed dramatically. The trend towards deregulation has become widespread and has brought with it new operating practices and management concepts. This second edition sets out to reflect these changes.

A great deal in the book is entirely new. The title, however, remains the same! The first edition appeared in 1985 at the end of a period of unprecedented losses in the international airline industry. The title 'Flying off Course' pinpointed the apparent inability of airline managers effectively to match supply of and demand for air transport so as to generate profits. After 1986 the profitability of the industry world wide improved dramatically. The managers seemed to have got it right. Is the title of the book still justified and relevant? The answer must be yes, because as the 1990s progress more and more airlines will see their profits reduced or disappear altogether. Yet as the 1980s ended the industry was buzzing with success and looking forward to continued, if less rapid, growth.

During the last 35 years the airline industry has undergone an expansion unrivalled by any other form of public transport. Its rate of technological change has been exceptional. This has resulted in falling costs and fares, which have stimulated a very rapid growth in demand for its services—a seemingly insatiable demand. In addition, for much of the period scheduled airlines have enjoyed considerable protection from both internal and external competition. Any other industry faced with such high growth of demand for its products while cushioned from competition would be heady with the thought of present and future profits. But not the airline industry. It is an exception to the rule. High growth has for the most part spelt low profits. Increased demand has not resulted in financial success. While some airlines have consistently managed to stay well in the black, the industry as a whole has been only marginally profitable.

The conundrum of high growth and poor financial performance, which characterizes the airline industry, is the background to this book. It is partly explained by some of the problems facing the industry recently. The most dramatic have been the increase in fuel prices in 1974 and 1978/9 and the world economic recession which followed. That recession coincided with the easing of many of the economic regulations and controls on air services. This happened most dramatically and rapidly in the United States from 1978 onwards and in Europe somewhat more gradually after 1983. But many other states also caught the bug. Liberalization has affected most of the major international air markets. Its effects even spilled over into countries that viewed deregulation with disfavour. While coping with these external difficulties the international airline industry was itself undergoing structural changes. The late 1960s onwards saw a dramatic growth in the charter services, particularly within Europe and on the North Atlantic, and the emergence of large but low-cost charter airlines. While the growth of charters on transatlantic routes was stemmed and reversed as a result of liberalization of scheduled services, this has not happened with intra-European charter services. Equally worrying for the established scheduled carriers was the emergence during the latter part of this period of new dynamic and low-cost airlines in some Third World countries, notably in South East Asia. The East Asian carriers rapidly captured a growing share of the long-haul markets to and from the Pacific rim.

After 1986 the economic fortunes of the international airline industry improved significantly and for two or three years profits shot up. This market turn-round was due essentially to two external factors—a fall in the real price of aviation fuel and a sudden acceleration in the demand for air services. The surge in demand caught most airlines unawares and short of capacity. Load factors went up and this pushed profits up too. However, by 1990 some of the major airlines were beginning to look less healthy again. Moreover in the period 1990–94 a huge number of aircraft (about 1,900 in all) ordered when growth rates had picked up after 1987 were due to be delivered. Would the airlines be able to generate sufficient demand to fill these aircraft? Or, as in previous decades, would a surge in new capacity lead to a collapse of profit margins? Further uncertainty was created by the Gulf War which broke out in January 1991.

There is no simple explanation of the apparent contradiction between the industry's rapid growth and its marginal profitability during the last 30 years. But, for the individual airline, financial success depends on matching supply and demand in a way which is both efficient and profitable. This is the underlying theme and focus of the book. While airline managements have considerable control over the supply of air services, they have relatively little control over the demand. Hence the matching process is not an easy one. To help in understanding the process the present book provides a practical insight into key aspects of airline operations and planning within the conceptional framework of economics.

The book works through the issues logically. Any understanding of the economics of the industry must start with the regulatory framework which circumscribes and constrains airlines' freedom of action (Chapter 2). Those constraints have been loosened on international routes to and from the United States following deregulation and are in the process of being eroded in Europe (Chapters 3 and 4). To match the supply of air services with the demand successfully it is essential to understand both airline costs and the factors that affect them (Chapters 5 and 6) and the nature of the demand. Understanding demand is the first step in the marketing process (Chapter 8). A thorough appreciation of demand must also be used to develop traffic and other forecasts, since every activity within an airline ultimately stems from a forecast (Chapter 9). Supply and demand are brought together in a number of ways but most crucially through effective product planning (Chapter 10). Price is a key element of the airline product or service. Alternative airline pricing policies and strategies need careful consideration (Chapter 11). While the emphasis throughout is on scheduled operations, a large part of international air transport is now provided by charter or non-scheduled services. The particular characteristics and advantages of such services require special attention (Chapter 7), as do certain aspects of air freight (Chapter 12). The book begins with the theme of this introduction. It examines the underlying trends in the airline industry, including its rapid technological change, the high growth rates and the marginal profitability.

The book is concerned primarily with international air transport, which accounts world wide for about half the industry's output. Only for the airlines of a few large countries such as the USA, the Soviet Union, Brazil and China are domestic operations of greater significance than international. United States' airlines and Aeroflot alone account for three-quarters of the world's domestic operations. The airlines of most other countries mainly run international air services, while several of them operate only internationally.

The US domestic airline industry has clearly undergone rapid and far-reaching changes since it was deregulated in 1978. Numerous articles, papers and books have analysed and considered the implications of those changes (for example, Button, 1989). It is for this reason that the present book does not deal directly with US domestic deregulation except where it impinges on international airline operations.

There is no magic wand to ensure success within the international airline industry. This book attempts to flesh out the economic and operational issues which must be understood in order to match supply and demand. Only when this has been done can there be some measure of success in this most dynamic of industries. So come, fly with me.

Flying off Course

1
Characteristics and Trends in Airline Operations

1.1
Rapid technological change

In the last 50 years technological innovation in air transport has far outstripped that in any other transport mode. The only comparable innovations elsewhere have been the emergence of the supertankers in shipping and the development of high-speed trains, though the impact of the latter is still only marginal. Innovation in aviation has centred on the development of the jet engine for civil use, first in a turbo propeller form and later as a pure jet. Successive developments in the jet engine have consistently improved its efficiency and propulsive power. The emergence of larger and more powerful engines in association with improvements in airframe design and in control systems has resulted in successive improvements in aircraft speed and size. Higher speeds and larger aircraft have in turn produced significant jumps in aircraft productivity. This is evident in Table 1.1. Even in the era of the piston engine, dramatic improvements were made, so that the hourly productivity of the Super Constellation was seven times greater than that of the Douglas DC-3. The early turbo-prop aircraft also significantly improved productivity. Though the Viscount's productivity was less than that of the Super Constellation, as a DC-3 replacement the Viscount's productivity was four times as great. Likewise, the Britannias were a significant improvement on the Super Constellations they were meant to replace.

The arrival of the turbo-jet engine had a twofold impact. In the early 1960s the turbo-jets led to a dramatic increase in speeds, while the size of the aircraft did not increase appreciably. In the later 1960s and early 1970s there was no appreciable increase in speeds, because existing speeds were approaching the sound barrier, but there was a significant increase in the size of aircraft. These earlier increases in aircraft speed and the later increases in size together produced major improvements in aircraft productivity so that while the Boeing 720B in 1960 was producing 11,000 tonne-kilometres per flying hour, only 10 years later the hourly productivity of the Boeing 747 was three times as great.

The next major breakthrough was the production of civil aircraft

Table 1.1 Impact of technological advance on aircraft productivity

	Aircraft type	Year of entry into service	Mean cruise speed (km/h)	Maximum payload[a]	Passenger payload	Hourly productivity (t-km/h)	Annual production[b] (000 t-km)
Piston	DC-3	1936	282	2.7	21	527	1,581
	Lockheed 1049 Super Constellation	1952	499	11.0	47–94	3,790	11,370
Turbo-prop	Viscount 700	1953	523	5.9	40–53	2,100	6,300
	Britannia 310	1956	571	15.6	52–133	6,048	18,144
Turbo-jet	Caravelle VI R	1959	816	8.3	52–94	4,600	13,800
	Boeing 720 B	1960	883	18.7	115–149	11,256	33,770
	Douglas DC-8–63	1968	935	30.6	259	19,500	58,470
	Boeing 747	1969	948	49.5	340–493	31,935	95,805
	Douglas DC-10	1971	915	38.8	400	24,130	72,400
	Airbus A300	1974	891	31.8	245	19,270	57,811
	Boeing 747–300	1983	948	67.8	660	44,350	133,050
	Airbus A320	1988	903	20.7	179	12,900	38,700
	Concorde	1976	2,236	12.7	110	19,346	58,040

Notes:

[a] Later versions or developments of these aircraft may have had different maximum or passenger payloads.

[b] Calculated on the basis of an average block speed assumed to be about 68–69 per cent of the cruise speed. This is likely to be an under. estimate for aircraft on medium- or long-haul sectors. Assume 3,000 flying hours.

Source: Compiled by author.

flying faster than the speed of sound. The Anglo-French Concorde, which entered service in 1976, flies more than twice as fast as its predecessors. Yet it is able to do this only through a very significant reduction in size. Because of this penalty, supersonic aircraft have a lower hourly productivity than their competitors on long-haul routes. It is this factor which makes their commercial viability so problematical.

From the mid-1970s onwards the rate of technological innovation slackened. Attention switched from the long-haul end of the aircraft market to the development of more efficient short- to medium-haul aircraft such as the Boeing 767 and the Airbus A310. Developments here were based essentially on existing engine and airframe technology, though there were major developments in avionics, the use of lighter composite materials in airframe construction and other areas. At the same time, the trend towards larger aircraft flying at the same speed continues. An example is the Airbus A320 introduced in 1988, which, with up to 180 seats, is significantly larger than the 100–130 seater aircraft it is intended to replace. Thus important gains in hourly productivity continue to be made as airlines switch to larger newer aircraft types.

The other important development since the mid-1980s has been the introduction of extended range versions of the newer twin-engined jets such as the Boeing 767. These allow more direct non-stop flights on thinner long-haul routes that could not support the large traditional long-haul aircraft such as the Boeing 747.

1.2
The impact of technological change

These developments described so briefly above, which were matched by equally rapid innovations in other areas of aviation technology in the air and on the ground, were due primarily to the increasing efficiency of the jet engine. For a given level of propulsive thrust successive engines were able to carry a larger payload and to carry it faster as well. This, combined with other economies arising from the greater size of aircraft, resulted in ever-decreasing costs per capacity tonne-kilometre. Herein lies the significance of the technological improvements in aviation and of the increase in aircraft productivity which they made possible. They enabled airlines to cut their costs of production steadily throughout the 1950s and 1960s both in current values and in real terms (Figure 1.1). During the 1970s, airline unit costs expressed in current values began to rise rapidly as a result of world inflation. They rose particularly sharply following the fuel crises of 1973 and 1978. The airlines tried to counteract the upward pressure on costs by the accelerated introduction of more modern and usually larger jet aircraft and by more effective cost control. As a result, airline costs did not rise as rapidly as world prices, so that in real or constant value terms airline costs during the 1970s remained stable or moved slowly downwards (Figure 1.1). In the 1980s the price of fuel began to decline in real terms, falling particularly sharply in 1986. It then fluctuated around this low 1986 level. Helped by both the switch to larger aircraft and the fall in the real price of fuel, airline costs again declined in constant value terms during the early 1980s but stabilized in the second half of the decade.

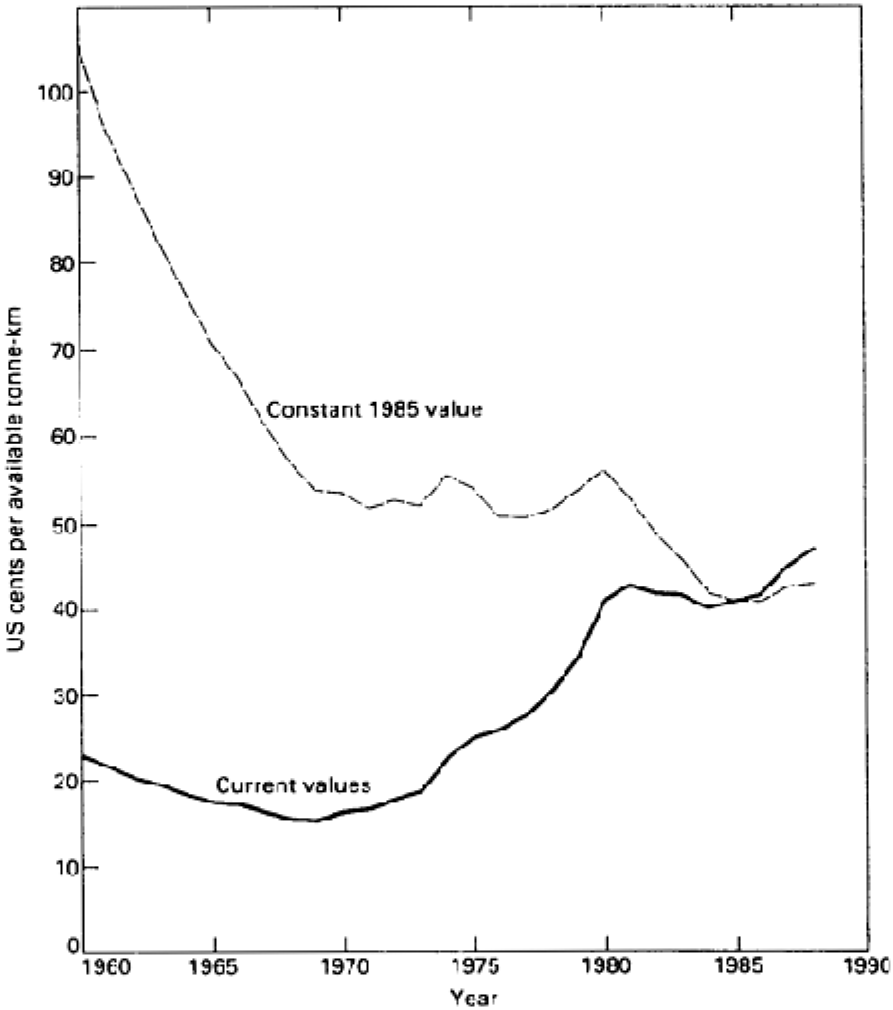

Figure 1.1 Trends in unit operating costs on services of ICAO scheduled airlines, 1960–88

Note: Current values adjusted to constant 1985 values using OECD Consumer Price Index (excluding Turkey).

Source: Compiled using ICAO data.

The technological developments in aviation, while they were beneficial in their impact on operating costs and in improving safety, also created problems. The increasing size and capacity of aircraft and the speed with which new, larger aircraft were introduced, often in reaction to competition from other airlines, created a strong downward pressure on load factors. Average load factors of ICAO (International Civil Aviation Organization) scheduled airlines dropped from a level of around 60 per cent in the early 1950s to levels below 48 per cent by 1969 (Figure 1.2). There was a significant fall in load factors between 1960 and 1963 with the widespread introduction of the first general jets, and then again between 1968 and 1971 with the introduction of the early wide-bodied jets. Both these periods of overcapacity were marked by sharply falling profit margins. The airlines did not learn their lesson until 1973 or 1974. It was only then that, in a major effort to counteract the effects of cost inflation, airlines cut their frequencies, often dramatically as more Boeing 747s, DC-10s or Lockheed Tristars were introduced into service. By the late 1970s load factors began to approach the 60 per cent level again. But deregulation of air services, particularly on the North Atlantic and transPacific routes, with the resultant increase in the number of carriers in many markets combined with a general world recession, pushed overall load factors down in the early 1980s. They then rose slowly in the second half of the 1980s and steadied at around 60–61 per cent. This means that more than a third of airline capacity each year is wasted.

The technical innovations also posed the problem of financing the new capital investments which they made necessary. While the operating costs per capacity tonne-kilometre were falling there was a very rapid escalation in the capital cost of new aircraft. Whereas up to the mid 1950s, with aircraft costing up to $2 million, airlines had been able to finance their purchases either by borrowing from the banks or from their governments or through the world’s stock markets, this became increasingly difficult as aircraft prices escalated. By 1974, a 189-seater Boeing 727–200 cost the airlines $8–9 million. (Note: throughout this book all references to dollars are US dollars unless otherwise specified.) Ten years later, in 1984, the same airlines were having to pay around $45 million for a 265-seater Airbus A310 with spares to replace their 727s. By 1990 the price for the same aircraft was up to $60 million. In the early 1970s a fleet of five small short-haul aircraft would have cost about $45 million. A similar fleet 10 years later cost over $200 million. In 1981 Singapore Airlines ordered eight Boeing 747-SUDs and six Airbus A300s at a total cost of $1.8 billion. In 1990 the same airline ordered 50 aircraft costing $8.6 billion for delivery between 1994 and 1999. These figures are indicative of the scale of investment necessary from the end of the 1970s onwards for a large international airline. Not only did aircraft prices escalate but interest rates also escalated from 4 to 6 per cent per annum in the early 1970s to a peak of over 16 per cent, though they decreased subsequently and were around 9–12 per cent for most of the 1980s.

Two developments eased the problem of raising capital on this scale. First, the aircraft manufacturers became increasingly involved with raising capital for their customers, either through the commercial banks in their own country or through special export trade banks, such as the United States Export-Import Bank. Manufacturers vied with each other to get better financing arrangements for their clients, and the terms of such purchase loans became an increasingly

Figure 1.2 Overall load factors on services of ICAO scheduled airlines, 1960–88

Source: Compiled using ICAO data.

important factor for airlines in making a choice between aircraft. Secondly, there emerged consortia of banks which purchased aircraft and then leased them to the airlines. The consortia enjoyed tax concessions and also retained ownership of the aircraft, which was a valuable security at a time when the resale value of aircraft was high. During the 1980s these bank consortia were overtaken by the rapid growth of aircraft leasing companies, the largest of which were Guinness Peat Aviation (GPA) based in Ireland and the International Lease Finance Corporation in California (ILFC). It was estimated that by 1991 about 20 per cent of the world's commercial airliners were being used under various operating leases.

Even when the industry as a whole was doing badly or a particular airline's results were poor, the manufacturers' need to sell inevitably ensured that finance would be forthcoming. But for the airlines this was a mixed blessing. It pushed them to invest when they should have been holding back. The result was that by the early 1980s many major airlines were heavily over-indebted. In other words, the ratio of their debts to their equity capital became much too high. When traffic failed to reach the forecast levels, airlines were no longer able to service these huge debts. Several carriers, such as Braniff and Laker in 1982, collapsed suddenly as their creditors ran out of patience and refused to reschedule debt repayments.

The low traffic growth rates achieved by many international airlines during the early 1980s resulted in a slackening off of new aircraft orders. Then the high growth rates of 1986–9 generated a boom in orders led by the bigger airlines and the aircraft leasing companies, which placed particularly large orders on behalf of existing and prospective customers. Many of these customers were the small airlines which were unable to self-finance new purchases or to get such good deals elsewhere as they could through the leasing companies. By the beginning of 1990 there were outstanding orders for close on 7,000 jet airliners for delivery in the 10 years between 1990 and 2001. The projected annual delivery rate of about 700 a year was almost double that achieved during the 1980s (AM, 1989). This huge extra capacity coming into the world market every year was likely to have an adverse impact on load factors during the 1990s unless traffic grew more rapidly than expected or older aircraft were retired at a faster rate. Trying to match rapidly increasing capacity with a slower growth in demand was to be one of the major headaches of airline managers during the 1990s.

1.3
High-growth industry

Compared with most industries, the annual growth rate achieved by civil aviation has been staggering. In the 15 years between 1955 and 1969 the annual growth in tonne-kilometres performed by the world's scheduled airlines averaged about 14 per cent and only twice during that period, in 1958 and 1961, did the annual increase drop to less than 10 per cent. This consistently high growth rate was unmatched by any other transport mode during this period, with the possible exception of international shipping, and that for a short time only. Since 1970 air transport growth has slackened. In the 10-year period from 1970 to 1979 the average annual growth rate fell to just below 10 per cent, and in the following 10 years average growth was only a little above 8 per cent per annum. But this was still high compared with most other industries.

The high though declining growth rates mask quite diverse growth patterns on particular routes or in particular countries or geographical areas. Long-term regional variations in growth trends are illustrated in Table 1.2. This shows that, in terms of both international and domestic tonne-kilometres performed, the

European and African airlines have experienced the lowest growth rates in the 10 years 1978–88. In terms of both international and domestic traffic, the Asian and Pacific airlines have achieved annual growth rates well above the world average, as they had done throughout the 1970s. Some airlines within this region achieved exceptionally high average growth rates on their international traffic: for Cathay Pacific growth was 18 per cent per annum; and for Malaysia Airlines 15 per cent.

The very rapid growth of Asian airlines completely changed the structure of the international airline industry. In 1973, European and North American airlines together generated almost three-quarters of

Table 1.2 Average annual growth rates in scheduled tonne-kilometres, 1978–88, by region

	Average annual percentage increase in:	
Region of airline registration	International t-km	Domestic t-km
Asia and Pacific	10.4	7.6
North America	8.4	5.6
Middle East	5.8	5.2
Latin America and Caribbean	5.8	5.1
Europe	4.8	4.6
Africa	4.6	3.5
World	7.0	5.5

Source: ICAO (1990).

scheduled international air traffic. This dominant position has been significantly eroded. By 1988 their joint share was down to little more than 55 per cent while during the same 15-year period Asian and Pacific airlines increased their share of the world's international traffic from 14 per cent to 29 per cent (Table 1.3).

North American airlines have ceded second place to the Asian carriers. However, the American share has actually increased slightly after reaching a low point in the early 1980s as US airlines became more aggressive following deregulation in the United States. For instance, Northwest's international traffic grew at an average annual rate of 21 per cent in the 10 years to 1988, faster than any of the other top 30 international airlines.

The reasons for the relatively rapid overall growth rate of air transport are not difficult to find. The falling level of operating costs, previously described, enabled airlines to offer tariffs that were lower in real terms. The yield or average fare charged per passenger-kilometre declined rapidly up to 1970 in real terms, that is in relation to the cost of other goods and services (Figure 1.3). This decline occurred at a time when per capita incomes in the developed countries of the world were increasing at a rate of 8 per cent per annum, while discretionary incomes were growing at an even faster rate. As a consequence, the demand for non-business air travel rose rapidly. At the same time, the 20 years to 1970 saw a boom in world trade which generated an increase both in business travel and in the demand for air freight facilities. The fall in the real cost of freight charges was even more marked than the decline in the real value of passenger fares.

During the 1970s the real cost of air transport in many markets continued to decline but more slowly and with some up and downs. Disposable incomes also rose, though less rapidly than before. It was not until 1980 and the two or three years that followed that economic recession affecting many developed countries began seriously to undermine demand and annual growth rates declined appreciably, even though real air fares fell rapidly as a result of over-capacity and deregulation in some markets (Figure 1.3). Towards the end of the decade, however, growth of scheduled traffic began to accelerate, especially on international routes. International scheduled traffic grew 14 per cent in 1987 and 10 per cent in 1988 and was expected to be about 9 per cent higher in 1989. But was this merely a short-term reaction following the poor years at the beginning of the decade, or was it an improvement in the underlying trend which would continue well into the 1990s?

Table 1.3 Regional distribution of international scheduled traffic, 1973 and 1988

Region of airline registration	Percentage of total tonne-km carried[a]	
	1973	1988
Europe	44.3	35.5[b]
Asia and Pacific	14.1	29.0
North America	27.5	21.5
Latin America/Caribbean	6.3	5.7
Middle East	4.0	4.9
Africa	3.8	3.4
Total world	100.0	100.0

Notes:
[a] Excludes domestic traffic, where US airlines are dominant.
[b] Inclusion of international charter traffic would push European share to around 40%.
Source: ICAO (1990).

The rapid growth in air transport was characterized by two features. In the first place, the rate of growth of non-scheduled air transport was higher than that of scheduled, and as a consequence non-scheduled services now account for a significant share of the international airline industry’s total output, particularly within Europe. Secondly, the profitability of airlines during the last 30 years has been fairly marginal despite the rapid growth of demand for their services.

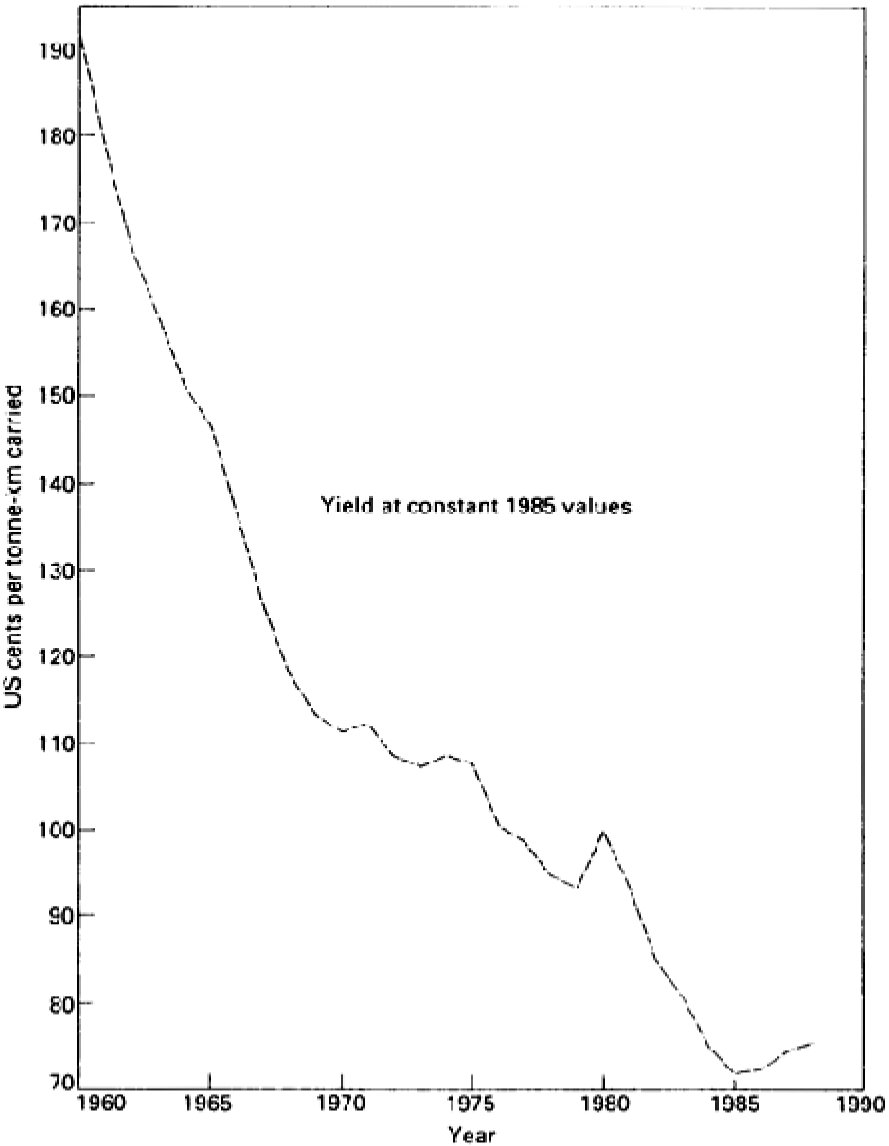

Figure 1.3 Trends in unit revenues on services of ICAO scheduled airlines, 1960–88

Note: Constant 1985 value based on OECD Consumer Price Index (excluding Turkey).

Source: Compiled using ICAO data.

1.4 Rapid growth of non-scheduled operations

In the early postwar years non-scheduled operations were relatively unimportant.

Reliable figures are not available, but it is estimated that in the 1950s only about 3–5 per cent of the total tonne-kilometres produced each year by the world's airlines was generated on non-scheduled operations. These early non-scheduled operations were largely associated with military and government charters and with single-entity charters, that is where single persons or organizations were chartering aircraft for their own exclusive use.

In the early 1950s, developments were taking place which would dramatically accelerate the development of non-scheduled traffic after 1960. American scheduled and supplemental (that is, charter) carriers inaugurated what came to be known as 'affinity charters' across the North Atlantic. These subsequently spread to other long-haul markets. Such affinity charters arose when societies or clubs, whose total membership was normally limited to 20,000 members and whose prime purpose was other than travel, chartered aircraft for their members who shared the cost equally. In the United States, the 1938 Civil Aeronautics Act had allowed non-scheduled operations under a general exemption from regulations which affected scheduled carriers. But in 1962 Public Law 87–528 confined the role of supplemental carriers exclusively to non-scheduled operations and authorized the Civil Aeronautics Board (CAB) to certify supplemental carriers to operate in designated geographical areas. In time, 13 supplemental carriers were certified. The final breakthrough came in 1968 with the Inclusive Tour Charter Bill, which empowered the CAB to authorize the operation of inclusive tour charters (ITCs), though the CAB had already been doing this for two years. An inclusive tour is a holiday package where a single charge includes travel, hotel accommodation and possibly local ground transport, visits, etc. Rapidly developing new holiday markets with affinity group charters and ITCs and, at the same time, bolstered by the operation of substantial military charters in support of the Vietnam war, United States non-scheduled operations grew at a phenomenal rate. Between 1964 and 1967 total passenger miles operated by the US supplementals quadrupled. High growth continued until about 1971 when military charters began to decline.

The European airlines, meanwhile, has based their own non-scheduled operations on inclusive tour charters, and were less dependent than their American counterparts on affinity group or military charters. The development of ITCs by the British private airlines in the early 1950s was followed by the formation of charter companies in Scandinavia and later in Germany and elsewhere. These and other companies concentrated on the carriage of high-density ITC traffics between northern and western Europe and the resorts of the Mediterranean, especially those of Spain and Italy, and, to a much lesser extent, those of Greece, Yugoslavia and Tunisia. Growth was rapid, especially after 1965 when the charter companies began to introduce the most modern jet equipment. Between 1965 and 1973 ITC traffic in Europe grew at an average annual rate of 25 per cent, which was more than double the growth rate of scheduled intra-European traffic (Cambau and Lefevre, 1981). The European airlines, both scheduled and non-scheduled, began to develop long-haul charters across the Atlantic and, to a limited extent, to Africa and the Far East. These were to a large extent affinity group charters, though ITCs also played a part.

The expansion of non-scheduled services was facilitated in the early 1970s by the trend in the United States and some countries in Europe towards the liberalization of often arbitrary regulations limiting passenger access to charter flights. Growing much more rapidly than scheduled services, non-scheduled operations captured an increasing share of the total international air traffic. By 1972 it was estimated that 31 per cent of international passenger traffic was carried on non-scheduled services (ICAO, 1974). That was the peak penetration achieved by non-scheduled carriers. From then on the charter share of the total passenger market gradually declined to a level of about 16–20 per cent. In 1988 it was 18.5 per cent (ICAO, 1990).

This relative decline of non-scheduled traffic in the 1970s can be explained by two parallel developments. First, in the years after the fuel crisis of 1973–4 the highest growth rates were experienced in markets where non-scheduled services were basically not permitted by the regulatory authorities, namely in the Middle East and in the Asia-Pacific region. High growth in these regions was thereby inevitably concentrated on scheduled services. Secondly, the further development of non-scheduled traffic in its two major markets either slowed down, which was the case in Europe, or actually went into decline, which happened on the North Atlantic route.

Liberalization of charter regulations had resulted in a rapid growth of non-scheduled traffic on the North Atlantic route (Table 1.4). Despite a hiccup in 1974, charter traffic grew faster than scheduled traffic until 1977, when it represented 29.2 per cent of the total passenger traffic on the route. Then in 1978 the charter market collapsed. This was a direct result of deregulation of fares and entry on many North Atlantic scheduled routes. Several new low-cost airlines, such as Laker Airways, began operating scheduled services. Competitive pressure pushed both new and existing scheduled carriers to offer fares which were charter competitive. With little price advantage to offer, charter airlines found their traffic shrinking rapidly. It was not until 1982 that they managed to slow the decline, but only for a time. The Chernobyl nuclear disaster and fears of terrorism in 1986 affected the volatile charter market more than the scheduled services and charters' decline continued. By 1988 only 2 million passengers travelled across the Atlantic on charter flights, half the number that had used charter flights at their peak in 1977.

In Europe, the much higher rate of growth of non-scheduled traffic, mentioned earlier, had gradually pushed up the charter airlines' share of international passenger traffic. By 1973 for the first time non-scheduled passenger-kilometres on international charters in Europe exceeded passenger-kilometres generated by international scheduled services (Cambau and Lefevre, 1981). But in 1973–4 the first oil crisis hit the non-scheduled sector of the market much harder than the scheduled sector. The ITC passengers were more price sensitive and more sensitive to the economic situation than the up-market tourists and the businessmen who travelled on scheduled services. The high charter growth rates of earlier years disappeared. Between 1974 and the end of the decade charter and scheduled international traffic grew at fairly similar rates and it was not until the end of the decade that charter traffic growth began to accelerate again. In the 10 years to 1988 charter passengers in Europe grew at an average annual rate of 7.2 per cent, while scheduled passenger numbers grew by 4.4 per cent each year (ICAO, 1990). But these were significantly lower overall growth rates than has been achieved in earlier decades.

Table 1.4 Scheduled and non-scheduled growth rates on the North Atlantic route, 1973–88

Year	Annual percentage change in passengers on:		Non-scheduled as a percentage of total passengers
scheduled services	non-scheduled services		
1973	+5.7	+11.6	26.3
1974	−6.4	−14.3	24.6
1975	−5.5	+3.1	26.2
1976	+10.9	+12.8	26.6
1977	+5.3	+20.2	29.2
1978	+23.4	−17.9	21.6
1979	+15.5	−24.8	14.8
1980	+5.2	−30.2	10.4
1981	+3.5	−7.6	9.4
1982	−5.2	+22.4	11.8
1983	+6.4	+5.7	11.7
1984	+12.6	+13.8	12.1
1985	+7.5	−13.1	9.8
1986	−5.9	−30.2	6.4
1987	+21.8	+19.6	7.0
1988	+9.1	+12.3	7.2

Source: International Air Transport Association, Geneva.

On a number of European air routes, charter carriers have captured over 80 per cent and sometimes over 90 per cent of the total air market, to the virtual exclusion of scheduled operations. This is the case on air routes from Spain to Scandinavia, the UK, Germany or the Netherlands to Spain and between Greece and the UK or Scandinavia. By far the largest single air market in Europe is that between the UK and Spain, which in 1989 generated 11.1 million passengers. Nearly 9 million of these, or about 80 per cent of the total, travelled on charter flights. Here as on many other Mediterranean routes, charters are dominant. It is difficult to obtain precise figures for the overall market split within Europe between charters and scheduled services. One estimate suggests that in 1988 45 per cent of air passengers within western Europe travelled on charter flights (ICAO, 1990). The charter share would decline if one considered the whole of Europe. But, in terms of passenger-kilometres, the charter share rises to well over half because charter services are generally operated on the longer sectors between northern and Mediterranean Europe. An optimistic estimate has suggested that in 1988 charters generated close to 70 per cent of international passenger-kilometres within Europe (Burnell, 1990). Whatever the precise figures, charters clearly represent about half the intra-European air transport market. Yet their importance is frequently underestimated.

Overall, non-scheduled operations have been characterized by particular features. First, in the period up to the mid-1970s, non-scheduled traffic grew much more rapidly than scheduled. Secondly, non-scheduled operations are primarily international. Of the total passenger-kilometres generated on non-scheduled services, 94 per cent are on international flights (ICAO, 1990). Their share drops to 81 per cent in terms of tonne-kilometres when freight is included. Finally, scheduled airlines play a major role in non-scheduled operations. In the early postwar years, the bulk of the world's non-scheduled traffic was carried by the scheduled airlines. Then the rapid expansion of the supplemental carriers in the United States and of the large charter airlines in Europe and elsewhere pushed the scheduled carriers out of the non-scheduled markets. Scheduled carriers were for a time constrained from entering such markets because of regulations imposed by the International Air Transport Association (IATA) or by their own governments. Some scheduled airlines, especially those in Europe, set up charter subsidiaries to circumvent such regulations. Lufthansa set up Condor, Air France and Air Inter jointly owned Air Charter International, British European Airways set up British Airtours, which later became a subsidiary company of British Airways, and the SAS member airlines established Scanair.

Most of these charter companies are now owned 100 per cent by their scheduled parent airlines. But in some cases the parent company is not the sole owner. Thus Swissair owns 48.9 per cent of Balair, and KLM has a 25 per cent stake in Martinair and another 40 per cent in Transavia, the two major Dutch charter airlines. In the United States where, prior to deregulation, scheduled airlines could not by law establish charter subsidiaries, airlines such as Pan American Airways (Pan Am) entered charter markets in their own right, and competed directly with US supplemental (charter) carriers in those markets where the Civil Aeronautics Board (CAB) allowed them to. Outside Europe and North America few countries enjoyed the luxury of separate charter and scheduled carriers. The national scheduled airlines carried charter traffic as necessary. While several very large independent non-scheduled airlines have emerged, such as Britannia (UK), about 55 per cent of the total non-scheduled traffic is carried either by charter subsidiaries of scheduled airlines or by airlines that operate both scheduled and non-scheduled services (Table 1.5).

The rapid growth of non-scheduled traffic after 1965 dramatically changed the structure of the airline industry and its pattern of operations, especially in Europe. A major problem facing airlines and

Table 1.5 Major carriers of non-scheduled passenger traffic, 1987 (millions of passenger-kilometres)

	Mixed scheduled & charter airlines		Charter subsidiaries of scheduled airlines		Charter airlines	
1					Britannia	11,486
2			Condor (Lufthansa)	7,813		
3	Dan Air	7,639				
4					LTU	7,623
5			Scanair (SAS)	6,681		
6			British Airtours (British Airways)	5,530		
7					Sterling	5,130
8					Monarch	4,890
9					Hapag Lloyd	4,622
10	Wardair	4,031				
11					Martinair	3,426
12					Am. Transair	3,302
13			Air Charter (Air France)	3,202		
14	Finnair	3,192				
15					Air Europe	3,025
16					Orion	2,947
17			Cal Air (British Caledonian)	2,413		
18			Balair (Swissair)	2,130		
19					Conair	2,124
20					Transavia	2,092
	Total top 20 non-scheduled carriers					93,298
	World total non-scheduled					172,340
				Top 5 as % of world total 23.9%		
				Top 20 as % of world total 54.2%		

governments during the 1990s will be how to adapt to the changes and pressures created by the growth of non-scheduled operations on routes where they have been allowed to develop. In two major international air markets, the North Atlantic and more especially the Europe-Mediterranean area, charter competition has been and remains a worrying fact of life for the scheduled airlines. As a result of such competition, the operational and other distinctions between scheduled and non-scheduled have become increasingly blurred and difficult to maintain. But the charter airlines, mostly European, also face a major problem during the 1990s and that is how to cope with European liberalization as it gathers pace. In the United States, deregulation in 1978 led to the virtual eclipse of the supplemental airlines (section 4.4.2 below). Will the same happen in Europe?

1.5
Marginal profitability

In an industry characterized by falling unit costs and an unusually high rate of growth in the demand for its products one would expect firms to obtain substantial profits. While this has been the case for many individual airlines, the profitability of the airline industry world wide during the last 25 years has been marginal. Only in the period 1963–8 were significant profits achieved and again in 1987–9.

The traditional measure of profitability, namely the rate of return on assets employed, cannot be applied to the airline industry as a whole. This is because of the difficulty of estimating real asset values for airlines with varied depreciation policies, using varying proportions of leased equipment and often receiving direct or indirect government subsidy in a variety of forms. The measures of profitability normally used among airlines are either the annual operating profit or loss expressed as a percentage of the total annual operating revenue, or the total operating revenue expressed as a percentage of the total operating expenditure (known as the ‘revex ratio’). The operating profit as a percentage of operating revenue is calculated annually for the world’s airlines by ICAO and is shown diagrammatically in Figure 1.4. The operating profit is before interest charges and other non-operating items. Net profit is after payment of interest and inclusion of these other items.

Between 1960 and 1989 the world airline industry experienced five distinct phases in its financial fortunes:

(1) *During most of the 1960s* as unit costs declined there was a dramatic improvement in profit margins despite the falling load factors (Figure 1.2). Fares and, more important, revenue yields were also falling during this period but less rapidly than the fall in costs.

(2) By 1968 load factors on scheduled services had fallen to less than 50 per cent and continued to decline. This, together with rising unit costs from 1970

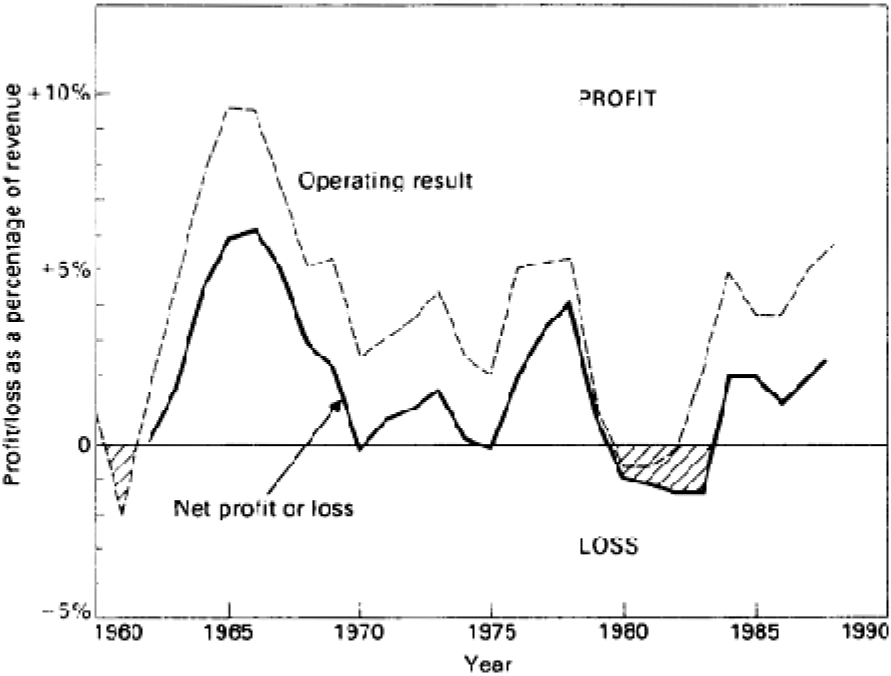

Figure 1.4 Profit margins of ICAO scheduled airlines, 1960–88

Note: Net profit/loss is after inclusion of interest and other non-operating items.

Source: Compiled using ICAO data.

onwards, began to bite into the profit margins. *The period 1968–75* is characterized by poor financial results, particularly in 1970 and 1971. As a reaction to these poor results the airlines made determined efforts to improve load factors and were partially successful in this (Figure 1.2).

Attempts to improve financial results were completely upset by the fuel price crisis which followed the Arab-Israeli war of October 1973. The years 1974 and 1975 were traumatic for the world's airlines. In the first place, the price of fuel escalated at an alarming rate. The average fuel price paid by IATA airlines doubled in the four months between September 1973 and January 1974 and continued to increase thereafter, but at a slower rate (Figure 5.1 shows changes in the real price of fuel since 1970). By mid-1975 airlines were paying three times as much for fuel as they had been paying two years earlier. Second, the widespread inflation in most of the world's economies pushed up other areas of operating costs, especially those that were labour intensive. Lastly, the downturn in economic growth, particularly in Europe and the United States, resulted in declining or very low rates of increase in real disposable income, which adversely affected the demand for both passenger and freight transport.

The effect of these trends was a large increase in unit costs in 1974 and 1975 (Figure 1.1). Cost escalation, combined with a worldwide recession in traffic development, pushed many airlines into a struggle for financial survival. Airlines operating on the North Atlantic route and in Europe were particularly badly hit. In Britain, the Civil Aviation Authority concluded in its annual report that ‘the financial year 1974–5 was the worst in living memory—both for the civil aviation and air travel industries’. But worse was to come!

(3) In the *three years 1975–8* the world’s airlines did reasonably well. The price of fuel and other costs declined in real terms, while demand was buoyant and load factors remained at around 55 per cent. This period of well-being was short lived.

(4) *From 1979 to 1983* the international airlines entered a period of deep crisis. They were in the anomalous position of enjoying the highest load factors for more than 20 years, while facing increasing losses. Dramatic increases in fuel prices in 1978, combined with stagnating demand and falling yields, all helped to bring this about. The high load factors were themselves symptomatic of the crisis, for they resulted from the industry’s attempt to compensate for the downward pressure on fares and freight tariffs. They did not compensate enough. In 1980 the world’s airlines as a whole made an operating loss before paying interest for the first time since 1961. Further operating losses occurred in 1981 and 1982. Several airlines went bankrupt in this period, including Braniff and Laker Airways, while many others accumulated large debts or were financially supported by their national governments. It was not till 1984 that results began to improve.

The curves in Figure 1.4 mask the real size of the losses incurred. After paying interest, IATA member airlines collectively lost $1,850 million in 1980; the following year the loss was $1,900 million and in 1982 it was marginally lower, at $1,800 million. While all airlines were under pressure during this period, many continued to operate profitably, either by achieving higher than average load factors or by reducing their costs in real terms, or both. This was the case with several of the new Third World airlines that were able to benefit from their low labour costs and from the high growth rates in the markets in which they operated. Singapore Airlines (SIA), for example, was very profitable throughout this period.

The declining fortunes of the international airlines from 1979 onwards coincided with the period of liberalization of international regulations, particularly on routes to and from the United States. A major issue of controversy within the airline industry was the degree to which, if any, deregulation could be blamed for the industry’s financial plight.

(5) The *second half of the 1980s* saw a dramatic turn-around in the airline industry’s fortunes, though overall profitability remained marginal. While airline directors around the world gladly took credit for this turn-around, in reality it was due primarily to two external factors, a significant fall in the real price of aviation fuel and a surge in demand as the world’s economies improved. Airlines

that had been making losses for years suddenly found themselves in profit, especially in 1987 and 1988. The underlying financial position, however, was still very weak because the industry as a whole and many individual airlines now found themselves with huge debt burdens. These arose from the need to cover their accumulated losses during the lean years of the early 1980s and to finance the new aircraft orders they were placing as traffic growth accelerated. Huge interest payments were needed to finance these debt burdens. In 1987 the interest charges of the world’s airlines totalled around $4–4.5 billion. Many governments which owned their national airlines turned to privatization as a way of injecting much-needed equity capital into undercapitalized airlines.

The late 1980s did have one bad year in 1986 when the Chernobyl nuclear disaster, the American bombing of Libya and increased terrorism in Europe and the Middle East let to a sharp fall in United States travel to Europe (Table 1.4). This adversely affected the financial results of many US and European carriers, especially those with substantial North Atlantic operations.

In short, the airline industry, which has benefited from uniquely rapid growth over the last 35 years, has actually enjoyed only two brief periods of reasonable profitability. A large part of its current revenues are needed to finance the interest payments on the industry’s accumulated debts. The industry’s indebtedness will worsen during the 1990s because of the large number of aircraft orders that were placed in the late 1980s. Between 1990 and the year 2000 the world’s airlines will spend close to $400 billion on aircraft. To finance these orders they would need to achieve an operating profit before interest of 6 per cent each year. They have not done this since 1969, though they came close to it in 1988 (Figure 1.4). The continuing marginal profitability of the industry, while needing to finance major capital investments, is the major problem facing the airlines during the 1990s.

1.6 The nature of the airline product

As far as passenger services are concerned, there are several contrasting aspects to the airline product. On the one hand, the air journey is seen not as an end in itself, but as part of a business trip or of a two-week summer holiday or of a weekend visit to watch a sports fixture. The air journey is a part of a variety of other products or services. A number of important considerations flow from this. The demand for passenger air services is a derived demand in that it is dependent on the demand for these other activities (business trips, two-week holidays, trips to sports fixtures, and so on). This means that to forecast the demand for air services one must forecast the demand for all these other types of expenditure. It also means that there has been strong pressure on the airlines to expand vertically into other areas of the travel industry—such as hotels, travel agencies, car hire or tour organizers—in order to gain greater control over the total travel product. There is also a direct effect on airline marketing techniques in the sense that these are frequently oriented towards selling and promoting the total product, whether it be a business or holiday trip or a weekend excursion, rather than selling a particular airline. In newspaper and television advertisements many airlines try to interest the reader or viewer in a particular destination or a particular type of trip, and only as an afterthought almost do they suggest the airline which might be used.

On the other hand, airlines have to face the realization that one airline seat is very much like another and that there is, from the passenger's viewpoint, little difference between one jet aircraft and another, if they achieve similar journey times. Equally, for the freight forwarder the major decision will be whether to ship by air or surface and, having taken the decision to use air, they may have difficulty in perceiving any difference between the airlines serving a particular route. Thus, while air journeys may be only one part of a variety of heterogeneous products or services with different market structures, the air service part of these various products is itself fairly homogeneous. Even when airlines wish to differentiate their products, competitive and economic forces and the fact that they are flying similar or identical aircraft have meant that they often end up offering very similar products.

The consequences of the homogeneous nature of the airline product are twofold. First, in competitive markets, it pushes airlines into making costly efforts to try to differentiate their product from that of their competitors. They do this by being first to introduce new aircraft types, by increasing their frequency of service, by spending more on in-flight catering and by advertising. Moreover, much of the advertising is aimed at trying to convince passenger or freight agents that the product they offer can be differentiated from that of their competitors because of the friendliness of the hostesses or the culinary expertise of their chefs, or because of other claims which are dubious and difficult to assess.

Second, the homogeneous nature of the airline product makes the emergence of entirely new airlines or the incursion of new airlines on existing routes relatively easy. In other words, in the absence of regulations or other economic barriers to entry, airline markets would tend to be characterized by considerable competition between existing carriers and new entrants.

This dichotomy between the heterogeneity of the various products of which the air service is only a part and the homogeneity of the air services themselves is a constant constraint in airline planning, a constraint which often results in apparently contradictory decisions and action by airline managements.

1.7
Passengers, freight or mail

It is generally assumed that airlines are primarily concerned with carrying passengers and that freight and mail traffic are relatively unimportant in terms both of output and of revenue. This is far from being the truth. In 1989 over a quarter of the world’s scheduled airline output was concerned with the carriage of freight and mail (Table 1.6). Passenger traffic accounted for the rest. On international routes, where distances are greater and air transport becomes more competitive, freight and mail’s share rises to over one-third of output. Conversely, their share is much less on domestic air services.

These global figures hide considerable variations between airlines. A few large international airlines, such as Flying Tigers in the USA

Table 1.6 Distribution of traffic and revenue on scheduled services of ICAO airlines, 1989

	Tonne-km performed			Revenue (estimated)
International %	Domestic %	All services %	All services (1988) %	
Passenger	61.7	84.7	72.0	85.0
Freight	36.6	12.4	25.7	13.5
Mail	1.7	2.9	2.3	1.5
Total	100	100	100	100.0

Source: IATA (1989 and 1990).

or Cargolux, are exclusively or almost exclusively concerned with the carriage of freight. They are the exceptions. Most international airlines carry both freight and passengers. At one end of the scale are airlines such as Korean Airlines, Air France, Lufthansa or El Al, for which air freight represents 50–55 per cent of their total production in terms of tonne-kilometres. At the other end are many airlines, such as Eastern in the USA or the Polish airline LOT, where freight and mail together account for only 5–10 per cent of total tonne-kilometres generated.

It is significant that, while freight accounts for about a quarter of total airline production, it generates only about one-eighth of total operating revenue (Table 1.6). This means that the average revenue per tonne-kilometre of freight and, incidentally, of mail must be very much lower than the average revenue or yield generated by passenger tonne-kilometres. Despite this, freight revenues make an important contribution to many airlines’ overall profitability.

Over the airline industry as a whole, the carriage of freight is a significant factor, both in terms of the amount of productive resources absorbed by it and in terms of its contribution to overall revenues. For an individual airline the split of its activities between passengers and freight clearly affects both its marketing policy and the structure of its revenues. The importance of mail revenue, however, is very limited and declining. In the early 1960s mail revenue was about 5 per cent of total revenue, whereas now it is below 2 per cent. Inevitably, much of the discussion which follows concentrates on the passenger aspects of both supply and demand. But this should not mask the significance of air freight for the international airline industry as a whole.

2
The Regulation of International Air Transport

Airline managers are not free agents. Their actions are circumscribed by a host of national and international regulations. These are both economic and non-economic in character and may well place severe limitations on airlines' freedom of action. An examination of the scope and impact of such regulations is crucial to an understanding of the economics of international air transport. For more than three decades the regulatory framework remained largely unchanged. It was three sided, based on bilateral air services agreements, inter-airline agreements and the tariff agreements of the International Air Transport Association (IATA). This chapter examines this traditional framework of economic regulation, which in many respects still stands. Chapter 3 then considers the arguments for and against economic regulation and evaluates the impact of international deregulation which began in the United States in the late 1970s, while Chapter 4 traces the development of liberalization in Europe.

2.1
Non-economic regulations

The advanced level of aviation technology, the need to ensure passenger safety despite the rapidity of technological innovation and the international nature of much of the airline industry have all tended towards the introduction of more complex and more wide-ranging external controls and regulations than are found in most industries. These regulations are broadly of two kinds.

First, there is a whole host of technical standards and regulations whose prime objective is to achieve very high levels of safety in airline operations. Such regulations cover every aspect of airline activity and, broadly speaking, they fall into one of the following categories:

(1) Regulations which deal with the airworthiness of the aircraft not only in terms of its design and production standards but also in terms of its performance under different operating conditions such as when there is an engine failure during take-off.

(2) Regulations covering the timing, nature and supervision of maintenance and overhaul work and the training and qualifications of the engineers who carry out such work.
(3) Regulations governing the numbers and type of flight and cabin crew, their duties, training and licensing and their work-loads and schedules.
(4) Detailed regulations covering both the way in which aircraft are operated (that is, aspects such as flight preparation and in-flight procedures), and also the operation of the airlines themselves. In all countries, air transport operators must be licensed by the relevant civil aviation authority and must satisfy certain criteria and operating standards.
(5) Lastly, there is a complex profusion of regulations and recommended standards dealing with aviation infrastructure, such as airports, meteorological services, en route navigational facilities, and so on.

Many of the technical and safety requirements are general, that is not specific to a particular aircraft type, and are promulgated as regulations of the civil aviation directorates or the relevant ministries of each country. In the United States they are known as Federal Aviation Regulations, while in the United Kingdom such regulations appear in the Air Navigation Order (CAA, 1981). While regulations may vary in particular detail from one country to another, they are generally based on a whole series of ‘lnternational Standards and Recommended Practices’ produced by the International Civil Aviation Organization (ICAO) as 16 annexes to the Convention on International Civil Aviation. For instance, Annex 8 deals with the ‘Airworthiness of Aircraft’ and Annex 1 with ‘Personnel Licensing’. These are constantly revised. As a result there tends to be considerable uniformity in the technical regulations of most member states of ICAO.

Operational and safety requirements specific to an aircraft type are contained in its flight manual. However, the operational constraints and practices recommended in the flight manuals conform to the more general regulations mentioned above and are approved by the relevant national airworthiness authorities. Among other things, the flight manual will impose payload limitations on an aircraft at airports with high temperatures or inadequate runway length. In this and numerous other ways airworthiness and other technical regulations have direct economic repercussions.

These various technical standards and safety procedures undoubtedly constrain airline managers and, at the same time, impose cost penalties on airline operations. But such external controls are inevitable if high safety standards are to be maintained, and significantly all airlines are equally affected by them. No major international airline can enjoy a competitive advantage by operating to lower tech-nical standards since there are no ‘flags of convenience’ in air transport to enable airlines to circumvent national or international safety or manning regulations.

In addition to the various technical regulations and rules, international air transport is circumscribed by a multitude of national, bilateral and multilateral regulations and agreements whose objective is the economic and, sometimes, political regulation and control of the industry. Such economic controls, unlike the technical standards outlined above, do not affect all airlines equally and therein lies their importance.

2.2
The growth of economic regulation

When the Paris Convention, signed in 1919, accepted that states have sovereign rights in the air space above their territory, direct government intervention in air transport became inevitable. A country's air space became one of its valuable natural resources. As a result, the free-trade *laissez-faire* approach towards air transport of the early years of aviation was gradually replaced by an incomplete pattern of bilateral agreements between countries having airlines and the countries to or through which those airlines wished to fly. But the restrictive character of 'bilateralism' was soon apparent. Even before the Second World War was over, 52 member states met in Chicago in 1944 to consider some form of multinational agreement in three critical aspects of international transport:

(1) the exchange of air traffic rights, or 'freedoms of the air' (see Appendix A);
(2) the control of fares and freight tariffs;
(3) the control of frequencies and capacity.

From an economist's viewpoint these three aspects together effectively determine the nature of any industry, for they regulate the entry of firms into each market (through traffic rights), the degree of pricing freedom and the nature of controls on production, if any.

At Chicago there were two conflicting approaches. The United States, whose civil aviation industry was going to emerge from the Second World War largely unscathed and much larger and better equipped than anyone else's, wanted no control of tariffs or capacity and the maximum exchange of traffic rights, including fifth freedom rights. This 'open skies' policy was supported by states such as the Netherlands or Sweden whose airlines would have to depend on carrying traffic between other countries because their home base was so small. On the other hand, the United Kingdom and most European countries were more protectionist, understandably so since their civil airlines had been decimated in the war. They supported tight controls on tariffs and capacity and the limitation of fifth freedom rights. These two conflicting views could not be reconciled. No multilateral agreement was reached on the three key issues of traffic rights, tariff control and capacity.

The participants at Chicago did manage to agree on the mutual exchange of the first two freedoms—the right to overfly while on an agreed service and the right to land in each other's country. This was done through the International Air Services Transit Agreement signed in December 1944 and to which many more states have subsequently adhered. But no agreement was reached on the mutual exchange of the commercial traffic rights. These are the third and fourth freedoms, which allow for the mutual exchange of traffic rights between two countries, enabling their respective airlines to carry passengers and freight between them. There is also the fifth freedom, which is the right granted by country A to an airline(s) from country B to carry traffic between A and countries other than B (see Appendix A).

The most significant result of the Chicago Conference was the signing of the Convention on International Civil Aviation, known subsequently as the Chicago Convention. This provided the framework for the orderly and safe development of international air transport. It did this through its various articles and the annexes (mentioned earlier), which deal with every aspect of the operation of aircraft and air services both in the air and on the ground. The Convention also set up the International Civil Aviation Organization (ICAO), an inter-governmental agency which provided the forum for further discussion of key aviation issues and the basis for the worldwide coordination of technical and operational standards and practices. ICAO also provided crucial technical assistance to many countries, helping them to establish airport and air navigation facilities and to organize other aspects of civil aviation infrastructure.

A further attempt at a multilateral agreement on traffic rights, pricing and capacity was made at the Geneva Conference of 1947, but this also failed. In time, governments and airlines together found a way of circumventing the failures of Chicago and Geneva. The exchange of traffic rights became a matter for bilateral agreement between states; the control of capacities and frequencies became a matter for inter-airline agreements, and sometimes for bilateral state agreements; and tariffs came to be regulated by the International Air Transport Association. The international regulation of air transport has since been based on these three separate but interlinked elements.

2.3
Bilateral air services agreements

Over the years, each country has signed a series of bilateral air services agreements (known as ‘bilaterals’) with other states aimed at regularizing the operation of air transport services between them. There are three distinct parts to such agreements.

First, there is the bilateral itself. This consists of a number of articles dealing with a variety of questions such as exemption from customs duties on imports of aircraft parts, airport charges, transfer abroad of airline funds, and so on. The two key articles are those dealing with the regulation of tariffs and capacity. Most bilaterals specify that passenger fares and cargo tariffs should be agreed by the designated airlines, ‘due regard being paid to all relevant factors, including cost of operation, reasonable profit, and the tariffs of other airlines’ (Martin *et al.*, 1984), but both governments must approve such fares and tariffs. In other words, ultimate control of tariffs rests with governments. On capacity, some bilaterals require very strict control and sharing of capacity by the airlines of the two countries while others have minimal control.

Underlying bilateral agreements is the concept of reciprocity, of an equal and fair exchange of rights between countries very different in size and with airlines of varied strengths. This is usually enshrined in an article containing the words 'There shall be fair and equal opportunity for the airlines of both Contracting Parties to operate the agreed service on the specified routes between their respective territories' (Martin *et al.*, 1984).

The second part of the bilateral is the annex containing the 'Schedule of Routes'. It is here that the traffic rights granted to each of the two states are made explicit. The schedule specifies the routes to be operated by the 'designated' airline(s) of each state. Airlines are never mentioned by name. It is up to each state to designate its airline or airlines subsequently. The points (towns) to be served by each designated airline are listed or, less usually, a general right might be granted, such as from 'points in the United Kingdom'. The routes or points granted to the designated airline of one state are not necessarily the reverse image of those granted to the airline of the other state signing the bilateral. If a town or country is not specifically listed in the route schedule, a designated airline cannot operate services to it unless the bilateral is amended.

The schedule will also indicate whether the designated airlines have been granted rights to pick up traffic in other countries or points lying between or beyond the two signatory states. These are the fifth freedom rights. But they cannot be used unless the third countries involved also agree. Thus the UK-Singapore bilateral grants the Singapore designated airline fifth freedom rights between Athens and London on its services between Singapore and London. The Athens-London rights cannot be exercised unless Greece agrees to this in its own air services agreement with Singapore.

The final part of the bilateral may consist of one or more 'memoranda of understanding' or 'exchange of notes'. These are agreements, often confidential, that amplify or subsequently modify particular aspects of the basic air services agreement.

Many bilateral agreements reflect protectionist attitudes. They insist on prior agreement on the capacity to be provided on the route and also specify that the agreed capacity should be shared equally by the designated carriers of the two states. Some go further and specify that services must be operated in 'pool' by the airline concerned (see section 2.4). At the same time, few if any fifth freedom rights are granted. Most bilaterals with east European countries tend to be very protectionist and also make pooling mandatory.

A more liberal type of bilateral agreement is frequently referred to as the Bermuda type, after the agreement signed in 1946 between the United Kingdom and the United States in Bermuda (HMSO, 1946). This was significant because it represented a compromise between the extreme positions taken at the 1944 Chicago Conference, and because both the United States and the United

Kingdom undertook to try to model all future agreements on the Bermuda pattern. As a result, Bermuda-type agreements have become widespread. They differ from the protectionist or ‘predetermination’ type of agreements described above in two respects. First, fifth freedom rights are more widely available, provided that the total capacity offered by the airline concerned on fifth freedom sectors is related to the end-to-end traffic potential of the routes. Second, there is no control of frequency or capacity on the routes between the two countries concerned. However, there is one safeguard on capacity: if one airline feels that its interests are being too adversely affected by the frequencies offered by the other, there may be an *ex post facto* review of capacity.

The other significant clause of the Bermuda Agreement was that on tariffs. While both governments maintained their ultimate right to approve or disapprove the tariffs proposed by the airlines, they agreed that where possible such tariffs should be arrived at using the procedures of the International Air Transport Association. For the United States this was a major compromise. It agreed to approve tariffs fixed by an association of producers (the international airlines), even though such price-fixing was illegal under US domestic anti-trust legislation. In essence, IATA tariff decisions were exempted from the provisions of such legislation. Subsequently, the tariffs article of most bilaterals included wording to the effect that tariff agreement should ‘where possible be reached by the use of the procedures of the International Air Transport Association for the working out of tariffs’. Even states such as Singapore, whose national airlines were not members of IATA, agreed in their bilaterals to approve where possible IATA tariffs (HMSO, 1971). Thus, approval for the IATA tariffs procedures was enshrined in the majority of bilateral agreements. It was this that gave the IATA tariffs machinery such force until deregulation set in from 1978 onwards.

Although Bermuda-type agreements became widespread, the effect is not as liberal as their terms might suggest. This is because they do not preclude airline pooling agreements, which effectively restrict capacity competition. Nor do they preclude subsequent capacity restrictions imposed arbitrarily by governments to prevent foreign carriers from introducing a new aircraft type or to limit increases in frequencies.

Today, each international airline is faced by a complex web of bilateral air services agreements signed by its home state. Such agreements will specify which points can be served and what traffic rights have been granted. Some may impose capacity controls, others will not. Some may even insist that services must be operated in ‘pool’. It is the bilateral which tells the airline where it can and cannot fly and how.

Following the United States government’s decision in 1978 to liberalize regulations affecting international air services, many United States bilaterals were renegotiated. In the process, several new concepts were introduced into the regulatory framework which were later also adopted in some newer bilateral agreements between European states. These concepts are discussed in the following chapter. But the majority of bilaterals around the world have remained largely unaffected by the wind of liberalization blowing through the United States and a few European and Asian countries.

2.4
Inter-airline pooling agreements

On the vast majority of international sectors there are two major carriers: the designated airlines of the two countries involved. There may in addition be one or more fifth freedom carriers, though in most cases the latter supply only a relatively small part of the total capacity available. As in many duopolistic situations, there is a strong incentive for formal or informal agreements between the duopolists to share out the market. Where one of the two airlines is much weaker or smaller, then pooling is a way of guaranteeing its share of capacity and revenue when faced with a much stronger or well-established rival. When the two carriers are of similar strength, then pooling is a way of pushing up load factors by removing frequency competition. It also helps to reduce costs and to rationalize schedules. Without a pooling agreement, competing airline departures tend to bunch at peak periods of demand. If all revenue is shared, then airlines do not mind operating some flights at less attractive times. Pool partners can plan their schedules so as to offer a good range of departure times throughout the day. This benefits the passengers and stimulates demand.

Pooling agreements have been forbidden to United States airlines by US anti-trust legislation. But they were very widespread in Europe (where until recently 75–80 per cent of intra-European tonne-kilometres were operated on pooled services), in South East Asia and to a lesser extent in other parts of the world. Agreements can cover a single route or sector or, more normally, all the routes on which the two signatory airlines operate between their two countries. Thus the 1980 British Airways-SAS pool covered virtually all services between Scandinavia and the United Kingdom operated by the two airlines even though only one of the two airlines was operating on some sectors. In general, airline pools cover third and fourth freedom traffics. Fifth freedom traffic may be included on long-haul pools, though these are relatively rare. While most pool agreements involve two airlines, three- or four-airline pools are not uncommon, especially in South East Asia. Though it is often known that airlines are operating in pool, the terms of any pooling agreement are closely guarded commercial secrets.

In some instances where the traffic is not considered to be adequate for two-airline operation, there may be a *'revenue-cost'* pool. This means that one airline alone operates the service on behalf of all the airlines in the pool, but costs and revenues are shared between them on a prearranged basis. On the Cairns-Tokyo route launched in 1986 there was an operating agreement between Japan Air Lines (JAL) and Qantas under which only the latter airline operated the services and revenue and costs were pooled and shared equally. A year later a similar arrangement was entered into for a new Perth-Tokyo service. About one in ten pool agreements are of this type. A revenue-cost pool involving three airlines was launched in 1982 on the Hong Kong-Manila-Port Moresby route. The twice-weekly service is still operated by Air Niugini, but costs and revenues are shared between Air Niugini, Cathay Pacific and the Philippine airline PAL. In revenue-cost pools all partners have an incentive to market and sell the service even if they are not operating it themselves since they share in any losses or profits.

Some airlines have extended the concept of the revenue-cost pool, which has been seen essentially as a solution for thin routes, into agreements covering routes which can support two carriers. In such wider cost-sharing pools *both* airlines operate on one or more routes between their countries and all their costs and revenues are shared on the basis of an agreed formula. The flight numbers often carry the code of both airlines. Malaysia Airlines is one airline which has pursued such pools, which it calls 'joint ventures', as a matter of policy. Its agreements include one with Thai International, covering air services between Thailand and Malaysia.

More commonly, airlines contract '*revenue-sharing*' pools in which all revenue on a route or sector is shared by the participating airlines in proportion to the capacity they offer on the route. In a two-airline pool, each airline will normally want a half share of the revenue and hence will expect to provide half the capacity. Imbalances in capacity may be permitted by mutual agreement if one carrier cannot or does not wish to increase its own capacity. If an airline does provide 50 per cent of the capacity but obtains only 47 per cent of the revenue compared with its pool partner's 53 per cent, then the pool partner will hand over 3 per cent of the revenue. The principle of sharing revenue in proportion to capacity is simple; its application becomes rather complex.

The first step in negotiating a pool agreement is to establish how much capacity each airline will be putting into the pool. On a single sector route, capacity usually means the number of seats offered, but if several sectors are involved then seat-kilometres may be used in order to take account of different sector lengths. On services with one or more intermediate stops en route, it becomes quite a complex problem to identify each carrier's capacity input to the pool. On any one flight only a part of the aircraft's capacity will be on the pooled service. If there are fifth freedom rights at some of the en route stops, the difficulties of calculating pooled capacity are compounded.

The second key item is to agree the pool accounting unit. This is the notional fare or revenue which each airline earns from one passenger on each pool sector. The number of revenue passengers carried on each sector by an airline is multiplied by the pool accounting unit for that sector to produce the revenue which that airline has to put into the pool. It is this notional revenue which is pooled, not the actual revenue collected. Such a system is less open to cheating because each airline need not know its pool partner's actual revenue, only the number of passengers carried, which is easy to verify. However, it also provides an incentive to keep up fares and a strong disincentive to undercut the market. If an airline sells a ticket for $220 when the pool accounting unit is $200, it can keep $20 and only $200 is credited to the pool. Conversely, if it has sold a ticket for $150 then it still has to contribute $200 for that passenger to the pooled revenue. Though a notional figure used purely for accounting purposes, the pool accounting unit is normally related to the average revenue per passenger in the preceding period. There may be a single pool unit irrespective of class or there may be two or three separate unit values applicable to passengers in different classes.

Some revenue-sharing pools allow for an unlimited transfer of funds from one airline to the other, provided that the final adjusted revenue of each airline is proportional to its share of capacity offered. About one in five of the pools between European airlines were of this type (ECAC, 1982). Such agreements remove all competitive incentive. In practice most pools have a limit to the revenue that may be transferred from one airline to the other. This transfer limit may be expressed as a percentage of the total pooled revenue, or as a percentage of the donor's or the recipient's revenue. Alternatively the transfer limit may be an agreed maximum sum of money. Many pool agreements will have fairly low transfer limits, often expressed as 1 or 1.5 per cent of the total revenue. Thus most of Thai International's revenue pools have a 1 per cent transfer limit, while the Cathay Pacific-JAL pool has traditionally had a 1.5 per cent limit.

The aim of the transfer limit is to ensure that an airline which is very successful in marketing and selling its services does not end up transferring large sums of money to its inefficient pool partner. In the pool negotiations, the more successful airline will try to have a very low transfer limit, while the weaker operator will want a high limit or no limit at all. Once transfer limits are imposed, particularly if they are very low, then competition begins to creep back, for the more passengers a pool carrier can carry the more revenue he can keep. But there is still no competition in terms of frequencies or capacities.

In some pool agreements, especially those covering complex route structures, pool partners have an 'entitlement' to a certain amount of revenue and only the balance is pooled. This entitlement (or 'retention') may be expressed as a fixed sum or usually as a percentage of each airline's revenue. The entitlement is generally between 10 and 30 per cent. Its aim is to cover certain elements of sales costs such as agents' commissions, sales office costs, and so on. However, there seems little point in having an entitlement if there is a low transfer limit.

Revenue-sharing pool agreements are mostly for a minimum period of three to five years, though capacities to be provided and the pool accounting unit are renegotiated annually or for each season. Pool accounts are settled monthly.

Pool agreements may also cover freight. Freight revenue pools are based on the same principles and have the same features as the passenger revenue pools described above. They may relate to all-freighter services or to freight carried on passenger aircraft or both. British Caledonian and Nigerian Airways had a cargo as well as a passenger pool for many years on their London-Nigeria services. Originally there was no transfer limit and BCal found it was paying so much of its freight revenue to Nigerian Airways that it withdrew from the agreement. Later a new agreement included a transfer limit of 10 per cent of total revenue, which was still very high and disadvantageous to BCal. Eventually in 1982 BCal pulled out of the pool since it found it was still paying too much to Nigerian Airways.

Among some airlines a pool agreement can become a comprehensive agreement covering much more than rationalizing of schedules and capacity control. One logical step is to develop a common tariffs policy for the pooled routes and for the IATA tariff negotiations. Other aspects of the agreement may involve joint sales promotion and advertising, use of each other’s reservation systems, sharing of ground handling facilities at airports, and so on.

The effect of all pooling agreements, once entered into, is to reduce the freedom of action of the airlines involved and to blunt any com-petitive tendencies. This is particularly so if there is no transfer limit on pooled revenue or if the limit is relatively high. Then there is little incentive for pool partners to compete since they are assured of half or close to half of the total revenue whatever their relative market performance. Collectively the effect of the bilateral air services agreements and of inter-airline agreements is to delimit the routes on which airlines can operate and to determine the capacity shares of the two (or occasionally three) designated carriers in these markets. This was particularly so in Europe, though more recently pooling agreements involving airlines within the European Community have been phased out (section 4.4.3). Revenue pool agreements are still widespread in Asia, especially South East Asia, and elsewhere but have never been permitted on routes to or from the United States.

2.5
Inter-airline royalty agreements

When airlines have wanted to pick up fifth freedom traffic from points where they did not have fifth freedom rights under the existing bilaterals, they have sometimes been able to ‘buy’ such rights by making royalty payments to the airline of the country concerned. It was pointed out earlier that Singapore Airlines (SIA) had had fifth freedom rights between Athens and London under the terms of the UK-Singapore bilateral, but could not use these rights unless they were also granted in Singapore’s bilateral with Greece. This was not the case, so when in 1977 SIA operated from Singapore to London via Athens it agreed to pay Olympic Airways a royalty for any local traffic picked up between Athens and London. In other words, SIA bought the Athens-London fifth freedom rights from the Greek government by paying the Greek airline for them. The royalty in this case was expressed as 20 per cent of the revenue generated from fifth freedom traffic. Despite the royalty, SIA began to carry so much traffic between Athens and London that Olympic cancelled the royalty agreement a year later in 1978.

Royalty or ‘revenue compensation’ agreements for fifth freedom traffic are fairly common. But in some cases, airlines have been forced into making royalty agreements to cover the carriage of the 'sixth' freedom traffic. The concept of sixth freedom has rarely appeared in any bilateral agreement, though the expression has been widely used for many years. It involves the carriage of traffic between two points, between which an airline does not have fifth freedom rights, by the use of two sets of third and fourth freedom rights. Philippine Airlines (PAL) can carry traffic between London and Manila using their UK third and fourth freedom traffic rights. It can then carry those passengers on to Australia using the third and fourth freedom rights granted under the Australia-Philippines bilateral. Traditionally, attempts have been made to limit such through traffic between London and Australia by the imposition of various controls such as the need to make stop-overs of several days in Manila or other intermediate points. KLM in Europe and SIA, Thai International and Malaysia Airlines in South East Asia as well as several Middle East airlines, such as Emirates, have been so successful in generating sixth freedom traffic that the various regulatory controls, such as the necessity for stop-overs en route, have been slowly eroded.

Sixth freedom traffic carried by Philippine Airlines, Malaysia Airlines or Thai International between London and Australia represents a loss of traffic for the third and fourth freedom carriers on the route, namely British Airways and Qantas. These carriers have therefore stepped in from time to time to exact royalty payments for sixth freedom traffic. Thai International has had an agreement with British Airways whereby it has been allowed to carry a certain limited number of sixth freedom passengers between London and Australia but has had to pay a royalty of almost $60 for each one-way passenger above this permitted number. However, no royalty is paid if the sixth freedom passengers spend a night or more in Thailand because they then become Thai's own stop-over traffic and are categorized as third and fourth freedom passengers. A more complex form of revenue compensation for sixth freedom traffic is the 1988 agreement between PAL and British Airways. Under this agreement PAL was permitted to carry sixth freedom passengers from London on condition that it generated $750,000 worth of interline or transfer traffic onto British Airways' own services and also paid an annual royalty of $250,000. This type of revenue compensation or royalty agreement whereby one airline guarantees an agreed value of interline sales onto the other airline's services is becoming more widespread. If the airline fails to generate the guaranteed level of sales it has to make up the difference in cash.

While royalty agreements covering sixth and more especially fifth freedom traffic have been fairly common for many years, a more recent phenomenon is the payment of royalties for third and fourth freedom traffic. This may occur when one of the two designated carriers on a route decides not to operate. It then argues that the other country's designated carrier will carry all the traffic including that which would have been carried by the airline which is not operating. The non-operating airline wants to be compensated for giving up its traffic share and may be able to push the other carrier into a royalty agreement.

For many years, SIA was forced to pay royalties to Korean Airlines (KAL) for traffic carried between Singapore and Seoul because KAL was not operating on the route. This was done even though SIA was enjoying rights granted under the terms of a bilateral air services agreement. When KAL began flying the Seoul-Singapore route, the royalties were discontinued. More recently, under a 1988 agreement between Thai International and Olympic, the former paid the latter a royalty for operating twice-weekly services between Athens and Bangkok of $1 million per annum, which was to continue until Olympic started its own Bangkok service.

Royalty payments, sometimes referred to as revenue compensation, are becoming more widespread. The royalty may be expressed as a percentage of the revenue generated, as in the case of the SIA-Olympic agreement previously mentioned; it may be a fixed amount per passenger uplifted, as in the British Airways-Thai International agreement; or it may be a more complex agreement involving guarantees of interline sales. Occasionally it may be a fixed annual sum not related to the amount of traffic carried. In some cases royalty payments may enable airlines to buy traffic rights that they do not have under the terms of existing bilateral agreements. In this way, they may improve the viability of certain routes. But if the airlines are forced to pay royalties for third and fourth freedom traffic, whose rights they already have under the bilaterals, then the result is merely to push up costs.

2.6
The role of IATA

The International Air Transport Association was founded in Havana in 1945, as a successor to the pre-war association, which had been largely European. Its primary purpose was to represent the interests of airlines and to act as a counterweight to ICAO, which was an intergovernmental agency primarily concerned with government interests in aviation. Through its various committees and subcommittees, which bring together airline experts for a few days each year, IATA has been able to coordinate and standardize many aspects of airline operations. Thus the Financial Committee has harmonized methods of rendering, verifying and settling accounts between airlines, while the Traffic Committee has standardized aircraft containers and other unit load devices as well as many other aspects of passenger or cargo handling. IATA also represents the airlines in negotiations with airport authorities, governmemts or ICAO on matters as diverse as airport charges or anti-hijacking measures.

One of IATA's most important functions is to operate the Clearing House for inter-airline debts arising from interline traffic, that is, the carriage by one airline of passengers (or freight) holding tickets issued by other airlines. The sums involved are enormous. In 1988, the 146 IATA and 27 non-IATA airlines using the Clearing House, together with nearly 170 airlines of an American-based clearing house, submitted for clearance claims amounting to $17.2 billion. The

Clearing House settles inter-airline accounts in both dollars and sterling by offsetting members' counter claims against each other. In 1988, 88 per cent of all claims could be offset without the need for any cash transaction. The Clearing House speeds up and simplifies the process of clearing inter-airline debts. Airlines that do not use the Clearing House must negotiate individually with each airline whose ticket stubs they might hold. This is slow and laborious and may involve long delays before debts are cleared.

Undoubtedly IATA's most important function has been to set airline fares and cargo rates. Up to 1979 the process for establishing fares was rather rigid (IATA, 1974). It involved the so-called traffic conferences—one covering North and South America, the second covering Europe, the Middle East and Africa, and the third the Pacific region and Australasia. Airlines operating in or through these areas belonged to the relevant conference. The conferences, meeting in secret and usually about four to six months in advance, established the tariff structure which would be operative for a specified period, usually of one year. The conferences also agreed on fares between the conference regions. About 200,000 separate passenger fares and over 100,000 cargo rates were negotiated together with complex conditions of service associated with each fare. The conditions would cover such aspects as seat pitch, number of meals to be served, charges for headphones, and so on. Once each conference had agreed on its own tariffs, then the three conferences came together in joint session for the tariffs proposed to be voted on. They had to be agreed unanimously. In other words, any airline, no matter how small, could veto the proposed tariffs and force further renegotiation. The tariffs process was lengthy and time-consuming. While in the early years unanimity was usually reached fairly quickly, by the early 1970s unanimity became increasingly difficult to achieve.

From the airlines' point of view, the traffic conference system had clear advantages: it produced a coherent and worldwide structure of interrelated passenger fares and cargo rates, together with tariff-related rules and regulations. The traffic conferences were also instrumental in developing standard documents and contracts of air carriage—tickets, waybills, baggage checks, etc.

IATA tariffs were accepted world wide because in so many bilateral air services agreements governments had explicitly agreed that they would approve fares negotiated through the IATA process. This was the case even with some governments whose airlines were not IATA members. Non-IATA airlines needed to adopt IATA fares in order to get their tickets accepted by IATA carriers. This is still largely the case. To give added force to its tariff agreements, IATA had compliance inspectors checking that member airlines were not illegally discounting on the IATA tariffs. If caught selling tickets or cargo space at discounted rates, IATA airlines faced heavy financial penalties. Since no IATA airlines were allowed to deviate from the IATA tariffs, no price competition was possible.

There can be little doubt that IATA was effectively a suppliers' cartel, whose object was to maximize its members' profits by mutually fixing the prices at which they sold their services. However, it was often argued that three features of the IATA traffic conference system safeguarded the interests of the public and the consumers and prevented the airlines' cartel from abusing its power. These were: first, a *de facto* ban on any kind of capacity regulation; second, the 'unanimity rule' mentioned above; and third, the fact that IATA fare agreements had to be approved by the respective governments.

In theory, since IATA was not in a position to restrict capacity or control entry, it would be difficult for the airlines to extract monopoly profits by fixing both fares and output at the appropriate levels. In practice, as has been noted above, government and airline agreements outside IATA effectively upset the competitive element in the ratemaking machinery. The entry of a new airline into a route is impossible unless its national government is willing and able to negotiate the necessary traffic rights. On many routes capacity is controlled either through the bilaterals or through airline agreements such as revenue pools. Often on routes such as London to Paris the fares were so disproportionately high that one had to suspect that monopoly profits were being extracted.

It was also argued that the unanimity rule favoured those airlines which were pressing for lower fares, since airlines wishing to maintain a higher fare structure would prefer some agreement to none, fearing that in the absence of any agreement free competition would push fares to even lower levels. At the same time it was clear that the unanimity rule did not work simply as a strong downward pressure on fares: first, because airlines knew that if no agreement was reached the respective governments would step in and fix the fares themselves; secondly, because the unanimity rule also resulted in higher fares in certain areas as a *quid pro quo* to the airlines in those areas for their agreement to lower fares elsewhere; thirdly, because several low-fare proposals (such as the advance purchase fares on the North Atlantic) were held up for a number of years before unanimous agreement could be reached. The unanimity rule was most effective in preventing an upward movement of fares. It was less effective in ensuring that fares fell to levels proposed by the more efficient airlines.

Under the terms of the bilateral air services agreements all governments concerned must approve any tariff agreements made through IATA. Many governments did in fact intervene, notably the US government through the Civil Aeronautics Board, which consistently tried to reduce the pace of fare increases. Other governments also intervened from time to time, but usually on relatively minor points affecting particular tariffs to their own countries. On the whole. the majority of governments have insufficient information on which to base valid arguments to influence their own airlines and the IATA machinery. Consequently, there has been a strong tendency among governments to approve IATA fares more or less automatically. This is certainly what IATA preferred them to do, and it consistently pressed for a minimum of government interference.

Overall the apparent safeguards against IATA working as a producers' cartel were not very effective. But if IATA was a cartel it was failing to achieve the prime objective of any cartel, namely high profits for its members. Our earlier analysis has shown an industry characterized by poor financial results (section 1.5 above). Nevertheless, the travelling public and consumer groups remained unconvinced of the benefits of the IATA tariff machinery. During the 1970s pressure began to build up on governments in Europe and North America to allow greater pricing freedom.

At the same time, IATA tariffs procedures began to prove too rigid and inflexible to deal with two new developments. The first of these, which had started more than a decade earlier, was the growth of non-scheduled or charter air services. Attempts by IATA and many governments to stem their growth had failed. As a result, charter airlines were making serious inroads into scheduled markets in Europe and on the North Atlantic. The second development was the emergence of new dynamic airlines belonging to newly independent states, especially in South East Asia. Airlines such as Thai International, SIA and Korean Airlines began to make an impact on regional and long-haul markets. As non-IATA carriers they captured market share either by offering much higher levels of in-flight service than was permitted under IATA's 'conditions of service' or, less frequently, through greater flexibility in their tariffs. To counter competition both from charters and from new non-IATA carriers, the IATA airlines needed much greater pricing freedom than could be obtained within the cumbersome traffic conferences.

Faced with these external competitive pressures, IATA airlines found it increasingly difficult to achieve unanimity on the tariffs policies to be adopted at the traffic conferences. Several conferences broke up without agreement on tariffs in particular markets. Governments stepped in to fix the fares where the airlines could not agree. At the same time, more and more IATA airlines began to offer illegally discounted fares in very competitive markets or to flout the strict controls on in-flight service standards. Several governments, particularly that of the United States, began to push for a system which allowed consumers to benefit from greater pricing freedom (section 3.8 examines US moves against IATA). Openly disregarded by some of its own members and under pressure from a number of governments, IATA's tariff machinery began to disintegrate.

In 1975 IATA began a review of its traffic conference system and other aspects of its activities. At the 1978 Annual General Meeting, airlines approved a number of key changes in the conditions of membership and in tariff coordination, which was the new name for tariff setting. The changes were implemented in 1979. The most significant are:

(1) Airlines can now join IATA as a trade association without participating in the passenger or cargo tariff coordinating conferences. By 1988 as many as 69 of IATA's 152 active member airlines did not take part in tariff coordination. Trade association members are not obliged to implement IATA tariffs.

(2) The primary interests of third and fourth freedom carriers in setting tariffs is now recognized by the fact that it has become possible within the traffic coordinating conference to reach limited agreements (covering travel between two countries) or sub-area agreements (covering a small geographical area) without the involvement of the full conference area. (As previously, the world is divided into three main conference areas.) In other words, the unanimity rule has been abandoned.
(3) Third and fourth freedom carriers may introduce innovative fares between their two countries, without prior conference approval but subject to the agreement of the governments concerned.
(4) Airlines participating in tariff coordinating have been encouraged to dispense with regulations on conditions of service relating to meals, bar service, free gifts, entertainment, and so on. This has been done in many sub-areas by the airlines concerned and with government approval. As a result, competition in the quality of in-flight service has become widespread.
(5) The secretive and confidential traffic conferences of earlier days have been replaced by the much more open and public coordinating conferences. Observers from governments and international organizations may attend and third parties may make written or oral presentations to the conferences.

Under external pressure to reduce tariff controls, IATA has also had to adopt more flexible tariff structures (see Chapter 11 on pricing). The restructuring of IATA and the introduction of more flexible and open tariff-setting procedures have enabled IATA to survive despite the considerable pressures towards deregulation. IATA tariffs remain the government-approved tariffs for the majority of international air routes. Even on routes with non-IATA airlines or where discounting is prevalent, the IATA-agreed tariffs are widely accepted as providing the basic tariff structure and level of fares.

IATA's more open structure and its role in pursuing airline interests on infrastructural issues made it increasingly attractive to airlines that had previously stayed aloof. A major breakthrough occurred in July 1990 when four Asian airlines—SIA, Cathay Pacific, Malaysia Airlines and Royal Brunei—joined as trade association members for the first time. The last real objection to their joining was removed when IATA had earlier agreed to modify its strict rules on IATA-accredited travel agents so as to allow carriers to deal with virtually any agent. Previously only IATA-accredited agents could be used. This represented a further relaxation in IATA's hitherto rigid membership rules.

2.7
Limited regulation of non-scheduled air services

Unlike scheduled rights, non-scheduled traffic rights have not been regulated by bilateral air services agreements. At the time of the 1944 Chicago Convention, non-scheduled air services were not expected to be of any significance, and a more liberal attitude was therefore adopted. Whereas under Article 6 of the Convention scheduled air services specifically required ‘special permission or other authorisation’ from the destination countries, Article 5 left authorization for non-scheduled services at the discretion of individual states (ICAO, 1980).

In practice, most countries have insisted on giving prior authorization to incoming non-scheduled flights, but attitudes towards authorization vary significantly. Some countries, such as India, have been restrictionist in their approach and have refused to authorize charter flights unless they are operated by their own national carrier or unless it can be shown that no scheduled traffic will be diverted. Others may insist, before authorizing an incoming charter, that one of their own airlines should be allowed to tender for the charter contract. In contrast, many other countries, particularly tourist destinations such as Spain, Morocco or Tunisia, have followed a more liberal ‘open skies’ policy and have readily authorized non-scheduled services.

In 1956, the member states of the European Civil Aviation Conference agreed to waive the requirement for any prior authorization from the destination country for a wide range of non-scheduled flights (HMSO, 1956). This agreement has greatly facilitated the development of charter services, particularly inclusive tour charters, within Europe.

Some countries, such as the United Kingdom through the Air Transport Licensing Board and later the Civil Aviation Authority, brought non-scheduled operations within some form of national regulatory control. Such regulation was aimed at clearly delineating the area and scope of non-scheduled operations so as to protect scheduled operations, while giving non-scheduled operators considerable freedom of action within their defined area. British airlines have had to obtain an ‘air transport licence’ from the Civil Aviation Authority for all commercial operations. An airline wishing to operate a charter inclusive tour for a particular tour operator applies for a Class 3 licence. The application may be for a large number of frequent flights to one or more destinations over a stated period of time. Today, Class 3 licence applications are granted more or less automatically by the Civil Aviation Authority.

Initially IATA tried to regulate the non-scheduled activities of its own members by trying to fix minimum charter rates as a function of the scheduled fare and by other rules governing who could have access to charter flights. In the 1960s, many governments, under pressure from IATA and to protect their own scheduled airlines, imposed arbitrary and often restrictive regulations on charter services. But, as the tide of public opinion in many western countries swung strongly in favour of cheap charter flights, governments were forced gradually to dismantle the various controls on charters. This process was given added impetus by the moves in the United States to deregulate both domestic and international air transport. In particular, the United States has tried to remove all price and other controls on charters while at the same time making non-scheduled traffic rights explicit within bilateral air services agreements.

The non-scheduled airlines have been relatively free of international regulation but subject to national controls on licensing, tariffs to be charged, and so on. In many countries these national controls have also withered away. In the two largest markets for passenger charters—in the Europe-Mediterranean area and on the North Atlantic—charter operators have been free for some time of both international and national controls on route access, capacity or fares. But uncertainty remains. Since charter rights are only explicitly included in a very few United States bilaterals, charter services are at the mercy of the destination countries, which may give or refuse landing authorization. Many countries, particularly in the Middle East and other parts of the Third World, still refuse to authorize incoming charters.

2.8 The economic consequences of international regulation

2.8.1 OPERATIONAL CONSTRAINTS IMPOSED ON SCHEDULED AIRLINES

The three-pronged structure of international regulation based on the bilaterals, the inter-airline agreements and IATA had constrained the freedom of action of individual scheduled airlines in a number of ways.

First, their markets are often restricted. Airlines cannot enter any market at will, but are dependent on government action and support first in making bilateral agreements to open up air routes and obtain the necessary traffic rights; and, secondly, in negotiating the points which should be served on these routes. This is not always straightforward, particularly if an existing bilateral has to be renegotiated. The other country may refuse to negotiate or may want to exact a high price for accepting changes to routes or traffic rights granted under the existing bilateral. SIA had long wanted to operate from Singapore to Kota Kinabalu and Kuching in eastern Malaysia (Sabah) but the Malaysia-Singapore bilateral granted traffic rights only to the Malaysian-designated carrier. The Malaysians were not prepared to renegotiate on this so SIA was for many years excluded from a potentially lucrative route. It was not until June 1990 that Malaysia gave way. To obtain fifth freedom rights some airlines have had to pay royalties to other carriers. Some have even had to pay royalties to exercise third and fourth freedom rights granted to them under air services agreements.

Secondly, the level of output or product of each airline is not entirely at its own discretion. Its production may be limited through bilateral agreements on capacity control on an equal sharing of capacity, or through inter-airline agreements on revenue sharing and capacity. An airline wishing to increase its capacity and output on routes where there is some form of bilateral or inter-airline capacity control may well find that the other airline in the duopoly may be unable or unwilling to increase its own capacity, and therefore may veto the expansion plans. SIA had long wanted to increase its flights from Singapore to Hong Kong from 14 to 21 weekly, as permitted under the air services agreement with the UK. But they could not do so unless Cathay Pacific matched any frequency increase, which they were not prepared to do. SIA waited several years before getting Cathay's agreement to an increase of frequencies in 1989. Capacity limitations are widespread, but have not existed in all markets. On many routes to or from the United States there was little effective capacity control even before deregulation.

Lastly, airlines' pricing freedom is also limited. This is partly because most tariffs have traditionally been set by the IATA tariff conferences, in which the influence of any individual airline was limited, and partly because governments must ultimately approve all tariffs. Thus even on routes where IATA tariffs do not apply or where IATA now allows innovatory tariffs by the third and fourth freedom carriers concerned, the government at either end of the route may prevent a new fare being introduced. Even non-IATA airlines may be required by governments to apply IATA tariffs on most of their international routes. Pricing freedom has existed only in markets where at times there has been widespread discounting of IATA tariffs, in markets where with the connivance of governments the IATA tariffs process has been abandoned or on routes where fare zones have been introduced. Some pricing freedom has existed on most of the North Atlantic and transpacific routes to and from the United States since about 1978 and more recently on certain European routes. With these major exceptions, airline managers have not been free to choose and set their own tariffs at will. Tariffs have had to be approved by IATA or by the two governments concerned. In practice such approvals have depended on the agreement of the other airline(s) on the route in question. Pricing freedom was further restricted if airlines were in revenue pools with the other carriers.

The cumulative effect of all these constraints has been that scheduled airline managers have been restricted in their ability to compete with other carriers, especially if their own airlines were IATA members. With some exceptions there has been little scope for pricing competition. Until 1979 IATA airlines could not even compete in terms of in-flight services, for their nature and quality were strictly controlled on a route-by-route basis. On many routes there was little scope for competition in terms of frequencies either because of capacity limitation clauses in the bilateral or because of inter-airline revenue pools. The latter also precluded competition through aggressive scheduling of departures.

2.8.2
TARIFFS NOT RELATED TO LOWEST COSTS

In markets where there is price competition, tariffs are more likely to be pushed down to the levels at which the more efficient carriers can operate profitably. Tariffs arrived at through inter-airline negotiations must inevitably be a compromise between the pricing policies of the high-cost airlines and those of the low-cost airlines. This is what has happened within IATA. As a result, IATA tariffs appear to have been based less on the costs of the more efficient carriers and more on the concept of charging what the traffic will bear and on the projected costs of the higher-cost operators.

Prior to 1979, the unanimity rule at IATA Traffic Conferences generated horse trading between participants in order to achieve unanimity among airlines with very diverse cost levels. This resulted in very different fares and cargo rates per kilometre for routes with similar cost characteristics. This was so even after 1979 when the unanimity rule was effectively abandoned. On many routes factors such as surface competition, or competition from charters, may have a more profound effect on tariffs than traffic density, sector length or other cost factors. (The relationship of tariffs to costs is examined in Chapter 11.)

The very high variation in IATA fare rates on routes which are outwardly similar suggests that there is considerable cross-subsidization between routes, and even between different classes of passengers on the same route. Cross-subsidization raises questions of welfare distri-bution which are too complex to go into here. However, one significant effect on consumer interests in general is that it holds back the development of air services in profitable markets because they may be burdened with unusually high fares to compensate for losses elsewhere.

The absence of effective price competition in most airline markets has had two adverse effects. It has meant higher tariffs for passengers and freight shippers than would otherwise have been the case. But, for many airlines, it has also meant higher costs than would have been the case in a more competitive environment because it has reduced the incentive to cut costs. This has been particularly the case among higher-cost operators. Higher tariffs have also encouraged the growth of low-fare charters.

2.8.3
MONOPOLY PROFITS EARNED?

On routes where an effective duopoly exists and where the duopolists are operating in a revenue-sharing pool, or where capacity is controlled and equally shared on the basis of the air services agreement, the carriers involved have been in a position to extract monopoly profits. They have done this by effectively controlling the provision of capacity and by controlling fare levels through the IATA traffic conference or inter-airline agreements. In practice, this has meant unusually high fare levels and high load factors. A particularly good example was the London-Paris route before new entrants were allowed in 1988. This route had been operated in a revenue pool by British Airways and Air France for many years, though British Caledonian also carried about 15 per cent of the total traffic. The route has a cost disadvantage because it is relatively short, only 215 statute miles. The traffic, however, has been the busiest in Europe with 3 million passengers in 1987 when both Air France and British Airways operated high frequencies with large aircraft. Therefore costs per passenger should have been relatively low, particularly when compared with other European routes of similar stage length. At the same time, the route generated a high proportion of business traffic and most of this travelled at the full economy or club (business) class fare. So there was relatively less fare dilution than on more tourist-oriented routes. Load factors on the route have also tended to be well above average. Lower costs, high yields and above-average load factors should have resulted in fare levels 10–20 per cent below the European average. Yet the London-Paris fare, when expressed as a fare per kilometre, had always been one of the highest in Europe. This suggests that high profits were being earned. On some European routes such as London-Paris, on several routes in the Middle East and one or two routes in South East Asia, the regulatory system failed to protect the public from monopoly pricing.

3
Deregulation and its Impact on the Industry

3.1
The case for and against regulation

Traditionally, economists have justified the regulation of both international and domestic air services on one or more of three grounds. In the United States the Civil Aeronautics Act of 1938 was introduced to regulate and control competition between US domestic carriers because the unregulated competition which had prevailed up to then had led to chaotic economic conditions, little security for investors and low safety margins. For many years the American view was that, while air transport is not a natural monopoly, regulation is required because ‘unregulated competitive market forces may have adverse consequences for the public at large’ (Richmond, 1971). The same philosophy has been widely adopted to justify the regulation of international air transport as well. It has been argued that, whereas there are strong oligopolistic tendencies in air transport, absence of any regulation would inevitably lead to wasteful competition. This is because the industry has a non-differentiated product and a relative ease of entry. At the same time, economies of scale are not very marked. New entrants into a particular market would try to establish themselves by undercutting existing fares, and a price war would result with adverse consequences for all participants (Wheatcroft, 1964).

The second economic argument favouring regulation has been based on the concept that air transport is a public utility, or at least a quasi-public utility. It has been argued that the external benefits arising from civil aviation are such that the industry needs to be regulated in order to ensure that any benefits are not jeopardized. These benefits are assumed to be not only economic but also strategic, social and political. The public utility nature of air transport has, rightly or wrongly, been considered so important that most countries have concentrated on developing one major scheduled operator, usually with direct government participation. The same carrier often operates domestic services and acts as the designated foreign carrier. These countries have tried to avoid a conflict between private commercial needs and ‘national interests’ by having a monopolistic structure in air transport with a strong direct or indirect government influence on the national airline. It was and still is a natural extension of this point of view to believe that free and unregulated competition on international air routes would endanger national interests because it might adversely affect that national airline.

The third argument in support of the regulation of international air transport is linked to the rapid development of non-scheduled air traffic. The Committee of Inquiry which examined British air transport and reported in May 1969 came out strongly in favour of protecting scheduled services on most routes because they had ‘public service’ features which imposed certain costly obligations upon them and which made them particularly vulnerable to price competition (HMSO, 1969, Chapters 5 and 13). Once an airline is committed to operate a series of scheduled services, the marginal cost of any empty seats is virtually nil, since services cannot be withdrawn at short notice. A fare war would thus result in disastrously low fares and a marked financial instability among scheduled airlines. The Committee also argued that in the long run scheduled operations cannot compete with charter operations because the former satisfy a ‘collective’ demand which necessitates the ready availability of spare seats on particular routes at short notice. In order to satisfy that demand, scheduled operators must inevitably operate at lower load factors than charter airlines. Ready availability is after all one aspect of ‘public service’. Lower load factors in turn mean higher passenger-kilometre costs than those achieved by non-scheduled operations. Where states wish to have scheduled services providing regular and readily available capacity with the minimum of special conditions for the public at large, some form of protection against the encroachment of charter operators is required. This is particularly so where the scheduled traffic is relatively thin, for even a small loss of traffic might jeopardize the continuation of scheduled operations. This argument was broadened by the International Air Transport Association (IATA) and others. They claimed that even greater price competition between scheduled carriers themselves would lead to a collapse of profit margins. This in turn would lead to the abandonment of thin routes and reduction of frequencies on others as airlines tried to compensate for lower fares by pushing up load factors. As a result the travelling public would be worse off.

During the 1960s economists in the United States and elsewhere began to question the benefits of regulation and argued the advantages of freer competition in air transport (e.g. Straszheim, 1969). Existing international regulations limited pricing freedom and product differentiation, restricted capacity growth and excluded new entrants. If these regulations were relaxed, a more competitive environment would provide considerable benefits to the consumer in lower fares, innovatory pricing and greater product differentiation. Lower tariffs would push airlines to re-examine their costs and would force them to improve their efficiency and productivity. Lower costs would facilitate further reductions in tariffs. Some inefficient airlines might be forced out of particular markets. But it was argued that the economics of the airline industry did not justify the fear that freer competition would lead to economic instability. The capacity of most large international airlines to fight tariff wars on a limited number of routes at a time, combined with a strong sense of self-preservation, would prevent the established carriers from going too far in a price war because of the dangers of getting ‘locked in’. In other words, they would avoid successive fare reductions which would ultimately leave each airline with much the same share of the market but with very low and possibly unprofitable fare levels. Fear of new entrants would almost certainly push down fares to a level where only normal profits were being secured. Excess profits would attract new entrants. By the same token, cross-subsidization, which was prevalent, would be largely eliminated, since it implied excess profits on particular routes. Where airlines did enter new markets or routes, they were likely to be innovative in their pricing and in their products. Existing carriers, hitherto protected by the regulatory environment, would be shaken out of their complacency. This could only be good for consumers.

Similar arguments were put forward regarding the benefits which would arise from the deregulation of domestic air services in the United States (Eads, 1975). The Civil Aeronautics Board (CAB) had imposed rigid regulatory controls on market entry, on pricing and on other aspects of airline operations. No new trunk airline had been authorized since the Board was set up in 1938. The number of airlines on any single route was strictly controlled. Airlines were not even free to withdraw from certain routes as a matter of commercial judgement if they were the only carrier. The CAB also approved all tariffs. It generally rejected discount fares, which were considered discriminatory. Since it was difficult for airlines to obtain new route authorizations, they tried to expand through take-overs or mergers, but even these were subject to CAB approval. Airlines were in a straitjacket. Only those operating entirely within one state, such as California, were free of CAB controls. The arguments for deregulation could readily be applied to US domestic air transport and they found favour with the American public.

3.2
The regulatory system under pressure after 1972

During the early 1970s the European scheduled flag carriers, many of them wholly or partly owned by their respective governments, began to complain of the inroads which cheap and unregulated charter services were making into their potential traffic and into their profits and campaigned for stricter controls. But the public, various consumer groups and the tourist industry were pressing for some deregulation of the scheduled sector and for greater freedom for non-scheduled operators, so that all travellers could readily enjoy the cheaper fares which the latter made possible. As the economic fortunes of both scheduled and non-scheduled carriers worsened, especially after the fuel crisis of 1973–4, the pressures on the regulatory system increased. One manifestation of these pressures was the growing difficulty, previously mentioned, of reaching unanimity at IATA Traffic Conferences. Another was the spread of the illegal discounting of scheduled tariffs in many markets. To mitigate the effects of the deteriorating economic fortunes of the industry, governments and airlines took a series of unconnected decisions which collectively and often imperceptibly began to change the regulatory framework. These various decisions were often contradictory, but one can discern certain trends in the various regulatory developments between 1973 and 1977.

First, the distinction between scheduled and non-scheduled services became increasingly blurred as controls on the latter were relaxed and new concepts introduced. In the United Kingdom, the Civil Aviation Authority (CAA) finally abolished minimum price control of summer charter inclusive tours in November 1972. In April 1973, advanced booking charters (ABCs) were introduced on the North Atlantic. The aim was to do away with the previous concept of 'affinity', which had limited access to transatlantic charters to members of a club whose purpose was not solely to provide cheap travel. To prevent or reduce diversion from scheduled services, the use of ABCs was limited to passengers booking at least three months in advance. ABCs gradually replaced affinity and other forms of group charters on the North Atlantic. The advanced booking period was progressively reduced. The ABC concept was also introduced on a few other long-haul routes. In the meantime, the European scheduled airlines had also developed the concept of part-charters. Under part-charter rules, scheduled carriers could sell off blocks of seats to travel agents or tour operators, who then packaged the seats into inclusive tour holidays. Part-charters were first introduced between Britain and Spain in 1971, but within a few years they were available on many of the major tourist routes in western Europe. Part-charters on scheduled services were introduced not merely as a competitive reaction to charters but also because they offered a number of economic advantages to the scheduled carriers. By mixing normal traffic and charter traffic, the scheduled carriers are able to improve load factors by filling up seats which would otherwise be empty. In this way, airlines can sustain scheduled services on routes where the scheduled traffic would otherwise be insufficient to maintain adequate frequencies and load factors.

The relaxation of controls on charter services, and the emergence of ABCs on many long-haul routes and of part-charters in Europe were clearly blurring the operational distinctions between scheduled and charter services.

The second development during this period was a trend towards introducing greater international regulation of non-scheduled services both by bringing them within bilateral agreements and by controlling charter fares. It was becoming increasingly clear that one could not continue to regulate the scheduled sector of the industry while leaving the fastest-growing sector, that of the charters, outside the framework of regulations. The fact that scheduled and non-scheduled services were becoming increasingly difficult to differentiate reinforced the argument for regulation on an industry-wide basis. Attention was focused on a bilateral approach to non-scheduled regulation. As early as March 1972, Secor Browne, then chairman of the Civil Aeronautics Board, stated that a multilateral approach to charter regulation was ‘simply not feasible’ and that bilateral treaties were the only way to control charters. Subsequently, a number of bilateral air service agreements which were renegotiated also included separate treaties covering non-scheduled services; for example, the ‘Nonscheduled Services’ Agreement between Canada and the United States in May 1974 (Canada Treaty Series 1974, No. 16). Meanwhile, the introduction of new charter concepts, such as advanced booking charters, had necessitated bilateral negotiations between governments. These resulted in a large number of bilateral agreements, mainly between the United States and Canada and several West European countries, which were effected by exchange of notes or memoranda of understanding (US Government, 1973). Such agreements, while covering only one type of charter service, did involve the acceptance by the signatory governments of the principle of bilateral negotiation as a means of regulating charter operations. Certain governments also became involved in regulating minimum prices for ABCs and other types of charters.

As scheduled airline losses mounted following the 1973–4 fuel crisis, many governments set out to protect their own scheduled carriers. This growing protectionism was another tendency in the period after 1972. There were many manifestations of this. A number of governments attempted to obtain a more equal share of the total traffic, in particular markets for their own carriers. In 1974 the Civil Aeronautics Board, later to be the champion of deregulation, began to pressurize a number of European and other governments on the grounds that the latter’s airlines were capturing significantly more than 50 per cent of the traffic on routes to the United States, even though American citizens generated over half the traffic. The CAB’s aim was to help restore Pan Am and TWA to profitability. But in some markets the CAB found itself on the defensive. In June 1976, the British government gave 12 months’ notice of the termination of the Bermuda Agreement with the United States with the express purpose of obtaining a larger share of the traffic on the North Atlantic for British Airways and of limiting American airlines’ traffic rights and earnings on other major routes passing through British territories. The British felt that they were doing badly under the existing Bermuda bilateral and produced figures to prove it (Doganis, 1977).

At about the same time the Japanese were arguing that, on the routes between Japan and the United States, two-thirds of the passengers were Japanese but Japan Air Lines (JAL) carried only one-third of the traffic (*Flight International,* 21 August 1976). They too wanted a more restrictive bilateral with the United States. Following its own review of international civil aviation policy, the Australian government in 1979 tried to restrict the Asian scheduled airlines offering sixth freedom services between Australia and Europe in order to protect Qantas.

3.3
Moves towards deregulation

Collectively, the various and often disconnected developments described above marked a tendency towards an extension of international regulation rather than its diminution. But the pressures were not all in one direction. There were, during the 1970s, countervailing tendencies towards deregulation.

In the United States, pressures for domestic deregulation became very vocal in late 1974 during the hearings of the Senate Judiciary Subcommittee on Administrative Practice and Procedures. These so-called Kennedy hearings focused attention on the need for reform of CAB procedures and controls. A few months later, the *Report of the CAB Special Staff on Regulatory Reform* came out strongly in favour of the deregulation of United States' domestic air services. It argued that the undesirable effects of the existing system included: (1) *de facto* exclusion of new airlines from long-haul trunkline markets; (2) protection of the relatively inefficient carriers; (3) unduly high labour costs and unduly high-cost type of service; and (4) lack of emphasis on price competition and on variations in the price/quality mix in response to consumer preference (CAB, 1975). As a result of this report and the discussions which it generated, the United States government introduced a deregulation bill in the spring of 1976, though this did not become law. In February 1977 President Carter announced that he would be introducing a new bill to Congress to allow greater competition among US domestic carriers. In view of the forthcoming legislation, the CAB began to relax its controls. Early in 1977 it began to encourage price competition through its approval of Texas International's 'Peanuts' fares and American Airlines' 'Super Saver' fares. At the same time, controls on the entry of new carriers into existing markets were relaxed in a series of individual route hearings. On 24 October 1978 the Airline Deregulation Act was signed into law.

The Act provided for the complete elimination of the Civil Aeronautics Board by 1985, bringing an end to all controls over routes and fares. Other aspects of the Board's responsibilities would be taken over by other branches of the federal government. The law instituted a gradual decontrol between 1978 and 1985, primarily by making new routes easier to obtain and unprofitable routes easier to give up. The Board retained authority over maximum and minimum fares until 1982 when tariffs were to become completely deregulated. Charter rules were relaxed, as were limitations on the right of scheduled carriers to operate charters. In practice, the Board reduced its own regulatory controls even more quickly than envisaged by the Act. The significance of US domestic deregulation was that the pressures for change which were generated inevitably spilled over to international air transport.

In Europe there were similar winds of change. The UK Civil Aviation Authority became increasingly liberal in its licensing decisions from 1975 onwards. One example of this was the virtual deregulation of international freight charters in 1976. The European Parliament in Strasbourg and the

European Commission in Brussels all began to discuss various aspects of deregulation within Europe. The European Commission went one step further and actually produced a draft proposal in October 1975 aimed at creating a single and rather liberal regulatory authority to control all air services between the nine member states (CEC, 1975). This was to be the first in a series of proposals or draft directives on the liberalization of air transport that were sent by the Commission to the Council of Ministers, though none was actually approved. It was not until 1983 that the first Directive, for the deregulation of inter-regional air services between member states of the European Community, was approved (CEC, 1983). This Directive, a watered-down version of earlier proposals, had little impact, though it marked the first step towards liberalization on a Community-wide basis.

3.4
Reversal of US aviation policy

In the international arena, the three-pronged structure of economic regulation which emerged following the 1944 Chicago Conference had resulted in an industry characterized by a high degree of regulation and a very limited scope for competition. Most markets were duopolies or oligopolies. The only real competition was in certain non-scheduled markets. The United States had acquiesced in this pattern of regulation for more than 30 years. Then late in 1977 US international aviation policy began to change dramatically. Far from accepting the existing regulatory framework, the United States suddenly appeared to be hell bent on deregulation, on reducing existing regulatory controls to a minimum. It was supported in this by several other governments, especially those of the Netherlands and Singapore, but it was the United States that was the prime generator of change.

The change in US policy was linked with the Carter administration, which took over at the White House in January 1977. Three key factors explain the moves towards a new policy. First, ‘consumerism’ had been a key element in Carter’s election campaign. In international air transport this meant reducing fares, facilitating access to air services, and opening new direct links from US cities not previously served by international services. There was considerable public and congressional pressure for international deregulation and the Carter administration was eager to harness such pressure in its own support. Secondly, the Carter administration had a fundamental belief in the benefits of greater competition. The early stages of domestic deregulation in the United States appeared to be producing lower fares for consumers and higher airline profits without any marked instability for the industry. The protected position of Pan American, TWA and other US international airlines could not be justified. If greater competition was proving beneficial domestically, it would also do so internationally. Thirdly, there was a need to increase US airlines’ share of international air transport. The once-dominant US position had been eroded. The regulatory system, together with the lack of drive of the established American airlines, had resulted in a declining market share for these airlines. By 1977 US airlines had only about 40 per cent of the market between the United States and Europe, and on some routes, such as those to the Netherlands or Scandinavia, their market share was below 20 per cent. More liberal bilateral air services agreements and the entry of new US carriers would enable the US industry to increase its market share. Here one can discern an element of self-interest behind the pressures for deregulation.

In October 1977 the White House produced guidelines on international aviation policy. These were further developed by the Department of Transportation and published in May 1978. Following public hearings in the summer of 1978 a statement on International Air Transport Negotiations was signed by President Carter on 21 August 1978 (Presidential Documents, 1978, pp. 1462–5). This stated that the United States' aim was 'to provide greatest possible benefit to travellers and shippers' and that 'maximum consumer benefits can best be achieved through the preservation and extension of competition between airlines in a fair market place'. This broad aim was to be achieved through the negotiation or renegotiation of bilateral agreements. In such negotiations, the US would henceforth have the following objectives:

(a) 'creation of new and greater opportunities for innovative and competitive pricing that will encourage and permit the use of new price and service options to meet the needs of different travellers and shippers.' This would be achieved by ensuring that tariffs were determined by airlines on the basis of competitive considerations. Government involvement should be the minimum necessary to prevent predatory or discriminatory pricing, to prevent monopolistic practices and to protect competitors from prices that are artificially low as a result of government subsidies;
(b) 'liberalization of charter rules and the elimination of restrictions on charter operations';
(c) 'expansion of scheduled services through the elimination of restrictions on capacity, frequency and route operating rights';
(d) 'elimination of discrimination and unfair competitive practices faced by US airlines in international transportation.' In particular, charges for providing en route and airport facilities should be related to the costs created by airline operations and should not discriminate against US airlines;
(e) 'flexibility to designate multiple US airlines in international air markets';
(f) encouragement of maximum traveller and shipper access to international markets by authorizing more US cities for nonstop direct service, and by improving the integration of domestic and international airline services; and
(g) 'flexibility to permit the development and facilitation of competitive air cargo services.'

The United States set out to achieve these objectives in a series of crucial bilateral negotiations in the period 1977–80. The major objective of US policy was generalized deregulation. This made sense given the free enterprise and competitive aviation environment in the United States. But in most of the countries with which the United States was negotiating there was only one airline or only one large scheduled airline, which was usually state owned and was the 'chosen instrument' of each country's aviation policy. As a result, most countries negotiating with the United States had quite different objectives from those outlined above:

(a) They generally wanted some capacity control and, in several cases, they wanted a reduction in US scheduled capacity rather than any increase. Italy and Japan were among countries that wanted some capacity controls.
(b) Several countries, including the United Kingdom and France, wanted to limit existing US fifth freedom rights, which had been liberally granted under the early Bermuda-type bilaterals.
(c) Most countries did not favour 'multiple designation'. Since many of them had only one major international airline, the concept was of little value. It was seen as little more than an American attempt to swamp the market with US airlines and capacity.

On the decontrol of tariffs, the liberalization of charters and air cargo, the position of several countries was more flexible and closer to that of the United States. The one common objective of most countries was to obtain rights to serve more gateway cities in the United States. This coincided with one of the President's own policies: increased access to the US market was the carrot used by American negotiators in order to obtain their own objectives.

3.5
New concepts in international regulation

In the process of renegotiating many of its key bilaterals between 1977 and 1980 the United States introduced some new concepts into international regulation and gave greater importance to others that hitherto had been of limited significance.

On traffic rights the most significant development is that of unlimited or *multiple designation,* that is, the right of each party to a bilateral to designate as many airlines as it wishes to operate its own agreed routes. Some bilaterals, such as the UK-USA Bermuda 1 agreement, had previously accepted multiple designation but they were the minority. In addition, many of the new US bilaterals include *break of gauge* rights. This is the right to change from a larger to a smaller aircraft in the other country's territory on a through service that is going beyond the other country, usually, but not necessarily, with fifth freedom rights. In order to use its break of gauge rights, an airline would need to station smaller aircraft at the airport where the change of gauge takes place. A few of the bilaterals also grant *combination rights*. These allow an airline to carry two sets of third and fourth freedom traffics on a single stopping service. In other words, an American carrier may combine a service from New York to London with one between New York and Copenhagen by stopping in London but without traffic rights between London and Copenhagen. None of the above are entirely new concepts but they have now become much more widespread in US bilaterals.

During the 1970s there had been a number of bilateral memoranda or exchange of letters covering aspects of non-scheduled services. But charter rights had not generally been covered by the bilateral air services agreements. In the new US bilaterals, *charter rights are explicitly covered by the bilaterals* and the general articles of each bilateral are deemed to refer to both charter and scheduled services and airlines. Hitherto it had been usual to try and ensure that rules regarding passenger access and other aspects of charter services (such as inclusive tour conditions, if any) were more or less similar for traffic originating in each of the two countries involved. In order to be able to liberalize such charter conditions, the United States introduced the concept of *country of origin* rules. This gives each country the right to establish whatever conditions it requires for charter services originating on its own territory while leaving the other country in the bilateral free to do the same for its own originating charter traffic.

In a few bilaterals the country of origin concept was also introduced for scheduled tariffs. The idea here is that each country can approve or disapprove tariff levels or conditions only for traffic originating in its own territory. It cannot prevent the implementation of fares approved by the other country for traffic originating in that country. Clearly the country of origin rule for tariffs does not exclude the possibility that the two aeronautical authorities might decide to implement similar fares at both ends of the route, as has sometimes happened. But the country of origin concept allows an individual country to be more liberal in its tariffs policy than its partners might wish. The second new concept on tariffs is that of *double disapproval*. Under traditional air services agreements, tariffs could not become operative unless approved by both governments. In other words, either government on its own could block a particular tariff proposal. If double disapproval is introduced into a bilateral agreement, a tariff can be refused only if both governments reject it. One government might not like a particular tariff but it cannot on its own prevent an airline from implementing it if the other government is prepared to approve it. In other words, in agreeing to double disapproval, a government gives up its veto power on tariffs.

It can be argued that the above concepts effectively change the previous bilateral philosophy of fair and equal opportunity for the airlines of both signatory states and of an equal balance of rights to a philosophy which strongly favours the larger aviation power. Multiple designation, break of gauge, country of origin rules for charters, or double disapproval for tariffs all favour the countries which have several large airlines and which are major traffic generators. They are concepts of limited value to countries which have only one airline, especially if it is not a large international carrier, and which are not themselves generators of substantial volumes of scheduled or charter traffic. In the case of the US bilaterals, this imbalance was heightened by the unequal exchange of traffic rights. Whereas the US-designated airlines are given rights from 'any point in the United States' to the major city or cities of the other country, the foreign designated carriers are given only a very few gateway points in the United States. Thus a single foreign airline flying to two or three US points may have to face the challenge of several US carriers able to operate from anywhere in the United States and with any tariff structure so long as it is not predatory.

3.6
Bermuda 2: the United States-United Kingdom bilateral

Picking off a country at a time, the United States gave away one or two new gateway points to the foreign carrier in exchange for minimum fare controls, multiple designation, elimination of capacity controls and the liberalization of charter rules. The British were fortunate in having opened negotiations in 1976 before the various objectives of the new US aviation policy had been clarified. As a result, in the new United States-United Kingdom bilateral signed in July 1977 (known as the 'Bermuda 2' agreement), the British got more and gave away less than their European counterparts did a year or so later (HMSO, 1977).

On traffic rights the United Kingdom achieved important gains. It increased its named gateway points in the United States from 9 to 14 with the addition of San Francisco, Seattle, Houston, Atlanta and Dallas-Fort Worth. United States fifth freedom rights through London and Hong Kong were reduced. At the same time a new right was granted to both sides for the combination of services. The right of 'break of gauge' was clarified and extended. Lastly there was a wide exchange of rights for all-cargo services.

Capacity control was one of the most difficult issues, though a compromise was eventually agreed for the North Atlantic. Airlines were to be required to submit their forecasts and advance schedules to the two governments, which would consult with each other if they disagreed. If no agreement was reached, airlines could operate the amount of capacity equivalent to the average of their forecasts. This limited but important safeguard on capacity did not appear in some of the bilaterals signed later.

The UK accepted the principle of multiple designation between the two countries but tried to secure single destination on each point-to-point route segment. In the middle of the negotiations, however, the Court of Appeal ruled that the UK government had no right to de-designate Laker Airways, which had previously been designated to operate a London-New York 'Skytrain' service. The Court of Appeal decision undermined the British negotiating position but a compromise was reached. Double designation (that is, two airlines from each country) was agreed for two routes only, New York-London and Los Angeles-

London. Elsewhere, single designation would prevail until the traffic on a route exceeded 600,000 one-way passengers a year.

It was agreed that tariffs would be subject to approval by both governments. If agreement could not be reached, the existing tariffs would continue to be operative. To prevent last-minute tariff changes and uncertainty, the bilateral laid down a detailed timetable for the submission and approval of fare filings. This was a new departure.

Lastly, charter rights were expressly included within the bilateral, and the general articles pertaining to scheduled services were deemed to be applicable to charter services as well.

On several issues the Bermuda 2 agreement was much less liberal than the bilaterals that followed. Within a year it was being attacked in the United States as being too protectionist compared with subsequent US bilaterals. In March 1980 amendments were negotiated. They allowed for double designation on two more routes (Boston and Miami) and for up to 12 new gateway points to be opened in stages up to 1984. New US carriers were also required to fly to Gatwick rather than Heathrow. But the United States failed to achieve any significant concessions on tariff liberalization or an increase in its fifth freedom rights. There have been further amendments, notably in 1986 when frequency controls were further relaxed. But a major point of conflict has continued to be the extensive fifth freedom rights enjoyed by US airlines between the UK and European points. This, together with the huge domestic feed into their transatlantic gateways, has given US carriers a major competitive advantage. The UK government has wanted traffic rights for British airlines beyond existing US gateways to other US cities. It refused to give US airlines rights to Manchester unless such cabotage rights were granted (see Appendix A), though it did give American Airlines an interim permit in 1987 to serve Manchester. Early in 1990 it was agreed by the two governments to set up a joint working party to deal with the fundamental problems arising out of Bermuda 2.

3.7
Deregulation through bilateral renegotiation

The Bermuda 2 agreement was the first major breach in the tradi-tional pattern of bilateral agreements, but it was the United States-Netherlands agreement, signed in March 1978, which was to become the trendsetter for subsequent US bilaterals. During the negotiations the Dutch set out to ensure that Bermuda 2 did not become the basis for the international regulation of air transport (Wassenbergh, 1978). It was too restrictive, whereas the Dutch wanted to maximize competitive opportunities for their own airline, KLM, and they also viewed with alarm the diversion of transatlantic traffic via London as a result of Laker’s cheap Skytrain services and the low scheduled fares, both of which had followed quickly on the conclusion of Bermuda 2. Since the Dutch were starting from a viewpoint very similar to that of the United States, it was inevitable that the US-Netherlands bilateral agreement would be a particularly liberal one. Both sides set out to reduce the role of the government in matters of capacity, frequency, tariffs and the setting of market conditions. The key terms of the agreement can be summarized as follows:

- agreement covers both scheduled and charter services;
- multiple designation accepted (within two years the US government had designated 8 scheduled and 13 charter airlines, though most did not operate; the corresponding Dutch figures were one and two;
- US airlines given unlimited authority from any points in USA via intermediate points to Amsterdam and points beyond with full traffic rights (i.e. fifth freedom rights);
- Dutch airlines given points in the Netherlands to New York, Chicago, Houston, Los Angeles and one additional US point, as well as a Netherlands-Montreal-Houston route (i.e. Dutch given only limited number of US gateways and some doubt whether they have fifth freedom rights beyond USA);
- no capacity or frequency restrictions;
- no restrictions on ‘sixth’ freedom traffic;
- unlimited charter rights between any points in either territory with country of origin rules;
- country of origin rules for scheduled tariffs; but government intervention should be limited to prevention of predatory or discriminatory pricing. Tariffs should be set by each airline on the basis of commercial considerations.

The protocol for the US-Netherlands agreement was signed in March 1978 at a time when negotiations had already been opened between the United States and Belgium and Germany for a revision of their bilaterals. Because of the geographical proximity of these two countries to the Netherlands, they could not afford to be less liberal on either scheduled or charter rights than the Dutch had been, otherwise considerable transatlantic air traffic would be diverted to Amsterdam and then move by road the short distances to Belgium or Germany. As a result, the US-Germany and the US-Belgium bilaterals concluded at the end of 1978 were very similar to the earlier US-Netherlands agreement. There were variations, but the pattern was set. Other countries in the European area were under pressure to follow suit in their own negotiations with the United States. The US-Israel agreement went one step further because it included a double disapproval article on tariffs. One or two of the larger European aviation powers, notably France and Italy, held out against the trend towards deregulation, though they too had to compromise on some issues.

Deregulation through bilateral renegotiation was also being pursued by the United States in other international markets. The most important after the North Atlantic for American airlines was perhaps the north and mid Pacific market. Here the United States negotiated several key bilaterals between 1978 and 1980 with Singapore, Thailand, Korea and the Philippines. These bilaterals followed the same pattern as those in Europe. The United States offered these countries a handful of gateway points in the United States, usually fewer than five, in exchange for most if not all of the US objectives previously outlined. One of the first renegotiated bilaterals was that between the United States and Singapore. The main features of the US-Singapore air services agreement of March 1978, as amended by a memorandum of understanding agreed in June 1979, are as follows:

- multiple designation;
- no unilateral control of frequency, capacity, scheduling or type of aircraft used, though capacity should be related to traffic requirements;
- no control of tariffs (except if predatory or discriminatory) unless both governments disapprove a particular tariff proposal (i.e. double disapproval);
- US airlines granted traffic rights 'from the United States via intermediate points to Singapore and beyond';
- Singapore's designated airline granted rights from Singapore via intermediate points to Guam, Honolulu, San Francisco and three additional points to be selected by Singapore;
- break of gauge permitted;
- unlimited charter rights for airlines of both countries with country of origin rules.

The other bilaterals between South East Asian countries and the United States generally incorporated the above features. Even the Philippines, one of the strongest opponents of deregulation, eventually succumbed and in October 1980 signed a new bilateral agreement with the United States, though this was not as liberal as the Singapore bilateral described above. Five years later the US-Malaysia air services agreement followed the same pattern. The only countries of significance to try and slow down the rush to total deregulation were Japan and Australia.

The Japanese wanted to maintain some control over capacity and preferred the IATA tariffs system to any general deregulation of tariffs. They were not prepared to give US airlines rights from any US point as the other new bilaterals did. They also wanted fifth freedom rights between the United States and South America, which the Americans were loath to grant. The Japanese stand against deregulation meant that, instead of an entirely new bilateral, a series of interim agreements were signed with the United States, in 1982, 1985 and 1989. Each successive agreement opened up two or three United States or Japanese points to air services from the other country, increased the opportunities for air cargo services and allowed an increase in the annual quota of charter flights. These changes allowed a gradual expansion in passenger and cargo services between the two countries while the Japanese gained some fifth freedom rights, notably from Los Angeles to Brazil. But the Japanese continued to feel that air services between the two countries were biased in favour of the US airlines. So they continued to insist on a ceiling on the frequencies to be flown by both scheduled and charter carriers and would not allow US airlines to fly from any point in the United States to Japan.

The Australians were the most successful in the Pacific region in negotiating a more balanced bilateral with the United States. They took a tougher negotiating stance and in May 1988 gave notice of termination of the 1980 memorandum of understanding which governed capacity and services between the two countries. Just over a year later, in 1989, a new bilateral was signed. It gave each country's designated airlines access to three new gateways in the other country in addition to the four existing ones. They could also serve eight further points via these gateways. The US could designate one additional carrier, making five in all, while Australia obtained rights from the US west coast to European points, including Britain. Capacity could be increased, but only in response to growth of US-Australia traffic.

3.8
The Show Cause Order and the declining influence of IATA

The US policy objectives, outlined in the Presidential Statement of August 1978, were pursued not only through the renegotiation of bilaterals but also through a direct attack on the tariff-setting activities of IATA. In June 1978 the US Civil Aeronautics Board issued an order requiring IATA and other interested parties to show cause why the Board should not withdraw its approval of, and consequently the anti-trust exemption for, IATA's Traffic Conferences and other related agreements. If exemption from anti-trust legislation was withdrawn, then no airlines flying to the United States would be able to be parties to IATA tariff agreements without risk of being taken to court in the United States. Over 40 per cent of IATA member airlines' international traffic was and still is to and from the United States, so the potential threat to IATA was considerable. The Show Cause Order stirred up a hornets' nest of protests from IATA, from many governments around the world, from regional organizations such as the Arab Civil Aviation Council, and so on. Even the US Department of State, citing foreign government protests, urged caution.

Following a hearing on the Show Cause Order, the CAB concluded, in a new order in April 1980, that IATA tariff agreements substantially reduced competition. Nevertheless, they should be approved by the United States for a period of two years for reasons of diplomacy and to allow for some experimentation in pricing. But the order excluded US airlines from participating in IATA pricing agreements on the North Atlantic. In May 1981 a new CAB decision largely reconfirmed the decisions reached in its 1980 Order. Subsequently the whole process of the Show Cause Order was wound up by President Reagan.

The Show Cause Order and the controversy which surrounded it undoubtedly undermined IATA's influence. Its immediate short-term effect was the withdrawal of all US airlines from IATA membership. When in 1979 IATA changed its constitution to allow airlines to participate in trade association activities without participating in tariff agreements, some of these carriers crept back as trade association members only. Following the abandonment of the Show Cause Order, some US airlines began to participate again in the tariffs process. But by June 1990 only Flying Tiger, American, Pan American, TWA and United were again full members of IATA, while another six US airlines were members of only the trade association. Other US international airlines remain outside IATA altogether.

A CAB order of April 1980 had required a non-IATA tariff experiment to be pursued on the North Atlantic. In practice this meant either bilateral agreements on tariffs on some routes or an open rate situation on others. A major breakthrough came in May 1982 when discussions between the United States and the 10 key members of the European Civil Aviation Conference led to an agreement to set up fare zones—the so-called 'zones of reasonableness'—on most North Atlantic air routes (see section 11.6). The fare zones agreement between the United States and ECAC was doubly significant. It introduced a new concept into international airline pricing but also it was a multilateral government agreement on tariffs completely outside the auspices of IATA. As such it undermined the tariff-fixing role of IATA. Subsequent IATA tariffs on the North Atlantic have been fixed within the agreed fare zones or bands. Further evidence of IATA's declining influence can be found in the tariffs clauses of some recent bilaterals. Whereas traditionally most tariffs clauses had mentioned the use of IATA procedures where possible (see section 2.3 above), reference to IATA has become less frequent. Even ICAO, in a 1978 document proposing standard bilateral tariff clauses, no longer mentioned IATA. Instead there is an ambiguous article which suggests that tariffs agreements 'shall, wherever possible, be reached by the use of the appropriate international rate fixing mechanism' (ICAO, 1978).

It is symptomatic of IATA's diminished role in setting tariffs that only 83 of its 157 trade association members in 1990 were full participants in its tariff coordination activities. Nevertheless, on most international air services, IATA provides the basic framework of air fares which governments appear happy to approve, though many of them may be discounted or reduced by individual airlines.

3.9
Deregulation spreading

Through the process of renegotiating its bilateral agreements, mainly in the period 1978–85, the United States managed to introduce a measure of deregulation on routes to and from the United States. International or bilateral controls on new airline entrants, on capacity or frequency, on tariffs and on charter services were reduced or eliminated. This was particularly so on the North Atlantic and the Pacific routes, and to an extent on the routes between North and South America. US pressures for deregulation had an impact on other countries, such as Canada and the United Kingdom, and induced them to be more liberal in their own aviation policies. For example, a new bilateral between Canada and the Federal Republic of Germany signed early in 1982 removed frequency and capacity limitations on the airlines operating between the two countries. Even more liberal was the 1987 UK-Canada air services agreement. Under this bilateral there is no control of capacity and route access is open. This means that there is no limit on the number of airlines designated per route or on the routes or points that can be served. Increased fifth freedom rights were also granted to both countries' airlines. Instead of the more radical double disapproval regime, a zonal fare scheme was introduced which allowed airlines some flexibility in pricing.

Such agreements were, however, relatively few, since there was little attempt by other countries to follow the United States example and systematically renegotiate all their key bilaterals. Even countries with a liberal aviation policy were often schizophrenic in its implementation. Thus the British, while protagonists of liberalization in Europe, repeatedly refused to allow South East Asian carriers to increase their frequencies on the London route. It was not till July 1989, when a new bilateral was signed, that the British allowed Singapore Airlines progressively to increase its London services from daily to twice daily even though the Singaporeans had been pressing for this for several years. In their turn, South East Asian airlines, while complaining of British protectionism, tightly controlled the third and fourth freedom capacities and frequencies on their own regional services.

In the second half of the 1980s the focus of deregulation switched to Europe. The first major breakthrough came in June 1984 with a new bilateral agreement between the UK and the Netherlands which effectively deregulated air services between them. This was the beginning of a series of steps towards European deregulation which are analysed in the next chapter.

Outside Europe and North America a number of other countries also began to move cautiously towards reducing controls on their air transport industries. In Japan, JAL's effective monopoly of international air services was broken when from 1986 onwards domestic carriers All Nippon Airways or Japan Air Systems were designated as the second Japanese carriers on a number of key international routes. In several South East Asian countries, new airlines were allowed to emerge to operate both domestic and international air services, often in direct competition with the established national carrier. In South Korea, for instance, Asiana Airlines was formed in February 1988 and launched domestic services at the end of that year. Regional services to Tokyo, Bangkok and Hong Kong were expected to start in 1990. Aerolift in the Philippines and Evergreen Airways of Taiwan were other examples. In Australia in 1987, a new government aviation policy reaffirmed Qantas' continued role as the country's sole designated international carrier but announced a complete deregulation of domestic air services from October 1990. This meant that the government would withdraw from regulating domestic fares or capacity. The previous policy of limiting domestic trunk operations to only two carriers—Ansett and Australian—was also abandoned, though Qantas would still be precluded from operating purely domestic services.

Such attempts at liberalization were often localized, haphazard and uncoordinated as between neighbouring countries. Their impact was fairly limited. In all areas outside Europe and North America single designation prevails (except Japan), third and fourth freedom capacities and frequencies are regulated and many services are covered by revenue-pooling agreements. On tariffs there is more flexibility. In many countries, governments, aviation authorities and airlines turn a blind eye to illegal discounting of government-approved IATA fares. In this way *de facto* liberalization of tariffs has been introduced on many international routes. By 1990, the situation was one where the most liberalized markets for scheduled air transport were those to and from the United States and Canada. On the North Atlantic routes, for instance, capacity or frequency constraints had largely disappeared and entry of new carriers was in theory easy because of multiple designation. The number of US gateway points had more or less doubled and on many routes US carriers could add new gateway points almost at will, though European carriers did not have the same freedom. The tightly regulated tariffs agreed through the IATA mechanism had been replaced by a more flexible system of fare zones, with airlines free to pitch their fares anywhere within the relevant zones. Attempts to control and standardize in-flight service had been abandoned. On the transpacific routes the situation was similar in many respects but not so liberal. Route access was fairly open for US airlines, less so for Asian carriers. But, while capacity or frequency controls were imposed only on certain routes, there was probably greater pricing freedom than on the North Atlantic since the agreed fares were widely discounted.

Within Europe the situation was very patchy. The most liberalized markets were those between the UK and the Netherlands and UK to Ireland. At the other extreme the Austria-Greece scheduled market or air services to eastern Europe were still characterized by capacity controls, revenue-pooling agreements and enforcement of IATA tariffs.

Elsewhere in the world, real liberalization had not progressed very far by 1990. On long-haul routes from Europe to central and South East Asia and Australasia there was some pricing freedom through widespread discounting of IATA and government-approved fares to which many governments turned a blind eye. The same was true of air services within South East Asia and the Pacific region. On the other hand, traffic rights and capacities were strictly regulated and revenue-pooling agreements were widespread. In Africa, South America, the Middle East and western Asia, deregulation had even less impact and the traditional regulatory framework remained largely intact.

Thus, in order fully to assess the impact of deregulatory trends in the period up to 1990, one should examine developments on the North Atlantic and the transpacific routes where international deregulation had started more than 10 years earlier.

3.10
The impact of international deregulation on the North Atlantic and transpacific

3.10.1
NEW CARRIERS AND EXPANDED CAPACITY

The most immediate effect of the renegotiation of US bilaterals was a dramatic expansion in the number of airlines operating in deregulated markets and in the total scheduled capacity offered in those markets. Such expansion came about as a result of the multiple designation of United States airlines and of the opening of routes to new gateway points in the United States. In addition, several South East Asian airlines started services to the United States for the first time.

Before the Bermuda 2 agreement in 1977 there were only three US carriers on the North Atlantic—Pan American, TWA and National, though the latter operated only from Miami. During the next two years or so they were joined by established scheduled carriers such as Delta, Braniff and Northwest and by former charter airlines that had moved into scheduled services, such as World Airways, Transamerica or Capitol. The numbers swelled till at one time there were about a dozen US carriers flying scheduled services on the North Atlantic. The number subsequently declined to fewer than 10 as a result of mergers and the collapse of airlines such as People Express. Those remaining, however, included new entrants into this market such as American, Delta and Northwest, which operated huge domestic networks in the United States that could provide substantial feed into their transatlantic operations. But from the European end there were few new carriers since most countries had only one scheduled airline capable of mounting a North American service. Laker Airways started its Skytrain services in 1978 only to collapse in 1982, though Virgin Atlantic, another British low-fare carrier, subsequently entered the market. Thus the continued national regulation of airlines in most European countries meant that there were few European airlines able to take advantage of the opening up of the North Atlantic.

On the international routes across the North Pacific the jump in the number of carriers and of capacity offered was also marked. Prior to 1978 there had been only seven airlines on these routes—Canadian Pacific, Pan American and Northwest Orient from North America, together with China Airlines, Korean, JAL and Philippine Airlines from the Asian side. By 1981 two entirely new Asian entrants had joined the market—Singapore Airlines and Thai International. They were joined by China's CAAC, and in April 1983 Cathay Pacific started flying from Hong Kong to Vancouver. Subsequently, Malaysia Airlines, Garuda and All Nippon launched services to the United States. It may well be that the entry of so many new Asian carriers into the North Pacific for a time held back US airlines from entering the market. While many airlines showed a keen interest when multiple designation became possible, only Braniff went in in a big way in 1979 and it subsequently collapsed. Other US airlines flirted with North Pacific services for a short time before disappearing. By the end of 1983 United Airlines was the only new US entrant still operating in this market. Within five years it had taken over Pan American's Pacific operations, but American and Delta had also started flying across the Pacific.

As a result of all this expansion, the number of US gateway points with direct services to Europe or Asian destinations increased dramatically. US cities with direct air links to Europe more than doubled under the new bilateral agreements. But while by 1990 US airlines linked over 40 US points directly to major European destinations, European airlines were limited by the terms of the bilaterals to serving only about half that number of cities in the United States. The imbalance in the Pacific was even greater. Asian airlines served only 8 or 9 cities in continental United States while US airlines flew transpacific services from well over 20 American cities.

3.10.2
DOWNWARD PRESSURE ON TARIFFS AND YIELDS

Two factors created a strong downward pressure on fares. First, the short-term abandonment of IATA tariffs following the Show Cause Order together with 'country of origin' or 'double disapproval' tariffs clauses in many bilaterals gave airlines considerable pricing freedom should they wish to use it. On the North Atlantic, the fare zones which were introduced by governments in 1982 and subsequently adopted by IATA also gave airlines scope for price differentiation. Second, new carriers entering existing markets had a strong incentive to undercut the established airlines in order to capture an appropriate market share.

The impact of new entrants on tariffs and more particularly on yields can be seen in Table 3.1, which shows the average revenue per passenger-mile of US carriers in the markets in 1979, the first full year of deregulation. It is quite clear that in each market the airline(s) with the lowest yield and therefore the lowest fares are always the ones which entered these markets for the first time in 1978 or 1979. Conversely, the old-established carriers have much higher yields. The case of Braniff illustrates the point. On US to Latin American routes Braniff was an established carrier with a very high yield of 9.30 cents per passenger-mile. With deregulation Braniff expanded in a big way on the Pacific and to a lesser extent on the Atlantic. To capture market share it went into both markets with very low fares. So low, in fact, that on both the Atlantic and the Pacific, Braniff had the lowest yield of any US airline. More surprisingly, Braniff's Pacific

Table 3.1 Impact of new entrants on average fares: Average revenue per passenger-mile on scheduled services of US airlines in 1979 (US cents per passenger-mile)

Airline		Route groups	
Atlantic	Latin America	Pacific	
Braniff	5.65*	9.30	4.61**
Delta	5.74	6.86	
Continental			8.18
National	6.12	6.84**	
Northwest	5.65**		6.99
Pan American	8.27	10.06	7.79
TWA	7.14		

Notes:
1. Year of entry of new entrants:
2. Underline shows lowest yield in each route group.
Source: Compiled from CAB data.

yield was less than half the yield on Braniff's own Latin American routes.

The same pattern was repeated throughout the 1980s, on both the North Atlantic and the transpacific routes. As new entrants came on to these markets, they invariably undercut the prevailing tariffs to capture market share from the established operators.

Laker and Braniff, which were the early price leaders on the North Atlantic, collapsed in 1982, but new carriers came in to replace them. First was People Express in 1983, later joined by Virgin Atlantic. Others such as World or Western came in briefly on the North Atlantic and then left, and People Express itself was taken over at the end of 1986. All these airlines offered most if not all of their capacity at ultra-low fares. With the exception of Laker, they did not capture a significant share of the market. People Express carried only 1.7 per cent of North Atlantic passengers in 1985 (IATA, 1986). But their impact on fare levels was significant, for they forced all the major scheduled airlines to offer some of their seats at fares which matched or were close to those of these new low-fare entrants.

Further evidence of the falling yields can be found in the mix of traffic by fare type. On IATA airlines' North Atlantic scheduled services in 1976 there were no ultra-low budget or stand-by fares and capacity-controlled advanced purchase fares (APEX) accounted for only 11.1 per cent of the total passenger traffic. Ten years later, in 1986, and several years after deregulation, 46.1 per cent of passengers were travelling on APEX and other capacity-controlled fares, with 1 per cent on stand-bys (IATA, 1986). As more and more passengers travelled at these lower fares, it was inevitable that the average revenue per passenger would decline. Not only were more passengers travelling on these new cheaper fares but even the North Atlantic average economy fare dropped in real terms (when adjusted for the composite consumer price of the USA, Canada and western Europe) in most years—especially in 1978 and 1979 and from 1982 onwards.

The experience of falling yields on the transpacific was similar but less well documented. Braniff once again was the early price leader. When it came on the Pacific routes in 1979 it offered new very low advance purchase and other special fares and sold a high proportion of its seats at these lower fares. When United took over Pan American's Pacific services, it too started to cut fares to maintain market share. It was overtaken by All Nippon Airways, which launched its first international services in 1986 flying from Tokyo to Guam, Los Angeles and Washington. It offered minimum fares of $450 one way to the United States, undercutting the previously prevailing minimum fares of $550 by $100. Here as on the North Atlantic, there was strong downward pressure on yields throughout the 1980s. It was not till 1988–9 that yields began to improve because there was insufficient capacity to meet the rapid growth in traffic. Under such conditions airlines were able to push up their fares, at least for a year or two.

3.10.3 HIGHER LOAD FACTORS

On the North Atlantic routes, the lower fares which resulted from deregulation and the entry of Laker, Braniff and, later, other low-fare airlines had a dramatic impact on passenger demand. In 1978, scheduled passenger traffic jumped by 23. 4 per cent and the following year it went up by a further 15.5 per cent. After that, as the worsening economic climate following the oil price increases of 1978–9 began to bite, scheduled traffic growth slowed down and averaged only 5 per cent per annum in the six years from 1980 to 1985 (Table 1.4). It actually dropped in 1986 because of the fears of terrorism following the US air raids on Libya early in that year and the Chernobyl nuclear disaster. But in 1987 and 1988 traffic growth was again rapid. The initial rapid growth in traffic resulted in an equally marked jump in the average passenger load factor for all North Atlantic services from 60.7 per cent in 1977 to 66.6 per cent in 1978 and 67.4 per cent in 1979. It then stabilized at around 67–70 per cent for the next 10 years, though it dropped back to 62.5 per cent as a result of the traffic fall of 1986. These were exceptionally high passenger load factors when one bears in mind that between 1960 and 1975 the average load factor on the North Atlantic never once reached 60 per cent. Thus deregulation had led to a better use of resources in that passenger load factors have risen by about 10 percentage points. In fact, the increase in load factors resulting from the rapid growth in traffic became a commercial necessity as average fare levels declined. Airlines became locked into a situation where they had to try to fill their aircraft to compensate for the lower yields per passenger that they were obtaining. This was particularly so after fuel costs rose sharply in 1978–9.

Overall passenger load factors for the transpacific routes are not available, but a similar pattern of development occurred. Lower fares and the entry of several new Asian carriers stimulated high growth rates and pushed up passenger load factors.

3.10.4 THE COLLAPSE OF CHARTER TRAFFIC ON THE NORTH ATLANTIC

The surge in North Atlantic scheduled passenger traffic in 1978 and 1979 was not all due to new traffic generated by lower fares. Some of it was traffic diverted from non-scheduled or charter services. An unexpected byproduct of the liberalization of scheduled services was the collapse of the charter market on the North Atlantic. This resulted from the introduction by the scheduled carriers of low charter-competitive fares which passengers could use in many cases without the constraints and inflexibilities associated with charter flights. The price leader at this bottom end of the market was Laker Airways, which through its Skytrain concept introduced charter economics into scheduled services. It did this by operating aircraft with much higher seating densities and load factors than had previously been thought acceptable for scheduled airlines and it was thereby able to offer substantially lower fares. The traditional scheduled airlines were forced to match Laker’s fares for at least a small proportion of their capacity. After Laker’s collapse, People Express, Wardair and Virgin Atlantic, all new entrants, became the price leaders in turn. The charters were undermined. From a peak of 4.4 million charter passengers in 1977, representing nearly a third of total North Atlantic traffic, charter traffic has bottomed out at around 2 million a year. In recent years charters’ market share has been well below 10 per cent (Table 1.4 above).

3.10.5 US AIRLINES INCREASE MARKET SHARE

US airlines appear to have done better out of deregulation than most of their European or Asian competitors at least in terms of market share. In 1978, when deregulation began, US airlines carried 43.9 per cent of the passengers between Europe and the United States, the European carriers carried about 50 per cent and 5–6 per cent travelled with other foreign carriers. On the transpacific routes, the US airlines’ share was 41.7 per cent (Table 3.2).

As deregulation in both these markets gathered pace, the US airlines at first lost market share. On the North Atlantic this was partly due to the success of Laker Airways’ low-fare strategy. On the Far East routes it was the inevitable consequence of the entry of several new Asian airlines that had not flown across the Pacific previously. As they launched their new services in the early 1980s they captured market share from the already established US carriers. After

Laker's collapse early in 1982, the US airlines began to push up their market share on the North Atlantic. They overtook the European carriers in 1985 and, despite a hiccup in 1986, they captured 47 per cent of the market in 1989. With other non-European carriers carrying around 6 per cent of the traffic, this left the Europeans with about 47 per cent. On the US-Far East routes the improvement in the US airlines' share came somewhat later, but by 1989 they had 49 per cent of the market, which was 7 percentage points higher than in 1978 (Table 3.2). Thus one objective of US deregulation policy, which was

Table 3.2 Share of total passenger traffic (scheduled and charter) carried by US airlines, 1978–89

	US airlines' share in each market area[a]	
US-Europe %	US-Far East %	
1978	43.9	41.7
1979	44.6	44.4
1980	42.9	42.0
1981	41.0	39.0
1982	44.9	39.3
1983	46.5	41.4
1984	47.2	42.6
1985	47.2	41.0
1986	43.0	40.7
1987	46.6	41.4
1988	49.2	45.5
1989	46.9	49.0

Note:
[a] In 1988 these two market areas generated about 56% of international travel to/from the USA.
Source: Compiled by the author from US International Air Travel Statistics, US Department of Transportation.

to increase US airlines' market share, appears to have been achieved (see section 3.4 above).

Many factors explain the growing success of US airlines in these two major markets. At first the new US entrants into these markets were some of the smaller and newer US airlines, such as People Express, or they were former supplemental (charter) carriers, such as World. Their market penetration was fairly limited. It was when the major US domestic carriers such as Delta and American came on the Atlantic, and United, and later American and Delta, came into the Far East that US airlines' market share began to improve. These and the other US carriers, which had also strengthened their domestic networks through mergers, enjoyed a number of advantages.

To capture market share the new US entrants, as well as the existing carriers, launched their European services from new gateway points such as Minneapolis (Northwest), Baltimore (World and later TWA), Charlotte (US Air) or Raleigh (American) that had previously not had direct European services and to many of which European carriers were precluded from flying by the bilaterals. The same pattern was repeated on transpacific routes. The major US domestic carriers operated their international flights from their domestic hubs into which they could provide dozens if not hundreds of feeder services from all over the US. European airlines flying into Atlanta, Delta's major hub, or into Dallas-Fort Worth, American Airlines' main hub, found it increasingly difficult to compete against these US carriers with their huge domestic feed. Similarly, Asian airlines flying into Los Angeles found that the domestic feeder services into that airport were dominated by US airlines that were their direct competitors on the Pacific routes. Two or three of the US carriers enjoyed a further advantage through having computer reservation systems (CRS) in widespread use by US travel agents. For instance, American Airlines' Sabre system was subscribed to by over one-third of US travel agents. These systems not only gave US airlines an important marketing advantage in the US but in some cases the CRS were programmed to give display preference to their own airline on services competing with foreign carriers. This was done particularly in relation to their own connecting flights involving a change of aircraft but shown under a single flight number.

US airlines, particularly new entrants, have been guilty of aggressive capacity expansion in order to increase their market share. In the process they have swamped their European or Asian competitors. In 1985 alone US carriers increased seats on non-stop transatlantic services to Germany by 78 per cent, while Lufthansa actually cut its own seating capacity by 1 per cent. As a result, Lufthansa's market share during the summer months fell from 47 per cent to 39 per cent (*Airline Business*, June 1986). In July 1990 Thai International, with a total of four weekly flights from Bangkok to the United States (via Tokyo), was being swamped with 30 weekly flights operated by Northwest, Delta and United, a 7:1 imbalance. Thai International wanted to mount more services but the United States would not grant fifth freedom rights out of Tokyo for any additional flights. In November 1989 the Thais, feeling that the post-deregulation bilateral was weighted against them and increasingly concerned at their inability to match the US mega-carriers, gave 12 months' notice of termination of the air services agreement with the United States.

Finally, the US carriers had used their old-established fifth freedom rights and their newly acquired break-of-gauge rights to establish hubs in Tokyo and a number of European airports such as Paris. The aim was to schedule a group of their own arriving and departing flights at the foreign hub in such a way as to provide a very wide range of connections between US and foreign points. Such connections were often given a single through flight number so that passengers might be unaware that an aircraft change was involved in Tokyo, London or

Paris. The workings of Northwest's Tokyo hub is shown in Figure 3.1. It is clear that this gave Northwest a major advantage in marketing its services on both sides of the Pacific. The Japanese, like the Thais, complained of being swamped by US capacity. Japan Air Lines (JAL) early in 1990 claimed that US airlines, taken together, operated 40 per cent of the international slots at Tokyo's Narita airport for their transpacific services, whereas JAL had only 42 per cent of the slots with which to mount all its international operations (*Bangkok Post*, 23 May 1990).

3.10.6 ADVERSE EFFECT ON PROFITS

Data on the financial performance of European or Asian airlines on transatlantic or transpacific routes are not published, but such data are available for the US airlines. These show that, in the years following the advent of deregulation, the American airlines faced spiralling operating losses in both these markets. On the North Atlantic, most of the US carriers made losses each year from 1979 to 1982 and on the Pacific losses were incurred annually between 1980 and 1982. Most of the competing European and Asian carriers also made losses in these markets during that period. After 1982 the steady drop in the real price of fuel, especially in 1986–7, helped most airlines move into profit as operating costs fell. Even when most operators were making profits, however, the new entrants were losing money as they tried to establish themselves. For example, United entered the Pacific routes in 1983 and, though the other US airlines made profits in that and subsequent years, United had four years of losses before posting its first profit of $15.7 million in 1987. In that year and in 1988 substantial profits were made in this market, yet American Airlines, which entered the Pacific in 1987, made losses here in both those years. The same pattern manifested itself on the North Atlantic. New entrants initially made losses for two or more years and then collapsed altogether, or left the North Atlantic. Some, such as Northwest, eventually broke through into profitability but after years of losses.

It is difficult, however, to establish the degree to which spiralling losses on the North Atlantic and Pacific routes in the three or four years after deregulation can be attributed to the general economic recession and to the dramatic fuel price increase of 1978 rather than to the impact of deregulation. Certainly there is a close correlation between worsening financial results and the advent of deregulation in 1978 and 1979, though this does not necessarily indicate causality. While any casual relationship between deregulation and worsening financial performance cannot be conclusively established, it is clear that the absence of effective capacity and/or tariff controls makes it particularly dificult for airlines to climb out of a crisis. With no multilateral agreement on tariffs, no single airline is prepared to increase its tariffs unilaterally in order to reduce its losses or to compensate for cost increases for fear of losing traffic. If one airline actually reduces its tariffs, the others feel they have to match them. The evidence

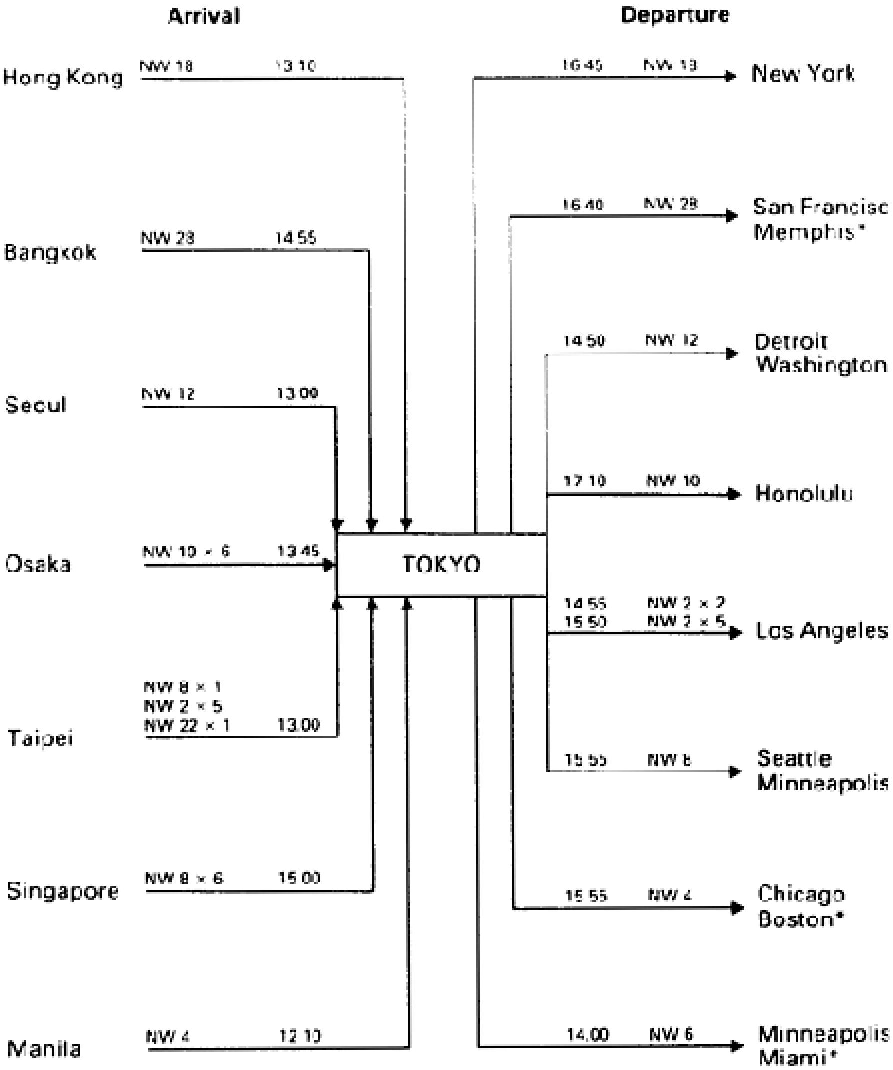

Figure 3.1 Northwest's Tokyo hub, June 1990

Notes: All flights daily unless otherwise shown.

* Plane change.

Source: Compiled by author from airline timetables.

in these markets after 1979 suggests that, while liberalization of tariffs makes it easy to reduce fares, it makes it very difficult to push them up again if losses are incurred. Equally, unless capacity control is imposed on all carriers in a market, a single carrier is loath to reduce its own capacity or frequencies for fear of losing market share. While airline problems on the North Atlantic or the Pacific in the early 1980s and especially in 1979–82 cannot be attributed to deregulation, there is some evidence to suggest that deregulation deepened and prolonged the crisis. In these deregulated markets it became very difficult to raise yields or load factors sufficiently to compensate for cost increases when input costs were rising. This raises an important theoretical question: have deregulated airline markets behaved as expected?

3.11
Competition in international air transport in theory and practice

The lessons of deregulation of international air transport can best be seen with regard to North Atlantic services where deregulation started earlier, and went further.

The economic theory of perfectly competitive markets requires that the product should be homogeneous and that there should be ease of entry for new suppliers to enter the market and operate without price or capacity controls. The theory also requires that consumers should be fully aware of the prices being offered by the different suppliers. To obtain the benefits of competition in international air transport, United States and other policy makers had to ensure that these conditions prevailed within the industry. Airline products are fairly homogeneous, so this was not a problem (section 1.6 above). Multiple designation, more US gateway points and relaxation of charter rules ensured freedom of entry. Absence of marked cost economies arising from large-scale operations within the airline industry facilitated new entrants. Reduction of government intervention in pricing through country of origin rules, double disapproval or zones of reasonableness enabled airlines to have considerable pricing freedom. By removing capacity or frequency controls through the bilaterals and by banning inter-airline pooling agreements as illegal under antitrust legislation, airlines operating to the USA were also freed of any output limitations.

Having created conditions of free competition in markets such as the North Atlantic, then economic theory predicts what should happen. Airlines compete primarily in terms of price but also in terms of frequencies, departure times, in-flight service, points served, and so on. Those airlines that are inefficient, either because they are unable to capture sufficient market share or because their costs are too high in relation to the prevailing tariffs, make losses and withdraw from the market. The more efficient, low-cost airlines remain in the market operating at tariffs that are lower than in the pre-competition days but are nevertheless profitable. Even if only one or two airlines remain, they will be inhibited from increasing tariffs to obtain excessive profits for fear of new entrants coming on to the routes. This view was reinforced by the so-called theory of contestability developed by US economists in the early 1980s. They claimed airline markets were clearly contestable in that there were no real barriers to market entry or exit. Fear of new entrants would be enough to ensure that monopoly or duopoly operators did not abuse their dominant position but behaved as if the market was competitive. In such a competitive environment, consumers would be better off. They would enjoy lower tariffs and a wider range of services and product features. In brief, this was the theoretical argument put forward by the protagonists of deregulation.

When applied to international air transport there is a flaw in the theory which has been overlooked. The theory of competition requires not only freedom and ease of entry but also freedom of exit, so that loss-makers leave the market to the more efficient carriers. In practice, on international air routes the loss-makers tend not to leave the market but continue to operate despite their losses. This is because many will be state-owned airlines and may receive direct subsidies, as Air France did in the early 1980s, or government support to enable them to raise further loans from the government-owned banks, as Olympic Airways has done for more than a decade. Even if privately owned, unprofitable airlines stay in business by selling off non-airline assets. In the 1970s, Pan Am sold the Pan Am building in New York and in 1981 when it lost $341 million it was able to cover the loss by disposing of the InterContinental Hotel chain. In 1985 it sold its Pacific network to United Airlines in order to salvage its Atlantic operations. After a loss of $337 million in 1989, it offered its internal German and US shuttle services for sale in the spring of 1990. In the last analysis, loss-making airlines may be able to continue operating for longer than would otherwise be the case because of their ability to reschedule their debts, as Braniff did for a time before its collapse in May 1982. Then there are the marginal carriers, that is, airlines whose transatlantic services are only a small part of their total operations. Such airlines, as mentioned in the previous section, can cross-subsidize losses for several years from domestic or other profits. Thus Northwest made losses on the North Atlantic for four years after it launched its services in 1979 but still kept going.

A further market distortion arises because it is often the loss-making airlines that are the price leaders. There was considerable evidence of this on transatlantic routes. As Laker and Braniff faced financial difficulties, they cut fares to generate cash flow. Since other carriers matched them, they thereby reduced or destroyed everyone’s profitability. This happened repeatedly. As airlines got into difficulties they dropped their fares. In the spring of 1986, People Express filed proposals for a one-way advanced purchase fare London to New York at $99/£66 for the first 30 seats and $149/£99 for the next 70 seats and at the same time offered agents’ commissions of up to 18 per cent (*Lloyds Aviation Economist,* August 1986). These were the panic measures of an airline on the verge of collapse. But since People kept going for another nine months, it had a depressive effect on all airlines’ tariffs. TWA, which was also facing growing financial problems on the North Atlantic in 1986, was the other price leader.

The ability of transatlantic airlines to continue to operate on routes on which they were incurring substantial losses, while pushing tariffs downward, clearly undermined the economic theory. It resulted in over-capacity and in subsidized or cross-subsidized competition, which forced the tariffs of all operators down to uneconomic levels. Airlines became locked into a situation where tariffs were too low in relation to the costs of even the more efficient operators but where it was impossible to raise the tariffs or reduce capacity because of competitive pressure from loss-making airlines. Virtually all airlines ended up making losses for several years after deregulation started. No one seemed able to break out of this mould until costs fell when oil prices slumped.

Even in the later 1980s when many airlines were making good profits on the North Atlantic and North Pacific markets, other airlines were continuing to operate at a loss. The most spectacular example was Philippine Airlines. It was carrying two-thirds of the traffic between the Philippines and the United States, its daily flights operated at very high load factors, yet it made large losses on this route because its yields were too low. They were so low that its breakeven load factor was reputed to be above 100 per cent. It continued to accumulate losses year after year, unable either to break out of the loss-making spiral or to leave this market altogether.

What about the consumer viewpoint on all this? There can be little doubt that on both the North Atlantic and the North Pacific routes consumers have benefited. First, they have had a wider range of airlines and airline products to choose from. Secondly, the passenger has benefited from much lower fares. The very low walk-on fares introduced on Laker Airways' Skytrain services generated a host of new low-fare types on the North Atlantic such as budget fares, standby fares, and so on as well as the illegal discounting of fares. Subsequently, low-cost operator People Express (until its demise) and, more recently, Virgin Atlantic have maintained the pressure for low fares on the North Atlantic. On the North Pacific it was Braniff, through its ultra-low budget and APEX fares, which was the early leader in inducing other carriers to lower or discount their fares. But each new entrant, as shown earlier, has undercut the prevailing tariffs. Finally the consumer has benefited from an increase in the number of direct point-to-point air services between new US gateways and destinations (or origins) in Europe and Asia. These benefits have also accrued to the cargo shipper.

The consumers have clearly benefited from lower fares, high frequencies and greater product choice. But airlines have found themselves in a position where the continued operation of loss-making services, which in theory should have been withdrawn, jeopardizes the profits of all airlines—even the most efficient. This suggests that international air transport cannot operate entirely free of both capacity and price regulation. Indications from other market areas, notably that of South East Asia where there is *de facto* liberalization of tariffs but some bilateral controls on capacity, suggest that most consumer benefits can be achieved while ensuring airline profitability if there is some control of capacity in deregulated markets. International air transport exhibits too many market imperfections to work as theory would suggest in a totally deregulated environment.

4
1992 and All That— Liberalization in Europe

4.1
The focus switches to Europe

While in the early 1980s the pressure for international liberalization and change emanated from the United States and primarily affected air services to and from North America, in the second half of the decade the focus of deregulation switched to Europe. Consumer pressures for liberalization of air transport built up throughout the 1980s. They were reinforced by the mounting pressure both from within the European Parliament and from the Commission of the European Communities for major changes to the structure of regulations affecting air services between the member countries of the Common Market. But it was not till the mid-1980s that the first significant breakthroughs were achieved. Changes in the regulatory environment were introduced in two ways: first, bilaterally through the renegotiation of air services agreements between pairs of countries; secondly, multilaterally, through actions initiated by the European Commission in Brussels or the European Court of Justice. While these two bodies brought about liberalization of air services within the 12 member states of the European Community, they inevitably induced some liberalization within the wider Europe of 23 states grouped within the European Civil Aviation Conference (ECAC). The 11 ECAC member states that were not within the European Community were anxious not to be bypassed by the regulatory changes taking place within the Community.

4.2
Bilateral liberalization

The more liberal and free-market attitudes towards air transport prevailing in the United Kingdom pushed it to renegotiate most of its key European bilaterals in the period from 1984 onwards. The first major breakthrough was in June 1984 when a new air services agreement was negotiated with the Netherlands, another country set on liberalization. This agreement, together with further modification in 1985, effectively deregulated air services between the two countries.

Free entry of new carriers, access by designated airlines to any point in either country, no capacity controls and a ‘double disapproval’ regime for fares (see section 3.5 above) were the key features introduced. These features, some of which were first introduced in the revised United States bilaterals discussed earlier, represented a clear break with the traditional European bilaterals which had prevailed till then (Table 4.1). These earlier agreements were very restrictive in terms of market access and, by limiting capacity and price competition, they had severely reduced the scope for airline competition.

The UK-Netherlands agreement set the pattern for the renegotiation of European bilaterals. Later in 1984 the UK signed a new air services agreement with Germany and in the following year agreements were concluded with Luxembourg, France, Belgium, Switzerland and the Irish Republic. Not all these agreements went as far as the UK-Netherlands agreement had done in removing constraints on competition, but all of them allowed for multiple designation of airlines by each state, while several of them also removed capacity restrictions and introduced double disapproval of tariffs. Others maintained some capacity and fare controls, as was the case with the UK-France agreement.

Some UK bilaterals went through a two-stage process. An initial agreement brought partial liberalization, to be followed by a more

Table 4.1 Traditional and new-style European air services agreements

	Traditional bilateral	New-style bilateral[a]
Airlines	**One per route from each state**—in most cases this was the national carrier	**Multiple designation**
Routes	**Only to points specified in bilateral**	**Open route access**—airlines can fly on any route between two states
Capacity	**Shared 50:50**— between airlines of two states	**No capacity control**
Fares	**Approval of *both* governments needed**— but negotiated through IATA	**Double disapproval**—fares can be rejected only if *both* governments disapprove

[a] e.g. UK-Netherlands as negotiated in 1984 and amended 1985.

radical second agreement. This happened with the UK-Ireland bilateral. A revised agreement in 1985 was superseded by a further agreement in 1988 which allowed for multiple designation, open route access, no capacity restrictions and double disapproval of fares.

While the United Kingdom set the pace, other European states also began to renegotiate their bilaterals in this period. Though they did not usually adopt all the features of the UK-Netherlands agreement in one go, the aim of such negotiations was usually to introduce gradual liberalization.

The impact of this bilateral liberalization was greatest in countries where domestic liberalization had encouraged the emergence of several airlines with the potential for international operations. Where the domestic air transport regime was highly regulated and controlled, then the impact of liberalization was more muted. Thus the French government's strategy of maintaining Air France as France's major international airline in Europe meant that by 1990 this airline was the sole French operator on the various London-Paris routes. Yet from the British side six airlines were operating on the route— British Airways, Air Europe, Dan Air, Air UK, British Midland and Brymon—and it was the new British entrants such as Air Europe which were most innovative in their pricing. But even they were held back by the French government's refusal to approve 30 per cent lower fares when Air Europe entered the London-Paris market in 1988. A 15 per cent reduction was eventually approved.

The potential effect of bilateral liberalization can be seen most clearly in the UK-Netherlands market because here the regulatory regimes at both ends were already very liberal. In June 1984 there were four airlines flying between Amsterdam and the various London airports: British Airways and KLM flew from London-Heathrow, Air UK from Stansted, and British Caledonian from London-Gatwick. In so far as Rotterdam is close to Amsterdam, one should also include the NLM services from Heathrow to Rotterdam. As with the North Atlantic, deregulation attracted many new entrants. By the end of 1986 these five carriers had been joined by British Midland (Heathrow-Amsterdam), Transavia and KLM (Gatwick-Amsterdam), Netherlines (Luton-Amsterdam), and British Caledonian (Gatwick-Rotterdam). Nine airlines in all were serving this market. In April 1987 two more, Brymon and London City Airways, were licensed to operate STOL services to Amsterdam from London's new Docklands airport. By 1990 there were still 10 carriers on the London-Amsterdam/Rotterdam routes, though some of the names had changed.

There was inevitably a significant jump in the capacity available on London-Amsterdam/Rotterdam services. In 1985 capacity grew by close to 20 per cent and by the end of 1986 by a further 30 per cent or so. This capacity growth was markedly higher than that on most European routes from London. Traffic growth, however, did not match capacity growth despite a significant drop in the level of promotional fares. On services from Heathrow, Gatwick and Stansted to Amsterdam/Rotterdam, passenger numbers grew only 6.7 per cent in 1985 and a further 9 per cent in 1986. These growth rates were broadly similar to those achieved on other major European routes from London, such as those to Paris, Brussels or Frankfurt, where liberalization had as yet had little impact. Thus, the growth on London—Amsterdam/Rotterdam, which in any case was not remarkable, cannot be attributed to liberalization of air services. Moreover, the fact that capacity has been growing faster than traffic led initially to a marked drop in passenger load factors. It was only in 1988 that load factors began to improve.

4.3
Multilateral liberalization

4.3.1
THE EUROPEAN COMMISSION'S AIR TRANSPORT OBJECTIVES

The European Commission's Directorate General for Transport espoused liberalization early on and has been trying to push various proposals through the Council of Ministers since 1975. Initially its only limited success was the July 1983 Council Directive on Inter-Regional Air Services (CEC, 1983). This allowed airlines flying aircraft of 70 seats or fewer to develop air routes freely between regional airports within the European Community. However, by excluding air routes from regional centres to capitals or major hubs, this directive had relatively little effect.

The European Commission outlined its own air transport objectives in the March 1984 *Civil Aviation Memorandum No. 2* (CEC, 1984). This included proposals for a reduction of capacity controls within Europe, for greater pricing flexibility through the adoption of fare zones or 'zones of reasonableness', and for allowing revenue-pooling agreements only if the transfer limits were very tight and thereby encouraged competition. From this Memorandum and from various subsequent speeches by officials of the Directorate General for Transport it was possible to identify the Commission's long-term air transport objectives. These could be summarized as follows:

(1) Community airlines should be free to operate between any airports in the 12 member states.
(2) Until the creation of the single internal market on 1 January 1993, fifth freedom rights should be available for members' airlines on intra-Community services but with some limits on the capacity offered.
(3) Multiple or double designation of airlines on all routes once traffic surpasses certain threshold levels.
(4) No capacity controls on air services.
(5) Cabotage (that is, the right to carry traffic between two points in the same country) should be available within limits.
(6) Fares to be set freely by airlines but states should have powers to control predatory pricing. In time, a 'double disapproval' regime should be introduced.
(7) Airlines of one state (A) should have the same rights in another state B as airlines of that state (B).
(8) Anyone meeting the technical and economic standards required for establishing an airline in any Community state should have the right to set up an airline in that state without hindrance.

(9) Negotiations of traffic rights with non-Community states should be carried out by the Community rather than bilaterally as previously.

These objectives of Community aviation policy emerged slowly during the mid-1980s but they do give a clear indication of the degree to which liberalization will be pursued both with regard to intra-Community air services and with the aim of opening up restricted national markets such as those of Greece. Clearly objectives (7) and (8) above are aimed at undermining any attempts to preserve national monopolies such as those of Olympic Airways.

Attempts were made to introduce some of these objectives, even in a limited form, through the Council of Ministers in 1986. But it was not till December 1987 that the Community transport ministers agreed on an air transport package of measures, which was the first major step towards gradual liberalization. More of this later (section 4.3.3).

4.3.2
APPLICATION OF COMPETITION RULES TO AIR TRANSPORT

Meanwhile, impetus for change within the European Community followed a more legalistic form. The breakthrough came with the April 1986 decision of the European Court of Justice on the 'Nouvelles Frontières' case. The court decided that the competition articles 85–90 of the Treaty of Rome do apply to air transport and that only a specific decision by the Council of Ministers could give exemptions for inter-airline agreements. Pending such a Council decision, competent authorities—that is, the Commission or individual governments —can declare particular airline activities illegal. It was on this basis that in September 1986 Peter Sutherland, Commissioner for Competition, wrote to all the major scheduled airlines of the Community asking them to explain and justify any anti-competitive agreements, such as revenue pools or price agreements, which they had entered into with other airlines.

Sutherland's action made it essential for agreement to be reached at Community level. One of the package of measures agreed by the Ministers of Transport in December 1987 was the specific application of the competition articles of the Treaty of Rome to air transport. This explicitly removed any ambiguity or uncertainty. Two of the articles were particularly designed to foster competition within the European common market:

- Article 85, which prohibits and makes unenforceable anti-competitive agreements, decisions and concerted practices which eliminate, reduce or distort competition unless specific exemptions have been granted;
- Article 86, which prohibits an abuse of a dominant position within the Community or any part of it so as to affect trade between EEC member states.

While the categories of prohibited agreements under Article 85 were not clearly defined, it was apparent that capacity-sharing agreements, tariff-fixing and revenue-pooling were not likely to be acceptable. Yet these were traditional elements of the hitherto existing regulatory regime in Europe as in much of the world. The Commission was given powers in December 1987 to grant exemptions, as it did in July 1988 (see section 4 3.3 below), but such powers were limited to intra-Community services only. Exemptions could not be granted for agreements between Community and non-Community airlines.

The application of Article 86 regarding the abuse of dominant position was more problematic since it involved defining what constitutes a dominant position. According to Dr John Temple Lang of the Directorate General for Competition, a 'dominant position is one in which a company is able to behave to an appreciable extent independently of other companies and has the power to prevent effective competition being maintained. Dominance is indicated by a market share over 40 per cent, advantages not shared by competitors—economies of scale and of scope—and other circumstances' (Lang, 1989). Such dominant airlines must not restrict competition or take advantage of their market power by discriminating against other airlines wishing to use any facilities (such as a computer reservation system) which they might control. According to Dr Lang, dominant airlines are obliged, among other things:

- not to enter agreements on fares or otherwise which eliminate competition;
- not to give travel agents commissions so as to cause the agents to deal with them exclusively;
- not to use their computer reservation systems (CRS) to give themselves undue advantage over their competitors;
- not to buy equipment only from suppliers of their own nationality (European Court's Saachi judgment);
- not to refuse to accept interline traffic from another airline without sufficient justification. The fact that the other airline charges lower fares is not sufficient justification;
- not to manipulate their airport arrangements in such a way as to cause artificial disadvantages for their competitors, such as by tying up more terminal facilities or runway slots than necessary;
- not to use 'predatory pricing' to force competitors out of a market (Lang, 1989).

The Commission believed that by 1989 all these rules followed from existing Community law and did not require to be specifically introduced in any air transport measures. However, there were areas of possible abuse of dominant position, such as runway slot allocation methods, CRS bias or exclusive ground handling arrangements, which would require direct Commission intervention.

The European Commission has very wide powers to investigate possible infringements of the competition rules, and may enter premises, make copies of documents, take statements and generally demand information from those involved. It may also impose very large fines on those who do not cooperate in its investigations or who infringe the competition rules. Fines of several million ECU, the European standard currency, have been imposed on companies in other industries (an ECU was worth US$1.22 early in 1990). Companies fined can appeal to the European Court of Justice.

The trend towards mergers and purchases of minority shareholdings among Community airlines which began to manifest itself in 1987 raised the question of whether the competition rules could be circumvented through mergers or other linkages. The Commission has always claimed that it had powers to control mergers and cross-shareholdings under the existing Articles 85 and 86. It used these powers in March 1988 to force British Airways to give up a significant number of routes and runway slots at London's Gatwick airport when it took over British Caledonian. The Commission, however, has no clearly defined policy on mergers. It treats each case on its merits, its aim being to ensure that there is no abuse of dominant position and that a 'sufficient number of competitors is available to provide effective competition in the future' (Lang, 1989).

Such general guidelines are of little help to airlines in their strategic planning. As a result, mergers and share buying proliferated between 1988 and 1990 and the Commission seemed very slow in responding. It was taking many months to reach decisions on crucial issues referred to it. When in November 1988 the French government announced a policy of one French airline per route, UTA (the French private airline) complained to the Commission since the decision effectively precluded it from entering any routes already operated by Air France. The Commission dragged its feet and before it had pronounced on the issue Air France bought a majority share in UTA in January 1990. Early in 1990, after KLM and British Airways each took a 20 per cent shareholding in Sabena World Airlines, the Commission responded more quickly. It declared in June 1990 that the deal could not be exempted from scrutiny and opened discussions with the three partner airlines.

Meanwhile, in December 1989 the Council of Ministers approvcd a regulation[*] on mergers which would come into effect in September 1990. This established the threshold for mergers which would be subject to investigation only by the Commission and not by national authorities as well. These would be mergers where the joint turnover of the two companies would be at least 5 billion ECU (that is over $6 billion) while that of each company was at least 250 million ECU. Mergers meeting this threshold but where each partner had at least two-thirds of its turnover in one state would be exempt from direct Commission investigation. This regulation further confused the issue since only a few airline mergers would be large enough to meet the 5 billion ECU threshold. By implication this would mean that they would be subject to investigation only by any national control authority. However, the Commission claimed that this did not exempt airline mergers below the threshold from Community laws on competition rules.

4.3.3
THE 1987 AND 1990 PACKAGES

It is evident that deregulation of air transport within the European Community is coming about as a result of strong pressure from two separate directions, namely from the Directorate General for Transport (DG VII), which is concerned with air transport policy, and the Directorate General for Competition (DG IV). While other Directorates have becomc involved in a number of related but marginal issues, it is these two Directorates which have pushed deregulation forward. Their efforts have frequently been facilitated by decisions of the European Court of Justice, which has also played a key role.

However, the gradual steps towards air transport deregulation can be understood only within the wider political context of European integration and the creation of a single internal market covering the 12 member states of the European Community. In a series of meetings during the early 1980s the heads of state of member governments had pledged themselves to the completion of the internal market as the Community's first priority. The agreed date for the single market to come into existence was 1 January 1993. This meant that by the end of 1992 immigration and customs controls between the 12 were to be abolished so that to all intents and purposes the European Community would become a single 'domestic' market open to the free movement of goods, services and people. The European Commission, in effect the administrative arm of the Community, acting through the Council of Ministers, took steps in all areas of economic activity to ensure that the movement of goods and services within the internal market was not distortcd by artificial barriers to trade. Liberalization of air transport was only one of the Commission's many initiatives. The abolition of internal frontiers would have farreaching implications for airport layout and for the operation of international air services. Yet by early 1990 the member states had not yet decided how and to what degree internal immigration controls would be removed.

Meanwhile, the air transport and competition objectives outlined earlier have been achieved in stages. The first was the so-called 'December 1987 Package' of measures agreed by the Council of Ministers. This was the first step towards liberalization of air transport within the Community as a whole (Table 4.2). It introduced a more liberal fares regime including the concept of fare zones. It abandoned the equal sharing of capacity by airlines of each state and facilitated the entry of new airlines by opening up market access (CEC, 1987a).

In their 1987 package, the ministers of transport explicitly acknowledged that the competition articles of the Treaty of Rome applied to air transport (CEC,

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* '*Regulations*' agreed by the Council of Ministers are binding in their entirety and directly applicable in all member states. '*Directives*' are binding on member states as to the results to be achieved but leave implementation to individual states through their own legislation.

1987b). Many of the inter-airline agreements then in existence would be illegal unless specific exemptions were granted. The exemptions were published by the European Commission in August 1988 and covered agreements and arrangements between Community airlines which were concerned with aspects of:

capacity-planning
revenue-pooling
tariff agreements
runway slot allocation and scheduling
jointly owned computer reservation systems
aircraft, passenger or cargo handling.

These block exemptions were granted only if certain demanding conditions were met (CEC, 1988), the aim of such conditions being to avoid abuse of oligopolistic power or discrimination against new entrants or airlines not wishing to join such agreements. Thus, revenue pools were exempted only if their aim was to compensate airlines for schedules at unpopular times, if there was a transfer limit of 1 per cent of the donor airline's revenue and if no cost-sharing was involved. Tariff agreements were exempted when subject to government approval and if they did not involve capacity-sharing. Also they should not be binding on other airlines.

The second stage in the liberalization process was set in motion in the autumn of 1989 when the Commission prepared a new package of measures for the December 1989 meeting of the Council of Ministers of Transport. The ministers, while not accepting all the Commission's proposals, committed themselves to the principles that

Table 4.2 December 1987 decisions of the European Community Council of Ministers

Area	Key elements—intra-Community air services
Air fares	Governments obliged to agree fares if they reflect costs. Creation of zones for discount and deep discount fares within which airlines free to set fares meeting specific conditions.
Capacity	Equal sharing abandoned. Up to 55% share by one country's airline(s) allowed in 1988 and 1989 and up to 60% in 1990.
Market access	Traffic rights created between regional airports and main airports even if not existing in current bilaterals (some exceptions in Greece, Spain, Italy and Denmark). Countries can designate a second carrier on intra-Community routes once traffic levels pass certain levels. Fifth freedom rights granted for airlines on routes between two other Community states (for 30% of seats on the route).

would be incorporated in the second package and to the longer-term objectives.

It was not till their meeting in Luxembourg in June 1990 that the ministers agreed the details of a new second package. First, the existing zonal fare system was replaced by a 'more liberal and effective' zonal system. Secondly, any member state whose airline(s) had already reached a 60 per cent share of the total capacity on a country-to-country basis would be allowed to add a further 7.5 percentage points in each of the subsequent two years, though with some safeguards on routes with excessive charter capacity. Lastly, increased market access would be achieved by allowing multiple designation on all Community air routes with more than 140,000 passengers per annum (reduced to 100,000 in 1992), by opening all intra-Community points (with a very few exceptions) to third and fourth freedom carriers and by increasing fifth freedom rights to 50 per cent of the seats on a through service. Previous exemptions granted to specific airports on grounds of congestion were also withdrawn.

More significant were the longer-term objectives approved by the ministers in June 1990. They gave a firm commitment that all bilateral limits on capacity shares would be abolished by 1 January 1993. They agreed that double disapproval of all intra-Community air fares remained another objective to be achieved by that date. But earlier still, by July 1992, each member state would be required to formulate a licensing system which allowed the establishment of new airlines meeting such licensing requirements and which also opened access to that country's air routes by airlines of other Community members. The Council of Ministers was to agree common specifications for such licensing systems by June 1991.

All these developments and proposals, if implemented, would have created a very liberal regulatory regime for air transport services within the Community by 1993. Airlines would be free to operate at will on any routes from their own state to anywhere else in the Community with extensive fifth freedom rights but without any capacity controls and few tariff controls since double disapproval would be needed to block any fare proposals.

4.3.4
THE EXTERNAL DIMENSION

The deregulation of air transport within the European Community will have only limited impact on airline competition if the external dimension is ignored, since the latter is crucial in ensuring the free provision of air services. Two external aspects are of critical importance. First, do the competition rules apply to air services to or from the Community or only to those between Community states? In other words, do the Community rules have any extra-territorial validity? Secondly, will the creation of a single European market by January 1993 invalidate the terms of existing bilateral air services agreements between individual Community states and third countries?

It is clear that the Community's competition rules and other regulations do apply to non-Community airlines operating to or through the Community. Revenue pools, capacity-sharing agreements or fares coordination on air routes to Community member states are therefore illegal. Moreover, the Commission has not had the powers to give exemptions to such agreements with non-Community airlines as it has to give block exemptions to agreements on purely intra-Community air services. Peter Sutherland, then Commissioner for Competition, stated this clearly in the autumn of 1988 in a speech in Sydney: 'the Treaty [of Rome] applies stricter rules to such third country cartels or agreements. The block exemption does not apply and the Commission has no power to grant an individual exemption…'

Two European Court of Justice decisions have reinforced the extra-territorial nature of Community rules. In 1988 in the 'Pulp Paper Case', the Court upheld a decision of the Commission to fine 36 US, Canadian and Scandinavian pulp paper companies for price-fixing even though they were not Community companies and their agreement was made outside the Community. This view was re-endorsed by the Court's 'Ahmed Saeed' judgment in April 1989. Two Frankfurt travel agencies were taken to court in Germany for selling cheap Frankfurt-Tokyo tickets, which had been bought very cheaply by the agents in Portugal as Lisbon-Frankfurt-Tokyo tickets. The agencies resold these tickets after throwing away the Lisbon-Frankfurt coupon. This was contrary to IATA and German regulations. The German court sought guidance from the European Court, which decided that the Community's competition rules apply to all air fares charged by airlines serving the Community. By implication, any attempt to maintain or fix fares at artificially high levels by airlines' agreements is illegal. Thus IATA or any other tariff agreements would appear to be illegal within Community states, whether they involve Community or non-Community airlines, if they restrict the freedom of others to charge less.

The implications of the 'Ahmed Saeed' judgment are clearly far-reaching, particularly for non-Community airlines whose governments may not have espoused a liberal airline policy. After the judgment, the Commission put forward a proposal to the December 1989 Council of Ministers of Transport which would give the Commission new powers to grant exemptions to agreements between Community airlines and third-country airlines. The Council decided that it wanted to see further details of the kinds of agreements that would be exempted before considering this proposal further. A decision on the proposal was postponed.

The aim of the creation of the single market is that producers (in this case airlines) should be free to supply their services freely and without discrimination throughout the Community. This clearly cannot be done if airlines are restricted by existing bilaterals as to the Community airports from which they can operate international services to points outside the Community. Thus British Airways may wish to fly from Athens to Bangkok but under the Greece-Thailand air services agreement only a Greek- or Thai-owned airline could be designated to enjoy the traffic rights on this route. To overcome this problem the Commission is pursuing two parallel lines of action. First, it is making it possible, as previously mentioned, for Community airlines to establish themselves in and operate from other Community states. Secondly, its long-term objective has been that the Community members should negotiate air services agreements as a group of 12 states and not, as hitherto, individually. With this in mind a new proposal [COM(90)17] for a Council of Ministers decision on relations with third countries was published in January 1990. This claimed that Article 113 of the Treaty of Rome already gives the Commission exclusive competence to negotiate commercial agreements, which is what air services agreements are. Thus no new powers are required. It also argues that the Rome Treaty overrides requirements in existing air services agreements requiring control of designated airlines by nationals of that state. In other words, the designated airline of Greece for Athens-Bangkok could be any Community airline, not merely a Greek-owned one. The Commission went on to argue that the creation of the internal market meant that the Community should be considered as one entity and therefore as a cabotage area. Moreover, the Commission believed it could create an intra-Community cabotage area which would not be in conflict with Article 7 of the Chicago Convention, of which all Community states are signatories. The January 1990 proposal concluded with a proposed Regulation by which the Commission would progressively take over bilateral negotiations between the Community as a whole and third countries. In June 1990 action on this was deferred at the Council of Ministers meeting, but the proposal was sure to re-emerge.

Community-wide negotiation of air services agreements is a very dramatic step towards the creation of a single aviation market. There will be opposition to the proposal from individual member states and airlines and this may delay its adoption. But the assumption of Commission power would be gradual. At first states would continue to negotiate bilaterally, provided agreements signed did not conflict with the Community's aviation policy. Already in March 1990 the Transport Commissioner instructed Community governments not to negotiate away fifth freedom rights without first referring them to the Commission. Sooner or later, however, negotiation of air services agreements by the Commission is inevitable because it will strengthen the Community's bargaining power. This is one aim of the proposal. Community airlines are eager to gain access to United States domestic routes, that is to US cabotage rights, in exchange for the extensive fifth freedom rights currently enjoyed by US airlines on international routes within the Community. The latter will become internal domestic cabotage routes after 1992 and the United States might be pressured to give up its rights on such routes unless it offers reciprocal rights within the United States to European carriers.

The Commission's proposals will have a major impact on other states as well. In the first place, their relative bargaining strength will be reduced unless they are major traffic-generating countries such as Japan. Take as an example the question of reciprocity of route rights. In negotiating with say Singapore, the Community negotiators may offer five points from Europe to Singapore to the Singaporean airline in exchange for European carriers being allowed to fly from five points in Europe to Singapore. This would represent a 'fair and equal' exchange. But the European negotiators might adopt the US approach by offering five European points to the Singaporean airline but demanding that European airlines should be able to fly from *any point* in the Community to Singapore. Secondly, non-Community states might lose their existing fifth freedom rights on routes between Community countries. It has been estimated that Asian airlines enjoy fifth freedom rights on more than 30 intra-Community sectors and at the start of 1990 were operating more than 200 services a week on such sectors (Nuutinen, 1990). These too will become domestic cabotage routes. While the Commission disclaims any intention to take such traffic rights away, they must come under pressure in the longer term. Will other countries be forced to give away their own cabotage rights as a *quid pro quo?* Will Thailand have to offer rights on Bangkok-Phuket in order to continue picking up passengers between Copenhagen and Munich? Finally, renegotiation of bilaterals on a Community-wide basis must lead to multiple designation of Community airlines from European points. So that on routes where previously third-country airlines were competing with a single and possibly weaker European carrier (such as Olympic out of Athens), they may find themselves competing with two or more stronger European carriers. This question of how the Commission will decide which Community airlines to designate for any international route is another area of potential controversy which has yet to be resolved.

4.3.5
ECAC AND EFTA JOIN IN

While the European Community was liberalizing its air services in stages it became apparent that other countries in western Europe did not want to be bypassed by the tide of deregulation. Some of them were in any case signing the new open bilaterals pioneered in Europe by the UK-Netherlands agreement of 1984. The Swiss, for instance, had signed a fairly liberal bilateral with the British as early as 1985. The European Civil Aviation Conference (ECAC), an intergovernmental agency which groups 23 west European states including the 12 Community members, began moving cautiously towards liberalization of the air services between its respective countries.

In June 1987 an ECAC agreement allowed airlines of member states to modify their capacity share on routes within the ECAC area from the previous 50:50 position to a 55:45 split. This could be done without government approval and for an initial two-year period. A later ECAC decision permitted airlines unilaterally to file fares which would be automatically approved if within agreed fare zones. Early in 1989 ECAC produced its own rules of conduct for computer reservation systems.

ECAC followed in the footsteps of the Community, but rather more slowly since agreement between its 23 members was at times difficult to obtain. A group of these states were also members of the European Free Trade Area (EFTA) and were particularly keen to keep pace with aviation developments within the Community. Two of them, Switzerland and Austria, felt this strongly because of their central geographical position, while for Norway and Sweden closer links with the Community were crucial since their jointly owned airline SAS was considered a Community airline as it was also partly owned by Denmark, a Community member. The last two EFTA members, Iceland and Finland, did not want to be left out. Late in 1989 the EFTA group approached the Community with a view to concluding an agreement on scheduled air services between these countries and the Community. They proposed that the December 1987 package should provide the basis for negotiation. In other words, they wanted the terms of that package extended to include their six countries as well. As a result of this initiative the Commission proposed in January 1990 that it should be authorized to open negotiations with the EFTA states. This was agreed to by the Council of Ministers in May 1990. These were to be the first air transport negotiations between the Community and third countries.

It is evident that multilateral liberalization of air services is affecting a wider Europe than just the 12 member states of the Community. The 11 non-Community members of ECAC, and more especially the six of these that are EFTA states, are keen not to be left behind. They are adopting many of the Community's air transport proposals, though often after a time lag. In 1990 some of the states of eastern Europe also began to talk of moving in the same direction. For non-European airlines it is crucial to be aware of this changing regulatory environment in Europe.

4.3.6
OTHER COMMUNITY MEASURES

While the various liberalization measures outlined above have been increasing the scope for inter-airline competition within the Community, the Commission has adopted a very detailed interventionist approach in drafting regulations to protect consumer interests. Such regulations and directives, which become enforceable in law, undoubtedly have a direct impact on airlines' marketing and distribution strategies. This is equally true for Community and non-Community airlines.

In July 1989 the Council of Ministers approved a code of conduct for computerized reservation systems (CEC, 1989). The Regulation states specifically that the code applies to any CRS system offered for use within the territory of the Community irrespective of the status or nationality of the vendor or the geographical location of the air services concerned. The extra-territoriality of the code is therefore clear. The code ensures that the system must be open to all airlines without discrimination and on an equal basis. Participating airlines must be free to join other systems as well. Flight options must be ranked in the following order: first, all non-stop direct flights between the two city-pairs ranked by departure time; secondly, direct flights with stops but not involving change of aircraft; lastly, connecting flights involving a change of aircraft. Code-sharing flights must be treated as connecting flights. Screen displays should not give excessive exposure to particular options nor discriminate against others.

In December 1989 a Directive was agreed by the Council of Ministers outlining rules for package holidays. The aim was to enshrine in law the liability of travel companies, including airlines or their subsidiaries, for the holidays which they sell to the public. The directive covered many aspects of the holiday contract. Most importantly it stipulated that a holiday brochure must be regarded as part of the contract between buyer and seller and its contents must therefore be fully met by the seller. If a hotel is described as quiet it must be quiet. If, furthermore, customers suffered loss or damage through the failure of all or part of the holiday arrangements they could claim compensation without having to prove negligence on the part of the holiday company.

A proposed Regulation on compensation for denied boarding was approved by the Council of Ministers in December 1990. It laid down common rules both for the criteria to be used in deciding which passengers should be offloaded on an overbooked flight and for the compensation to be paid to those who were denied boarding. Compensation should be 100 per cent of the fare where no suitable alternative flight is available, 50 per cent if alternative seats are offered on flights arriving more than 2 hours after the original scheduled time, and 25 per cent if an alternative arriving within 2 hours of the original flight is found.

In addition to the above, the European Commission had by 1990 given notice that it was also looking to produce Directives on a code of conduct for travel agents, on rules for runway slot allocations and on non-national ownership of Community airlines. It produced a first discussion paper on slot allocation in May 1990. All this was in addition to action already being undertaken on aviation personnel licensing, on pilot flight-time limitations and aircraft airworthiness requirements.

In a very real sense European deregulation is a paradox. On the one hand regulations have been and continue to be removed to allow more direct and intense airline competition. On the other, a host of rigid rules and codes of conduct are being introduced, with the twin aims of harmonizing the terms of competition and of consumer protection, but which increasingly constrain airline managers’ freedom of action.

4.4 The impact of deregulation on European air transport

4.4.1 MERGERS AND TRANSNATIONAL ALLIANCES

The process of liberalization which began with the transatlantic services to the United States after 1978 and then spread into Europe through both the renegotiation of bilateral air services agreements and action within the European

Community has led to significant changes within the European airline industry. Such changes have been both structural and operational as airlines adjusted to the changing regulatory environment. Moreover, the pace of change accelerated as the single market of 1 January 1993 approached.

The European scheduled airlines saw their highly regulated and controlled markets being opened up to increased competition both from other scheduled airlines and from charter operators. At the same time they were very conscious of the growing concentration within the US airline industry which had followed the initial and short-lived proliferation of airlines after deregulation in 1978. By 1989 the six largest US carriers generated 84 per cent of US domestic passenger-kilometres. The US experience showed that large size was crucial for success, not because of cost economies of scale but because of the marketing benefits of scope. To be successful, an airline had to be active in virtually every marketplace. As early as 1985 an IATA working party had clearly pinpointed what these benefits of scope were (IATA, 1985).

- attractions of large and widespread network
- ability to dominate operations at a hub(s)
- control of distribution especially through CRS (computer reservation system)
- ability to exercise price leadership
- value of network size in 'loyalty' marketing schemes, e.g. 'Frequent Flyer'
- range of markets allows cross-subsidizing of competitive pricing on particular routes
- marketing power of large-scale advertising.

The European airlines were not slow to appreciate the implications. They all needed to widen their market base to be competitive and to survive in a deregulated environment.

Interestingly, it was some of the smaller, more marginal carriers that learnt the lesson first. The Scandinavian airline SAS (Scandinavian Airline System) was a case in point. It was a high-cost operator but very profitable as it concentrated on the high-fare business market. It was also one of the smaller scheduled national airlines in Europe with a relatively small population base in its three home countries. It survived because it operated mostly in highly protected markets with limited competition. Faced with liberalization and the opening up of Europe it set out frantically looking for partners to link up with, through either share purchases or marketing alliances. No airline in the world seemed to have escaped SAS interest but several of its plans were thwarted, as was its attempt to buy a substantial share of British Caledonian in 1987. Many of the proposed linkages, especially with South American carriers, appeared to have little commercial logic. But by early 1990 SAS was the centre of a web of alliances (Figure 4.1).

Other European airlines, particularly the larger ones, were more circumspect and less frenetic than SAS in their search for a wider marketing base. They followed three lines of approach. First, they bought out or bought into the smaller scheduled and feeder airlines in their own countries in order both to gain wider control of their domestic marketplace and to preclude future competitors emerging. In a few cases, such as KLM, they also acquired shares in their country's charter airlines. Secondly, some airlines, such as SAS, followed a strategy of buying shareholdings in other European scheduled airlines and, in a few cases, in airlines outside Europe. US airlines were the favoured target outside Europe because of the marketing spread they provided; SAS and KLM bought significant shares in Texas Air and Northwest respectively. The third strategy was to set up marketing alliances with other large carriers, especially those operating in different markets, so as to achieve the benefits of scope without buying shares. In some cases marketing alliances were consolidated by share swops, as in the case of the Swissair-Delta-SIA link-up.

British Airways pursued all three strategies. In 1987 it bought 40 per cent of Brymon Airways, a small turbo-prop regional operator in the south-west of Britain. Brymon subsequently merged with Birmingham Executive Airways in 1988. Meanwhile at the end of 1987 British Airways had taken over Britain's 'second force' airline, British Caledonian. This was an airline with an extensive domestic and international network which included parts of Africa and the Middle East not served by British Airways. It was also the largest operator out of London's second airport at Gatwick, where it had access to around a quarter of the runway slots. Having consolidated its domestic position, British Airways set about improving its international scope. In 1987 it set up a worldwide marketing alliance with United in the USA and in 1989 tried unsuccessfully to buy into United. Early in 1990 the airline bought a 20 per cent shareholding in Sabena World Airlines, a new company jointly owned with Sabena (60 per cent) and KLM (20 per cent). In addition to operating the existing Sabena network, SWA planned to develop a wide European network, based on a Brussels hub linking 75 European regional centres.

Air France's strategy has been to concentrate on ensuring total dominance of its home market. It started this by building up its shareholding in Air Inter, the dominant French domestic carrier, and by acquiring 40 per cent of TAT, the largest of the French regional carriers. The final success of its strategy was the acquisition early in 1990 of 54.6 per cent of UTA, France's only other large international scheduled airline. Since UTA also held over a third of Air Inter's shares, this deal gave Air France total control of Air Inter as well (Figure 4.2). Air France's strategy was helped in no small way by a French government policy statement of November 1988 which reconfirmed that the government would designate only one airline per route. This precluded UTA from gaining access to Air France's more lucrative international routes except after a lengthy battle in the European Court. UTA gave up the struggle!

Most of the other west European airlines also became involved in share purchases, share swops and marketing alliances. The longer-term effect of all these moves would be to reduce the potential for competition between the major European scheduled carriers at a time when liberalization was creating a more

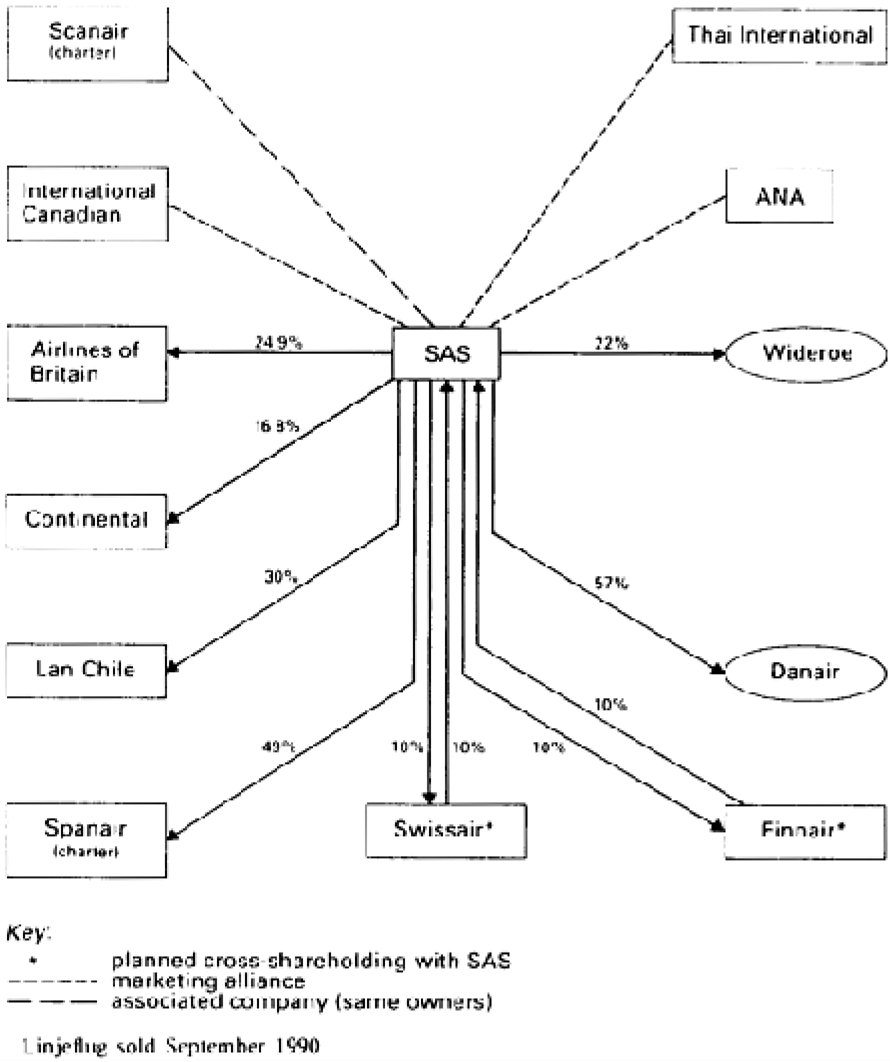

Figure 4.1 SAS marketing spread, September 1990

Source: Compiled by author.

competitive environment. The other source of potential competition was the European charter industry, where structural changes were also taking place.

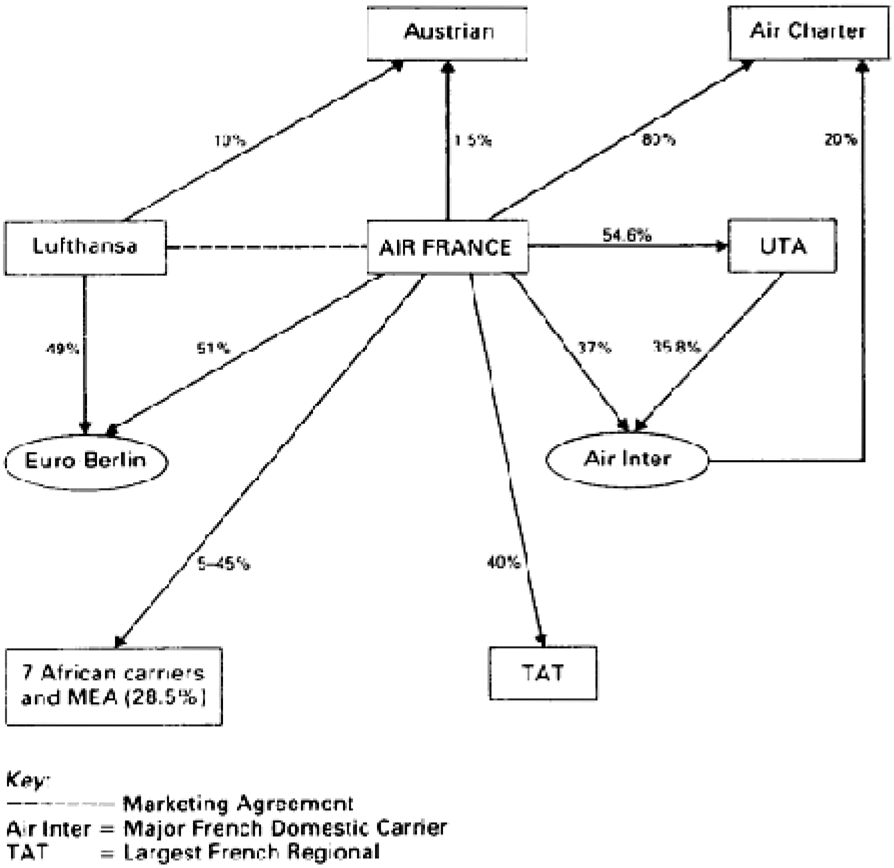

Figure 4.2 Air France shareholdings, September 1990

Source: Compiled by author.

4.4.2
CHARTER AIRLINES MOVE INTO SCHEDULED MARKETS

Competition between charter and scheduled services had previously been indirect and confined to the inclusive tour markets and in recent years to the bottom sector of the leisure market catered for by ‘seat only’ charter tickets. Direct competition was limited by the fact that on many holiday routes only charter flights were available while many of the major European routes were more or less exclusively served by scheduled carriers, as in the case of London-Paris. But as the bilaterals were liberalized, especially those of the United Kingdom, a number of charter airlines began to operate scheduled services.

At first, such scheduled services were to Mediterranean holiday destinations. Most of the large British charter airlines started operating one or two scheduled routes to Spain or Portugal in 1986. But in October 1986, the Dutch charter carrier Transavia launched an Amsterdam-London (Gatwick) service, while a month later Air Europe applied for 11 scheduled licences to Europe, including several to business destinations. This process was accelerated in 1988 when British Airways was forced by the European Commission to give up some of British Caledonian's scheduled routes when it took over that airline. Some of these routes were snapped up by charter airlines, notably Air Europe. By early 1990 Air Europe had built up a network of over 15 scheduled routes, mainly from London, serving many of the major European cities. Other charter airlines had also developed their scheduled networks but to a more limited extent. Meanwhile in Germany in 1988 charter airlines, such as Aero Lloyd, had been allowed to launch scheduled domestic services and later some international flights as well.

The reasons for these moves into scheduled operations were fairly mixed. They enabled charter airlines to increase their yields by tapping into the higher-fare business and independent leisure market while continuing to cater for the charter market through selling blocks of seats on their scheduled flights to tour operators at charter rates. Scheduled services improved aircraft and crew utilization during the winter months when charter demand slumped. Year-round operations also ensured higher priority in the allocation of scarce runway slots at congested airports than did seasonal charter flights. The ultimate rationale was to expand the charter airlines' total market base and hence their profitability. They also felt that their lower operating costs (see Chapter 7) would make them very competitive with the previously entrenched scheduled carriers. The real question, however, was whether they could maintain this operating cost advantage as the size of their scheduled networks expanded. Whether, in other words, they could introduce charter economics into scheduled services?

American experience was not encouraging. After deregulation in 1978 all the major US supplemental (charter) carriers expanded into scheduled services. One by one they collapsed. One of the better known was World Airways, which developed a fairly extensive scheduled operation across both the Atlantic and the Pacific. But its losses mounted and in September 1986 it was forced to pull out of all scheduled services. It managed to survive by becoming a pure charter airline. None of the other supplementals that entered scheduled markets in the early 1980s still survives today.

There were several reasons for the failure of the US supplementals to survive in scheduled markets. Their low fares based on lower costs could be selectively matched where necessary by the scheduled airlines once fares were deregulated. The supplementals lacked recognition among the travelling public and did not have the critical mass, in terms of size, to compete effectively in the markets they entered. Many of their aircraft were too large for the scheduled markets in which they operated new services. As a result frequencies were too low. Furthermore, US anti-trust legislation effectively prevents vertical integration between tour operators and airlines. The European charter airlines are in a stronger position when entering scheduled markets. They are substantially larger and better-known airlines, at least in their home markets, than their US counterparts were. Most also have close links with large tour operators and travel agencies that can provide both a distribution network and a source of passengers. However, by early 1990 there were clear indications that the charter airlines were having trouble in coping with the demands of scheduled services. Air Europe, which had developed the most extensive scheduled operations, was in some difficulty. Its costs were rising as it tried to meet the needs of a scheduled operation, while it was having problems marketing its services in the non-UK points it served because it was unknown. Its scheduled load factors, which initially had been relatively high at around 75 per cent, began to decline as the scheduled network was expanded. Growing problems with its scheduled operations together with a downturn in the charter market induced Air Europe's parent company to consider selling the airline in April 1990. Other airlines heavily involved in both charter and scheduled operations also looked vulnerable at that time, notably the British airline Dan Air. Meanwhile, Britannia, the largest charter airline, decided in August 1990 to discontinue its limited scheduled services.

4.4.3
GROWING CONCENTRATION AMONG TOUR OPERATORS

As 1993 and the single European market approached, the large tour-operating companies began to follow the airlines' lead. They looked for mergers and alliances which would generate substantial scale benefits and consolidate their market base while giving them greater marketing scope. This trend was most marked in the United Kingdom. It began in the summer of 1988 when Thomson Holidays, the largest UK tour operator, took over Horizon Holidays, which was the third largest, together with its charter airline Orion. Orion was absorbed by Thomson's own charter airline Britannia. In an industry where there are substantial economies of scale, firms struggled to increase their size. But the competitive pressures meant that many failed, especially when growth in demand weakened from 1988 onwards, and they were absorbed by the bigger companies, which themselves needed to increase in size. By the spring of 1990 three giants had emerged in the UK: Thomson Holidays, the International Leisure Group and Owners Abroad. Together they controlled about 50 per cent of the United Kingdom market for inclusive package holidays.

The same trend was apparent in other west European countries. In France, two very large groups emerged as a result of consolidations. In 1989, the two market leaders, Club Mediterranée and Nouvelles Frontières, joined forces in an alliance which involved the former taking a substantial shareholding in the latter. They merged their sales and distribution systems. Then in April 1990 Club Mediterranée bought 50 per cent of Minerve, France's leading charter company.

Also in 1989, Sotair (an Air France subsidiary), Frantour (a French railways' subsidiary) and Fram joined forces to create a second major alliance of tour operators. Meanwhile, Tjaereborg, Scandinavia's largest tour operator, had been taken over by the Danish travel company Spies.

These consolidations within the European travel industry had important implications for the airlines. They meant that the leisure market, and in particular the inclusive tour market which generates well over half intra-European air travel, would be increasingly controlled by a small number of mega tour operators. These would have considerable market power and several of them owned or were establishing direct links with their own charter airlines.

4.4.4
OPERATIONAL CHANGES

The first noticeable operational change was the entry of several new small airlines onto scheduled routes in addition to the charter airlines previously mentioned. A few of the new entrants were start-up airlines, created as a result of liberalization, such as Ryanair in Britain or Hamburg Airlines in Germany. But most of the new entrants were previously existing domestic or regional carriers which substantially expanded their operations to take advantage of the increased opportunities available. Crossair, in Switzerland, and British Midland were two such companies. Though larger than the start-up entrants, these too were relatively small airlines.

Equally significant was the emergence of new fifth freedom operations between Community states. These were a direct result of the December 1987 package (see section 4.3.3 above). Two airlines in par-ticular set out to take advantage of the fifth freedom rights which were opened up. The Irish airline Aer Lingus developed a number of routes from Dublin via Manchester and other points in the UK to European destinations such as Amsterdam, Paris or Copenhagen, picking up fifth freedom traffic between the UK and Europe. Its aim was to develop a secondary hub in Manchester. Air Portugal also launched a number of European services from Lisbon to European destinations via intermediate points from which it automatically had fifth freedom rights. One example was its Lisbon-Amsterdam-Hamburg service. Other European Community airlines also launched new routes where they could exploit the newly granted fifth freedom provisions.

Another consequence of the December 1987 package was the abandonment of most of the revenue-pooling agreements which had previously been common between European carriers. The block exemptions granted in July 1988 allowed pooling agreements only if revenue transfers were limited to a maximum of 1 per cent of the total pool revenue. Given this constraint and the generally hostile climate towards pooling within the European Commission, most of the Community airlines abandoned their pool agreements. A few, such as Olympic Airways, continued to maintain their pools but essentially as a way of coordinating schedules with their pool partners rather than for the purpose of sharing revenues. One important result of the break-up of many pool agreements was that schedule coordination was abandoned. Airline flights, which on previously pooled routes had been well spaced throughout the day, began to bunch up at the more popular times as former pool partners competed head-on.

4.4.5
DECLINING YIELDS ON SOME ROUTES

Lastly, as a result of decontrol of fares and the entry of new carriers seeking market share, there has been a strong downward pressure on yields. This has not been universal because most scheduled intra-European routes are still dominated by the two national carriers from either end of the route. Though abandoning their revenue-pooling agreements, such duopolists have avoided price wars and have been willing to maintain the existing fares. Fares and yields declined appreciably only where one or more new entrants set out to capture market share by substantial fare reductions which the established carriers had to match in some way. This happened with some of the new entrants on the London-Amsterdam route and more dramatically with the entry of Ryanair on the London-Dublin market.

The general pattern was for club-(business-) class and full economy fares to remain unchanged while the new entrants introduced a variety of much lower discount fares, some of which were matched by the incumbent national carriers. On London-Amsterdam the club and economy fares in 1989 were only marginally higher than they had been in 1983 before deregulation. This means that in real or constant value terms they actually declined. In 1989, of the three major carriers on the route, British Airways and KLM were both charging identical club and economy fares, while British Midland also charged the same economy fare but offered a club-class product for it. Thus relatively little apparent price competition emerged at the top end of the fare range. But at the same time there was a dramatic proliferation of low promotional fares. In 1983, prior to the revision of the UK-Netherlands bilateral, the cheapest London-Amsterdam fare was an advance purchase fare of £82 return, and only three other reduced fares were available. Within two years of the new bilateral being signed, 15 different discount fares were available and the lowest round-trip fare cost only £55. By 1989, the number of separate fares had increased to around 30 and the cheapest return fare was £62. The multiplicity of different fares was confusing to the public, especially as they all had different and often complex restrictions placed on them. Nevertheless, their effect on yields was significant. New carriers began to impact on the London-Amsterdam route at the end of 1986 and average yields fell by about 15 per cent over the next two years. Between 1986 and 1988 KLM’s yields on London-Amsterdam went down by 16 per cent. KLM’s response was to cut capacity by 20 per cent and change from Airbus to smaller Boeing 737s so as to increase frequency. It also pulled out of Gatwick. As a result of this strategy of going for the ‘schedule-driven’ market, KLM yields went up slightly but its market share went down. At more or less the same time, KLM bought a 14.9 per cent share in Air UK as another way of participating in the UK-Netherlands and beyond markets, and 40 per cent in Transavia, a Dutch charter airline which had launched a scheduled Amsterdam-London service.

In terms of both fare reductions and traffic growth, bilateral liberalization in Europe had its most dramatic impact on the UK-Ireland market. Here a new airline, Ryanair, started a Dublin service from Luton, just north of London, in May 1986 with very low unrestricted fares. In subsequent years Ryanair and another new entrant, Virgin Atlantic, were offering unrestricted fares which were less than half the normal economy fares. This forced the established carriers, Aer Lingus and British Airways to introduce a host of lower but restricted fares. As with London-Amsterdam, the number and variety of discount fares mushroomed. Average yields are estimated to have dropped by nearly one-third (Barrett, 1989). Traffic boomed. In the five years 1980–5, London-Dublin traffic grew by only 2.9 per cent. But the 1985 traffic level was doubled in the first three years of liberalization, that is by 1988. This phenomenal growth was due to the special characteristics of this market, notably the large Irish population in the United Kingdom and a very substantial volume of seaborne ferry traffic which was ripe for diversion to air as fare levels fell. It is unlikely that deregulation elsewhere in Europe will have such a profound effect of doubling traffic in two years.

4.4.6
IMPACT LESS DRAMATIC

With the exception of the UK-Irish market, the overall impact of European liberalization during its first five years or so to 1990 appeared to be much less dramatic in terms of traffic growth, fare reductions and the emergence of new entrants and new airlines than had been the case following domestic deregulation in the United States. There would appear to be two reasons for this. First, unlike the United States where deregulation was virtually total and implemented in a very short period of time, the process within Europe has been gradual and slow. As the preceding analysis has shown, it was a step-by-step liberalization rather than total deregulation. Even by 1990 only one or two bilateral markets within Europe were largely deregulated as a result of new air services agreements. Elsewhere a greater or lesser degree of regulation still persisted. Within the European Community, a deregulated environment more closely akin to that of the United States was unlikely to emerge till after 1992. Given the slow pace of liberalization, airline responses were also relatively slow and careful. The larger airlines were more concerned with preparing and positioning themselves for the more competitive environment that was to come than in embarking on short-term price or frequency wars.

Secondly, no large and aggressive new entrant or start-up airlines emerged in Europe to challenge the dominance of the existing national carriers. There was nothing anywhere nearly comparable to US developments such as the expansion of Braniff up to 1982 or to People Express. This was no doubt related to the gradual pace of liberalization and the continued existence of barriers to new entrants in many European countries. In western Europe no new start-up airlines were created to compete head-on with the established national carriers. In some countries, existing small airlines, such as Germany's Nürnberger Flugdienst or Air Littoral in France, or one or two entirely new carriers such as Sudavia increased their international services. Usually these were on thin regional routes and rarely involved direct competition. In most of Europe there were no scheduled airlines that could effectively compete with their national carriers on the dense routes where competition was justified. France had two such airlines, Air Inter and UTA, but the French government prevented them from entering routes already served by Air France. Only in the United Kingdom were there independent airlines capable of taking advantage of the new multiple designations and increased route access that became available. The largest of these, British Caledonian, was taken over by British Airways in 1987. The others were generally smaller airlines, such as British Midland, Dan Air or Air UK, flying relatively small aircraft and characterized by high costs. Nor did they have much marketing power. As a result they had little scope for price or product innovation. They were also conservative in their approach and expanded only slowly onto newly liberalized routes. Unlike their US counterparts, they did not merge so as to challenge the majors. Even the entry of low-cost charter airlines at first had little impact. Transavia was one of the first charter airlines to enter a scheduled market (Amsterdam-London), but it was happy to accept the prevailing fare levels. Other charter airlines generally flew to Mediterranean holiday destinations when launching new scheduled services. It was not till Air Europe began systematically to develop an extensive scheduled network in 1988 that the incumbent European carriers began to face serious competition on trunk routes out of the UK from a low-cost carrier with a determined low-fare strategy. By 1990 the Air Europe scheduled services had not been in operation long enough to assess their true impact on fare levels and traffic growth. Nor was it clear whether the Air Europe strategy of a massive and rapid expansion into scheduled services would prove successful.

What is clear is that by 1990, and with the exception of Air Europe, no serious competitor had emerged to challenge the dominance of the existing national carriers. Thus, as liberalization moves towards deregulation in the Europe of the 1990s, real competition can come only from the existing airlines. But will these airlines, with their mutual shareholdings, share swops and marketing alliances, be prepared to compete with each other? In the US domestic airline industry, sudden deregulation led over 10 years to the emergence of five or six dominant carriers. In Europe, it was hoped that a gradualist approach to deregulation would prevent the consolidation of market power among a handful of airlines by ensuring that a more open and competitive environment prevailed. It is difficult to see where the new competitors to the incumbent European carriers will come from.

5
The Structure of Airline Costs

5.1
The need for costing

The costs of supplying airline services are an essential input to many decisions taken by airline managers. The way that an airline's costs are broken down and categorized will depend on the purpose for which they are being used. In airline planning, cost information is required for three key purposes. First, airlines require an overall breakdown of their total expenditure into different cost categories as a general management and accounting tool. They need a general breakdown of costs to show cost trends over time, to measure the cost efficiency of particular functional areas such as flight operations or passenger services, and ultimately to enable them to measure their operating and non-operating profit or loss. Secondly, an assessment of costs is essential in any evaluation of investments, whether in new aircraft or in new routes or services. Lastly, cost identification is crucial in the development of pricing policies and pricing decisions, for both passengers and cargo.

No single cost categorization is capable of satisfying all of these three management requirements simultaneously. A cost breakdown developed for general management purposes may be useless as a guide to pricing strategy. As a result, most airlines break down their costs in two or more different ways in order to use them for different aspects of management. While the approach to cost categorization used by each airline is strongly influenced by accounting practices in its home country, it is also influenced by the cost classification adopted by the International Civil Aviation Organization (ICAO). The governments of the member states of ICAO are required to provide ICAO each year with financial data about their airlines on a standard form. These data provide the basis for ICAO's annual *Digest of Statistics, Series F, Financial Data,* which contains the balance sheets and profit and loss statements for all the ICAO member airlines, though in practice data for several airlines are missing. The need to provide ICAO with a particular breakdown of costs and the ability once this is done to compare one's costs on a fairly straightforward basis with those of other airlines have over time induced many airlines to adopt a cst classification similar to that of the ICAO. The ICAO cost classification was in any case based fairly closely on prevailing cost practices in the United States and among several European airlines. Thus world wide throughout the airline industry there tends to be a fairly standard approach to the categorization of costs for general management use.

5.2
The traditional approach to airline costs

5.2.1
OPERATING AND NON-OPERATING ITEMS

It is normal practice to divide airline accounts into operating and non-operating categories. The aim is to identify and separate out as non-operating items all those costs and revenues not directly associated with the operation of an airline's own air services. ICAO, the former US Civil Aeronautics Board (CAB) and most airlines have adopted this practice.

ICAO identifies five *non-operating items:*

(1) The gains or losses arising from the retirement of property or equipment, both aeronautical and non-aeronautical. Such gains or losses arise when there is a difference between the depreciated book value of a particular item and the value that is realized when that item is retired or sold off.

(2) Interest paid on loans, as well as any interest received from bank or other deposits. For some costing purposes, however, such as aircraft evaluation, some airlines would include interest paid on aircraft-related loans as an operating cost.

(3) All profits or losses arising from an airline's affiliated companies, some of which may themselves be directly involved in air transport. In some cases this item may be of some importance in the overall financial performance of an airline. In 1990 British Airways, for example, had over 15 wholly owned subsidiaries and shareholdings in another 10 or so related companies.

(4) An assortment of other items which do not fall into the previous three categories, such as losses or gains arising from foreign exchange transactions or from sales of shares or securities. In recent years airlines have from time to time made large losses or profits as a result of sudden marked fluctuations in exchange rates. These are clearly a non-operating item.

(5) The final item is direct government subsidies or other government payments. In the case of some airlines, subsidies have at times been very substantial. Thus, in the early 1980s Air France, like several other airlines, received government subsidies to see it through the loss-making years that

followed the fuel price escalation of 1978–9. Such subsidies would appear as non-operating items.

For some airlines non-operating items may have a major impact on their financial results. Thus, in the financial year 1989/90 Singapore Airlines produced an overall profit before tax of US$718 million. Of this, only US$503 million or 70 per cent was from airline operations. The remainder came from non-operating items. As much as $37 million was dividends from subsidiary companies, there was a surplus on the sale of aircraft and other assets of US$98 million while the airline earned a further net surplus of $80 million from bank interest. Non-operating items are not necessarily profits or surpluses. They may well be losses or costs. In particular, most airlines normally pay out a great deal more in interest charges on their loans than they receive from their own cash deposits at the bank. Thus in 1988 TWA had a net interest charge for the year of $344 million. In other words, it was paying almost $1 million in net interest each day. In the same year, Continental, the US carrier, turned an operating surplus of $83 million into a deficit of about $315 million before tax by the inclusion of three large non-operating costs—a $129 million provision for extraordinary items, interest charges of $285 million and a loss of $12 million from affiliated companies, though there was a profit of $27 million from the sale of assets (ICAO, 1988a). Since the nature of each airline’s non-operating costs and revenues is probably unique, in that many non-operating items are influenced by circumstances which are very particular to each airline, inter-airline comparisons of total non-operating costs are of little value.

On the operating side, airline accounts are divided into operating revenue and *operating costs*. The latter can be further subdivided into direct operating and indirect operating costs. In theory, the distinction between these two cost categories is fairly clear. Direct operating costs should include all those costs which are associated with and dependent on the type of aircraft being operated and which would change if the aircraft type was changed. Broadly speaking, such costs should include all flying expenses (such as flight crew salaries, fuel and oil), all maintenance and overhaul costs and all aircraft depreciation costs. Indirect operating costs are all those costs which will remain unaffected by a change of aircraft type because they are not directly dependent on aircraft operations. They include areas of expenditure which are passenger related rather than aircraft related (such as passenger service costs, costs of ticketing and sales, and station and ground costs) as well as general administrative costs. In practice, however, the distinction between direct and indirect operating costs is not always clear cut. Certain cost items, such as maintenance administration or costs of cabin staff, are categorized as direct costs by some airlines and as indirect costs by others.

The main categories of airline operating costs are shown in Table 5.1. The cost categories shown are those currently accepted and used, with some modification, by ICAO, by the UK Civil Aviation Authority and by the US

Department of Transportation. Similar cost categories are used by the majority of airlines round the world.

5.2.2
DIRECT OPERATING COSTS

Cost of flight operations

This is undoubtedly the largest single element of operating costs. It includes, in the first place, all costs associated with *flight crew*. Such costs cover not only direct salaries and travelling and stopover expenses but also allowances, pensions, insurance and any other social welfare payments. Flight crew costs can be directly calculated on a route-by-route basis or, more usually, they are expressed as an hourly cost per aircraft type. In the latter case the total flight crew costs for a particular route or service can be calculated by multiplying the hourly flight crew costs of the aircraft being operated on that route by the block time for the route.

The second major cost element of flight operations is *fuel*. Fuel consumption varies considerably from route to route in relation to the sector lengths, the aircraft weight, wind conditions, the cruise altitude, and so on. Thus an hourly fuel cost tends to be even more of an approximation than an hourly flight crew cost, and it is normal to consider fuel consumption on a route-by-route basis. In addition to aviation fuel, aircraft also use up *oil*. But the oil consumption is negligible and, rather than try to calculate it directly for each route, the normal practice is to have an hourly figure for oil consumption for each type of engine. The oil consumption on a particular route is then calculated from the number of engines on the aircraft flying the route multiplied by the hourly oil consumption for that engine and by the block time. For turbo-prop aircraft there is additional expenditure on water methanol, which is used to boost engine power at take-off. This is a very small cost element which can be directly related to the number of take-offs per route. Fuel and oil costs include all relevant taxes and duties, such as taxes on fuel or oil levied by governments, or fuel throughput charges levied by some airport authorities on the volume of fuel uplifted.

Another significant element of flight operation costs is made up of *airport and en route charges*. Airlines have to pay airport authorities for the use of the runway and terminal facilities. Airport charges normally have two elements: a landing fee related to the weight of the aircraft and a passenger charge levied on the number of passengers boarded at that airport (occasionally it is calculated on the number of disembarked passengers). Many Third World airports do not charge the airlines for the number of passengers embarked but collect a fee directly from each passenger on departure. This does not appear as an airline cost. Additionally, if an aircraft stays at an airport beyond a stated time period, it will have to pay parking or hangarage fees. These are relatively small compared with the basic landing and passenger charges.

Table 5.1 Structure of operating costs

DIRECT OPERATING COSTS (DOC):	
1	*Flight operations*
—Flight crew salaries and expenses	
—Fuel and oil	
—Airport and en route charges[a]	
—Aircraft insurance	
—Rental/lease of flight equipment/crews[b]	
2	*Maintenance and overhaul*
—Engineering staff costs	
—Spare parts consumed	
—Maintenance administration (could be IOC)	
3	*Depreciation and amortization*
—Flight equipment	
—Ground equipment and property (could be IOC)	
—Extra depreciation (in excess of historic costs)	
—Amortization of development costs and crew training	
INDIRECT OPERATING COSTS (IOC):	
4	*Station and ground expenses*
—Ground staff	
—Buildings, equipment, transport	
—Handling fees paid to others	
5	*Passenger services*
—Cabin crew salaries and expenses (could be DOC)	
—Other passenger service costs	
—Passenger insurance	
6	*Ticketing, sales and promotion*
7	*General and administration*
8	*Other operating costs*

Notes:
[a] ICAO classifies airport and en route charges as an indirect operating cost under 'Station and ground expenses'.
[b] The US practice is to classify rentals under 'Depreciation'.

Airlines must also pay en route navigation charges to cover the cost of en route navigation aids that their aircraft use while flying. The actual level of the navigation charge is related to the weight of the aircraft and the distance flown over a country's airspace. As a result, both airport charges, where they are not passenger related, and navigation services charges will vary with the type of aircraft used and are therefore considered as a direct operating cost. On the other hand, passenger-related charges do not vary with aircraft type. This may partly explain why ICAO insists on treating landing and en route charges as an indirect cost, though few airlines follow this lead. Since landing and en route charges vary by individual airport and country, they must be separately calculated for each flight or route.

A relatively small cost in flight operations is that of the *insurance of the flight equipment*. The insurance premium paid by an airline for each aircraft is calculated as a percentage of the full purchase price. The annual premium may be between 1.5 per cent and 3 per cent depending on the airline, the number of aircraft it has insured, and the geographical areas in which its aircraft operate. If the airline wants full war risk cover, if it wants to be covered against terrorist action or if it is operating in or through an area where there is armed conflict, an additional premium of up to 2 per cent may need to be paid. The annual premium, which is fixed, can be converted into an hourly insurance cost by dividing it by the projected aircraft utilization, that is, by the total number of block hours that each aircraft is expected to fly during the year.

Lastly, there may be some costs related to flight operations which do not fall into any of the above categories. Such additional costs may include costs of *flight crew training* or of *route development*. However, if training costs are amortized over two or three years then they are grouped together with depreciation. Some airlines may, in addition, have to meet *rental or lease charges* for the hiring or leasing of aircraft or crews from other airlines. These are usually considered as part of flight operation costs. Several of the small national airlines were originally launched on the basis of leased aircraft, though more recently operating leases have become widespread even among larger airlines. In such cases, rental or lease charges are high, pushing up that airline's total flight operations costs to abnormally high levels. This is because the rental charges for leased aircraft effectively cover both the depreciation and the interest charges paid by the owners of the aircraft. Conversely, airlines heavily dependent on leased equipment tend to have very low depreciation charges, since they pay for depreciation indirectly through the rental charge. It is because rentals include a large element of depreciation that the American practice is to categorize rental charges under the heading of depreciation rather than to treat them as a cost of flight operations.

Maintenance and overhaul costs

Total maintenance costs cover a whole series of separate costs, related to different aspects of maintenance and overhaul, which ideally ought to be treated separately. In practice there are so many joint costs in the separate maintenance areas that it is difficult, if not impossible, for many airlines to break down total maintenance costs into separate cost categories. As a consequence both ICAO and the UK Civil Aviation Authority, which closely follows ICAO practice, group all maintenance and overhaul expenditure into a single undivided cost item. This item covers not only routine maintenance and maintenance checks but also periodic overhauls and repairs. It encompasses labour costs and expenses related to all grades of staff involved directly or indirectly in maintenance work. Where possible, costs of maintenance staff at outstations should be separated out from station costs and included under maintenance. The costs of components and spare parts consumed are also included, as are the costs of workshops, maintenance hangars and offices. Finally, if an airline is subcontracting out any of the maintenance done on its own aircraft, then the charges it pays for any such work should be allocated to the maintenance and overhaul category.

In the United States, the CAB and subsequently the Department of Transportation have required airlines to split their flight equipment maintenance costs into three categories: direct maintenance on the airframe; direct maintenance on the engines; and a maintenance burden. The maintenance burden is essentially the administrative and overhead costs associated with the maintenance function which cannot be attributed directly to a particular airframe or engine but are allocated on a fairly arbitrary basis. US airlines are obliged to furnish the federal government with these three categories of maintenance costs separately for each aircraft type that they operate. These data are published quarterly and provide an excellent basis for the comparison of maintenance costs between airlines and also between different aircraft types and engines (Avmark, 1990).

Outside the United States, airlines also try to apportion their maintenance costs between different aircraft types but there is no standard way of doing this, so inter-airline comparisons would not be valid even if such data were publicly available. Individual airlines, having estimated the total maintenance costs for one particular aircraft type, may then convert these costs into an hourly maintenance cost by dividing them by the total number of block hours flown by all the aircraft of that particular type operated by the airline.

Depreciation and amortization

Depreciation of flight equipment is the third component of direct operating cost. Airlines tend to use straight-line depreciation over a given number of years with a residual value of 0–15 per cent. Up to the early 1970s, depreciation periods were generally 12 years or less. The introduction of wide-bodied jets led to a lengthening of the depreciation period, first, because the capital cost of such aircraft was very much higher than that of the previous generation of aircraft; second, because air transport technology appeared to have reached a plateau. It became much more difficult than it had been previously to predict that further developments in technology might adversely affect and shorten the economic life of the wide-bodied jets. Their economic life was dependent on the strength and technical life of their various components and was unlikely to be affected by any new leaps forward in aircraft technology which might make them obsolescent. In response to these two factors, airlines throughout the world have tended to lengthen the depreciation period of their large wide-bodied jets to 14–16 years with a residual value of around 10 per cent. For smaller short-haul aircraft, depreciation periods are shorter, generally 8–10 years.

The annual depreciation charge or cost of a particular aircraft in an airline's fleet depends on the depreciation period adopted and the residual value assumed. An airline buying a Boeing 747–400 early in 1990 might have paid $127 million for the aircraft and another $13 million for a spares holding, making a total of $140 million. Assuming it depreciated the aircraft over 15 years to a 10 per cent residual value, then the annual depreciation charge could be calculated as follows:

Annual depreciation

$$= \frac{\text{Price of aircraft \& spares (\$140m)} - \text{residual value (10\%)}}{\text{Depreciation period (15 years)}}$$

$$= \frac{\$140\text{m} - \$14\text{m}}{15} = \frac{\$126}{15} = \$8.4\text{m}.$$

If an airline chooses a shorter depreciation period, then the annual depreciation cost will rise. Thus Singapore Airlines in the financial year 1989/90 depreciated its aircraft over 10 years. On this basis and with a 10 per cent residual value, then the annual depreciation cost of the Boeing 747–400 aircraft would rise from $8.4 million to $12.6 million, thereby increasing operating costs.

The hourly depreciation cost of each aircraft in any one year can be established by dividing its annual depreciation cost by the aircraft's annual utilization, that is, the number of block hours flown in that year. Thus, if the Boeing 747–400 above achieved 3,500 block hours in a year, its hourly depreciation cost would be $2,400 ($8.4m divided by 3,500). If the annual utilization could be pushed up to 4,500 hours, then the hourly cost would be cut to $1,867 ($8.4m divided by 4,500). It is evident that any changes in the depreciation period, in the residual value or in the annual utilization will all affect the hourly depreciation cost.

A major issue for airline accountants in recent years has been whether to use the historic purchase price of the aircraft as the basis for calculating its annual depreciation cost or the current cost of replacing that asset (aircraft), which may be substantially higher, especially for aircraft that are more than five or six years old. Current cost depreciation would result in substantially higher annual depreciation charges and few airlines have adopted this. Some airlines, however, Swissair among them, have adopted a policy of charging extra depreciation in good years when profits are high. This enables them to put more money aside for fleet replacement.

It is ICAO practice to include depreciation of ground property and equipment as a further item of direct operating costs. This practice is questionable in that such depreciation charges are not directly related to the operation of aircraft and, except where they relate to ground equipment which is specific and unique to a particular aircraft type, they will remain unaffected if an airline changes its fleet.

Many airlines amortize the costs of flight crew training as well as any developmental and pre-operating costs related to the development of new routes or the introduction of new aircraft. In essence this means that such costs, instead of being debited in total to the year in which they occur, are spread out over a number of years. Such amortization costs are grouped together with depreciation.

5.2.3 INDIRECT OPERATING COSTS

Station and ground expenses

Station and ground costs are all those costs incurred in providing an airline's services at an airport other than the cost of landing fees and other airport charges. Such costs include the salaries and expenses of all airline staff located at the airport and engaged in the handling and servicing of aircraft, passengers or freight. In addition there will be the costs of ground handling equipment, of ground transport, of buildings and offices and associated facilities such as telex machines, telephones, and so on. There will also be a cost arising from the maintenance and insurance of each station's buildings and equipment. Rents may have to be paid for some of the properties used. By far the largest expenditure on station and ground staff and facilities inevitably occurs at an airline's home base. At some of the smaller airports it serves, an airline may decide to contract out some or all of its check-in and handling needs. Handling fees charged by third parties should appear as a station expense.

Some aircraft maintenance may be done at an airline's outstations and the costs arising from such maintenance work should ideally be included as a direct operating cost under the 'maintenance and overhaul' category. But maintenance expenditures are frequently difficult to disentangle from other station costs and are in many cases left as part of station and ground costs.

Costs of passenger services

The largest single element of costs arising from passenger services is the pay, allowances and other expenses directly related to aircraft cabin staff and other passenger service personnel. Such expenses would include hotel and other costs associated with overnight stops as well as the training costs of cabin staff, where these are not amortized. As the number and grading of cabin staff may vary by aircraft type, some airlines consider cabin staff costs as an element of flight operations costs; that is, as a direct operating cost.

A second group of passenger service costs are those directly related to the passengers. They include the costs of in-flight catering, the costs of accommodation provided for transit passengers, the costs of meals and other facilities provided on the ground for the comfort of passengers, and expenses incurred as a result of delayed or cancelled flights.

Lastly, premiums paid by the airline for passenger liability insurance and passenger accident insurance should also be included. These are a fixed annual charge based on an airline's total passenger-kilometres produced in the previous year. The premium rate will depend on each airline's safety record but is likely to be within the range of 35–55 US cents per 1,000 revenue passenger-kilometres.

Ticketing, sales and promotion costs

Such costs include all expenditure, pay, allowances, etc., related to staff engaged in ticketing, sales and promotion activities as well as all office and accommodation costs arising through these activities. The costs of retail ticket offices or shops, whether at home or abroad, would be included. Problems of cost allocation arise. It is frequently difficult, especially at foreign stations, to decide whether particular expenses should be categorized as station and ground expenses or as ticketing, sales and promotion. For instance, where should an airline allocate the costs of ticketing staff manning a ticket desk at a foreign airport who may also get involved in assisting with the ground handling of passengers? The same difficulty arises with the costs of an airline's 'country manager' in a foreign country who may have overall charge for sales as well as the handling at the airport.

The costs of all advertising and of any other form of promotion, such as familiarization visits by journalists or travel agents, also fall under this heading. Lastly, commissions or fees paid to travel agencies for ticket sales would normally be included here.

General and administrative costs

General and administrative costs are generally a relatively small element of an airline's total operating costs. This is because, where overhead costs can be related directly to a particular function or activity within an airline (such as maintenance or sales), then they should be allocated to that activity. Thus, strictly speaking, general and administrative costs should include only those cost elements which are truly general to the airline or which cannot readily be allocated to a particular activity. Inter-airline comparison of these general costs is of little value, since airlines follow different accounting practices. While some airlines try to allocate their central costs to different cost centres as much as possible, other airlines do not do so either as a matter of policy or because their accounting procedures are not sophisticated enough to enable them to do so.

Where airlines cannot legitimately include a particular expense under one of the cost categories discussed above, they may include it as a separate item under *'Other operating expenses'*.

5.3
Trends in airline costs

The distribution of total operating costs between the various cost elements discussed above can be seen in Table 5.2. It is apparent that for the world's scheduled airlines as a whole just over half of total operating costs now arise from direct costs, though in the 1980s the figure was generally around 55 per cent. The rest are indirect costs. While this is a useful generalization, it hides the fact that there may be differences between airlines in the cost structure. A number of factors cause variations in airline cost structures, but direct operating costs are generally between 45 per cent and 60 per cent of total operating costs. It is only in non-scheduled operations that direct costs generally surpass 60 per cent of total operating costs and may reach as high as 80 or 85 per cent.

It has previously been pointed out (Figure 1.1) that, as a result of rapid technological developments since the Second World War, the unit operating costs of air transport declined steadily in real terms in the 1950s and 1960s. This downward trend bottomed out in 1970 and the unit operating costs then remained fairly steady in real terms despite two hiccups in 1974 and 1979/80. After 1980, the downward trend in real unit costs returned, though the decline was slower than it had been previously. In current terms, the unit operating costs of the world's scheduled airlines rose by about half in the decade 1978–88 from 30.1 US cents per available tonne-kilometre to 46.8 cents.

The two successive oil crises of 1973 and 1979/80 have dramatically altered the structure of airline costs. Whereas in 1972 fuel and oil had on average represented about 10–11 per cent of ICAO airlines' total operating costs, by 1978 this figure had gone up to about 18 per cent (Table 5.2). Three years later, in 1982, fuel and oil accounted for close to 29 per cent or nearly one-third of airline costs. As the real price of fuel declined after 1982 so did its share of total costs, so that by 1988 this was down to 14.5 per cent. It was largely as a result of the escalation of fuel prices that flight operations costs went up from just under 30 per cent of total costs in the early 1970s to a peak of 43–44 per cent in 1980/1 before declining to just above 30 per cent.

Table 5.2 Distribution of operating costs: scheduled airlines of ICAO, 1978–88

	1978 %	1983 %	1988 %
Direct operating costs:			
1 Flight operations	35.2	39.1	31.1

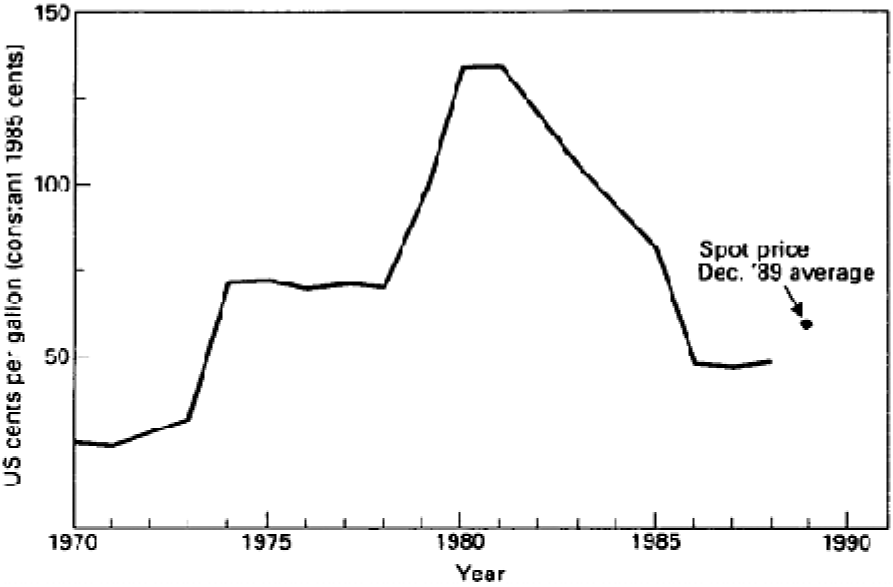

Figure 5.1 Changes in the real price of jet fuel, 1970–89

Source: Airbus Industrie.

		1978 %	1983 %	1988 %
	Flight crew salaries/expenses	(8.5)	(7.1)	(6.8)
	Fuel and oil	(18.4)	(24.5)	(14.5)
	Airport and en route fees	(5.2)	(4.8)	(5.2)
	Insurance and aircraft rentals	(3.1)	(2.7)	(4.6)
2	Maintenance and overhaul	12.3	10.0	11.5
3	Depreciation and amortization	7.9	7.2	7.8
	Total DOC	55.4	56.3	50.4
Indirect operating costs:				
4	Station and ground expenses	12.6	11.1	12.6
5	Passenger services	10.1	9.2	10.5
6	Ticketing, sales and promotion	15.5	16.4	17.6
7	General and administrative	6.4	7.0	8.9
	Total IOC	44.6	43.7	49.6
Total operating costs		100.0	100.0	100.0

Source: ICAO (1990).

The two other elements of direct operating costs—maintenance costs and depreciation—were not as adversely affected by the general inflation of costs as were flight operations. Both these cost elements, but particularly depreciation, were helped by the introduction of the wide-bodied jets during the last two decades, which were technically more proficient and had lower maintenance requirements. At the same time, their annual productivity was such that, despite their high purchase price, their unit cost of depreciation was actually lower in real terms than that of the aircraft they were replacing. As a result, the share of both maintenance and depreciation in total costs has been fairly stable. However, the large variations in the price of fuel and, as a consequence, in flight operation costs has meant that direct operating costs as a whole rose from about 55 per cent of total operating costs to a peak of 60 per cent in 1980/1. They then declined gradually to stabilize at around 50 per cent.

In terms of indirect operating costs, the most marked increases have occurred in ticketing, sales and promotion costs. Ticketing, sales and promotion are today by far the most significant indirect cost element, accounting for almost 18 per cent of total costs (Table 5.2). The other worrying trend is the steady increase in the proportion of expenses attributed to general and administrative functions.

5.4
The concept of 'escapability'

The traditional classification of costs described above is essentially a functional one. Costs are allocated to particular functional areas within the airline, such as flight operations or maintenance, and are then grouped together in one or two categories, as either direct or indirect operating costs. This cost breakdown is of considerable value for accounting and general management purposes. This is particularly so where the organizational structure within an airline corresponds fairly closely to the same functional areas as may be used for costing purposes—in other words, where an airline has a flight operations division, an engineering (maintenance) division, a sales division, and so on. A functional classification of costs is useful for monitoring an airline's performance over time and also for inter-airline comparisons. Costs can be broken down relatively easily to produce disaggregate costs within a particular functional area. For instance, one could analyse separately labour costs in the maintenance area as opposed to the labour costs in station and ground operations.

In addition, the broad division into direct and indirect costs is especially useful when dealing with aircraft evaluation. The indirect costs of a particular network or operation can be assumed to remain constant, since they are unaffected by the type of aircraft used. An evaluation of a new aircraft type or a comparison between several aircraft can then be based purely on an assessment of the direct operating costs. This simplifies the process of evaluation.

The great advantage of the traditional approach to cost classification is its simplicity and the fact that in allocating costs by functional area it avoids many of the problems associated with trying to allocate joint or common costs. For instance, station and ground costs common to a number of different services are grouped together and are not allocated to particular flights or services. However, the simplicity of this cost classification is also its major drawback. It is of only limited use for an economic evaluation of particular services or routes; or for pricing decisions; or for showing how costs may vary with changes in the pattern of operations on a particular route.

To aid decision-making in these and other related areas the concept of ‘escapability’ of costs needs to be introduced. The degree of escapability is determined by the time period required before a particular cost can be avoided. Clearly some costs may be immediately escapable, as a result of a particular management decision, while others may not be avoided except in the very long run. The concept of escapability involves a temporal dimension. Different costs will require different periods before they can be avoided, but ultimately all costs are escapable. There is also a technical dimension to the concept, in that the degree of escapability also varies with the size and nature of the airline service or activity being considered. Thus, if all services on a particular route were to be cut, the nature of the escapable costs would be other than if only one flight on a particular day of the week were cancelled on this same route. The first course of action might involve not only a saving of flight operation costs but also the closure of a complete station or a reduction in the number of crews or even the number of aircraft in the fleet. Cancellation of only one flight a week may involve a reduction in some flight operation costs but little else. This is because many costs are joint or common costs and will go on being incurred to support the remaining flights even if one flight a week is cancelled. The interaction of the temporal and technical aspects of escapability must be constantly borne in mind by airline managers.

Airlines vary in the way they introduce the concept of escapability into their costing procedures. The most usual way is by adopting the traditional accounting distinction of fixed and variable costs. Airlines do this by taking those elements of cost generally accepted as being direct operating costs and further subdividing them into ‘fixed’ and ‘variable’ costs. There are several ways in which this can be done because of the temporal and technical considerations outlined above. The larger and more sophisticated airlines may use one breakdown of costs for, say, pricing decisions and a different one for evaluating the profitability of particular services or routes. One possible approach is discussed below.

5.4.1
FIXED AND VARIABLE DIRECT OPERATING COSTS

Fixed or standing costs are those direct operating costs which in the short run do not vary with particular flights or even a series of flights. They are costs which in the short or medium term are not escapable. They are certainly not escapable within one scheduling period. That is to say, having planned its schedules for a particular programme period and adjusted its fleet, staff and maintenance requirements to meet that particular schedules programme, an airline cannot easily cut back its schedules and services, because of public reaction and its own obligations towards the public, until the next schedules programme is introduced. New schedules would normally be introduced twice a year. If the airline decided to cut back its frequencies when the next schedules programme was introduced, it could reduce its fleet by selling some aircraft and it could reduce its staff numbers and cut its maintenance and other overheads. Thus fixed or standing DOCs may be escapable but only after a year or two, depending on how quickly the airline could actually change its schedules and cut back on aircraft, staff, and so on.

Variable or flying costs are costs which are directly escapable in the short run. They are those costs which would be avoided if a flight or a series of flights was cancelled. They are immediately escapable costs, such as fuel, flight crew overtime and other crew expenses arising in flying particular services, landing charges, the costs of passenger meals, and so on. These are fairly self-evident. Less self-evident are the engineering or maintenance costs which should be classified as variable. Certain maintenance checks of different parts of the aircraft, involving both labour costs and the replacement of spare parts, are scheduled to take place after so many hours of flying or after a prescribed number of flight cycles. (A flight cycle is one takeoff and landing.) Undercarriage maintenance, for example, is related to the number of flight cycles. Since a large part of direct maintenance is related to the amount of flying or the flight cycles, cancelling a service will immediately reduce both the hours flown and the flight cycles and will save some engineering expenditure, notably on the consumption of spare parts, and some labour costs.

While most *indirect operating costs* are fixed costs in that they do not depend in the short term on the amount of flying undertaken, others are more directly dependent on the operation of particular flights. This is particularly true of some passenger service costs such as in-flight catering and hotel expenses and some elements of cabin crew costs. Fees paid to handling agents or other airlines for ground handling of aircraft, passengers or freight can be avoided if a flight is not operated. Some advertising and promotional costs may also be escapable in the short run. Airlines breaking down their costs according to their escapability take some or all of the above expenses previously categorized as indirect costs and redefine them as fixed or variable direct operating costs. This leaves within the indirect cost category costs which are not dependent on the operation of particular services or routes. They are fixed in the short term.

One possible division of costs based on the concept of escapability is shown in Table 5.3. In this example, all cabin crew costs, handling fees paid to others and the costs of in-flight catering and passenger hotels all previously categorized as indirect operating costs (in Table 5.1) are here shown as direct costs. Using published operating cost data for the financial year 1988/9 (CAA, 1990b) it proved possible to break down British Airways' costs in the way suggested in

Table 5.3. This analysis showed that British Airways' costs in that year were made up as follows:

Direct operating costs	
Variable	36.2%
Fixed or standing	22.3%
Indirect operating costs	41.5%
	100.0%

This breakdown is shown in greater detail in Figure 5.2. It is clear that in British Airways' case more than a third of the total operating costs are immediately escapable. The same exercise conducted a few years earlier (that is, after the fuel price increases of 1978) would have shown that variable costs were around 50 per cent or more of total costs.

The high proportion of variable costs has important implications for operations planning and for pricing. It shows that significant savings can be achieved in the short term by cancelling a flight or a series of flights. The potential savings are greatest when the price of fuel is high, since this increases the relative proportion of variable costs.

Variable costs are those that are immediately escapable. In the medium term, that is, within a period of a year or so, many costs previously considered fixed start to become variable. Aircraft can be sold, cutting depreciation costs, staff numbers can be run down or staff redeployed, sales offices shut, headquarters buildings sold off. Elements of both fixed direct costs and indirect costs are escapable in the medium term. Ultimately all costs are escapable. What is perhaps more significant and often forgotten is that as much as 90 per cent of

Table 5.3 Cost structure based on fixed and variable direct operating costs

VARIABLE DIRECT OPERATING COSTS	FIXED/STANDING DIRECT OPERATING COSTS
1 *Fuel costs*	7 *Aircraft standing charges*
– fuel	– depreciation or rental
– oil consumed	– insurance
– water methanol (if any)	8 *Annual flight crew costs*
2 *Variable flight crew costs*	– fixed salaries and other expenses unrelated to amount of flying done
– flight crew subsistence and bonuses	
3 *Variable cabin crew costs*	– flight crew administration
– cabin crew subsistence and bonuses	9 *Annual cabin crew costs*

	– fixed salaries and other expenses unrelated to amount of flying done
4 *Direct engineering costs*	
– related to number of flying cycles	
	– cabin crew administration
– related to number of flying hours	10 *Engineering overheads*
	– fixed engineering staff costs unrelated to aircraft utilization
5 *Airport and en route charges*	
– landing fees and other airport charges	
	– maintenance administration and other overheads
– en route navigation charges	
6 *Passenger service costs*	
– passenger meals/hotel expenses	
– handling fees paid to others	
INDIRECT OPERATING COSTS	
	11 *Station and ground expenses*
	12 *Passenger services*
	– passenger service staff
	– passenger insurance
	13 *Ticketing, sales and promotion*
	14 *General and administrative*

Note: Cabin crew costs, passenger meals/expenses and handling fees here classified as direct costs whereas in Table 5.1 they were part of indirect costs.

total costs can be varied in the medium term either by discontinuing all operations or by a partial withdrawal of certain operations. Airlines can disinvest or dramatically cut their operations more easily than most forms of public transport because they do not have fixed investments in navigational aids, runways or terminals, though there may be some exceptions, as in North America where airlines may own terminals.

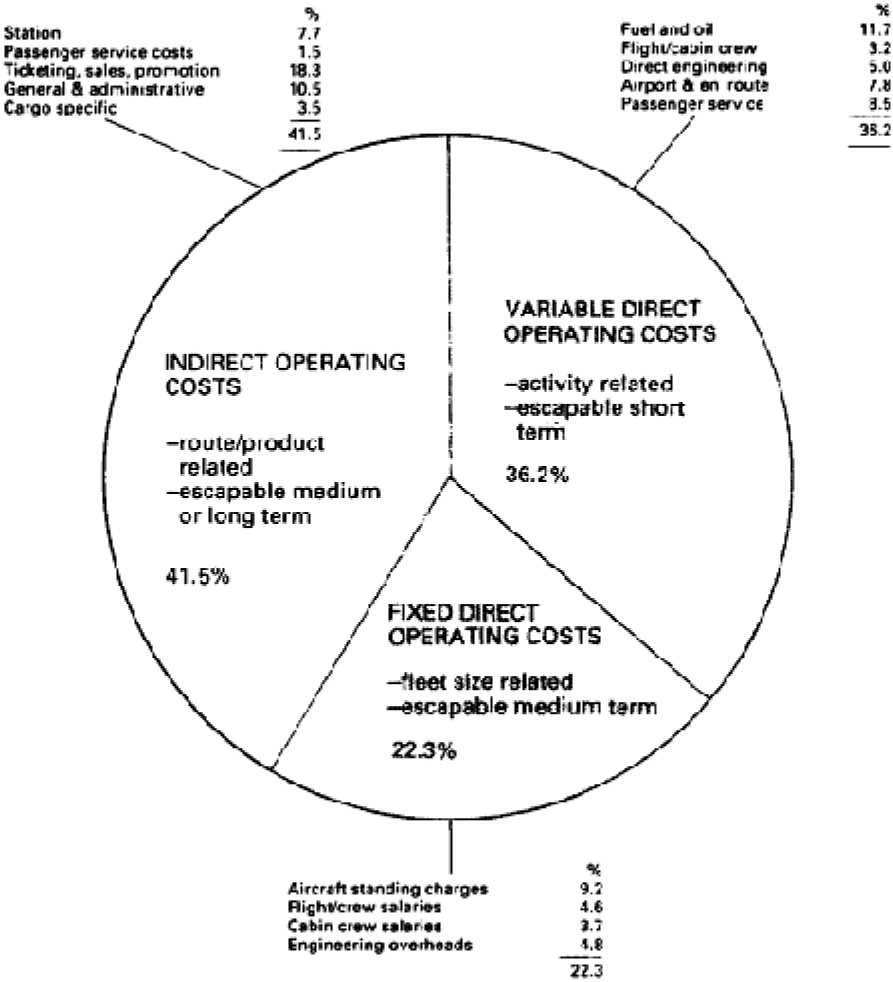

Figure 5.2 British Airways' costs in terms of escapability, 1988/9

Source: Compiled using CAA data.

5.5
Allocation of costs

In order to be able to use the concept of cost escapability in making operating decisions—such as whether to cut one frequency on a route or whether to open up an entirely new route—the various fixed and variable costs need to be allocated to individual flights or routes. Broadly speaking, the approach adopted by various airlines is similar, though there may be differences in the details.

Allocating *variable direct operating costs* is fairly straightforward since nearly all of them are specific to individual flights. Fuel costs, variable flight and cabin crew costs, airport and en route charges and passenger service costs (as defined in Table 5.3) depend directly on the type and size of the aircraft used and the route over which it is being flown. They are clearly very specific and can be easily measured. The exceptions are the variable engineering or maintenance costs. Here some averaging out is required.

Some direct maintenance work and checks are related to the amount of flying that an aircraft undertakes, while other checks depend on the number of flight cycles. Maintenance on those parts of the aircraft which are most under pressure on landing or departure, such as the undercarriage or the flaps, is clearly related to the flight cycles undertaken. For each aircraft type an airline will normally work out an average cost of maintenance per block hour and a separate average cost per flight cycle. The variable maintenance cost of an individual flight can then be calculated on the basis of the number of block hours and flight cycles required for that flight.

An airline's *fixed direct operating costs* are normally converted into a cost per block hour for each aircraft type within its fleet. They can then be allocated to each flight or route on the basis of the aircraft type(s) being used and the block times for the sector or route. It is relatively easy to identify the annual flight crew costs, since each aircraft type has its own dedicated complement of pilots, co-pilots and flight engineers. In many cases, if there are several aircraft of a particular type, that fleet will have its own administrative managers as well. Some flight crew overheads, however, will not be aircraft type specific and will need to be allocated on some basis between the different aircraft types, usually the number of aircraft or annual utilization. The total annual fixed flight crew cost for a fleet of aircraft of a particular type can then be divided by the total annual utilization (that is, block hours) flown by all the aircraft in that fleet to arrive at a flight crew cost per block hour for that aircraft type. A similar approach is adopted with other fixed elements of direct operating costs. In the case of cabin crew, problems of allocating fixed annual costs between aircraft types do arise because, unlike flight crew, cabin crew can work on different aircraft types at any time. Nevertheless, the annual cabin crew costs can be apportioned to different aircraft types on the basis of the number and seniority of the cabin crew they use and the sectors they fly on. Some fixed maintenance costs will be aircraft type specific, others will be common costs that need to be allocated between aircraft types, usually on the basis of maintenance man hours required for different aircraft. Thus, for each aircraft type, airlines can estimate an hourly flight crew and cabin crew cost and an hourly maintenance cost to cover the fixed element of such costs. Some airlines take this process a step further and calculate different hourly crew and maintenance costs for different types of routes. KLM, for instance, uses a higher hourly flight crew cost for a given aircraft type when it is flying on short sectors than when it is used on longer sectors. This is to reflect the poorer flight crew utilization that is achieved on short sectors.

The last element of fixed direct operating costs is aircraft standing costs, that is, depreciation and aircraft insurance. These are aircraft type specific since they depend on the purchase price of the aircraft. They are a fixed annual cost, based on the number of aircraft of a particular type, which when divided by the annual utilization of these aircraft produces a depreciation and insurance cost per block hour.

Since all the fixed direct costs discussed above are allocated to specific aircraft types, some airlines refer to them as ‘fleet’ costs, associated with operating a fleet of aircraft of a particular type.

When one turns to *indirect operating costs,* difficult problems of allocation arise since by definition such costs are independent of the type of aircraft being operated. Some indirect costs may be route specific and may be escapable in the medium term if a whole route operation is closed down. If an airline operates a single route to another country, the sales and advertising costs in that country as well as the station and ground costs at the airport served can be readily identified as a cost specific to that route. But most indirect costs are fixed joint and common costs that cannot be easily allocated to individual flights or routes except on some arbitrary basis. Most station costs, indirect passenger service expenses and the costs of ticketing, sales and promotion as well as overhead administrative costs will normally be allocated to particular services or routes on the basis of some output measure such as the revenue tonne-kilometres or revenue generated. Each approach has its advantages and drawbacks. Using revenue tonne-kilometres may penalize long-haul routes where tonne-kilometres generated are high but revenues per kilometre are low because fares, like costs, taper with distance. Allocating indirect costs on the basis of revenue earned may appear more equitable, but would bias against shorter routes where fares per kilometre are high. More than one allocative method may be used. Sales, ticketing and passenger service costs may be divided between flights on the basis of passenger-kilometres produced, while cargo-specific costs may be apportioned using freight tonne-kilometres carried.

Using an allocative methodology such as that outlined above, but adapted to its own particular requirements and accounting procedures, an airline can identify the variable and fixed costs of individual flights or routes. By comparing them with the revenues generated, it is then in a position to make decisions as to the number of frequencies it should operate on a route or whether it should operate a route at all.

6
Determinants of Airline Costs

6.1
Management control of costs

Variable operating costs, which may represent up to 50 per cent of total operating costs, can be escaped in the short term by cancellation or withdrawal of services. In the medium term, perhaps as much as 90 per cent of costs can be saved by disposal of aircraft, reduction of staff, closing of offices, and so on. Through their ability to increase or reduce their scale and pattern of operations, airline managements can directly affect their total costs. In this sense management control over costs may be absolute and constrained only by the desires of shareholders—whether governments or private individuals or firms. Clearly, overall costs are broadly determined by the level of supply (that is, the volume of output) decided upon by the management. But, once a level of output has been decided upon and is being planned for, what factors then determine the precise level of costs that will be incurred?

Airline managers' prime objective is to match the supply of air services, which they control, with the demand, over which they have much less control, in such a way as to be both competitive and profitable. Having decided upon the appropriate level of supply for particular routes or markets, they must then ensure that their operating costs are as low as possible. In deregulated markets, with little or no tariff or entry control, costs per passenger kilometre or tonne-kilometre must be at least as low as those of other competing airlines. If not, the airline may be unable to compete effectively and be profitable at the same time. Even in regulated markets, unit costs must be kept low, not so much for competitive reasons but in order to ensure high or at least adequate profits at the prevailing tariffs.

Unit cost levels among international airlines vary widely. Table 6.1 shows the unit costs for the six largest international carriers (in terms of international tonne-kilometres performed and for which data were available) in each of three regions in the world. Together these 18 airlines carried 50 per cent of the world's international tonne-kilometres in 1988. The unit costs are for their total operations. (Subsequent tables also refer to these 18 airlines except where data are unavailable.) The table amply illustrates both the wide range in cost levels between airlines and the existence of marked regional vari-ations. High-cost airlines such as Lufthansa or Swissair have unit costs twice as high as low-cost Singapore Airlines (SIA) or Cathay Pacific. Asia/Pacific is the region which stands out as having the lowest-cost airlines, though it also encompasses one or two higher-cost operators, notably Japan Air Lines (JAL). The North American carriers are also relatively low-cost operators and it is noticeable that there is relatively little variation in cost levels between them. In contrast, the six European carriers tend to be at the bottom of the list, indicating relatively high costs.

The numerous factors which affect airline operating costs can be grouped into three broad categories according to the degree to which they can be influenced by management. First, one can identify a number of external economic factors over which airlines have little control. Such factors include the prevailing wage levels, fuel prices and airport and en route navigation charges. An airline has to accept these as more or less given and can only marginally mitigate their impact through negotiations with unions or fuel suppliers. The levels and patterns of demand that an international airline is trying to satisfy are also largely externally determined by economic and geographical factors beyond its control. Secondly, there are two major determinants of costs over which airlines have somewhat greater but still limited control. These are the type of aircraft used and the pattern of operations for which the aircraft are used. While both of these might seem to be entirely at the discretion of airline management, in practice managements' hands are tied to some extent by factors beyond their control. The geographical location of an airline's home base, the bilateral air services agreements signed by its government, the traffic density on its routes and other such factors will strongly influence the type of aircraft required and the network operated. Management does not have an entirely free hand to do as it wishes. This is particularly so of national airlines in countries with only one flag carrier. The third category of cost determinants is that over which managements have more or less total control. Marketing, product planning and financial policy fall into this category. In the final analysis one must also consider managerial efficiency as a cost determinant. It is crucial in that it determines the degree to which the impact of the other factors mentioned above, whether favourable or unfavourable, can be modified to the benefit of the airline concerned.

The analysis in this chapter of the effect of different variables on costs is qualitative rather than quantitative. Earlier studies have used various forms of multivariate analysis to establish the influence of a range of independent variables (for instance, airline size, pilot wage levels or stage length) on a dependent variable such as unit costs or labour productivity. Stratzheim (1969) used a multivariate approach in his examination of international airlines, as did Pearson (1977) in his study of European carriers. In theory, multivariate analysis should be able to establish the relative impact of the various independent variables on the unit costs of the airlines concerned. Certainly Pearson was able to produce high coefficients of determination suggesting that a high proportion of the variations in the dependent variable could be explained by variations in the independent variables. Subsequent work by the Civil Aviation Authority has questioned the value of multivariate analysis (CAA, 1977c, Appendix B). The CAA carried out its own multivariate analysis of European airline performance. For instance, it examined labour productivity as a dependent variable. Using different independent variables from Pearson, but comparable ones, it was able to produce equally high coefficients of determination. However, one or two airlines that were labour efficient when analysed by Pearson were inefficient in their use of labour when assessed by the CAA model. Such discrepancies occurred in other areas too. Two models using the same technique and broadly comparable sets of explanatory variables should have produced consistent results. The fact that they did not raises serious doubts about the validity of multivariate analysis for comparative studies of international airlines.

Table 6.1 Unit operating costs: selected international airlines, 1988 (US cents per tonne-km available)

Rank	North American		European		Asia/Pacific	
		US¢		US¢		US¢
1					SIA	31.0
2					Cathay Pacific	32.3
3					Air India	34.2
4	Northwest	36.4				
5	TWA	37.2				
6	American	39.2				
7 =	Air Canada	39.5			Thai International	39.5
8						
9	Pan Am	40.2				
10	United	41.3				
11					Qantas	42.2
12			Air France	43.3		
13			KLM	44.3		
14					JAL	52.4
15			Alitalia	53.5		
16			British Airways	56.3		
17			Lufthansa	59.2		
18			Swissair	76.2		

Source: ICAO (1988a).

It has subsequently been argued by some economists that studies such as those mentioned above are essentially inductive. They can correlate events rather than establish cause and effect between them. This is an added shortcoming of such an approach. The alternative might be to develop a deductive approach, which by using selected measures of total factor productivity allows comparisons between airlines in different countries by adjusting for differences in factor prices, network characteristics, aircraft size and so on (see, for example, Gillen *et al.*, 1985). This is an interesting and potentially valuable approach, but it is mathematically complex.

In order to provide a better conceptual understanding of the determinants of airline costs it was felt that for the purpose of the present study a more qualitative approach would be preferable to both the above techniques.

6.2
Externally determined input costs

The cost of a number of key airline inputs or factors of production is determined by external economic variables that are largely outside the control of individual airline managements. Since the external variables vary between countries and regions, the input prices of different airlines may also vary significantly. While airlines can try to reduce the prices of their inputs, in the case of some key inputs they can do so only to a limited extent. They have to accept the general level of these input prices as given and they have only limited scope to negotiate downwards from that given level. Another feature of these input prices is that they are subject to sudden and often marked fluctuations. Adjusting to sudden changes in the price of fuel or in the level of charges at a particular airport is a common headache among airline managers.

6.2.1
PREVAILING WAGE LEVELS

For most international airlines wage costs represent 25–35 per cent of their total operating costs, though the figure is lower for many Third World airlines. Since wages represent a high proportion of total costs, variations in the average level of wages paid have a direct effect on an airline’s total costs and may also lead to appreciable cost differences between airlines. However, the salaries and wages paid by any airline depend primarily on prevailing salary levels and the labour market in its home country rather than on the negotiating skill of the airline’s personnel department.

In a country with free wage bargaining it is the interplay of supply of and demand for the categories of labour required by the airline(s) together with the strength of particular unions which will broadly determine the level of wages that an airline has to pay for its various categories of staff. In other countries, wage levels may be set by national agreements between governments or employers’ associations and the trade unions. In some cases governments themselves virtually determine the levels to be paid and impose them on employers and employees alike. In all cases the prevailing wage levels are related to the standard and cost of living in the country concerned. Airlines can negotiate with the unions representing their employees but usually only within a fairly narrow band whose level is predetermined by the prevailing wage levels in the country concerned. An interesting byproduct of deregulation in the United States was the way in which new, largely non-unionized airlines undermined the power of the established airline unions, including the pilots' union ALPA. The new carriers had no trouble in getting employees willing to work at much lower salaries and stricter work conditions. The established carriers were forced either to induce their employees to accept wage cuts which was done by several airlines, or to introduce a two-tier wage structure whereby any new employees were taken on at much lower salaries than existing ones (Nammack, 1984). American Airlines did the latter.

The significant variations in wage levels for similar categories of staff between regions and between airlines in the same region are illustrated in Table 6.2. This shows the average annual remuneration or wage for three discrete types of airline employees for most of those airlines whose costs were given in Table 6.1. Some variation in pilot salaries may be due to differences in flight equipment, since pilot salaries vary with the type of aircraft flown, or with the age and seniority of the pilots. Nevertheless, allowing for this and other minor discrepancies, some interesting conclusions emerge.

US airlines, which 10–15 years ago tended to pay higher wages for all categories of staff than other international airlines, now find themselves paying less than several of the high-wage European carriers. The wage cost disadvantage of North American carriers has largely disappeared. At the same time, wages paid in the United States tend to be very similar for all carriers. In other words, it is the prevailing labour market conditions that set the levels, and most airlines, with one or two particular exceptions, pay wages close to the norm. Conversely, when one examines European or Asian carriers one finds large differences in wage levels even between airlines in neighbouring states. Thus Swissair pilots or cabin attendants are getting paid nearly twice as much as their British counterparts.

Lastly, it is apparent that Asian carriers, with the exception of JAL, pay very low wages for all categories of staff when compared with most of their international competitors. This explains why wage costs are a relatively small proportion of their total costs. For most Asian airlines, other than JAL, staff costs are generally 10–20 per cent of total operating costs. This contrasts with North American carriers where the figure is around 30–35 per cent and European airlines where it is normally in the range 25–35 per cent. Lower staff costs may also be one explanation for the low unit costs of Asian carriers shown in Table 6.1. An extreme case is Air India, where wage rates are very low even by Asian standards. On the other hand, Air India wages are likely to be commensurate with wages for similar employment within other Indian companies. Significantly lower wage levels are a distinct cost advantage enjoyed by a number of Third

World airlines. More surprisingly it is also a relative advantage enjoyed by British airlines (and British Airways in particular), since airline salaries in the United Kingdom have lagged behind those in other European countries. The gradual devaluation of sterling over many years has reinforced this tendency.

Table 6.2 Average annual remuneration for different staff categories in selected airlines, 1988

Region/airline	Average annual remuneration (US$)		
	Pilots and co-pilots	Cabin attendants	Maintenance and overhaul staff
North America:			
United	116,100	29,600	40,500
Delta	93,600	27,600	34,300
TWA	93,000	26,400	31,000
Northwest	86,200	26,300	47,900
Pan Am	85,600	32,300	28,500
Air Canada	76,100[a]	25,800	32,800
Europe:			
Swissair	165,300	42,400	n.a.
KLM	142,200	32,900	31,200
Lufthansa	135,100[a]	45,800	44,200
Alitalia	100,200[a]	65,300	n.a.
British Airways	84,600	24,500	32,300
Asia/Australasia:			
JAL	170,600[a]	65,200	n.a.
Qantas	86,400	28,900	28,300
SIA	69,000	21,100	26,600
Malaysia Airlines	50,800	16,100	8,900
Thai International	35,400[a]	8,200	7,900
Air India (1987)	29,400	10,000	3,300

Note:
[a] Figures include flight engineers.
Source: ICAO Digest of Statistics: Fleet and Personnel 1988.

The ultimate cost of labour depends not only on the wage rates paid but also on the productivity of that labour. This partly depends on institutional factors such as working days in the week, length of annual holidays, basic hours worked per week, maximum duty periods for flying staff and so on, and partly on operational factors such as size of aircraft, stage length and frequencies operated. Within these constraints, management has a role to play in trying to achieve as high productivity as possible amongst its various groups of workers. In particular, airlines paying high wages can try to compensate for their high wage levels by achieving high productivity per employee. When comparing wage levels (Table 6.2) and employee productivity (Figure 6.1), it is evident that several North American carriers, such as Pan American, Northwest and TWA, do this, as does JAL. European carriers are noticeable as a group for their generally low productivity even when, as is the case with KLM or Swissair, their wage levels are unusually high. Airlines which have both relatively low wage levels and high labour productivity are in a very strong competitive position. Singapore Airlines is in this situation. Conversely, a few very low-wage airlines, such as Air India, are overstaffed and do not appear to get the full cost advantage of their low wages.

While available tonne-kilometres (ATK) per employee is the traditional measure of labour productivity, in the highly competitive world of international air transport it is not the number of employees which is critical but the cost of such employees in relation to the output they generate. It does not matter if an airline is apparently overstaffed if it pays relatively low salaries. If labour is a cheap resource, there may be operational or service benefits in employing more than is strictly necessary. Since comparative wage rates vary enormously, it may be more indicative of efficiency in the use of labour to compare airlines in terms of ATKs per $1,000 of labour cost (Figure 6.2). Many of the Asian carriers now come into their own, with labour productivity levels double or triple those of their European or North American counterparts. Airlines like Air India or Pakistan International Airlines (PIA), the least efficient users of labour in physical terms, are now among the most efficient in terms of resource costs. Conversely, among US airlines the high ATKs per employee are substantially eroded by the relatively high wage levels, so that their ATKs per $1,000 of labour cost do not look so impressive.

Some Third World airlines face a particular labour problem, which is the need to employ expatriate staff as flight crew and in engineering. Expatriate staff are very expensive both because they expect to receive salaries comparable to those in their own country and also because they receive accommodation and other allowances in order to move to the country of the airline employing them. Singapore Airlines, for example, because of its rapid expansion, had to employ many expatriate pilots during the late 1980s and this pushed up its average remuneration for pilots to levels which were high in comparison with neighbouring airlines in South East Asia (Table 6.2). Management in airlines using expatriate staff can significantly reduce their labour costs by encouraging and financing the training of their own nationals as pilots and aeronautical engineers.

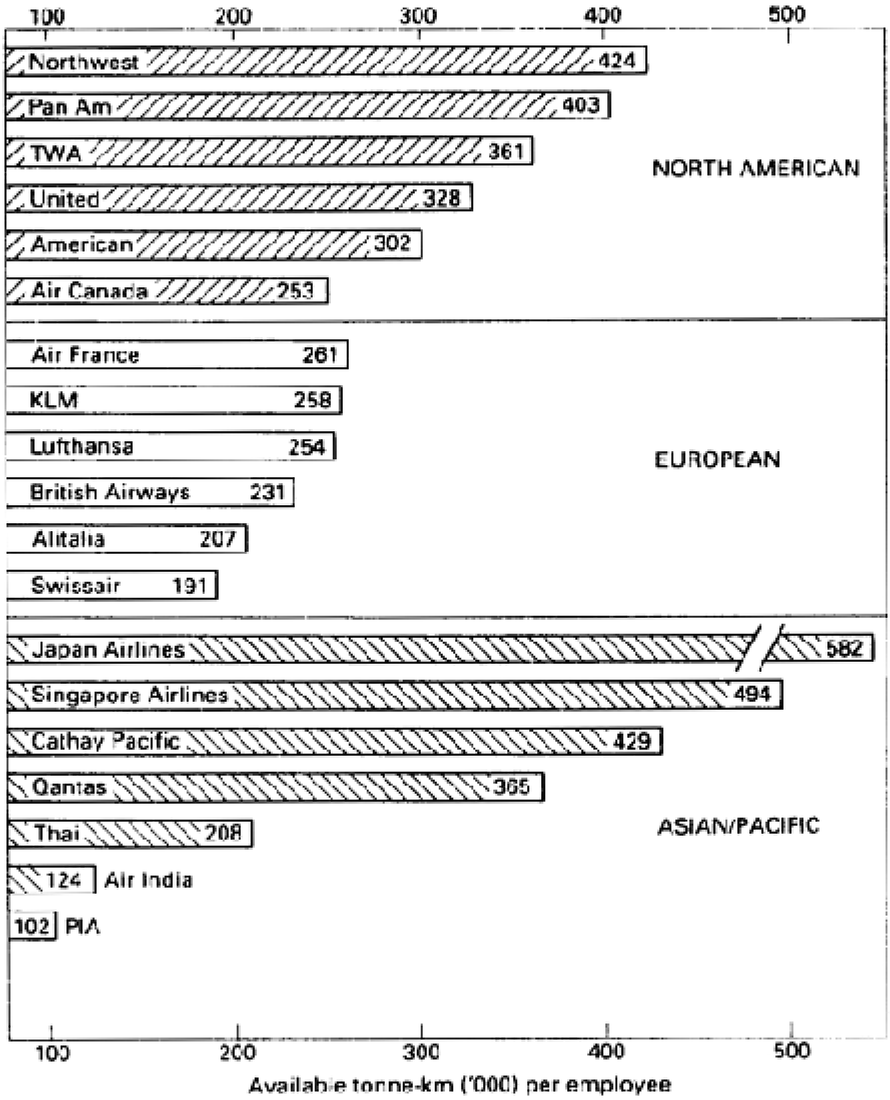

Figure 6.1 Labour productivity, 1988: available tonne-km per employee

Source: Compiled using ICAO data.

6.2.2
PRICE OF AVIATION FUEL

The price of aviation fuel at any airport depends partly on the companies supplying the fuel and partly on the government of the country concerned. As far as the fuel companies are concerned, the price of crude and refinery costs are

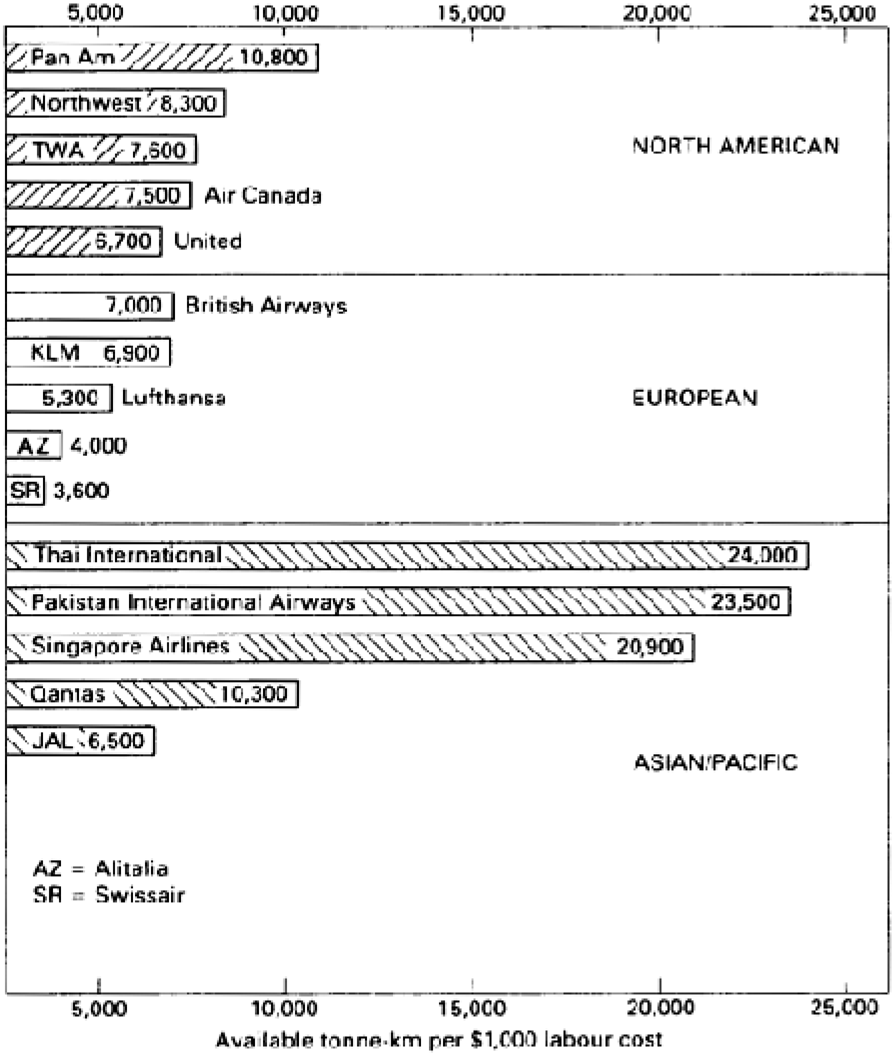

Figure 6.2 Labour productivity, 1988: available tonne-km per US$1,000 labour cost

Source: Compiled using ICAO data.

fairly similar world wide. But distribution and handling costs vary considerably. While oil refineries are widely scattered around the world only a relatively small number refine jet fuel. The supply of fuel to some airports may involve lengthy and costly transportation, especially if the airport is well away from a port. Transportation costs also rise if the volume of fuel supplied to an airport is small. Handling costs vary in relation to the facilities used and the volume handled.

Governments may influence the price of jet fuel in two ways. They may impose import duties or some other kind of tax, though many governments do neither of these things for fuel supplied to international flights. Philippine Airlines, for example, has for many years complained of the high prices it pays for jet fuel in its own country because of government taxes. Some governments may also try to control or fix the price of fuel as a matter of government policy. During the 1970s both the United States and Australian governments maintained domestic crude oil prices and the prices of refined products at well below world levels but subsequently abandoned this policy. As a result, in both countries the price of jet fuel is now closer to prices in other countries. But other governments, that of Brazil is one, continue to impose price controls on fuel.

The interplay of oil company costs and pricing strategies and individual government policies on taxation and fuel price control determines the posted fuel prices at airports around the world. Inevitably considerable variations arise. In May 1990 the posted fuel price per US gallon exclusive of duties or taxes was 170 US cents in London or Manchester, 145 cents in Entebbe (Uganda), 100 cents in Manila, 95 cents in Singapore and only 84 cents at any Brazilian airport because of the Brazilian government's policy (Shell, 1990). Regional variations are also quite marked. African airlines seem particularly disadvantaged by the very high fuel prices at most African airports south of the Sahara except Lagos, while fuel prices in North America are generally the lowest (Table 6.3).

Few airlines pay the posted price. Regular users of an airport will negotiate their own contract price with the fuel suppliers. This will be at a discount on the posted price, the level of the discount depending on the total tonnage of fuel that an airline expects to uplift during the contract period. Thus in May 1990, when the posted price in London was 170 US cents per US gallon, a large carrier uplifting over 50 million US gallons a year was probably paying around 60 cents a gallon. Airlines with only a handful of flights a week would be paying more. In Hong Kong, where the posted fuel price was only 110 cents, a big buyer would have been paying around 58 cents. In other words, the prevailing discount on the posted price in Hong Kong is less than that in London. The discount will also be influenced by the number of fuel suppliers. If there is only one oil company providing fuel, the scope for pushing down the price is clearly limited. At most airports around the world there are generally only a few available fuel companies. In the United States, on the other hand, the existence of a large number of small refineries and of common carrier pipelines open to use by any company has resulted in very large numbers of companies competing for fuel supply contracts. This has a strong downwards pressure on jet fuel prices. In a few countries such as India, fuel prices may be fixed by the government and may be non-negotiable.

Table 6.3 Fuel prices on international scheduled services, 1987

Route group	Average fuel/oil price paid (US¢ per litre)	Index North America=100
Africa	25.7	178
South America	23.0	160
Asia/Pacific	19.0	132
Middle East	18.1	126
Europe	16.4	114
North America	14.4	100
World average	17.3	120

Source: ICAO (1989a).

The price of fuel is crucial for airlines since on any particular route it may represent as much as 25 per cent of operating costs, though overall it accounts for 10–20 per cent of the total costs of many airlines. The cost of fuel for any airline will depend on the posted prices at its main operating airports, and in particular its home base, and on its ability to negotiate discounts on those posted prices. However, the discounted prices paid by large users at any airport will be fairly similar, since the fuel buyers in each airline will have a fairly good idea of what other airlines are paying. Thus the general level of the fuel price at any airport for large users is set by prevailing market conditions. Airline fuel buyers, if very good negotiators, may marginally reduce the price they have to pay, but their impact is only very marginal.

Airlines can try to mitigate the impact of high fuel prices at certain airports by reducing their fuel uplift at those airports. Instead, cap-tains may be instructed to tanker as much fuel as possible at airports where fuel prices are low. Such a policy, however, needs careful monitoring since extra fuel will be burnt during the flight to carry the additional fuel loaded, as fuel consumption rises with the total weight of the aircraft.

An added problem for airlines is that oil companies now generally insist on escalation clauses in fuel supply contracts. These allow the fuel price to move up or down in response to changes in the price of crude oil. In some contracts prices may also fluctuate in response to supply and demand considerations. Airlines can no longer use fixed-price contracts to isolate themselves from external economic factors leading to a sudden jump in the price of aviation fuel.

The differential impact of fluctuating exchange rates may also adversely affect some airlines, since fuel prices in most parts of the world are quoted in US dollars. If the dollar exchange rate of a particular currency drops rapidly, then the cost of fuel in that country in terms of its own currency will rise equally rapidly. This will hit hardest the country’s own national airline, most of whose earnings are in local currency. This happened in many countries in recent years.

While unable to influence the basic price of fuel except marginally, airlines can lower their fuel costs by trying to reduce their fuel consumption. A number of options are open to them. They can try to reduce the weight of their various aircraft by using lighter equipment in the cabin, and less paint on the outside of their aircraft. They can also reduce weight by avoiding unnecessary 'tankering', that is, carrying more fuel than is required to meet safety minima on a particular sector. Then they can save fuel by reducing the aircraft cruising speed. A 3–4 per cent reduction in the cruising speed of a jet aircraft on a sector of 1 hour or more may reduce fuel consumption by 6–7 per cent at the cost of a few minutes' extra flying. Computerized flight planning can also help. By choosing particular rates of climb or descent and particular cruise altitudes, airlines may be able to reduce further the fuel consumed. But ultimately the biggest savings come from switching to newer, more fuel-efficient aircraft, especially where one can replace three- or four-engined jets by aircraft having fewer and more advanced engines.

6.2.3 USER CHARGES

For the world's airlines as a whole, user charges (that is, airport charges and en route facility charges) account for just over 5 per cent of their total costs. The proportion generally rises for international airlines operating relatively short sectors, where landings occur more frequently. In 1988, Finnair and British Midland, both short-haul airlines, found that airport and navigation user charges together represented close to 20 per cent of their total costs; for Finnair it was 19–9 per cent and for British Midland 20.3 per cent. Yet for some airlines, such as KLM or SIA, the proportion dropped to just below 5 per cent, while for US carriers it was generally 2–4 per cent.

User charges, like wage levels and fuel prices, are largely externally determined. But, in contrast, user charges give little room for manoeuvre. While the airlines as a whole acting through the International Air Transport Association (IATA) may try to hold down increases in landing fees or en route charges in a particular country, an individual airline has no scope for negotiating better rates for itself. All are in the same boat.

The level of airport charges will depend partly on the costs at the airports and partly on whether the airport or the government is trying fully to recover those costs or even make a profit. As a result, landing charges vary enormously between different airports (Table 6.4). Except in the United States, airport charges consist of two major elements; a landing fee based on the weight of the aircraft and a passenger charge levied on a per passenger basis. The International Civil Aviation Organization (ICAO) recommends that the passenger charges should be levied on the airlines and their cost recouped through the ticket. Most European and some Third World airports do this. Elsewhere the fee is levied directly on passengers on departure and therefore does not appear as an airline cost. Airlines based in or operating through airports where passenger charges are levied directly on passengers enjoy a cost advantage. This is reinforced if the aircraft landing fee is also low. Examination of Table 6.4 suggests that this might well be the case with South East Asian or South American airlines.

Table 6.4 Representative airport charges, 1990

	Landing plus passenger fees[a] (US$)	
Airport	Boeing 747	MD 80
Manchester (peak)	8,157	2,190
Manchester (off-peak)	7,035	1,725
London-Heathrow (peak)	6,477	3,080
Frankfurt	6,470	1,524
Tokyo-Narita	6,305	1,062
Montreal	5,238	1,768
Amsterdam	5,147	1,321
Paris	4,758	1,109
Zurich	4,568	1,230
Rome/Milan	4,030	1,188
New Delhi/Bombay[b]	3,297	384
Buenos Aires[b]	2,732	338
Cairo	2,343	729
Singapore[b]	1,876	254
Rio de Janeiro[b]	1,754	295
Bangkok[b]	1,513	220
Kuala Lumpur[b]	1,320	184
New York	1,297	219
London-Heathrow (off peak)	1,221	795
Caracas[b]	1,140	192
Hong Kong (peak)[b]	1,022	356
Nairobi[b]	529	72
San Francisco	490	83

Notes:
[a] Based on 70% seat factor.
[b] Excludes passenger charge because paid direct by passenger to airport.
Source: IATA Airport and En-Route User Charges Manual.

The position in the United States is unique. Passenger charges imposed by airports are forbidden and landing fees are generally low. On the other hand, airlines at most airports build and run their own terminals, which clearly increases their costs. Elsewhere in the world it is very unusual for airlines to operate their own passenger terminals, though they may have their own cargo complexes.

En route navigation charges are imposed by civil aviation authorities on aircraft flying through their air space to cover the cost of air traffic control and navigational and other aids provided. The charges are generally levied on the basis of the weight of the aircraft and the distance flown within each country's air space. While there is some uniformity in the method of charging, the level of charges varies enormously, as can be seen in Table 6.5. By far the highest charges are those in Japan and those imposed by Eurocontrol for use of the air space in western Europe. At the other extreme, many countries have very low charges or none at all, like South Africa or the United States. In the States, navigational facilities are provided as a free public service without a direct charge to the airlines by the Federal Aviation Administration. Costs are recovered by a tax on airline tickets paid by passengers.

A few airlines have been able to persuade their governments or airport authorities to give them preferential treatment on airport or en route navigation charges. They are either exempted from payment altogether or they may get a substantial discount. The Greek airline

Table 6.5 Representative en route charges, 1990

Country	Charges for a 500 km overfly distance (US$)[a]	
	Boeing 747	MD 80
Japan	1,493	1,293
UK	1,134	465
France	819	336
Italy	777	319
Germany	762	312
Netherlands	631	259
India	544	306
Argentina	536	200
Egypt	359	94
Kenya	199	64
Venezuela	183	51
Canada-Atlantic routes	129	129
Philippines	100	100
United States	none	none

Note:
[a] Based on aircraft weights of 380 tonnes for Boeing 747 and 64 tonnes for MD 80.
Source: As for Table 6.4.

Olympic, for instance, was for many years not paying landing fees at Athens on its international flights. Elsewhere, some national airlines are billed but do not pay their bills to the civil aviation authorities. Such cases are relatively few, however, because such preferential treatment runs counter to Article 15 of the

Chicago Convention and to the principle of equal treatment of each other's airlines which is enshrined in bilateral air services agreements.

The costs of labour, fuel and airport and navigation facilities together represent between 40 and 50 per cent of most airlines' total expenditure. Therefore the prices that any airline pays for these inputs have a major effect on its cost levels. Moreover, differences in input prices may explain some of the variation in costs between airlines. Yet airlines can only marginally influence the level of these input prices. What they can do is try to minimize the use of these inputs for any given level of output. In other words, they must strive to be as efficient as they can in their use of inputs. A key determinant of efficiency in the use of inputs is the type of aircraft being used and the sector lengths over which it is being flown. However, before considering the impact of aircraft type on costs, one needs to consider the influence of demand.

6.3
The influence of demand on costs

It is generally understood and accepted that airline costs have a direct impact on the demand for air services since they influence the prices at which those services are sold. What is frequently forgotten, however, is that costs are not entirely independent of demand; they are themselves influenced by demand. There is a two-way relationship between supply (costs) and demand. Two aspects of demand, in particular, impact on costs, namely route traffic density and sector length.

The traffic density on a route and the sector length(s) on that route will influence the size and type of aircraft chosen for that route. Aircraft type, and more especially the size of the aircraft, is a key determinant of unit costs. Route traffic density also influences the frequencies which are needed and will thereby affect the annual utilization, that is, the number of hours flown by each aircraft. The higher the utilization, the lower the costs. Traffic density also affects the level of station costs per passenger or tonne of cargo. Since station costs do not go up in proportion to the traffic handled, then more traffic going through a station means lower costs per unit of traffic. These relationships will become clearer in the following sections.

There is one other aspect of demand which impacts on costs and that is the variations in demand over time. Marked seasonal peaks create a need for extra capacity in terms of aircraft, crew, ticketing and sales staff, catering facilities and so on, which may be grossly under-utilized in off-peak periods. Carrying that extra capacity during the off-peak is costly. From a cost point of view, airlines are better off if they are trying to satisfy a pattern of demand that is more or less constant throughout the year (section 8.6).

In a truly competitive environment airlines would be free to choose their own markets in terms of the length of routes and traffic densities that they wish to serve. This may be happening among US domestic airlines and to a more limited extent among European charter airlines. But the vast majority of international airlines do not have an entirely free hand with regard to the demand that they set out to satisfy. The routes that they serve and the density of demand on those routes are largely determined by the interplay of geographical, political, economic and social factors outside the airlines' control. The starting point for any international airline is its home base. The geographical location of the home base, together with the level of business and tourist interaction between the home country and other nations, will influence the potential sector lengths and traffic densities that can be fruitfully operated. Australia and Malta represent the two extremes. The international airline of Australia must be a long-haul carrier because of its geographical location. Conversely, the national airline of Malta, as a result of the island's location and size, is predetermined to be a short- to medium-haul airline with only a small number of relatively thin routes.

Where an airline is a country's only international airline, which is the case with most airlines, it may also be under political pressure to operate some routes which it would otherwise ignore. Conversely, where there are two or more international carriers, as in the United Kingdom or the United States, they may have much more choice as to the routes they can serve.

Though constrained by some of the above factors, airlines do have some ability to influence the patterns of demand on the routes they serve or wish to serve. First, they can as a matter of policy concentrate on the denser traffic sectors. Second, they can try to increase the total traffic on their routes through their pricing policy and promotional activity. Third, they can try to improve their own traffic density by increasing their market share when they have competitors on the route. Many airlines place considerable emphasis on increasing their market share on their major routes. This is not merely because it increases their revenues but also because it can help them to reduce costs.

6.4
Aircraft type and characteristics

Many technological aspects of each aircraft type have a direct effect on that aircraft's operating costs. The most important from an economic viewpoint are likely to be the size of the aircraft, its cruising speed and the range or distance which that aircraft can fly with a full payload. The significance of size, speed and range is reinforced in that, taken together, they determine an aircraft's hourly productivity, which in turn also affects costs.

6.4.1
AIRCRAFT SIZE

As a general rule, though there are exceptions, the larger an aircraft the lower will be its direct operating costs per unit of output, that is, per tonne-kilometre available or per seat-kilometre. In other words, other things being equal, the direct operating costs of aircraft do not increase in proportion to their size or their payload capacity. The cost per hour of the larger aircraft will be higher than that of a smaller aircraft but when converted into a cost per seat-kilometre or per tonne-kilometre it is lower. For example, in 1989, in the United States a Boeing 737–200 aircraft with say, 110 seats would have incurred direct operating costs of about $1,510 per block hour (Avmark, 1990). An Airbus A320 aircraft with 150 seats would cost about $1,700 per block hour to fly. The larger aircraft's hourly costs were almost 13 per cent higher than those of the Boeing but its capacity in terms of seats was about 36 per cent more. The A320's greater capacity more than compensated for its higher hourly cost. As a result, the cost per seat-kilometre of the A320 was significantly lower. Assuming the same average block speed of 505 km per hour for both aircraft, the direct cost per seat-kilometre of the Boeing would have been 2.71 cents and of the A320 only 2.24 cents, or 17 per cent less.

Aircraft size influences costs in two ways. In the first instance, there are certain aerodynamic benefits from increased size. Larger aircraft have proportionally lower drag and more payload per unit of weight. At the same time, larger and more efficient engines can be used. Thus the 260-seater Airbus A300 has a maximum take-off weight which is nearly three times as great as that of the Boeing 737–200, yet its hourly fuel consumption is only slightly more than twice as high (Avmark, 1990). It is relatively easier and cheaper per unit of weight to push a large mass through the air than a smaller one. (The same applies to mass in water. Hence the development of supertankers.) Secondly, there are other economies of size related to the use of labour. Maintenance costs, a large part of which are the costs of labour, do not increase in proportion to increases in aircraft size. One can see this clearly when comparing two aircraft from the same manufacturer, the Boeing 737–300 and the Boeing 757–200. Their hourly maintenance costs among US airlines in 1989 were almost identical, at just over $300 per block hour, yet the 757 could carry up to 40 per cent more passengers. In addition, large economies also arise in flight crew costs since larger aircraft do not require more flight crew, though the pilot and co-pilot may be paid slightly more for flying a larger aircraft.

Thus, when in 1979 Cathay Pacific introduced Boeing 747s in place of Tristars, both with three-man crews, it found that the crew costs went up by about 12 per cent but the larger aircraft offered 40 per cent more seats. Since the early 1980s three new large twin-jet aircraft (the Boeing 757 and 767 and the Airbus A310) and frequently smaller jets, such as the Airbus A320, specifically designed for two-man operation, have been available. Developments in digital and cathode ray display technology allowed redesign of the cockpit so as to eliminate the role of the flight engineer. Airlines switching from some smaller older aircraft types such as Boeing 727s to these newer and larger jets obtain a significant saving in flight crew costs as flight crew numbers are cut from three to two.

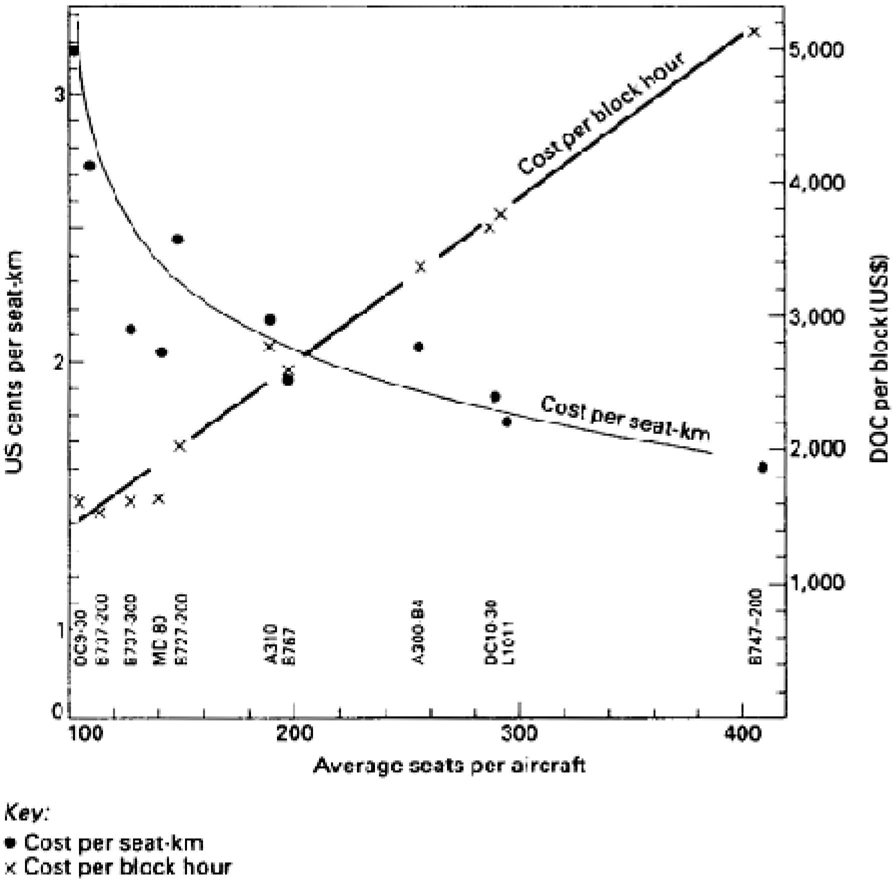

Figure 6.3 Direct operating costs against aircraft size: US airlines, year to 30 September 1989

Source: Compiled using Avmark (1990) data.

The close relationship between aircraft size and unit costs for the major aircraft types operated by US trunk airlines can be seen in Figure 6.3, which shows (right-hand axis) how hourly costs increase in a linear progression as aircraft size, measured in seats, rises. However, since hourly costs increase less than proportionately to size (that is, the slope of the straight line is less than 45°), when they are converted to costs per seat-kilometre there is a strongly downward-sloping curve (left-hand axis). The relationship between increasing size or seating capacity and declining unit costs is clear, though there are deviations. Such deviations relate either to new and improved versions of existing aircraft types, which explains the lower unit costs of the MD 80 or Boeing 737–300 compared with the Boeing 727, or to the newer generation of twin-engine aircraft, such as the Boeing 767, with unit costs lower than those of some larger aircraft. It should always be borne in mind that the aircraft illustrated are in practice flown on different average sector lengths and this also influences the unit costs shown in the diagram.

Lastly, it is important to emphasize that, while larger aircraft generally produce lower seat-kilometre or tonne-kilometre costs than smaller aircraft when flown on the same sectors, their total round-trip costs are in most cases higher. This is a basic conundrum of airline planning. Does an airline choose the aircraft with the lower seat-kilometre costs or the one with the lower trip costs?

6.4.2
AIRCRAFT SPEED

Apart from size, aircraft speed also affects unit costs. It does this through its effect on an aircraft's hourly productivity. Since hourly productivity is the product of the payload and the speed, the greater an aircraft's cruising speed the greater will be its output per hour. If an aircraft flies at an average speed of 800 km/h and has a 20 tonne payload, its hourly output is 16,000 t-km. An aircraft with a similar payload flying at 900 km/h would generate 18,000 t-km per hour, or about 12.5 per cent more than the slower aircraft. Some elements of cost might be higher for a faster aircraft. Fuel consumption might be slightly higher, unless the faster speed was due to improved aerodynamic design. Many costs, however, particularly those that are normally estimated on a per block hour basis, would be similar. Flight and cabin crew costs, maintenance costs, insurance, landing fees and depreciation would certainly be fairly similar. These similar hourly costs would be spread over 12.5 per cent more tonne-kilometres. Therefore, assuming other things are equal, the cost per tonne-kilometre for the faster aircraft would be lower. In the earlier cost comparison between the Boeing 737–200 and the Airbus A320 it was assumed that both aircraft had an airborne speed of 505 km/h. This was in fact the average speed achieved in 1989 by the smaller aircraft. The Airbuses were actually faster and their average speed was around 590 km/h. At this speed the Airbus unit costs go down from the 2.24 cents per seat-kilometre previously calculated to 1.99 cents per seat-kilometre. This compares with the 2.71 cents per seat-kilometre of the smaller and slower Boeing 737 and produces a unit cost reduction of 27 per cent. Since in practice the faster aircraft are frequently larger as well, the cost advantages of size and speed reinforce each other, producing the lowest seat-kilometre or tonne-kilometre costs.

6.4.3
TAKE-OFF PERFORMANCE AND RANGE

The lower unit costs of larger and faster aircraft do not mean that airlines should always choose to operate such aircraft in preference to smaller, slower aircraft.

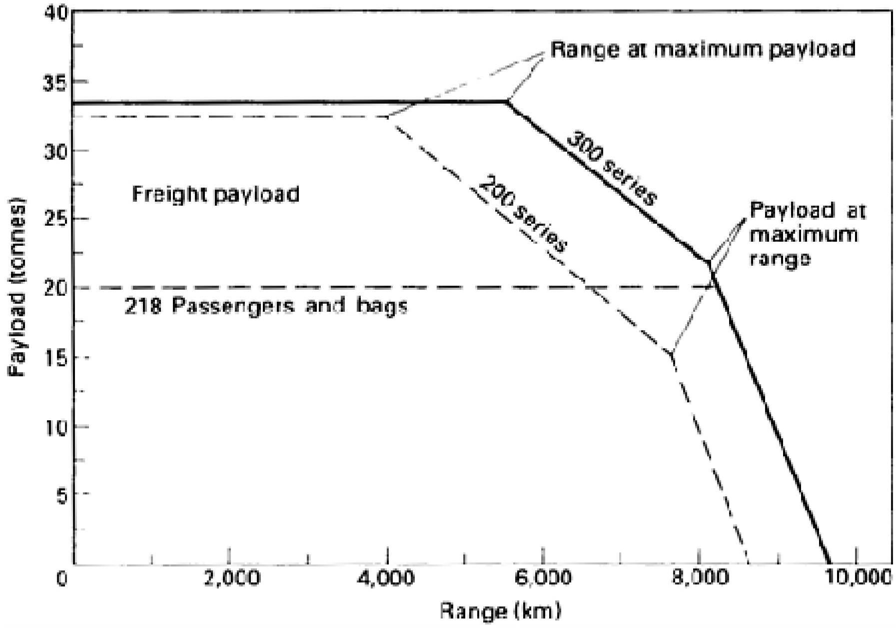

Figure 6.4 Payload for two versions of the A310

Note: The 300 series is an extended-range version of the 200 series. Passenger payload is based on 18 first class at 100.7 kg each plus 200 economy at 0.7 g.

Source: Airbus Industrie.

Airlines must resolve the conundrum previously mentioned. The larger aircraft with the lower tonne-kilometre costs will have higher trip costs than smaller aircraft. In making a choice between aircraft types, other factors must also be considered, such as the level and pattern of demand on the routes for which aircraft are needed and the deign characteristics of the aircraft in relation to those routes. Aircraft are designed to cater for particular traffic densities and stage lengths. As a result, each aircraft type has different take-off and range characteristics and these in turn influence unit costs. An aircraft requiring particularly long runways or with engines adversely affected by high ambient temperatures at airports suffers cost penalties. In either case it can overcome its design handicap by reducing its payload so as to reduce its take-off weight. This would enable it to take off despite a runway or temperature limitation. But the reduced payload immediately results in higher costs per tonne-kilometre since the same costs need to be spread over fewer units of output.

An aircraft's range performance is illustrated in payload-range diagrams such as the one for the Airbus A310 in Figure 6.4. Each aircraft is authorized to take off at a maximum take-off weight (MTOW). This weight cannot be exceeded for safety reasons. The MTOW is made up of the 'operating weight empty' of the aircraft, plus some combination of fuel and payload. With maximum payload the aircraft taking off at its MTOW will be able to fly up to a certain distance for which it has been designed. This is known as the 'range at maximum payload'. To fly beyond this distance the aircraft must substitute fuel for payload, always ensuring that it does not exceed its MTOW. Initially the reduction in payload may be in terms of belly-hold freight rather than passengers. The aircraft's range can be progressively increased by a further uplift of fuel and a continuing reduction in payload. This process continues until the fuel tanks are full and no extra fuel can be uplifted. The amount of payload at this point is known as 'payload at maximum range'. This is the effective maximum range of the aircraft. In practice, an aircraft could fly further without more fuel by reducing its payload since a lighter aircraft consumes less fuel per hour. This is why the payload line at maximum range is not exactly vertical but very steeply sloping. The shape of each aircraft's payload range' line is different, since aircraft have been designed to satisfy particular market needs.

Aircraft size, speed and range together determine an aircraft's productivity curve and hence its unit costs. The relationships are illustrated in Figure 6.5. Hourly productivity is the product of aircraft size and speed. As sector length increases, average aircraft speed rises. This is because aircraft speed is calculated on the basis of the block time for a journey. Block time is from engines on to engines off. It therefore includes an amount of dead time on the ground. Ground time will vary with runway, taxiway and apron layout at each airport and with the number of aircraft movements during a given period. On departure at a very busy international airport such as London-Heathrow or Frankfurt, aircraft may spend up to 20 minutes from engine start-up to lift-off. This may be spent on being pulled out from the stand, disconnecting from the ground tractor unit; awaiting further clearance from ground traffic control; taxiing to the end of the take-off runway, which may be some minutes from the stand; perhaps waiting in a queue of aircraft for clearance to taxi onto the runway and take off. On landing, the ground time is usually less, though at peak periods an aircraft may have to wait for a taxiway to be clear or even for a departing aircraft to vacate a stand. The total ground manoeuvre time at both ends of a flight may amount to 20 or 30 minutes at large and busy airports and will rarely be less than 15 minutes on any international air services. When airborne, the aircraft may have to circle the airport of departure and it will then climb to its cruise altitude. The climb and descent speeds are relatively slow, especially if based on the horizontal distance travelled. On short sectors an aircraft may spend most of its airborne time in either climb or descent, that is, at slow speeds, and may fly at its higher cruising speed and altitude for only a few minutes. As the stage distance increases, more and more time is spent at the cruising speed and the ground manoeuvre, climb and descent phases become a smaller proportion of block time. Average block speed therefore increases.

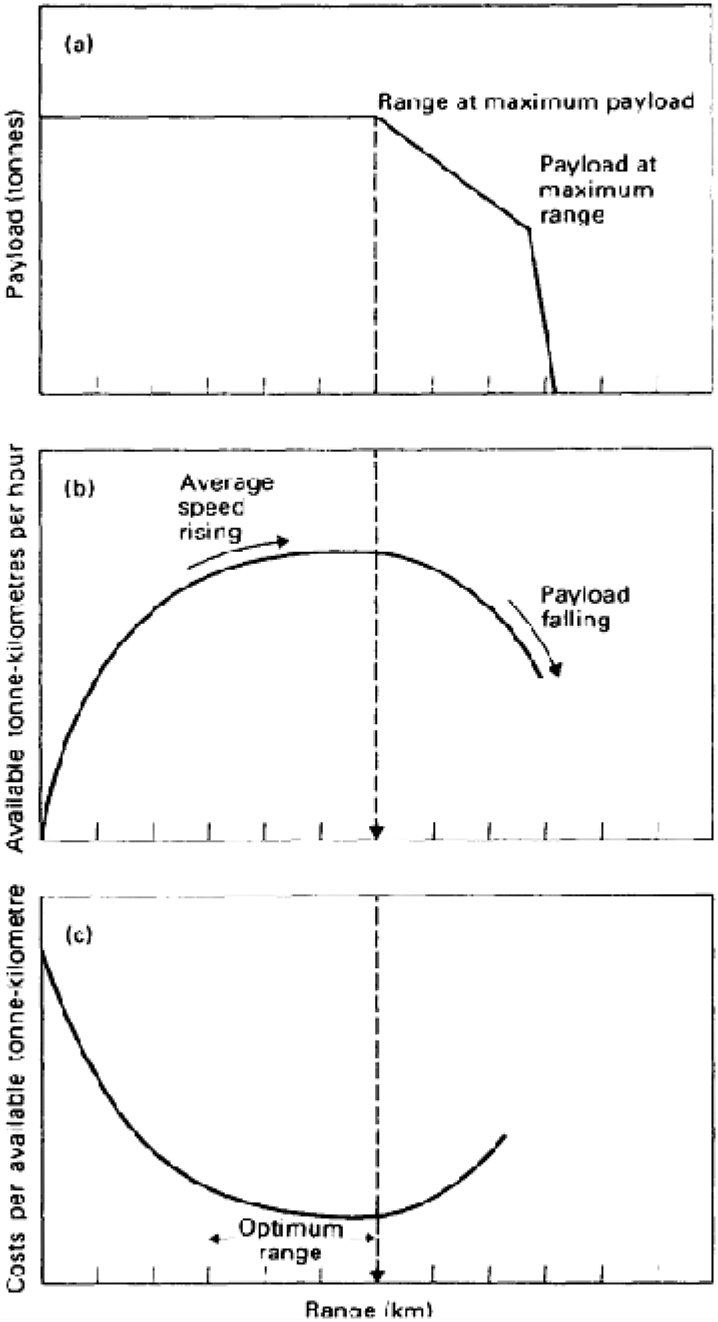

Figure 6.5 Payload-range, productivity and cost relationships

(a) Payload-range

(b) Hourly productivity

(c) Unit costs

At first the payload capacity is constant. The increasing average speed ensures that hourly productivity rises (Figure 6.5b). It continues to rise until the range at maximum payload is reached. For distances beyond this, payload falls and, though average speed may still be rising marginally, the net effect is that hourly output falls.

Hourly productivity directly affects unit costs because all the costs which are constant in hourly terms, such as flight crew costs or depreciation, are spread over more units of output. Thus a unit cost curve can be derived from the productivity-range curve showing how unit costs decline as range and hourly productivity increase (Figure 6.5c). Unit costs continue to decline until payload has to be sacrificed to fly further and hourly productivity begins to drop. The unit cost curve is typically U-shaped. The precise level and shape of the cost curve will vary for each aircraft type depending on its size, speed and range characteristics. For each aircraft type it is possible to identify a range of distance over which its unit costs are uniformly low. This might be considered the optimum cost range for that aircraft.

The preceding discussion has assumed that total costs per hour are constant irrespective of sector length. Section 6.5.1 below on the effect of stage length on costs will indicate that costs decrease relatively with distance. This reinforces the effect of increasing hourly productivity. More of this later.

6.4.4
ENGINE PERFORMANCE

A key characteristic of any aircraft type is the engine it uses. Increasingly, the same engines or engines with similar thrust made by different manufacturers are being used by broadly similar types of aircraft. This is because there are only three major manufacturers of civil jet engines in the western world and competition to get their engines into the same aircraft drives them to produce similar products. This should not obscure the fact that even similar engines may have different fuel consumption. The earlier Boeing 747s were powered by the Pratt and Whitney JT9D–7A engines. Later versions of the same engine on the same aircraft were more fuel efficient. This is why late in 1979 Singapore Airlines (SIA), which had been operating Boeing 747s with the 7A engine, began the gradual introduction into its fleet of 12 Boeing 747s powered by the JT9D–7Q engine. These engines had lower maintenance costs than the 7As and were expected to offer a 2–3 per cent better fuel consumption. By 1981/2 SIA's fuel costs were 32 per cent of their total cost; thus a 3 per cent saving in fuel consumption would represent a saving of almost 1 per cent in total costs. At about the same time, Qantas was introducing newer 747s into its own fleet but with Rolls-Royce RB211 engines. It found that the Rolls-Royce engines were saving 5–7 per cent on fuel compared with the older Pratt and Whitney engines, but there was a weight penalty because the new engines were heavier. It is clear from these two examples that the type of engines in an airline's fleet and in particular whether they are new or old versions of the engine type may influence operating costs. Subsequently Boeing claimed that third-generation engines such as the Pratt and Whitney JT9D–7R4 or the RB211–524G together with other refinements on their 747 aircraft would reduce fuel burn per seat by 26 per cent compared with early models of the same aircraft (*Flight International,* 15 October 1983). In assessing the costs of different airlines, one needs to consider the impact not only of the aircraft type being used but also the version of engine which powers it.

There can be little doubt that the type of aircraft operated has a significant effect on cost levels. With this in mind the key question is how far an airline has the freedom to choose any aircraft type it wishes or how far the choice is constrained by the sector lengths and the traffic densities on the routes concerned, or other factors. The choice of aircraft occurs in two stages and management influence is critical only in the second. The first stage is shortlisting the possible aircraft types for a given operation. As previously emphasized, an international airline's route structure and demand pattern are dependent on its geographical location and on economic and political factors largely beyond its control. The route structure, the airports used and the traffic density on those routes will broadly delimit the type of aircraft needed. For particular parts of its network, the sector lengths and traffic densities taken together will reduce the options open to the airline to perhaps only two or three aircraft types. In some cases only one type may fit the requirements. In 1990 airlines operating relatively long-haul routes of say about 4,000 km but with traffic flows that were too thin to support a 400-seater Boeing 747 would have been looking for a 200–250-seater twin-jet. Given these market constraints, the choice would probably have been between an Airbus A310 or a Boeing 767. At another level, an airline planning to operate international charters into the Aegean islands of Greece, such as Myconos, can use only Boeing 737 or MD 80 series aircraft because of runway limitations. In both these examples it is a combination of external factors that produces the shortlist of possible aircraft. It is only when one moves to the second stage, that of choosing between the shortlisted aircraft, that the role of management becomes critical. Management has to make several key and related decisions. It must not only choose the aircraft which best meets its airline's needs and objectives, but it must also choose the number of aircraft and optimize the mix of aircraft in the fleet. Management must also decide on the engines which will power its aircraft, if more than one engine type is available. All these decisions will eventually affect the airline's cost levels.

Once an airline has made its choice and invested in particular aircraft types for various parts of its network, then those aircraft types have to be considered as given. They cannot be changed from year to year. Because of investment in flight crew training, maintenance and ground facilities, aircraft types are unlikely to be changed except after several years. Once aircraft have been introduced into an airline's operation, the most significant factor which will then affect their costs of operation, other than the level of input costs, is the route structure on which they will be operated.

6.5
Pattern of operations

6.5.1
STAGE LENGTH

Several aspects of an airline's operating pattern may influence its costs but the most critical is the stage lengths over which it is operating its aircraft. The average stage lengths will vary within an airline by aircraft type, since it is likely that different aircraft will have been chosen for different types of routes within the total network. For each aircraft type, nevertheless, the longer the stage length which can be flown the lower will be the direct operating costs per unit. This is so until sectors get so long that payload has to be sacrificed.

The rapid decline of unit costs as stage distance increases is a fundamental characteristic of airline economics. A number of factors help to explain this relationship. One of these, the effect of stage length on block speed, has already been discussed in the previous section. It was pointed out that ground manoeuvre time and the relatively slow climb and descent phases of a flight become a decreasing proportion of the total block time as stage length increases. Consequently, the average block speed increases. In turn, the hourly productivity in terms of tonne-kilometres or seat-kilometres also rises. Fixed costs, both direct and indirect, are spread over more units of output and therefore the total operating cost per unit goes down.

The same considerations which affect block speed also influence block fuel. During ground manoeuvre time on departure or arrival aircraft are burning fuel. In 20–30 minutes on the ground they can burn a considerable amount of it. During climb and to a lesser extent during the descent phase, fuel consumption is relatively high in relation to the horizontal distance travelled. Conversely, fuel consumption is least at higher altitudes and in the cruise mode. Ground manoeuvre and climb and descent fuel becomes a decreasing proportion of total fuel burn as stage distance increases. The net result is that fuel consumption does not increase in proportion to distance. Thus if an Airbus A310 or a Boeing 767 doubles its stage distance from, say, 500km to 1,000 km the fuel burnt will not double. Depending on the particular circumstances of the route, the fuel consumed will increase by only about 60–70 per cent. Looking at an actual example, it can be seen that in 1990 the Airbus A320–200 on London—Paris with a full passenger load and no cargo would have consumed about 1,700 kg of fuel. Flying to Geneva, whose distance from London is 118 per cent greater, the Airbus would have burnt about 2,800 kg, an increase of only 65 per cent. As a result, the fuel burned per km and the fuel cost per km would have dropped by 25

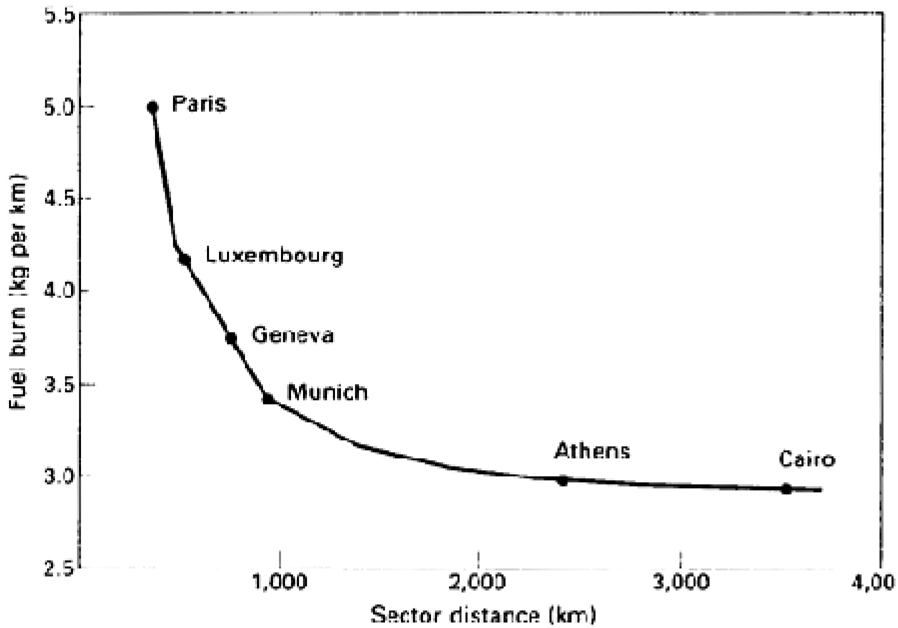

Figure 6.6 Impact of sector distance on fuel burn: Airbus A320–200 on routes from London

Note: Fuel burn is average of outward and return trips based on 65% load factor.

Source: Airbus Industrie.

per cent (Figure 6.6). This is a major saving, given that fuel may be a significant proportion of total costs. On longer sectors beyond 2,500 km the fuel savings from additional sector distance become marginal.

Stage length influences aircraft and crew utilization and this too impacts on costs. An aircraft is a very expensive piece of capital equipment. It is earning revenue and paying back its high initial cost only when it is flying. The more flying it does, the lower become its hourly costs. This is because the standing annual charges, notably depreciation and insurance, can be spread over a greater number of productive hours. It is much easier to keep aircraft in the air if stage lengths are longer. On short sectors such as London-Paris or Singapore-Kuala Lumpur, where aircraft have to land after every 40–45 minutes of flight and then spend up to an hour on the ground, achieving more than 5 or 6 block hours per day with an aircraft becomes very difficult. Higher utilization requires either a reduction in the aircraft turn-round time so as to carry out more flights within the operating day, or an extension of the operating day by scheduling very early morning or late evening departures. Charter airlines in Europe achieve very high utilization on relatively short sectors by extending the operating day.

Conversely, when one looks at longer sectors involving, say, 5 block hours, an aircraft can fly out and back and with just two flight sectors achieve a daily utilization of 10 block hours while spending only a couple of hours or so on the ground. The close relationship between stage length and aircraft utilization can be seen by examining British Airway's Lockheed Tristars in 1988. The 200 series aircraft flown on long-haul routes and with an average stage length of 3, 245 km achieved a daily utilization of 11.2 hours. Yet the 100 series aircraft being flown on European sectors of 1,640 km could achieve an average of only 8. 1 block hours per day, equivalent to about 1,100 hours per year less than the 200 series aircraft.

Flight and cabin crew, like aircraft, are a valuable and costly resource. A high proportion of crew costs are fixed and do not vary in the short term. The more flying that crews can actually do, the lower will be the crew costs per block hour. On short sectors, crews spend relatively more of their time on the ground. On 1–hour sectors, crews may actually be flying for only 4–6 hours during a 12–14 hour duty period. As stage lengths increase, they should be able to spend more of their duty period actually flying.

A more obvious implication of short stages is that airport charges and station costs are incurred more frequently than on longer stages. Their impact on total costs is therefore greater. One can see this when examining the cost structure of short-haul airlines, whether international or domestic. In 1988, landing and other airport charges represented about 3.7 per cent of scheduled airlines costs world wide. For short-haul operators the figure was much higher. For the small British carrier British Midland, with an average sector length of only 421 km, airport charges came to a staggering 15.7 per cent of their total costs. While for Finnair, with an average stage length of 831 km, the figure was 11.3 per cent (ICAO, 1988a).

Some elements of maintenance expenditure are also related to stage length. This is because certain maintenance checks and spare parts replacement schedules are related to the number of flight cycles, that is, take-offs and landings. These occur less frequently as stage length increases. The most obvious part of the aircraft whose maintenance is related to the number of flight cycles is the undercarriage, though there are others too.

All the above factors reinforce the cost-range relationship, based on aircraft productivity, discussed in the preceding section. Together, they result in a typically U-shaped cost curve for every aircraft type. Unit costs fall rapidly at first as stage length increases, then gradually flatten out until they rise sharply as payload restrictions begin to push up costs. A cost curve based on a 1990 route-costing study of the Airbus A320 is shown in Figure 6.7. The A320 study and other similar analyses indicate that the most significant economies with respect to distance occur by increasing stage lengths at the short to medium range. The implication for airlines is clear. They must avoid short sectors, because they impose much higher costs, and should try to operate each aircraft at or near the stage distances where costs are at their lowest.

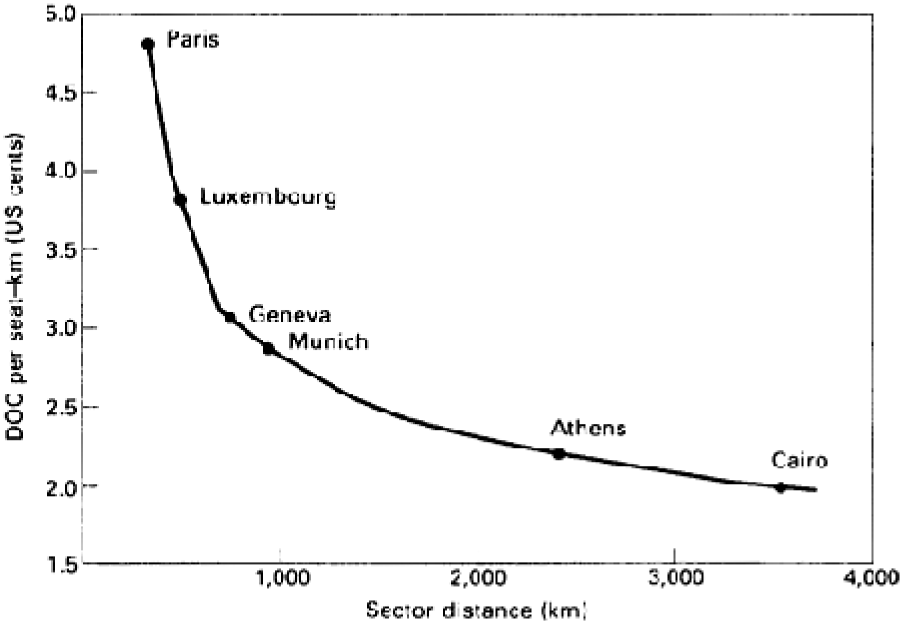

Figure 6.7 Impact of sector distance on unit costs: Airbus A320 on routes from London

Source: Airbus Industrie.

In so far as larger aircraft tend to be used on longer stages, the twin effects of aircraft size and stage length frequently reinforce each other. The result is that operating costs on long sectors flown by large wide-bodied aircraft may be as low as 20–40 per cent of the costs on short-haul sectors flown by smaller aircraft. This is vividly illustrated by comparing two new-generation Airbus aircraft on routes out of London, the 150-seater short-medium-range A320 and the much larger 300-seater long-haul A340 (Figure 6.8). The larger aircraft's direct operating costs on long sectors are only 40 per cent of those of the smaller aircraft on London-Paris. The unit cost discrepancy would be even greater if an older generation aircraft was being used on the shorter sectors.

Airlines operating primarily large aircraft over long sectors will always appear to have lower unit operating costs than airlines flying smaller aircraft on domestic and shorter-haul international services. But their lower costs will be primarily a function of aircraft size and sector distance rather than better managerial efficiency! It is no coincidence that the three airlines with the lowest unit costs in Table 6.1 above—namely Singapore Airlines, Cathay Pacific and Air India —operate very large aircraft over average sector distances which are well above the average for the 18 airlines in the group. The only other airlines which are comparable to these three in terms of aircraft size and sector distances are Qantas and Japan Airlines but these are penalized by high labour costs, especially in the case of JAL.

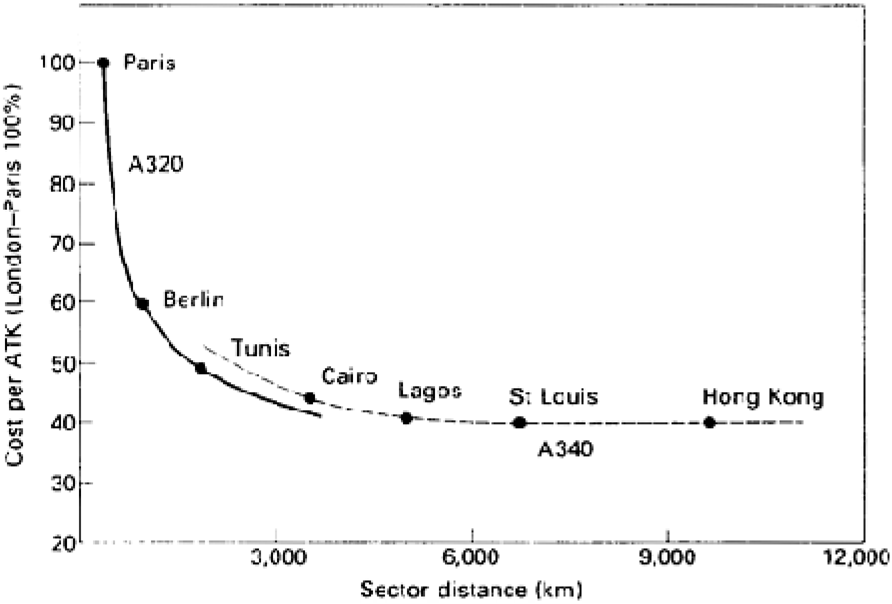

Figure 6.8 Impact of sector distance and aircraft size on unit costs: Airbus A320 and A340–300 on routes from London

Note: The A320 is a 150-sealer twin-jet; the A340–300 is four-engined and here operated with 295 seats The A320 is operated on short sectors, the A340–300 on long sectors.

Source: Airbus Industrie.

6.5.2
FREQUENCY OF SERVICES

High frequencies provide airlines with greater flexibility in schedules planning, thereby enabling them to increase aircraft and crew utilization. The availability of further schedules to be operated whenever an aircraft and crew return to base makes it much easier to keep them flying throughout the operating day. Airlines operating low frequencies face the problem of what to do with their aircraft when they have completed their first round trip. On long-haul routes, high frequencies also enable airlines to reduce the length and cost of crew stopovers. Conversely, low frequencies prove costly. Malaysia Airlines' European services early in 1984 provide a good example. Of the four weekly flights between Kuala Lumpur and Europe, two stopped in Kuwait and two in Dubai. Crews were changed in both places on both outward and return flights. The split operations in the Middle East meant that at both Kuwait and Dubai there were at all times two crews stopping over for three or four nights waiting to take over the next flight. In October 1984 all four flights were scheduled through Dubai and the Kuwait station was closed.

As a result the airline saved about $1.5 million per annum. Among other economies it was able to cut its cabin crew numbers by about 50.

Despite this experience, Malaysia Airlines in 1988 operated three flights a week between Kuala Lumpur and Los Angeles via Tokyo, one of which was a DC-10 and two were Boeing 747s. This was a very expensive mix since flight crew, that is pilots, were not interchangeable between the two aircraft types. As a result, the weekly DC-10 had a crew change en route at Honolulu. That complete crew had to wait a week in Honolulu to fly the following week's service on to Los Angeles. Another week's stop-over was necessary in Los Angeles together with a further week in Honolulu on the way back. While cabin crew could be switched to the Boeing 747 aircraft at Los Angeles, the flight crew could not. The latter would have been away from base for three weeks, with all the attendant expenses, but would have flown only four sectors. This low-frequency DC-10 service was very costly and inefficient in its use of human resources. It was discontinued in 1990.

6.5.3
LENGTH OF PASSENGER HAUL

Many costs associated with sales, ticketing and the handling of passengers are related to the number of passengers rather than to the distance that each passenger travels with the airline on a particular journey. This is true with costs of reservation, of ticketing and of the handling of both passengers and their baggage. It is also frequently true of airport passenger charges when paid by airlines. In other words, a passenger who buys a single ticket and travels 3,000 km on an airline network will cost the airline less than three separate passengers each travelling 1,000 km. In the latter case, each of the three will impose their own ticketing and handling costs and the airline may have to pay a separate airport charge for each. From the cost point of view, an airline is better off carrying fewer passengers travelling long distances rather than many more passengers on short journeys. Although the shorter-haul passengers may produce higher yields and generate more income because of the way fares are structured (see Chapter 11), purely in cost terms the long-haul passenger is to be preferred. What is surprising is how the average length of passenger haul varies between airlines operating what outwardly appear to be very similar types of networks. This point is illustrated by reference to four airlines whose international operations have common features. These are a strong regional network covering East Asia and Australasia, one or more routes to Europe together with a transpacific route as well. In 1988, the average length of haul for international passengers varied widely from 6,650 km for Qantas and 5,190 km for JAL to 4, 640 km for SIA and 3,690 km for Thai International. Qantas is in a particularly favoured position.

An international airline's stage lengths are broadly influenced by its geographical location and the patterns of demand it is trying to meet. Demand patterns, together with bilateral air services agreements or inter-airline agreements, influence or even determine the frequencies to be operated. In countries such as the United States, Canada, United Kingdom or France where more than one national carrier operates international services, the country's own licensing or regulatory controls may influence the sectors on which their airlines operate. While a number of external factors influence both stage lengths and often frequencies, an airline has some scope to try to reduce or cut out its short sectors and to try to increase its frequencies by changes in operating pattern or route structure. Because changes in stage lengths or frequencies tend to be piecemeal and gradual, it takes time before they have any effect on an airline's overall costs. Nevertheless there is some scope here for management action.

6.5.4
AIRLINE AND FLEET SIZE

Early study of airline economics, particularly in relation to US airlines, had suggested that there might be significant economies of scale, particularly at the lower end of the size scale (Wheatcroft, 1956). Such economies were expected to arise through the ability of larger carriers to gain the benefits of bulk buying and of spreading contingency provisions over more units of output. Large carriers would also benefit from their ability themselves to undertake discrete activities such as certain maintenance checks or computerized reservation systems for which a minimum scale of operations was necessary. Increasingly the view that there are economies of scale in airline operations began to be questioned. In 1969 the Edwards Committee (HMSO, 1969) concluded that an analysis of US domestic airline results suggested that the advantages of scale as such might be exaggerated. Quality of management, the Committee believed, might be more significant in determining airline costs than factors related to size of output. An American study by Straszheim (1969) came broadly to the same conclusions. It found that direct operating costs declined sharply as airline size increased but this was not due to any scale effect. Smaller firms reported higher direct costs because they flew thinner routes using smaller aircraft over short stage lengths. Subsequent studies both in the United States (for example, White 1979) and elsewhere have also failed to establish any economies of scale in airline operations. These findings were confirmed in practice following US domestic deregulation and liberalization on the North Atlantic. From 1978 onwards many small carriers entered new markets and were able to be price competitive against very much larger and well-established airlines.

The airline industry appears to be characterized by constant returns to scale. In other words, there are no marked cost economies of scale. Such a conclusion has important implications for regulatory policy. It means that, in the absence of entry or capacity controls, new small carriers should be in a position to enter existing markets and to be cost competitive with established carriers. The economics of the airline industry indicate a natural tendency towards competition rather than monopoly. In practice in international air transport, that tendency is distorted by bilateral agreements, by state involvement in aviation and by other constraints discussed in earlier chapters on regulation. Moreover, post-deregulation experience in the United States and the emergence of so-called mega carriers suggest that, while there may be no cost advantages of larger size, the larger airlines with a wide marketing spread enjoy distinct scale benefits in terms of marketing (see section 4.4.1). Thus new smaller entrants into an established market may be competitive in terms of costs but may not be competitive in their marketing because of the small scale of their operations. This reinforces the tendency towards oligopolistic rather than perfect competition.

If there are no economies of scale, what about the related question of fleet size? The Edwards Committee was impressed by the evidence that there are economies from increasing the scale of operations of a standard fleet of the same aircraft type. The Committee estimated that the hourly direct operating costs of operating five aircraft of one type would be about 5 per cent higher than those of an airline operating 15 of the same aircraft type (HMSO, 1969). Varied stage lengths and differing traffic densities impose the need on many airlines to have quite mixed fleets. This in turn means that some airlines, especially smaller Third World airlines like Zambia Airways or Air Tanzania, may operate only two or three aircraft of one type. When the number of aircraft in a fleet of one type is so small there are likely to be higher costs. The cost of spares holding will be higher since the spares holding expressed as a proportion of the purchase price of the aircraft goes up as the number of aircraft purchased drops below a certain level. Flight crew training and engineering training costs have to be spread over fewer aircraft and are therefore higher. Maintenance costs would be particularly high for small fleets if engines or aircraft have to be sent elsewhere for major overhauls. The small numbers may preclude the installation of more advanced local maintenance facilities. Sets of flight crews per aircraft may be higher for very small mixed fleets because of the inability in emergencies to switch crews between aircraft if they are of different types. Pilots are certificated for only one aircraft type at a time. All these considerations mean that an airline, such as Kenya Airways, with a small but mixed fleet, has a cost disadvantage. In 1988, Kenya Airways operated 12 aircraft of seven different types. In contrast, Qantas operated 36 aircraft of two types, Boeing 767s and Boeing 747s. Though they were different variants, in some cases with different engines, the degree of commonality of spare parts, maintenance procedures and flight crews must have produced significant economies.

6.6 Marketing policy

6.6.1 PRODUCT QUALITY

Airlines have to decide on the nature and quality of the product they are going to offer in the various freight and passenger markets that they serve. They do not have an entirely free hand. For commercial and competitive reasons they may have to conform to certain minimum standards of product quality. This is particularly so if they are IATA members and operating on routes where IATA conditions of service still apply, though such routes are now few in number. They must also conform to a variety of international or national safety and technical regulations. These affect many aspects of the cabin layout such as the seat pitch next to emergency exits, or the minimum number of cabin staff, and so on. Within these constraints, airlines enjoy considerable freedom to decide on the quality of the product they are going to offer and on the costs they are prepared to incur. The product standards may be different for the various markets served by the airline and will be related to the stage length, to the timings of the services and above all to the degree and nature of competition from other carriers. On routes operated in a revenue pool with a high transfer limit, product competition will inevitably be less acute than on routes where airlines are involved in head-on competition.

Three aspects of cabin service standards are particularly important for passenger services. Cabin layout and seating density are frequently the most significant in terms of their impact on unit costs. Each aircraft type has a maximum design seating capacity based on an all-economy layout at a given minimum seat pitch. The actual number of seats that an airline has in its own aircraft of a particular type depends on several key decisions which the airline itself takes. The distribution of space between fare classes, if there is more than one, the seat pitch adopted for each class and the number of seats abreast are the more crucial determinants of seating capacity. The distribution of cabin space between seating areas, galleys, toilets and storage is another factor. In certain wide-bodied aircraft extra space for seating can be provided by positioning one or more of the galleys in the freight hold, though this is at the expense of freight capacity. The fewer the number of seats on offer, the higher will be the cost per seat-kilometre, since the aircraft’s trip costs need to be divided among the fewer seat-kilometres generated.

The range of seating densities used by international airlines in two aircraft types is illustrated in Table 6.6. Some scheduled airlines as part of a superior product strategy choose seating configurations which may result in a reduction in the number of seats by a quarter or more compared with the seating capacity offered by other carriers. The airline’s product may be improved but the cost implications are serious. For example, in 1988 the seat-kilometre costs of

Swissair with only 221 seats in its DC-10–30 aircraft were 41 per cent higher than they would have been if it had adopted Korean's 312-seat layout. The impact of different scheduled seating densities on costs is normally less marked than that and involves unit cost variations of up to 15 per

Table 6.6 Impact of seating densities, 1988

	Airbus A300 B			DC-10–30	
Airline	No. of seats	Cost per seat[a]	Airline	No. of seats	Cost per seat[a]
Scheduled airlines:					
Air France	281–291	100	Korean	312	100
Iran Air	270	108	Malaysian	291	107
Olympic	262	111	United	285	109
Iberia	251	116	Aeromexico	280	111
PAL	246	118	KLM	248	126
Air India	238	122	Zambian	236	132
Varig	234	124	Swissair	221	141
Charter airlines:					
Hapag Lloyd	315	92	Balair	345	90
Orion	328	89	Martinair	376	83
Dan Air	336	87	World	380	82

Note:
[a] Indexed to 100 for airline having most seats and assuming airlines have similar operating costs for each aircraft type. Index shows impact of higher seating densities.
Source: Compiled by author from ICAO data.

cent. The economics of charter operations, as discussed in the following chapter, require high seating densities. It is for this reason that the charter airlines shown in Table 6.6 push their seating densities way above those found acceptable for scheduled services, with a concomitant reduction of seat-kilometre costs.

A second aspect of cabin service standards which has important cost implications is the number of cabin crew used. Safety regulations impose a minimum number for each aircraft type. It is up to each airline to decide how many more than the minimum it wishes to use. On short- to medium-haul sectors where there is less time for meals and other in-flight services, cabin crew numbers may be close to the minimum. On long-haul sectors, airlines have more scope to try to differentiate their product through their in-flight services, and one aspect of this may be more cabin staff. In 1989 Singapore Airlines was flying its Boeing 747s with 19 cabin crew when the minimum required was 11. Other South East Asian airlines had fewer cabin crew on their 747s—Cathay Pacific had 18, while Thai International and Malaysian had 17; Philippine Airlines had fewer, at only 15. When cabin crew wages are low by international standards, then the cost of improving the in-flight product by having more cabin staff is not high. This is the case with these Asian carriers (Table 6.2 above). Conversely it is costly for high-wage airlines to compete in terms of cabin staff numbers.

The third key element of cabin service standards is that of catering. As during the 1980s more and more airlines abandoned the IATA conditions of service pertaining to particular routes and fare classes, so the scope for management initiative increased. Competitive pressures, however, have pushed most carriers more or less to match what their competitors are doing. For this reason, while catering costs may vary between airlines, they are unlikely to be important in explaining differences in total unit costs between those airlines. The same is also true of the minor elements of cabin service such as newspapers and journals, give-aways, head sets, the showing of films, and so on.

There is also scope for product differentiation on the ground. Airlines can operate and pay for more check-in desks to speed up check-in and they may also decide to provide more ground staff for passenger handling and assistance in general. Some international airlines go further and provide sometimes quite luxurious and costly first-or even business-class lounges at airports, while their competitors may provide neither. An example is Singapore Airlines, which has decided, as a matter of product policy, to provide its own exclusive first/business-class lounges at all the airports it serves irrespective of the frequency of its services or the number of first- or business-class passengers handled. In this way it imprints its own brand and product style on the lounges. To save costs some other carriers share executive lounges with one or more different airlines.

It is difficult to assess the impact of product quality decisions of different airlines on their comparative costs because of the paucity of reliable data. One way of doing this, however, is to establish the expenditure on passenger services per 100 passenger-kilometres of traffic carried. Passenger services expenditure, according to the ICAO statistics, covers the costs of cabin crews and passenger service personnel as well as passenger-related costs such as in-flight catering and hotel accommodation. By expressing such expenditure per 100 passenger-kilometres rather than per passenger, one can partially adjust for the fact that there will be quite different passenger hauls on the airlines selected. The relative passenger services expenditure levels for our selected carriers are shown in Table 6.7. The implication of Table 6.7 is that European airlines spend more on product quality than their North American or Asian counterparts, in many cases two or three times more; yet many Asian carriers, because of their lower wage rates, may be providing more cabin crew and ultimately a better cabin service.

6.6.2
SALES AND PROMOTION ACTIVITY

Airlines enjoy considerable discretion in the way they organize and run their sales and promotion activities. They decide on the extent to which they should sell their services through their own sales outlets rather than through other airlines or agents. Such decisions have cost implications. Although setting up and operating its own sales outlets cost money, the airline saves the commissions it would otherwise have to pay agents. An important decision in this respect is whether an international airline should set up off-line sales outlets, that is, outlets in cities or countries to which it does not fly. Equally crucial may be the decision on whether it should itself staff and operate sales offices at some of its less important overseas destinations or whether to appoint a general sales agent, who may or may not be another airline.

Table 6.7 Passenger services expenditure, 1988 (US¢ per 100 scheduled passenger-km)

Rank	North American Airline	US¢	European Airline	US¢	Asian/Australasian Airline	US¢
1			Swissair	267		
2			Lufthansa (1987)	202		
3					JAL	166
4			British Airways	166		
5			Air France	162		
6			Alitalia	150		
7	Air Canada	121				
8			KLM	115		
9					Qantas	101
10					SIA	99
11	Pan Am	97				
12					Air India	93
13	American	87				
14					Cathay Pacific	84
15	United	82				
16	TWA	79				
17	Northwest	76				
18					Thai International	73

Source: Compiled by author from ICAO data.

Having taken these decisions on whether to provide its own sales outlets, an airline has to decide on their location and size within each city. If opening a sales outlet in London, does it insist on its being with many of the other airlines in a small area bordered by Bond Street, Piccadilly or Regent Street, one of the most expensive shop locations in the world, or does it follow Philippine Airlines and Air Algerie and choose a less expensive location in central London but somewhat away from the other airlines?

It is open to airlines to decide themselves how much to spend on advertising and promoting their services and how to spend it. Numerous promotion channels are open to them from television, radio or national press advertising aimed at large numbers of potential customers at one end to promotional activities or trade press advertising involving relatively small numbers of freight and travel agents or travel journalists at the other. Many airlines target an advertising and promotional budget equivalent to about 2 per cent of their revenue, but they may spend much more than this in particular markets, especially when they are launching a new service.

Different management attitudes towards advertising can be seen in Table 6.8, which shows advertising expenditure in the UK press, radio and television of all the East Asian airlines in the year to March 1990. All Nippon Airways was the biggest spender by far, as it had launched its London service only in 1989 and was trying to establish its name in the UK market. Of the established carriers, Cathay Pacific and SIA spent much more per flight than any of the others, though Malaysian was not far behind. Because of their high advertising spending and excellent in-flight service, Cathay and SIA were getting particularly high loads in first and business class. Other airlines, such as Thai International, Philippine Airlines, Korean and Japan Airlines, spent very little in relation to the number of weekly services they operated. This was purely a management decision.

Table 6.8 Advertising expenditure of East Asian airlines in the UK, year to 31 March 1990

Airline	Total advertising expenditure £'000	UK flights per week	Annual expenditure per flight £'000
Cathay Pacific	2,870	14	205
All Nippon Airways	1,715	4	429
SIA	1,370	9	152
Qantas	1,055	14	75
Malaysia Airlines	630	6	105
JAL	370	13	28
Thai International	300	6	50
Garuda	250	3	84
PAL	145	3	48
Korean	65	2	33

Source: Compiled by author from various sources.

Ticketing, sales and promotion represent almost 18 per cent of total operating costs of scheduled airlines of ICAO number states (ICAO, 1990). As such, it is clearly a major item of expenditure, yet one which very much depends on the policies adopted by individual airlines. While most of the major international airlines spend around 17–18 per cent of their total expenditure on ticketing, sales and promotion, some spend much more (Table 6.9). SIA and Qantas both spend over 25 per cent of their expenditure in this area. While some North American airlines also have relatively high expenditures on sales and promotion, European carriers as a group appear to spend less. In the case of Northwest, United or American, high sales costs may well be due to the fact that a large part of their operations are domestic and in recent years, as a result of US deregulation, travel agents' commission rates in the United States have reached very high levels. At times and in certain areas US travel agents can command up to 20 per cent commission. This then becomes a major externally determined cost. In general, however, both product quality and sales and promotion activity are key elements of airline marketing policy where management decisions have a direct impact on costs.

Table 6.9 Ticketing, sales and promotion expenditure as a percentage of total operating costs, 1988

Rank	North American Airline	%	European Airline	%	Asian/Pacific Airline	%
1					Qantas	30.6
2					SIA	24.5
3	Northwest	24.4				
4	United	21.9				
5	American	20.2				
6			Swissair	19.5		
7					Thai International	19.1
8			KLM	18.6		
9	TWA	18.4				
10	Air Canada	18.4				
11			British Airways	18.3		
12			Lufthansa	17.9		
13					Air India	17.8
14					JAL	17.8
15			Air France	17.1		
16			Alitalia	17.1		
17	Pan Am	15.7				
18					Cathay	n.a.

Source: ICAO (1988a).

6.7
Financial policies

6.7.1
DEPRECIATION POLICY

The hourly depreciation cost of an aircraft at a given price depends on the length of the depreciation period, the residual value of the aircraft at the end of that period and the annual utilization of the aircraft. The annual utilization (that is, the block hours flown during the year) is dependent on the pattern of operations, on the stage lengths flown and on the scheduling efficiency of an airline's management. The depreciation period adopted and the residual value assumed are determined by an airline's financial policy. In many countries, legislation or accounting convention may require the adoption of a particular depreciation policy or may impose certain minimum requirements. Most international airlines, however, have some flexibility in deciding on the effective commercial life of their aircraft and their residual value at the end of that life. This flexibility is important. If an airline can adopt the practice of depreciating its new wide-bodied aircraft over 16 years to a zero residual value, its hourly depreciation costs (assuming the same annual utilization) will be less than half what they would have been had it used a seven-year life for the aircraft with a 10 per cent residual value.

Both these depreciation policies are currently in use by different airlines and they show the significant variations in depreciation costs that can result from the adoption of different policies. Since, on average, depreciation charges represent around 8 per cent of airlines' total operating costs, then the depreciation policy adopted can influence total costs by as much as 3–4 per cent.

Having adopted a particular depreciation policy, airlines may subsequently change it in order to increase or reduce their costs. For many years Singapore Airlines (SIA) had adopted a policy of using depreciation periods which were exceptionally short by international airline standards. They estimated the life of their aircraft to be between five and six years with zero residual value. The purpose appears to have been to build up reserves from the depreciation charges to finance the rapid renewal of the fleet and also to mask the large operating profits that were being made. When in 1979 the fortunes of the airline industry were hit by the rise in the price of fuel, SIA promptly lengthened the life of its aircraft to reduce its costs and thereby still managed to show a profit. The process is clearly documented in Singapore Airlines' annual report for 1979/80. It shows that in that year the airline made a profit on its airline operations of S $15.7 million. But the operational life of the airline's aircraft was estimated to be five to eight years with appropriate residual values. In the previous years aircraft lives had been five to six years with nil residual values. The report states: 'As a result of the change in the estimated useful lives of the aircraft fleet the depreciation charge for the year is reduced by Singapore $44.37 million.' In other words, had the airline continued to use the depreciation policy adopted in previous years, its costs would have been S$44.37 million higher and the airline profit of S$15.7 million would have been converted into a loss of S$28.7 million! During the 1980s Singapore Airlines continued to use an eight-year life for its aircraft with appropriate residual values. This was still very short compared with most international airlines. It explains why SIA's depreciation costs per tonne-kilometre available were amongst the highest when compared with international airlines with roughly similar average stage lengths. Then in April 1989 SIA again lengthened its depreciation period to 10 years with 20 per cent residual value so as to be more in line with industry practice.

Other airlines have also changed their depreciation policies from time to time. Cathay Pacific, which had been depreciating its Boeing 747 aircraft over eight years, switched to a 15-year period after 1980 and almost halved its depreciation costs. In its 1981/2 accounts, British Airways threw in a massive provision of £208 million for accelerated depreciation of some of its aircraft and other assets. The result was substantially lower depreciation costs in subsequent years and a marked improvement in profitability.

6.7.2
CURRENT OR HISTORIC COST ACCOUNTING

The theoretical justification for depreciation is that money set aside each year as depreciation charges should be used to build up a reserve fund, from which new aircraft or equipment can be bought to replace existing aircraft when they are retired or sold off. A failure to cover depreciation charges out of revenue means that an airline is not generating enough revenue to renew its assets. Inevitably, however, new aircraft cost more than the aircraft being replaced, so there is normally a shortfall between the funds set aside through depreciation based on the historic cost of the aircraft and the capital required to finance the new purchases. At times of relatively low inflation this shortfall was of manageable proportions and could be covered by raising loans. But the annual rates of inflation in many industrialized countries began to accelerate in the early 1970s and reached abnormally high levels in the second half of the decade. As a result, the difference between the historic cost of aircraft and their replacement cost became excessively large. A number of airlines began to consider whether they should depreciate their aircraft and other assets on the basis of their current cost rather than on the basis of their historic cost.

Different methods can be used to calculate the current replacement cost of an asset or aircraft purchased some years ago, but they all involve inflating the historic cost through some price index such as the index of manufacturing costs or aircraft prices. By inflating the cost of assets to be used for depreciation purposes, one of the effects of current or replacement cost accounting is to increase depreciation charges and thereby an airline's operating costs. In the financial year 1982/3 British Airways' depreciation costs went up from £126 million on a historic cost basis to £209 million in current cost terms. In the early 1980s a few airlines embraced current cost accounting, but the practice was then largely abandoned as inflation rates declined. The adoption or otherwise of current cost accounting is another aspect of financial policy which influences airline costs.

Some airlines have adopted a compromise position of charging extra depreciation in addition to historic cost depreciation without formally adopting current cost accounting. This is done on an ad hoc and arbitrary basis. For instance, Swissair has often charged increased depreciation in years when profits are high. It could also be argued that using relatively short asset lives, as Singapore Airlines does, has the same result as current cost accounting. It accelerates the accumulation of reserves needed to finance new aircraft purchases.

An additional problem when considering depreciation costs is how to treat aircraft which have been leased rather than purchased, since legally the airline is not the owner. One approach is to differentiate between lease agreements that give the airline rights approximating to ownership, often involving the transfer of ownership at the end of the lease period (finance leases), and so-called operating leases, which do not give such rights and are usually of shorter duration. In the case of finance leases, the aircraft can be depreciated in the normal way so that its depreciation cost appears under the airline's direct operating costs in the profit and loss account. While interest element in the lease payment is added to the other interest payments in the airline's accounts, the capital repayment element is not charged to the profit and loss account but is shown only as a liability. Conversely, annual lease payments on operating leases would appear as a flight operating cost and there would be no separate depreciation charge. This is the approach adopted by Singapore Airlines. It follows that the type of aircraft leases that an airline negotiates will affect the absolute and relative level of its depreciation costs.

6.7.3
METHODS OF FINANCE

Interest charges on loans are considered within the airline industry as a non-operating item. As such they do not affect operating costs or the operating results. However, they do affect each airline's overall profit or loss after inclusion of interest and other non-operating items. The bulk of interest charges relates to loans raised to finance aircraft acquisitions, though some airlines may also be paying interest on bank overdrafts arising from cash flow problems or from the need to finance losses incurred in previous years. An airline can reduce or avoid interest charges by financing part or all of its aircraft purchases internally from self-generated funds. Self-financing is clearly cheaper than borrowing, especially at a time when interest charges are high.

High rates of interest, which in recent years have averaged around 7–9 per cent but have been well over 10 per cent, have pushed annual interest charges to very high levels. This is so even for airlines that have been able to self-finance part of their capital expenditure. Carriers such as Singapore Airlines which, as a result of a policy of rapid depreciation previously referred to and high profits, built up sufficient reserves to be more than 70 per cent self-financing in most years, are relatively few.

Most airlines would prefer to be self-financing but may be unable to generate sufficient reserves from their depreciation charges and retained profits to do so except to a limited extent. Their remaining capital requirements can be met in one of two ways. First, there may be an injection of equity capital into the airline. The advantage of equity finance is that airlines pay interest on it only in the form of dividends if they make a profit. Most international airlines outside the United States are government owned, but governments have been loath to put in more capital to finance aircraft purchases, especially as the sums involved are very large. Private shareholders have also been hesitant because of the poor financial performance of the airline industry. If equity finance is unavailable, airlines must borrow in one form or another from commercial or government banks. Several different forms of loan finance are available, but either directly or indirectly they all involve interest charges. This is true even of finance or operating leases.

The growing reliance of national airlines on external finance rather than self-financing or equity capital, has pushed them into having very high debt/equity ratios. In other words, too much of their capital is financed by loan capital and too little by equity. Many airlines have been under-capitalized and have needed an injection of capital if the interest burden was to be kept within manageable proportions and if they were to be in a position to order new aircraft without bankrupting themselves. Even Singapore Airlines, which had been able to self-finance so much of its investment, had a major injection of equity capital in 1981/2 of S$404 million (US$190m) from its then shareholders, the Singapore government. As a result, in 1982/3 SIA's debt/equity ratio was 46:54. It is generally believed that a debt/equity ratio of 25:75 is desirable and that a ratio of up to 50:50 is acceptable. Given the very high cost of new aircraft, airlines can stay within acceptable limits only by injections of new capital. Most governments have been loath to follow the example of Singapore and put more equity capital into their airlines. Their airlines' debt/equity ratios have consequently deteriorated. Many airlines around the world, especially in developing countries, have needed an injection of equity capital in order to reduce their interest charges and to be able to finance new aircraft.

Early in 1984 Malaysia Airlines was finalizing its five-year development plan. This required substantial investment in new aircraft. In the absence of additional equity capital from the Malaysian government, the airlines would have to raise commercial loans. But it was already heavily in debt and interest charges were likely to be high, so it had to try and self-finance part of its capital needs. The management estimated that to do this it needed to generate a profit of about US $30 million per annum. In 1982/3 its profit was only $3.4 million and, though in 1982/4 it was about $40 million, the $30 million target could not be met every year. Without it, the airline's development programme would be in jeopardy. This was why in 1984 it was decided to inject capital by privatizing the airline. This is the main reason why many other governments in the latter 1980s decided to sell off a major part of their state-owned airlines. However, it was difficult to attract private capital unless the airlines in question had a good profit record and were not heavily indebted already. Companies like Philippine Airlines, which in 1989 had large debts and minimal profits, could not easily be privatized.

As previously mentioned, an alternative solution for airlines with inadequate financial resources is to lease aircraft from specialist aircraft-leasing companies, like Guinness Peat Aviation, or bank consortia that provide the same service. This solution is particularly attractive for airlines that are too small to obtain the best prices from the manufacturers or that are not themselves in a position to get any tax advantages from direct purchase. The leasing companies by doing both can provide aircraft which may be cheaper in real terms.

6.8 The quality of management

The analysis so far indicates that the most important variables affecting airline costs are the level of input prices, the type and size of aircraft used and the stage lengths operated. In so far as the last two of these variables are themselves influenced by the pattern and levels of demand that an airline is trying to satisfy, then demand may also be considered an important variable. Other, though less impor-tant, variables have been discussed. Many of these are particularly prone to management decision and choice. There is a further dimension of management whose importance may be absolutely crucial in establishing an airline's unit cost levels, but may be difficult to define or measure. One might broadly define it as the quality of management and it permeates through to most areas of an airline's activities.

The quality of management affects the efficiency with which the management of an airline brings together the various factors of production at its disposal in order to meet different levels and types of demand in different markets. In theory it is management ability or the lack of it which should explain cost differences between airlines which cannot be attributed to variations in input costs, aircraft types operated, stage lengths or any of the other cost variables. Northwest best illustrates the importance of management. Northwest is one of the lowest-cost operators of the airlines sampled, and its unit costs are lower than those of other North American airlines (Table 6.1). Yet it appears to have no apparent advantage in terms of the key cost variables. Its input costs are broadly similar to those of other North American carriers, though its fuel costs are likely to be lower than those of non-US airlines (Table 6.3). The wages it pays are similar to those of other US airlines and much higher than those of most Asian airlines. Its average aircraft size in 1988 was less than half that of Cathay or SIA and smaller than that of several other carriers. Its average stage length at 1,163 km was shorter than that of most of the European and Asian carriers. Yet Northwest appears to be very efficient in its use of labour. Its output per employee is very high and in terms of ATKs per $1,000 of labour cost it is among the highest of the non-Asian carriers (Figures 6.1 and 6.2). This efficiency in the use of resources probably permeates other areas of activity too. North-west has also made marketing policy decisions which ensure that its passenger service costs per 100 passenger-kilometres are among the lowest (Table 6.7), though it spends a high proportion of its total costs on ticketing, sales and promotion (Table 6.9). It is policy decisions in this and other areas, together with the quality of its management, which enable Northwest to produce at lower unit costs than most of the other airlines sampled.

In practice, no airline management is likely to be equally efficient or inefficient in all areas of management. It may well be efficient in one area, such as flight crew scheduling, but relatively inefficient in the organization of maintenance procedures. Thus the total unit cost of an airline may mask wide variations of performance in discrete areas of activity such as flight operations or maintenance management. Ideally, inter-airline comparisons should be on a disaggregate basis, looking at such discrete areas separately.

7
The Economics of Passenger Charters

7.1
The nature of non-scheduled passenger services

One of the enigmas of international air transport is the ability of charter airlines to sell seats at one-half or even one-third of the price charged by their scheduled airline competitors and still make a profit. The fare advantage offered by charters can be gauged by examining the London-Athens route during the peak summer months of 1990 (Table 7.1). The cost of a charter round trip per passenger was only one-third of the scheduled excursion fare and around half of the advanced purchase fare. The charter fare advantage was much less when compared with the consolidation or group fares on scheduled services, which could be bought by travel agents. However, it should be borne in mind that the number of seats on any scheduled flight available for consolidation or group fares is limited, especially during periods of peak demand when scheduled carriers have little difficulty in filling seats at the higher fares. It is the charter airlines' ability to offer such low seat costs which has enabled them to capture around 45 per cent of the international passengers within the Europe-Mediterranean area and well over half the traffic in terms of passenger-kilometres (ICAO, 1990). Their penetration of the North Atlantic market is lower, at around 7–8 per cent, but it was as high as 29 per cent in 1977 (Table 1.4 above). Passenger charters are important in these two major international markets. Their impact in other markets has been more limited, though charters are significant on a few individual but smaller routes such as Canada to the Caribbean.

The regulatory constraints on charter services, their early history and subsequent development have been described earlier (sections 1.4, 2.7 and 3.2). This chapter examines how passenger charter airlines can achieve such low costs and fares while continuing to operate profitably. But first one needs to consider the nature of non-scheduled operations.

The Chicago Convention in 1944 had asserted that non-scheduled flights were those 'not engaged in scheduled international air services'. But no attempt was made to define 'scheduled' until 1962 when

Table 7.1 Scheduled fares and charter costs London-Athens, summer 1990 (July–September)

		Return fare £	Fare index Excursion=100
Scheduled—publicly available:			
Club/Business class		560	155
Eurobudget		442	123
Excursion		360	100
Advanced purchase (APEX)			
Weekend		270	75
Weekday		254	71
Super APEX			
Weekend		235	65
Weekday		219	61
Scheduled—available to agents:			
Individual inclusive tour or			
consolidation:	British Airways	186	52
	Olympic	179	50
Charter—cost per passenger:			
Friday day flight		143	40
Tuesday day flight		126	35
Tuesday night flight		112	31

Note: Charter cost assumes 85 per cent load factor on Boeing 737–300 and includes airport taxes.
Source: Author.

the Council of the International Civil Aviation Organization (ICAO) agreed that a scheduled international air service is one 'operated so as to serve traffic between the same two or more points either: (i) in accordance with a published timetable, or (ii) with flights so regular or frequent that they constitute a recognisable systematic series'. Within a few years of this definition being drafted it was meaningless as the basis for any real distinction between scheduled and non-scheduled services. Many inclusive tour and affinity group charters were being operated as a 'recognisable systematic series' of flights and, though the timetables were not published by the charter airlines themselves, they were to all intents and purposes published by the tour operators and travel agents. The formal distinction between the two types of services became increasingly blurred.

Two types of charter flights have emerged, namely ad hoc charters, that is, one-off flights where aircraft are chartered for a specific event such as a sports fixture or a sales promotion, and 'series charters'. The latter are charters involving several flights which may be on behalf of tour operators, oil companies, the military or others requiring regular transfer of people. As previously mentioned they normally have a set timetable and are operated as a regular series. In many European holiday markets they operate on routes where there are frequently no direct scheduled flights at all.

Traditionally, within the Europe-Mediterranean area, the vast majority of passenger charter flights are inclusive tour charters (ITCs.) These are where the whole of an aircraft is chartered by one or more tour operators who combine the round-trip seats with hotel or other accommodation into ‘package’ holidays. The passenger buys the holiday package from a travel agent or tour operator at a single price and is unaware of the cost of travel within that total price. Some charter packages may involve minimal accommodation or may include car hire, boat hire or something else in addition to or instead of accommodation. Apart from ITCs there are some affinity group and student charters within Europe, and in one or two markets, such as UK-Switzerland, advanced booking charters are operated. But these other forms of charters have been relatively limited compared with ITCs, which have dominated the market.

In recent years, however, the European charter market has been undergoing change. First, there has been strong growth of self-catering inclusive tours, where the package does not include a hotel and meals but provides only for accommodation in houses or apartments. By 1989 nearly one-third of the UK inclusive tour market went on self-catering packages. Secondly, tour operators have increasingly been selling seats on their chartered flights on a seat-only basis. It is logical for tour operators or airlines with empty seats on their hands to try to sell them at virtually any price. Seat-only tickets on charter flights are therefore particularly cheap. In 1989 about 13 per cent of UK charter seat sales were on a seat-only basis, though for some individual charter airlines seat-only sales represented around 20 per cent of their capacity. As a result of the rapid growth of self-catering ITCs and seat-only sales, the traditional hotel-based ITC market had by 1989 declined to around 55 per cent of the UK charter business.

Advanced booking charters (ABCs) are relatively more important on North Atlantic routes, though their market share varies from route to route. ABC rules require the prepurchase of tickets a minimum number of days prior to departure and that such tickets must be bought from licensed travel agents, not the airlines themselves. Following deregulation, the United States had espoused the concept of ‘public charters’ with such minimal controls on seat access for charters passengers that such charters would be difficult to differentiate from scheduled services. Most European countries have not wished to go so far. Apart from ABCs, most of the remaining charters on the North Atlantic are inclusive tour charters that operate very much as they do in Europe. Charter flows in other smaller markets such as Europe to East Africa, to the Caribbean or to Thailand and from Canada to the Caribbean generally involve inclusive tours.

While a few charter airlines such as Martinair or LTU have always served long-haul markets, from the late 1970s onwards long-haul charters generally stagnated or declined in many markets, not just on the North Atlantic. There were several reasons for this. The relatively thin and highly seasonal demand could not support the large wide-bodied aircraft which the charter airlines needed to operate once the older narrow-bodied Boeing 707s or DC-8s were no longer competitive. Moreover, the scheduled airlines operating to tourist destinations developed group fares or individual advance purchase fares that were charter competitive. This made it difficult for charter airlines to get established on routes where there were scheduled services already. They did better in markets, such as the Maldives or parts of the Caribbean, poorly serviced by scheduled flights. Lastly, many potential markets were closed to charter services because national governments were not keen to see their scheduled airlines undermined. Then in the late 1980s the picture began to change. The introduction of smaller longer-haul twin-jets with low operating costs, such as the A310–300 or Boeing 767-ER, made long-haul charters more viable. Charter airlines operating long-haul flights could ensure maximum utilization of the smaller aircraft by flying them on shorter sectors as well if needed. At the same time, there was renewed interest among European leisure travellers in particular in long-haul destinations in South East Asia, the Caribbean and North America. As a result of these parallel developments, long-haul charters expanded rapidly from about 1987 onwards. In the United Kingdom, the largest single charter market, charter traffic declined marginally in 1988 and 1989 and more substantially in 1990. But in all three years long-haul charter traffic from the UK actually increased, notably to Australasia, the Caribbean and North America. This strong growth trend in long-haul charter markets was expected to continue during the 1990s.

Inclusive tour charters are distinctive in that a passenger cannot, in theory, buy only a seat on the flight but must buy a holiday package of some kind. But one can also buy inclusive tours using scheduled services. The only major feature which distinguishes ITCs and other forms of charter services from scheduled flights is that the passenger cannot buy a seat or a package holiday directly from the airline as scheduled passengers can, but must do so through an intermediary such as a tour operator, travel agent, student union, and so on. This distinction, too, may be cosmetic rather than real, since in some cases the intermediary selling agent may be a subsidiary company of the charter airline or even its parent company.

7.2
The charter airlines

While many scheduled airlines operate charters, the international passenger charter market is dominated by specialist charter carriers which are either privately owned non-scheduled airlines or charter subsidiaries of scheduled airlines (Table 1.5 above). In 1988 these specialist charter carriers generated about 65 per cent of the total international non-scheduled passenger-kilometres, with the balance of 35 per cent being carried by the charter flights of scheduled carriers (ICAO, 1990). Several of the charter carriers are relatively large, with traffic levels exceeding those of many national scheduled airlines. Their size and importance can be gauged by the fact that the largest of them, Britannia Airways (UK), generates more passenger-kilometres on international services than any of the scheduled airlines of South America or Africa, more even than SAS or Air Canada. The non-scheduled carriers are equipped with large and modern fleets of aircraft, usually bought new. By the beginning of 1990 Britannia Airways operated a fleet of 40 Boeing 737 and Boeing 767 aircraft with an average age of 9 years. Other charter airlines had even younger fleets. In the spring of 1990, Air Europe's fleet had an average age of 2 years while the figure for Monarch was 2. 3 years. By comparison many scheduled fleets were clearly middle-aged or old. The average age of British Airways' fleet was 11.3 years, Air France's was 12.6 years and TWA's 16.1 years (Burnell, 1990).

A particular feature of the European inclusive tour industry is the strong tendency towards vertical integration between tour operators and charter airlines and in some cases with hotel groups as well. The largest non-scheduled carrier in the world, Britannia Airways, is part of the Thomson organization, which also owns Thomson Travel, Britain's largest tour operator, which also has interests in a number of hotels. Sterling, another of the larger charter airlines, is owned wholly by Tjaereborg International Holdings, a leading Scandinavian travel agency and tour organizer. Many more instances of vertical integration can be found in the UK and elsewhere in Europe.

Another feature of non-scheduled airlines is that, as a group, their financial performance has been better than that of scheduled carriers. They managed to continue making profits in the early 1980s at a time when many scheduled airlines were nosediving into deficit. In 1981, losses amongst the world's scheduled airlines reached their peak. Member airlines of the International Air Transport Association (IATA) made a loss (after interest) of $1,900 million on their international services. In the United Kingdom all the larger scheduled airlines made losses too, even those operating charters in addition to their scheduled services. Yet in that year all the British passenger charter airlines showed a profit except Dan Air.

In 1988, a relatively good year for scheduled airlines, the profitability of some of the larger European charter airlines (in terms of profit as a percentage of revenue) was better than or comparable to that of the more successful of the large European scheduled carriers and significantly better than the profit performance of Alitalia or Lufthansa (Table 7.2). However, in recent years, the performance of the charter industry has not been uniformly good. Two sectors of the industry have faced serious problems. The first is the sector based in destination countries, notably Spain, which has by far the largest volume of incoming charter traffic. Many Spanish charter airlines have been set up, often with the participation or help of north European airlines or leisure companies, to try to capture some of this market. The proliferation of such carriers, which has pushed down charter rates, their relatively small size compared with their northern competitors and the absence of a sufficiently large winter market have undermined the financial viability of many of them. Several, such as Hispania in 1989, have gone out of business. More are certain to follow. The other problem area is that of some of the smaller charter airlines in the large charter markets such as Germany, France and more especially the United Kingdom. In the late 1980s, within a climate of liberalization, many new charter airlines were established. The over-capacity in

Table 7.2 Profitability of selected European scheduled and non-scheduled airlines, financial year 1988

Airline	Profit or loss (after interest etc.)[a] as % of revenue
Largest scheduled airlines:	
Air France	+6.6
British Airways	+6.6
KLM	+6.0
Swissair	+0.4
Alitalia	−0.2
Lufthansa	−0.9
Large non-scheduled airlines:	
Martinair	+12.2
Britannia	+7.5
Monarch	+7.4
Condor	+3.8
LTU	+3.5

Note:
[a] Before taxes and excluding profits from sale of assets.
Source: CAA (1990b); ICAO (1988a).

the market squeezed charter rates, and when charter traffic growth faltered in 1988 and subsequent years the smaller charter airlines were particularly badly affected. In a 12-month period in 1988–9, three British charter airlines collapsed or went into receivership—the long-established British Island Airways, Novair and Paramount. Even Britannia, the largest and one of the most successful of the charter carriers, was affected by the downturn in the market and in the spring of 1990 announced a cutback in staff numbers.

Nevertheless, the larger non-scheduled airlines have generally shown themselves more adept than many scheduled airlines at matching supply and demand in a way which both generates profits for the producers and meets consumer needs. A key element in this matching process is the ability of charter airlines to produce at low unit costs.

7.3
Non-scheduled cost advantages

7.3.1
DIRECT OPERATING COSTS

In order to appreciate how non-scheduled operators can produce such relatively low unit costs, one must examine separately each element of costs for a charter service and compare it with the costs of a comparable scheduled service. To eliminate the effect of differing aircraft types and stage lengths, any cost comparison must assume the use of similar aircraft on the same route. The London-Greece route would be a suitable example, since Boeing 757 aircraft have been used by both sectors of the industry on this route.

Flight operations are the largest single element of direct costs. Here, charter operators may enjoy some limited advantages. While in the early days of charter services flight crew salaries were lower than those in scheduled airlines, this is no longer the case amongst most airlines in the UK and other European countries. The pilots' unions, helped by the worldwide shortage of pilots in the late 1980s, have ensured that salaries within each country are broadly comparable for pilots flying the same aircraft type. Fuel costs are likely to be similar for both charter and scheduled carriers if flying the same aircraft on the same route and paying the same price for fuel. The larger charter airlines should be able to negotiate equally favourable fuel prices at their home base because their uplift will be very high. If, however, they have only a limited number of charter flights to a particular destination, their fuel uplift at that destination may be rather limited and they may be unable to negotiate as good a price as the scheduled carriers. In this case they may have a cost disadvantage. Insurance costs will be broadly similar for both types of operators, as will en route navigation charges. Charter operators may, on the other hand, pay lower landing fees by using cheaper airports, especially in their home country. Scheduled services between London and Greece fly from Heathrow, but charter flights might use either Gatwick or Luton, which are also in the London area. In the summer of 1990 a scheduled Boeing 757 flight at Heathrow with 150 passengers on board would have paid the airport £2,398, whereas the same aircraft with the same number of passengers on a charter flight from Luton would have paid £1,718 and at Gatwick £2,003. If the charter flight flew from Gatwick after 1600 hours, which was an off-peak time, the airport charge dropped to only £342.

Maintenance costs for both charter and scheduled operations would be broadly similar if using the same aircraft on the same routes. Depreciation costs per hour would also be the same if both charter and scheduled airlines achieved the same utilization. In practice this is unlikely. First, aircraft used by the scheduled airlines will be used on different routes, many of which are, as previously explained, relatively short. The need to use the London-Greece aircraft on other much shorter scheduled sectors inevitably reduces the annual utilization which that aircraft could have achieved flying only on longer sectors such as London-Greece or London-Palma, which is what charter aircraft will be doing. Secondly, during the peak summer months the charter airlines will be flying their aircraft night and day. Aircraft on scheduled short- to medium-haul routes have a limited 14–16-hour operating day since scheduled passengers do not like departing much before 0800 hours or arriving after 2200 hours. Scheduled short-haul aircraft frequently spend the night hours on the ground. Not so charter aircraft. Charter passengers seem prepared to put up with considerable inconvenience in order to fly cheaply. They will accept departures or arrivals at any time of the night, or at least some of them will. As a result, except where constrained by night bans or limits, charter airlines programme their aircraft to fly during night hours. They have an effective 24-hour operating day during the peak months. They can usually get three daily rotations, that is, round trips, of the aircraft on a 2-hour or longer sector, whereas a scheduled airline would plan for only two rotations. On the other hand, charter services have much more marked seasonal peaks and troughs, so that in the off-peak winter months daily utilization of aircraft may drop below that of scheduled aircraft. This is more than compensated for by the very high peak utilization achieved by using the night hours. In addition, some charter airlines are able to lease out aircraft during their own off-peak periods to airlines in other parts of the world that face peak demand at that time. Thus Monarch in the UK has often leased some of its aircraft in the past to Canadian airlines, which used them for winter charters to the Caribbean. Air Europe in Britain has leased some of its aircraft to its sister companies in Europe for winter charter work. The net result is that European charter airlines achieve significantly higher aircraft utilization than their scheduled counterparts (Table 7.3). Monarch, for example, in 1989 got more than twice as many flying hours out of its Boeing 757s than British Airways did. Higher aircraft utilization might also enable the charter airlines to achieve more flying hours per flight crew member. On long-haul air services, scheduled airlines are not so restricted by the commercial need to avoid the night hours. Time zone changes make this difficult anyway. Consequently, on long-haul services, charter airlines rarely achieve significantly higher aircraft utilization than scheduled airlines.

In terms of direct operating costs, a charter operator flying London-Greece may obtain some cost advantage by paying lower airport charges and, by achieving higher daily utilization for its aircraft, it may also be able to reduce its hourly depreciation costs. Since airport charges and depreciation together may account for 10–15 per cent of total costs, savings in this area would have only a limited effect on a charter airline’s total operating costs. Flight crew might also be more productive. Conversely, the charter airline may have to pay higher prices for fuel at airports where their total uplift is not very high. Overall a charter operator is likely to achieve only marginally lower direct operating costs when competing with a scheduled carrier on a particular route and flying the same aircraft. The differences in direct costs are likely to be no greater than might exist between two scheduled airlines flying on that route.

7.3.2
INDIRECT OPERATING COSTS

It is in the area of indirect operating costs that the costs of charter

Table 7.3 Aircraft utilization rates: UK scheduled and charter services, 1989

Airline	Average daily utilization (hrs)	
	Boeing 737–200	Boeing 757
Mainly scheduled:		
British Airways	6.7	6.8
Charter only:		
Air 2000		14.6
Air Europe		10.7
Britannia	10.1	
Monarch		12.2

Source: CAA (1990b).

and scheduled services begin to diverge markedly. Charter airlines flying to Greece or elsewhere save money by subcontracting out most of the aircraft, passenger and baggage handling activities at their destination airports. This may be expensive on a per flight basis, but it means that they avoid a heavy year-round commitment. The seasonal nature of their operations means that they have no need for permanent staff or offices or other facilities at most of the outstations they serve. Even where they do need staff dedicated to their operations, they may be in a better position to use seasonal staff. In contrast, British Airways or any other scheduled airline with daily or more frequent flights to Greece will almost certainly do most of its own handling. It will employ a station manager in Athens, together with assorted other station and handling staff. It will have offices at the airport and perhaps off the airport as well, with associated rents and other costs. It will have vehicles and perhaps aircraft steps, baggage trolleys and other equipment. While it might employ some seasonal staff, a scheduled airline would have high year-round costs in Athens. Charter carriers are thus likely to have lower station and ground costs.

Charter airlines will also have lower expenditure on passenger services. They will try to have fewer cabin staff than a scheduled airline would have in the same aircraft type, while providing the statutory minimum required for safety. For example, a British charter airline would normally have one cabin crew member per 32 passengers on a Boeing 737–200 aircraft, compared with British Airways which carries one cabin crew for every 21 passengers on the same aircraft. Moreover, a higher proportion of the cabin staff will be seasonally employed and will not be a cost burden for the rest of the year. Some charter airlines employ as much as 50–60 per cent of their staff for a six-month peak season only. By providing relatively poorer and simpler in-flight meals they will reduce the costs of in-flight catering. On long-haul charters, airlines will not normally have interlining passengers or passengers catching connecting flights the following day for whom they have responsibility. They thereby escape the hotel, food, transport and other costs associated with such passengers which scheduled airlines have to meet.

The largest savings obtained by charter airlines arise in ticketing, sales and promotion. Charter operations do not require large reservations computers or other expensive ticketing facilities, since the whole plane is chartered to one or perhaps a handful of agents or clubs, which then become responsible for distributing the tickets and allocating the seats. The airline merely prints tickets and hands over to the charterer a book for each flight chartered and has no further ticketing or reservation costs. Charterers then allocate the tickets as they feel best. In some cases the charterers print their own stock of tickets. A charter airline has minimal sales costs. Since it does not sell direct to the public, it has no retail sales offices or staff, nor does it pay commission to others for selling its tickets. Yet agents' commission is an important cost for scheduled airlines. In the financial year 1988/9, commission paid (net of commission received) represented 9.3 per cent of British Airways' operating costs and 5.5 per cent of British Midland's costs. A charter airline sells its services not to passengers but to travel agents, tour organizers, or other charterers. In the UK there are a small number of very large tour operators and a somewhat larger number of medium-sized ones. Perhaps fewer than 50 tour operators purchase up to about 90 per cent of the charter flights operated each year out of the UK. Thus a charter airline's annual selling and promotion costs may be no more than the cost of 50 or so lunches with the key buyers of charter capacity. The charter airline's managing director, with a handful of back-up sales staff to do the detailed costings and negotiations, is probably all that is required. There is no need to sell or promote its services to the travelling public, so a charter airline is unlikely to have a promotion or advertising budget. Alan Snudden, the then managing director of Britain's second largest charter airline, Monarch, claimed that in 1987 it 'achieved a turnover of £111 million based on the selling activities of one Sales Director, three Salesmen and two typists with an advertising budget of £10,000 which I have to say was underspent'.

Enormous cost savings accrue to charter airlines from the virtual absence of ticketing, sales and promotion expenditure. In 1988 British Airways, Britain's major international scheduled airline, spent more than £28 per passenger on ticketing sales and promotion (Table 7.4). For the smaller scheduled airlines such as British Midland, concentrating on domestic services, the per passenger figure was lower at between £4 and £8. The contrast with the UK charter airlines is quite stark. The latter, if engaged exclusively with charter services, generally spent only a few pence each per passenger on ticketing and sales.

Charter airlines tend to have very much lower general and administrative costs because they require fewer administrative and accounting staff. Many functions which are crucial to scheduled airlines and absorb significant resources either do not exist within a charter airline at all or because of the different nature of charter operations, require relatively few staff. A charter airline, for example, does not need a large planning department or forecasting staff or large numbers of accountants to sort out revenue and sales accounts and inter-airline ticketing debts.

A charter airline can make economies in virtually all areas of indirect costs. It can thereby reduce its total operating costs to levels well below those that can be achieved by a scheduled airline flying the same aircraft on the same routes. Because most of the savings in

Table 7.4 Marketing costs per passenger: UK airlines, financial year 1988

	Charter passengers as a percentage of total passengers	Ticketing, sales (inc. commissions) and promotion costs per passenger £
Mainly scheduled:		
British Airways	2	28.33
British Midland	4	6.09
Mainly charter:		
Air Europe	79	3.42
Dan Air	79	2.37
Britannia	98	0.14
Novair	100	0.88
Monarch	100	0.18

Source: CAA (1990b).

charter operations arise in indirect costs, while direct costs are broadly comparable for both charter and scheduled operations, indirect costs are a much lower proportion of the total costs of charter airlines than of scheduled airlines. In 1989, among UK scheduled airlines, indirect costs accounted for around 50 per cent of total costs. Among charter airlines, in contrast, indirect costs were between 20 and 35 per cent.

Major savings in indirect costs, together with marginally lower direct costs, suggest that if flying similar aircraft a non-scheduled operator may have *total* round-trip costs between 20 and 30 per cent lower than those of a scheduled operator on the same route. This is clearly insufficient to explain the wide differentials in charter and scheduled passenger fares which exist in the European market and which were illustrated earlier by reference to the London-Athens route in summer 1990 (Table 7.1). However, the initial 20–30 per cent operating cost advantage is magnified by two key elements in the economics of non-scheduled air services: high seating densities and very high load factors.

7.3.3
HIGH SEATING DENSITY

Hapag-Lloyd, a large German airline, has in the past operated Airbus A300s on charter flights from Germany to Greece, Spain or elsewhere in the Mediterranean in a 315-seat configuration. Dan Air has used similar aircraft with 336 seats on Mediterranean charters. Scheduled airlines such as Lufthansa, Iberia or Olympic flying on the same routes have generally operated this aircraft type with around 250 seats (Table 6.6 above). By putting in 15–25 per cent more seats than their scheduled competitors, the charter airlines would have been able to reduce their seat-kilometre costs by nearly the same proportion. The scope for higher seating densities and therefore for even lower seat-kilometre costs is sometimes greater on wide-bodied aircraft. Non-scheduled airlines operating DC-10–30 aircraft would normally expect to have close to 380 seats in a charter configuration. Yet the same aircraft flown on scheduled services is more likely to have 235–285 seats (Table 6.6). In this case, the charter configuration increases the seating capacity by well over a third.

Several factors explain the ability of charter operators to push up the seating capacities on their aircraft. Non-scheduled aircraft are invariably in a single-class layout and at a constant seat pitch (the distance between each row of seats). No space is lost accommodating first- or business-class passengers in separate cabins with greater leg room and low seat densities. The trend towards a three-class cabin on medium- and long-haul scheduled flights has in many cases reduced the total seating capacity on aircraft that had previously had only two cabins for first- and economy-class passengers. Conversely, in Europe, airlines such as British Airways, which discontinued first class and adopted a business-class concept but with economy-class seating and seat pitch, were able to push up their seating capacity. Whatever the cabin layout, the charter configuration will also have lower seat pitch, that is, less distance between each row of seats, so that more seat rows can be installed within the length of the cabin. A 29-inch seat pitch would be acceptable in a short-haul charter layout, whereas 31–34 inches would be more normal for economy-class seating on a scheduled flight. Charter airlines also tend to increase the floor area on the main deck of their aircraft available for seating by reducing the number of toilets and galley space and by eliminating other space uses such as coat cupboards and so on. Galley space can be reduced because in-flight catering tends to be less lavish than on scheduled flights. The absence of first- or business-class passengers helps in this. In wide-bodied aircraft, such as DC-10s, the galleys may be placed on the lower deck with an internal lift providing access. This is possible because aircraft on non-scheduled flights do not have traffic rights for the carriage of freight so the aircraft hold is relatively empty.

7.3.4 HIGH LOAD FACTORS

Not only do non-scheduled airlines put more seats into their aircraft but they also fill substantially more of them. Whereas scheduled airlines would be pleased to achieve year-round passenger load factors on their international services of 65–70 per cent, charter airlines would be aiming for around 85 per cent. The stark contrast in the seat factors of the two sectors of the industry is illustrated in Table 7.5. While in 1988 or 1989 one or two of the scheduled airlines achieved international seat factors of 70 per cent or more (considered very high by scheduled standards), the majority had seat factors in the middle sixties and some were less than 60 per cent. In contrast, over half the non-scheduled operators shown achieved very high seat factors of over 85 per cent while none had a seat factor below 80 per cent. One can conclude that, in general, passenger seat factors are at least 20 per cent higher on non-scheduled than on comparable scheduled services. Finnair is the extreme case with a seat factor of only 67 per cent on its scheduled flights but achieving a very high 92 per cent on its non-scheduled operations.

The achievement of such high load factors is due not to the non-scheduled operators themselves but to the efforts of the charterers,

Table 7.5 Passenger load factors on international services, 1988 or 1989

Scheduled services	Seat factor %	Non-scheduled services	Seat factor %
United Kingdom airlines 1989:			
Virgin Atlantic	79	Air 2000	90
British Airways	72	Air Europe	89
Air Europe	69	Britannia	89
Dan Air	60	Dan Air	88
Air UK	52	Novair	87
British Midland	51	Caledonian	86
		Monarch	84
Other European airlines 1988:			
Iberia	70	Finnair	92
KLM	69		
SAS	67	Hapag-Lloyd	88
Lufthansa	67	Condor	85
Finnair	67	Transavia	83
North American airlines 1988:			
Air Canada	73	Air Canada	81
TWA	66	Pan Am	80
Pan Am	64	World	90

Source: CAA (1989b); IATA and ICAO.

for it is they who have the responsibility for retailing the seats they have bought wholesale. By careful programming and scheduling of flights and other components of the total package such as hotel beds, self-catering apartments, ground transport, and so on, the tour operators can achieve very high seat factors on the aircraft and high occupancy factors for the beds and other facilities they have booked. Vertical integration between tour organizers, which may be hotel owners too, and charter airlines facilitates the process of closely matching and programming the supply of and demand for hotel beds and aircraft seats. Load factors must be kept high to ensure low and competitive prices.

Several features of the charter market help in achieving this. Charter passengers are given limited flexibility in terms of choice of departure days and almost none on the choice of the return days. Particularly with inclusive tours, passengers can stay for only a fixed period at their destination—usually 7 or 14 days on intra-European charters, or perhaps 12 nights on long-haul charters to East Africa. Most of the travellers on an outward flight will come back together on the same return flight and on the same day of the week that they flew out on. Aircraft loads are not subject, as in scheduled operations, to the whims of different individual travellers who want to be away for different periods of time and travel on different days of the week. Moreover, once made and paid for, charter bookings are difficult to change and cancel except at a considerable cost to the passenger concerned. Ticket brokers are also used by aircraft charterers to fill up spare capacity on inclusive tour or advanced booking charters. The ticket brokers try to sell spare seats to other travel agents or at a discount to the public. If things go really badly, a tour operator with a large number of unsold seats on a flight it has chartered may cancel the flight (though it will pay a large penalty if it does that late in the day), and ‘consolidate’ its passengers onto someone else’s flight where seats may be available. Both tour operators benefit from such an arrangement. Loads on individual flights are carefully monitored to ensure high load factors. A finely tuned and highly differentiated price structure for charter tours is used to induce a potential customer to travel on less popular days or times or seasons of the year. Such incentives include lower holiday prices, two weeks for the price of one, free car hire, no charge for a child, and so on.

Higher load factors substantially reduce the passenger-kilometre costs of charter as against scheduled services. The twin impact of higher seating densities and very much higher seat factors on the unit costs of charters can be illustrated by reference to two British airlines, British Airways and Monarch, both of which have been flying Boeing 757 aircraft on European routes such as London-Athens. Monarch operated this aircraft in a charter configuration with 224 seats. Its average load factor in 1989 was 84 per cent. Assuming it achieved this on its Boeing 757 flights, this would have resulted in a load of 188 passengers. British Airways’ scheduled Boeing 757s had 180 seats and its average load factor on its European scheduled services was around 66 per cent in 1989. On Boeing 757 this would have been 119 passengers. Even if on a particular route the operating costs of the two airlines were the same, and we have seen that they are not, the costs per passenger round trip or per passenger-kilometre for Monarch would be about 37 per cent lower than for British Airways, purely because it was carrying 188 passengers instead of 119. In other words, by spreading the total round-trip operating costs over many more passengers, the non-scheduled operator can significantly reduce the trip cost per passenger. The above example shows that the higher charter seating densities and load factors together have a greater impact on reducing the charter costs per passenger than do the savings in operating costs.

7.4
The Cascade and Reverse Cascade studies

The preceding analysis indicates that non-scheduled operators start with an initial round-trip cost advantage of 20–30 per cent. This arises largely because of their lower indirect operating costs. By putting more seats into their aircraft they magnify this into an even greater cost advantage per seat-kilometre. Then, by filling 80–85 per cent of a larger number of seats, the costs per passenger-kilometre become even less vis-à-vis those of scheduled operators. The net effect may be to convert the round-trip cost advantage of only 20–30 per cent into a passenger cost advantage which may range from 50 to 65 per cent.

It is impossible to obtain operating cost data for comparable routes for both scheduled and non-scheduled services, so inevitably there is some uncertainty about the precise level of the initial operating cost advantage enjoyed by charter operators. One of the very few published studies of non-scheduled costs was the so-called ‘Cascade’ study in 1977. This was a joint study carried out by the UK Civil Aviation Authority and British Airways (CAA, 1977c, Appendix 6). It covered the same ground as the above analysis, but it looked at the comparative costs of the two sectors of the industry from a different viewpoint. Commencing with British Airways’ scheduled cost per passenger on three sample intra-European routes, systematic adjustments were made for the known differences between charter and scheduled operations, so as to arrive at a derived charter cost per passenger. This was expressed as a percentage of the initial scheduled cost per passenger, and on all three routes it was found to be around 36–39 per cent. The *derived* charter cost obtained was then compared with the *actual* charter rates in that year (1975/6), and was found to be quite close.

The British Cascade study found that on London-Athens both the derived and actual charter cost per passenger were around 35–37 per cent of the scheduled cost (Table 7.6). This corresponds very closely to the 1990 differential between the charter cost and the excursion

Table 7.6 Scheduled and charter costs per passenger on London-Athens route

		Charter adjustment to scheduled cost	Cost index
	Total scheduled cost per pax		
	Assuming 55% load factor		100
1	*Charter cost savings:*		
	No sales comission	−8	92
	Higher aircraft and crew utilization (assumed 25% higher)	−3	89
	Lower charter ‘standards’ (i.e. lower landing fees, fewer cabin crew, lower handling and in-flight standards)	−6	83
	Cost not applicable (i.e. no sales, reservations or advertising; low overheads; higher bar sales)	–15	68
	Higher charter peak/trough ratio (– increases fixed element of aircraft operating and station costs)	+4	72
2	*Higher charter seating density:*		
	Elimination of first class	−6	66
	Higher seating density	−9	57
3	*Higher load factor:*		
	Assumed 85% on charters	−21	36
	Derived charter costs as % of scheduled		36
	Actual charter costs 1975/6 as % of scheduled		34–37

Source: Based on UK Civil Aviation Authority Cascade Study 1977.

fare (Table 7.1 above). If one examines the different adjustments that were made to scheduled costs to arrive at a charter cost which was 64 per cent lower, two elements stand out. Straightforward cost savings, after adjustment for the higher costs of meeting charter peaks, accounted for about 28 per cent of the 64 per cent cost reduction. The remaining 36 per cent was due to the increased seating capacity and higher load factors on charter flights. These figures correspond broadly to the cost savings suggested by the analysis earlier in this chapter.

The UK Civil Aviation Authority carried out a similar study three years later using March 1978 costs and adopting a different approach. This second study considered the costs which a charter airline would incur if it were to offer a scheduled product. Unlike the earlier Cascade study, it defined charter rather than scheduled cost per passenger as its index base and instead of cascading down to a charter product it cascaded up to the scheduled cost. Hence it became known as the ‘Reverse Cascade’ (CEC, 1981, Annexe 6). Starting with a charter cost per passenger, at an assumed 85 per cent load factor, adjustments were made to allow for the intrinsic differences which a scheduled operation would impose. In the Reverse Cascade, the charter cost represents 46 per cent of the derived scheduled cost, whereas in the original Cascade study the derived charter cost for the same route represented 39 per cent of the scheduled cost. The implication is that a charter airline using scheduled seating densities and load factors might well be able to operate a scheduled service at a lower unit cost than a scheduled airline would do. It seems that this lower estimated cost came about because the charter airline’s estimates of what it would cost to retail the scheduled product were considerably lower than those actually incurred by scheduled airlines.

Both the Cascade and Reverse Cascade studies include some cost adjustments which are controversial. For instance, the assumption that charter costs are adversely affected by their higher peak/trough ratio might be questioned in view of the fact that, despite this alleged handicap, charters achieve much higher aircraft and crew utilization. The highly peaked nature of charter services also allows much greater use of seasonal labour, which may reduce overall labour costs. Thus cost adjustments given in the various studies should be considered as indicative rather than precise. None the less, all the studies do indicate that the charter cost per passenger will normally be less than half the scheduled cost and may be as low as a third. The precise relationship between the two will vary on each route and will clearly be affected by the cost efficiency of the scheduled and non-scheduled airlines competing on that route.

On many European routes the charter-scheduled passenger cost differential has tended to decline since the Cascade and Reverse Cascade studies were costed out because there have also been two significant changes in scheduled operations since then. Many scheduled airlines replaced first class by a business class on their intra-European scheduled services. In the process the number of seats in their aircraft was increased. At the same time, there has been a determined effort to push up scheduled seat factors, especially since 1980. As a result, by 1990 average scheduled passenger load factors in Europe had risen to around 62 per cent, though they were actually higher on many Mediterranean holiday routes. This contrasts with the 55 per cent load factors assumed in the studies discussed earlier. These changes will have reduced the scheduled-charter cost differential on some routes.

The discussion so far has been concerned with short-to medium-haul charter operations within the Europe-Mediterranean area. Much of the analysis is equally relevant to long-haul charters across the North Atlantic or on other routes. Certainly such charters enjoy similar large savings in indirect costs which are magnified by higher seating densities and high load factors. However, it is unlikely that long-haul charters obtain any savings in direct costs. What evidence there is does not indicate that charter airlines on long-haul routes achieve higher aircraft or aircrew utilization, while the relatively low frequency of long-haul charters may result in higher prices being paid for fuel at outstations. The only direct cost saving may be in airport landing fees through the use of airports with lower charges in the country of departure.

7.5
Planning and financial advantages

Apart from a straightforward operating cost advantage, charter airlines enjoy other planning and financial advantages which are inherent in the workings of the charter market, particularly for inclusive tour charters. The peak period for ITC holidays is during the European summer from mid-June to mid-September. The retailing of those holidays begins the previous November or December, with peak sales generally during January to March; though, as a result of the economic recession in recent years, the proportion of late sales in early summer has increased. Because of early sales, the tour operators have to publish their summer brochures with full details of their various package holidays at the very latest by October of the previous year. For competitive reasons the very large tour operators try to produce their brochures even earlier. To do this they must plan and schedule their flights and 'buy' the hotel beds they need some months earlier. Hotel beds and flights for the summer season of 1992 would have been contracted for at the very latest by May or June 1991. The same pattern of charter contracts finalized up to a year in advance exists for winter ITCs. The markets for advanced booking and other forms of series charters basically function in the same way as the ITC market, though the charter contracts may not be closed so long in advance.

The commercial pressure on tour operators and travel agents to plan and sell their holiday packages so far in advance works to the benefit of the non-scheduled operators. By May or early June of one year a charter operator would expect to negotiate several contracts for a 24–25-week summer season starting around the following April or Easter. Each contract may require several return flights per week and may involve hundreds or thousands of hours of flying. The routes to be flown, aircraft types, frequencies, days of the week and departure times will all have been specified. Staggered but high cancellation fees would also have been agreed. Usually up to about 10 per cent of flights may be cancelled if this is done well in advance and before January or February when the agreed flying programme is finally firmed up. After that, cancellation fees are very high. Thus, if a charter cancels a summer flight after February, the cancellation fee might well be the full cost of the flight minus the out-of-pocket expenses that would be saved, that is for fuel, meals, en route navigation charges and airport fees. Charter operators are in an enviable position. Having negotiated contracts with their various customers they are in a position to know almost a year in advance the routes and frequencies they will be operating and the aircraft and crews they will need. They can plan their productive resources so as to ensure that supply precisely matches demand and that it does so as efficiently as possible. Even if demand falls below expectations and a charterer cancels some flights, the charter airline is safeguarded against loss by the high cancellation fees. Knowing their total revenue in advance, charter airlines can adjust and reorganize their costs to ensure that costs do not exceed revenues. In contrast to this, scheduled airlines normally do not know their revenues until the costs have been incurred and it is too late to make any significant adjustments.

The charter airline has further safeguards. The negotiated price for the charter is normally per round trip or per block hour for a minimum number of trips or block hours per season. If this minimum number is exceeded, the trip or hourly cost may decline. But the price is based on the airline’s input costs at a datum point and will include actual or forecast fuel prices, airport fees and navigation charges and assumed exchange rates for relevant currencies, especially the sterling to dollar rate. The airline is obliged to advise the charterer of any net change of costs in relation to the datum costs a certain number of days before a flight. If costs have gone up there will be a surcharge to pay. If they have gone down the charterer may be entitled to a rebate. A minimum notice period of 90 days is often used so the charterer has time to pass on any surcharge to the passenger. This system of surcharges on the negotiated charter price insulates charter airlines against any sudden and adverse variations in their input costs. They cannot lose.

Once the contracts with the various tour operators and other charterers have been negotiated, the airline receives a series of advance payments. The size and timing of these advances will vary with each contract. It would not be unusual for an airline to receive 5 per cent of the total contract sum either on signing the contract or when the flying programme is finalized. Another 5 per cent may be paid a month later. Very large or good customers may try to avoid paying this deposit, but smaller and newer tour operators will normally have paid about 10 per cent of the total contract price by January or February. Once flying commences, the balance due on each flight has to be paid the month before the flight takes off. Thus charterers have to pay in full for all July flights they have contracted by the 15th of the previous month, namely June. The purpose of these advance payments is to help the airlines’ cash flow through the relatively slack winter months and to provide some security against cancellations by the charterers. The net result is that a charter operator gets paid in full before a flight even takes off, whereas a scheduled carrier may wait for months after a particular flight to collect all the revenues due from ticket agents, credit card companies and other airlines.

These advance payments often produce a very positive cash flow during the spring and early summer. If this happens they can be banked so as to earn bank interest. In the financial year 1986/7 British Airtours, the then charter subsidiary of British Airways, generated just over a third of its profit from interest received on funds deposited in the bank.

The charter operator’s cash flow is also helped by the high volume of on-board sales of spirits, cigarettes, perfumes, watches, and so on. For some reason on-board sales per passenger in Europe are much higher for charter than for scheduled passengers. This may be due partly to the fact that many charter flights are from secondary airports with poor duty-free facilities of their own and partly to the high proportion of regular travellers on scheduled flights, who may be less inclined to spend money on board. Britannia, the largest charter airline, estimated that in 1988 its 6.1 million passengers spent around £4.10 ($7.30) per head on in-flight sales, including drinks and tobacco consumed on-board. This produced a total sales revenue of £25 million, of which about half was profit. This represented a third of the airline’s total pre-tax profit in that year. Other UK charter airlines at that time confirmed that in-flight sales contributed between a quarter and a third of their profits. For these UK carriers in-flight sales in 1988 were £2–4 per passenger, which was the highest among European airlines except for the Scandinavian charter carriers such as Sterling, Scanair and Conair. Because of the very high taxes on tobacco and alcohol in much of Scandinavia, duty- and tax-free sales on flights are very high and passengers are encouraged to mail order their in-flight requirements well in advance. As a result, Scandinavian charter airlines’ in-flight sales per passenger are between three and five times as high of those of the best UK airlines.

Whereas some scheduled airlines are tending to reduce their in-flight range of goods on intra-European services or have done away with them altogether, non-scheduled operators are carrying more high-value goods such as expensive watches and perfumes. While in-flight sales are a positive element for non-scheduled operations, the absence of freight revenue clearly reduces the potential revenue from any one flight. Authorizations for passenger charter flights from destination countries normally exclude the right to carry any freight. Where charters are allowed to carry freight, they have no distribution system so shippers must bring their own shipments to the airport. Generally, however, charter operators cannot top up their passenger revenue with freight revenue as their scheduled competitors can. The price at which they charter out their aircraft must therefore reflect this.

The charter airlines’ planning and financial advantages described above are also the cause of their major headache, which is the constant fear of over-capacity in the market. Signed contracts to provide many hours of flying a year or so later can be used to facilitate the raising of loans to purchase aircraft to meet the charter contract. The ease with which finance can be raised once a contract has been signed may well induce new entrants into the market or existing airlines to expand their capacity too quickly. If too much capacity is available there is a strong downward pressure on charter rates. This happened in the UK charter market in 1981 and again in 1989–90. In 1981, Laker Airways started offering its new Airbuses on charters for the 1982 summer season at charter rates per seat about 8 per cent below the 1981 rates. It forced the 1982 market rates down by 8 per cent, yet Laker Airways itself collapsed early in 1982 before the summer season had started. An additional problem during the 1980s in the UK was the move by a few large tour operators into charter airline operations. This was part of the trend towards vertical integration previously mentioned. The Intasun leisure group set up Air Europe in 1979 and a year later Orion Airways was launched by Horizon Travel. In 1987 the Owners Abroad Group, a major British tour operator, set up Air 2000. This was done in some cases because the tour operators were able to offset investment allowances on their newly purchased aircraft against their large profits and thereby reduce their tax liabilities. There were tax advantages to be gained by diversifying from tour operating into flying. The result was to increase the overall charter capacity in the market. The fear that more new charter airlines will be set up reinforces the pressure towards vertical integration. As more tour operators become financially linked with particular charter airlines, the scope for new airline entrants diminishes. Yet new and ever-hopeful charter airlines are regularly being set up, notably in the UK, Spain, Germany and France. In September 1990, after a poor summer for charter airlines, Airtours, the UK's fourth largest tour operator, announced that it was launching a new charter airline to carry 60 per cent of the company's summer 1991 charter traffic.

The early negotiation of charter contracts, the ability to adjust charter rates in response to changes in input costs and the high cancellation fees paid by charterers who cancel flights provide non-scheduled operators with a level of certainty and financial security that is unique in air transport. They can sell their product in advance, at a price which will be adjusted if their costs go up. They can then go out and procure the resources necessary to provide the capacity they have sold. Scheduled airlines are handicapped because they have to do the exact opposite. They first decide to provide a level of scheduled capacity which they judge necessary to meet the demand, they then allocate resources to it and subsequently try to sell it. Scheduled operators must plan their output in advance, without knowing for certain how much of it they will sell. As a result, they face much greater problems in trying to match supply and demand than do the charter airlines.

7.6
Charter versus scheduled competition

There can be little doubt that non-scheduled operators enjoy several cost and other advantages when competing with scheduled air services. These advantages are particularly marked in the short-haul leisure markets within the Europe-Mediterranean area. When faced with head-on competition with charters, European scheduled airlines have had difficulty in maintaining their market share. Some, such as Olympic Airways or in the mid-1980s the Portuguese carrier TAP, have tried to fight back by entering the charter market themselves. This is rarely a financial success, since scheduled airlines can match the prevailing charter rates only at a loss. This is because they have to carry and recoup the high indirect and overhead costs of a scheduled airline. At the same time they lack the flexibility of a specialist charter operator. If their aircraft are being used on both scheduled and charter flights, they may be unable to use charter seating densities. They may also be unable to tender for all sectors of the charter market if aircraft have to be used for scheduled services for much of the day.

The difficulties involved in competing directly in the charter markets have pushed European scheduled carriers in two directions. Many have set up separate but subsidiary charter companies with their own dedicated aircraft and crews. Subsidiaries such as Condor (Lufthansa), Air Charter (Air France and Air Inter), and Scanair (SAS) are now large and successful charter airlines in their own right. The second tendency has been the growth of so-called 'part-charters' or other charter-competitive fares on scheduled services within Europe. Under part-charter rules, scheduled carriers can sell off blocks of seats to travel agents or tour operators, which package the seats into inclusive tour holidays. First introduced between Britain and Spain in 1971, they quickly spread to several other routes where both governments approved. In some cases controls were introduced on the number of seats in scheduled aircraft that could be part-chartered. In many cases there may not be a separate part-charter fare but the airlines may give tour agents a discount on the group inclusive tour (GIT) or consolidation fare. For example, on London-Athens in summer 1990 some agents were able to buy consolidation seats at up to 20 per cent discount on the £179–186 round-trip IT fare (Table 7.1). This produced an effective part-charter rate of around £143–148, which compared favourably with charter passenger costs of £112–143.

The concept of part-charter on scheduled services is not merely a competitive response to low-cost charters; it also offers scheduled carriers other advantages. By mixing normal traffic and charter traffic, scheduled carriers can fill up otherwise empty seats and improve load factors. In the process they may also be able to switch to larger aircraft sooner and thereby get the benefit of lower seat-kilometre costs. By mixing traffic in this way it may also be possible to sustain scheduled services on routes where the scheduled traffic would otherwise be insufficient to maintain adequate scheduled frequencies.

There is, however, an inherent danger in scheduled airlines trying to match charter fares. Scheduled costs are much higher than charter costs. If the proportion of part-charter or other very low-fare passengers is controlled and mixed with an adequate proportion of high-yield passengers, the total revenue on the scheduled service may be pushed up. On the other hand, too many very low-fare passengers are a recipe for financial disaster since scheduled costs are not low enough. Yet during the 1980s, some European scheduled airlines, in their desperation to head off charter competition, ended up with too high a proportion of part-charter and low-fare passengers on some of their intra-European holiday routes. As a result, they frequently lost money on such routes without effectively stemming charter penetration. These very low charter-competitive fares should be introduced by scheduled airlines only as part of an effective yield management programme (section 11.7 below).

In Europe, the charter airlines' response to part-charters on scheduled services has been, as mentioned earlier, to try to introduce seat-only sales on charter flights. The first step in this direction was the 'throw-away' inclusive tours or 'cheapies' introduced in 1975 when the UK Civil Aviation Authority authorized a small number of tour operators to offer ITC holidays which included only very simple ground arrangements. In time, such holiday packages, where the accommodation content was derisory and where the passengers were discouraged from using it, spread—despite attempts by governments at both ends of the route to control it. Such 'throw-aways' in effect enable passengers to buy a seat only on a charter flight while remaining technically within the regulations. In recent years, Britain's Civil Aviation Authority has turned a blind eye to this, as do some other aviation authorities. The logical next step is formal authorization for seat-only sales on charter flights, but tourist destination countries are loath to formalize this currently 'illegal' practice because they fear the repercussions on their own scheduled carriers. Some such as Greece have tried to stop the practice by checking that incoming charter passengers have hotel or other accommodation vouchers. Yet there seems to be so much public pressure to allow seat-only sales that in the end the destination countries may have to give way if they want to maintain their tourism levels. If not, travel agents and tour operators will continue to bend the rules to meet public demand for seat-only travel on charter flights. In some cases, charter airlines themselves have set up subsidiary travel agencies to sell off to the public unsold seats or seats the agencies have actually bought from the parent charter airline. On the North Atlantic, the advance booking charters are in effect seat-only sales.

Another development bridging the gap between traditional scheduled and charter operations has been the introduction by charter operators of a two-class cabin. This began in a small way in 1989 when several charter airlines offered their passengers on some longer routes the option of paying a premium for a seat in the front part of the cabin where an improved in-flight service was available and for which preferred seats could be allocated prior to departure. These 'improved'-class charter services were particularly popular on routes with a more up-market clientele on independent or self-catering inclusive tour packages and where there was no scheduled alternative. The two-class charter flights are likely to spread as charter passengers become more discriminating.

Part-charters, very low charter-competitive fares on scheduled services and seat-only sales on charter flights are further eroding the remaining distinctions between scheduled and charter services in markets where both are allowed to operate. The two sides of the industry are moving closer together. In Europe, this tendency is being reinforced by the expansion of many charter airlines into scheduled services (as described in section 4.4.2 above). The real question is to what extent the key elements of charter economics—such as low indirect operating costs, higher seating densities and higher passenger load factors—can be introduced into scheduled services. None of the US 'supplemental' or non-scheduled carriers which entered scheduled markets after US deregulation did well. Some new scheduled airlines have tried to adopt charter features into their operations with mixed success. Laker Airways and People Express did well initially, but failed subsequently. Virgin Atlantic, a relatively small British carrier, appears to have understood the implications of others' mistakes. It has survived successfully as a low-fare long-haul scheduled airline operating at unusually high load factors (Table 7.5), with high seating densities on its Boeing 747 aircraft and with minimal indirect operating costs, but offering a superior in-flight service. There may be a lesson here for other scheduled airlines and for charter airlines launching scheduled services.

8
Airline Marketing—The Role of Passenger Demand

8.1
The interaction of supply and demand

The discussion so far has concentrated to a great extent on supply aspects of international air transport. There is a tendency among airline managers to concentrate on supply considerations at the expense of demand factors. Within many airlines great emphasis is placed on operational safety and efficiency and on reducing costs of production. A large range of performance indicators are produced to enable the airlines to monitor various aspects of supply: engine shutdown rates per 1,000 hours, punctuality, annual utilization of aircraft and crews, maintenance man-hours per aircraft, and unit costs per tonne-kilometre are just a few of the indicators used to monitor supply conditions. By contrast, performance indicators on the demand or revenue side are relatively few and often less importance is attached to them. Too many airlines, among them smaller international carriers, assume that if their supply of services is efficient and low cost that is enough; profitability should follow. The international regulation of fares through the International Air Transport Association (IATA) and widespread use of airline pooling agreements may have blunted initiative with regard to understanding and stimulating demand. Yet airline management is about matching the supply of air services, which management can largely control, with the demand for such services, over which management has much less influence. To be successful in this an airline can be a low-cost operator or a high-cost operator. What determines profitability is the airline's ability to produce unit revenues which are higher than its unit costs. Low unit costs are no guarantees of profit if an airline is unable to generate even the low unit revenues necessary to cover such costs. Pan American, one of the lower-cost international carriers, in 1988 was losing $2 million a week before interest, while Wardair, a Canadian charter airline that had expanded rapidly into scheduled services and was the world leader in terms of cost, also made a substantial loss (Table 8.1). VARIG, South America's largest airline, also lost heavily despite its low costs.

Conversely, as the 1988 results for British Airways, Swissair or SAS

Table 8.1 Operating result of select airlines, financial year, 1988

	Cost per available t-km (US¢)	Revenue per available t-km (US¢)	Oprating profit or loss[a] ($m)
Wardair	21.9	21.0	−69
SIA	31.0	37.8	+395
Cathy Pacific	32.3	42.8	+460
Air India	34.2	36.3	+46
VARIG	36.1	34.4	−69
Northwest	36.4	37.7	+196
TWA	37.2	39.6	+259
American	39.2	43.3	+801
Thai International	39.5	49.0	+275
Air Canada	39.5	41.6	+117
Mexicana	38.7	42.8	+72
Pan Am	40.2	39.0	−103
United	41.3	44.7	+669
Qantas	42.2	43.8	+85
Air France	43.3	46.7	+332
KLM	44.3	47.5	+190
Kumait Airways	47.5	44.8	−26
Japan Air Lines	52.4	57.1	+568
Alitalia	53.5	54.9	+52
British Airways	56.3	51.7	+598
Iberia	66.6	73.9	+278
Swissair	76.2	76.6	+11
SAS	109.2	117.5	+223
British Midland	115.9	123.7	+16

Note:
[a] British interest and other non-operating items.
Source: ICAO (1988a)

indicate, high unit coats are not necessarily a bar to profit if an airline can develop its markets in such a way as to insure even higher units revenues. Some airlines do this by setting out to position themselves at the top end of their markets, developing and catering for traffic which will produce high enough revenue to compansate for those airlines' high costs. SAS their and Swissair have been doing this very successfully in recent year on their international routes and US air has been doing it domestically in the United States.

To achieve this profitable matching of supply and demand it is crucial for airlines managers to have a thorough understanding of the demand they are trying to satisfy. Such an understanding is fundamental to every aspect of airline planning. Aircraft selection, route development, scheduling, product planning and pricing and advertising are just some of the many decision areas which ultimately are dependent on an analysis of demand for the transport of both passengers and freight. As in all industries, supply of and demand for air services are not independent of each other. On the contrary, each affects the other. Aircraft types and speeds, departure and arrival times, frequency of service, air fares, in-flight service, the quality of ground handling and other features of supply will influence demand for an airline's services. Conversely, the demand will itself affect those supply features. The density of passenger demand, its seasonality, the purpose of travel, the distance to be travelled, the nature of the freight demand and other demand aspects should influence supply and will impact on costs. (The impact of demand patterns on costs has been discussed briefly in section 6.3 above.) Thus airline planning is a dynamic and iterative process. An understanding and evaluation of the demand for air transport leads to the provision of services which themselves then affect the demand. New adjustments to the supply then take place to meet changes in the demand and this interactive process continues. The more competitive and unregulated the market, the more dynamic the interaction becomes and the greater are the headaches for airline managers. Marketing is concerned with this dynamic and interactive process of matching supply and demand.

8.2
The role of airline marketing

There is a widely held misconception that marketing is about selling what is being produced. It is much more than that. Marketing is involved in deciding what should be produced as well as how it should be sold. As such it is the linchpin of any industry. The role of airline marketing is to bring together the supply of air services, which each airline can largely control, with the demand, which it can influence but not control, and to do this in a way which is both profitable and meets the airline's corporate objectives.

The essence of marketing is to identify and satisfy customer needs; to be consumer or market oriented rather than production or supply oriented. If an airline concentrates on merely selling what is produced before identifying what customers want and are prepared to pay for, it is doomed to failure. A good example is supersonic air services. The Concorde aircraft was produced largely because it was technically feasible, with little reference to whether passengers would ultimately be prepared to pay the excessively high cost of travelling in the aircraft or whether people were prepared to pay the full cost of super-sonic air travel to save 2 or 3 hours. British Airways' and Air France's Concorde services survived only because they were not expected to cover their full costs since the capital costs were written off by their respective governments. No more Concorde aircraft were built after the initial batch of 16.

The first step in marketing is to identify markets and market segments that can be served profitably. To do this one uses the whole range of market research methods, from desk-based statistical analyses to surveys of current and prospective users of air services. The aim is to gain an understanding of the needs of different market segments and also the degree to which such needs are not currently being satisfied. This leads on naturally to the production of traffic forecasts, which should be as detailed and segmented as possible.

The second stage of marketing is to decide, in the light of the preceding market analyses, the air services that should be offered in the market and their product features both in the air and on the ground. This is product planning. Price is the most critical of the product features but, as discussed later in Chapter 10, there are many other aspects of the airline's product that must also be decided on. Product planning is related to three key factors: the market needs which have been identified, the current and expected product features of competing airlines and the costs of different product features. In assessing the costs of proposed products, the supply and demand sides of the industry are brought together, for there is a trade-off between the two. The product planners must balance desired product features against their costs and what customers are prepared to pay for.

The third stage is to plan and organize the selling of the products on the basis of a marketing plan. This involves setting up and operating sales and distribution outlets both airline owned, such as sales offices or travelling salespeople, and through a range of agents and sub-agents. In order to attract potential customers, the marketing plan will also include a detailed programme of advertising and promotion activities.

Lastly, marketing is concerned with reviewing and monitoring both the degree to which the airline has been able consistently to meet the service standards and product features planned and customers' responses to them. Such monitoring through weekly sales figures, customer surveys, analyses of complaints and other market research techniques should enable airlines to take short-term corrective action, where possible, and also to make longer-term changes in their service and product features.

It is not the aim of this book to analyse airline marketing in detail but rather to assess its role in the process of matching supply of air services with the demand. Marketing starts with an understanding of demand. This chapter considers certain characteristics of the demand for air travel and examines the various factors which affect the level and growth of demand in any given market. This understanding of demand leads on naturally to an examination of the forecasting techniques most widely used by airlines (Chapter 9). This is followed by a brief assessment of product planning and distribution (Chapter 10), of which a key element is pricing (Chapter 11). The cost implications of marketing strategies have been considered earlier (section 6.6).

8.3
The pattern of air travel

The bulk of air travel is either for business or for leisure. Business travel involves a journey necessitated by one's employment and paid for by the employer. The business traveller and the employer may in some cases be the same person, but even then business travellers will be paying not directly out of their own pocket but out of the firm's. The leisure market is further subdivided into two distinct categories, holiday travel and travel whose primary purpose is visiting friends or relatives (often referred to as VFR). Leisure travellers, unlike those travelling on business, invariably pay their own fares out of their own pockets. A number of important differences between the business and leisure markets stem from the fact that in the former case business passengers are not paying for their own travel whereas in the latter they are. These are discussed later.

There is, finally, a small proportion of air passengers who do not fit into the business, holiday or VFR categories. These include students travelling to or from their place of study, those travelling for medical reasons, and migrants moving to another country. They are normally grouped together as a miscellaneous category.

In the early days of international air transport the majority of passengers were travelling on business. The remainder were relatively wealthy leisure passengers. As the total air passenger market has expanded following the steady rise in personal incomes and the decline in real cost of air fares, the proportion of business travel has fallen rapidly. In Europe, business now generates about 20 per cent or less of international air travel while the proportion for US domestic travel is slightly higher at around 25 per cent (Blake, 1989). In the UK, the figure is well below 20 per cent. In 1988, UK residents took 21 million trips abroad by air. Of these, only 15.3 per cent were business trips. Nearly three-quarters (72.5 per cent) were holiday travellers and 10.4 per cent were flying to visit friends and relatives. The remainder, approximately 1.8 per cent, were travelling for a miscellany of other reasons (*Business Monitor*, 1989).

Thus leisure travel—for holidays and to visit friends or relatives —accounts for around 83 per cent of the UK originating air travel market, and its share has been slowly increasing. It is also significant that in 1988 10.3 million trips, representing two-thirds of these leisure visits (67.6 per cent), involved inclusive tours, the majority of which would have been on charter flights. Charters thereby absorb a large proportion of the total holiday market. Conversely, business travel is almost entirely confined to scheduled flights. As a result, on many scheduled flights the business proportion of the traffic is much higher than the 15.3 per cent overall business share would suggest.

On short-haul scheduled routes out of London, such as Frankfurt, Brussels or Paris, business trips may generate as much as two-thirds of the total traffic. The business share goes down to about one-quarter on long-haul routes, such as

London to Los Angeles or Singapore, and will be lowest (at around 10–20 per cent) on scheduled routes such as those to Australia or Cyprus where the VFR traffic is particularly high (CAA, 1989b).

While only about one in ten UK travellers going abroad do so to visit friends or relatives, in some markets such VFR traffic can be more important. On routes to Canada, to the Caribbean or to South East Asia and Australia, as much as one-third of the UK originating traffic may be visiting friends or relatives.

In other regions of the world the split between business, holiday, VFR and other trips will vary. As a general rule, the higher the personal disposable income of the population in a country, the greater is the proportion of holiday trips in the international air travel generated by that country (unless, of course, travel or foreign exchange restrictions are imposed on its citizens). Low incomes in most countries of Africa mean that business trips dominate on international air routes within the continent. Conversely, rapidly rising personal incomes in Japan and the newly industrialized countries of East Asia during the 1970s generated a rapid growth of leisure travel, which partly explains the unusually high growth rates enjoyed by airlines in the region during the last decade (Table 1.2 above). VFR traffic tends to be significant on air routes joining countries between which there have been earlier population movements. Apart from the UK examples previously cited, there are many other air routes with an important VFR component. These include France to Algeria or Morocco, and United States to the Philippines.

The air travel market is smaller than the number of passenger trips recorded since each individual traveller will normally make more than one flight. The relationship between the number of travellers and the passenger trips recorded varies on a route-by-route basis. It is greatly influenced by the proportion of business travellers on the route, since they are the most likely to be frequent users of air services. On many inclusive tour charter routes, the number of travellers is probably close to half the number of passengers recorded on the route since each traveller will make both an outward and a return trip, while it is unlikely that they will make that round trip more than once a year. In scheduled markets, the position is more complex, with a small proportion of frequent travellers generating a high proportion of the total passenger trips recorded. Such frequent travellers will usually be flying on business, but some may also be on leisure trips. In the United States in 1989, frequent flyers who took 10 trips or more in the previous year represented only 6 per cent of air travellers but took 41 per cent of all air trips (ATA, 1989). In 1987, the 35 million largely scheduled passenger movements recorded at London’s Heathrow airport (excluding airside interliners) were due to about 8.5 million travellers making an average of four trips a year through the airport. The average figure hides the fact that UK business passengers had, on average, each used Heathrow seven times during the year, while UK leisure passengers had used it 1.6 times each.

Travel motivation has an impact on frequency of travel but also on the duration of the trip. While business travellers fly more frequently, they also take shorter trips. Among leisure passengers, those on inclusive tour holidays have the longest trips since such holidays normally are of fixed duration, often in multiples of a week. As the journey distance increases so does the duration of the trip, whatever its purpose. These two tendencies—longer trip duration for leisure travellers and longer duration for longer-distance trips by all travellers—were clearly illustrated in the 1978 survey of Heathrow passengers (CAA, 1980). This showed that, remarkably, 22 per cent of business travellers on European routes out of Heathrow flew back the same day or the next. At the other extreme, two-thirds of leisure passengers to or from North America had trips lasting for more than two weeks.

8.4
Socioeconomic characteristics

One would expect male passengers to make up the bulk of the business market, but the extent to which males still dominate is perhaps surprising. In the UK in 1987, only about 15 per cent of business air travellers were women (CAA, 1989b), though the figure had been 10 per cent 10 years earlier. The proportion is somewhat lower on UK domestic air services and lower on international long haul. This pattern is indicative of the situation elsewhere in Europe too. In the United States, the proportion of women among business travellers is 20 per cent, though it had been up to 27 per cent in 1983 (ATA, 1990). Traditionally, business travellers have been thought to be primarily middle and senior managers and executives and established lawyers, architects, consultants or other professionals. Their seniority inevitably meant that they would be in the middle to upper age group, that is, early thirties to mid-fifties. However, the business market has been undergoing a fundamental change. The internationalization of the world's trade and industry and the fall in the real cost of air travel, together with the speed advantage offered, have resulted in recent years in a growth of business travel by more junior staff and skilled workers. A 1987 survey of air passengers at London's airports found that about one-third of business passengers were supervisory clerical and junior managerial or professional staff or skilled manual workers (CAA, 1989b). Moreover, this proportion has been growing steadily. Such passengers would tend to be younger and on lower incomes than the more traditional business passenger.

The leisure market manifests a more even split of passengers between the two sexes, though in many European and North American leisure markets women if anything predominate. The 1987 survey of passengers at the London area airports indicated that close to 53 per cent of leisure passengers were women (CAA, 1989b). The proportion of women is even higher among international VFR passengers. In the United States, women are dominant in the leisure market, generating well over half the total air trips. Among leisure passengers the age distribution is wider and more evenly spread than among business passengers. The propensity to travel by air for all forms of leisure is highest in the UK among those aged 30–49 years. It tapers off among those 60 years or older, though still remaining high. Conversely, the very young, those below 16 years of age, who represent a fifth of the UK population, account for less than 10 per cent of leisure air travel. The most significant socioeconomic variable affecting the demand for leisure travel is personal or household income, since leisure trips are paid for by the passenger, who may also be paying for a spouse and one or more children. As a result, those with higher incomes generate a disproportionately large share of the leisure market. The 1987 survey of passengers using Heathrow airport indicated that the 58 per cent of business trips by UK passengers and 45 per cent of leisure trips were generated by the 13 per cent of the population at the top of the income scale. Since income is closely related to socioeconomic grouping it is not surprising to find that, whereas in 1987 18 per cent of UK residents were in the higher or intermediate managerial, administrative or professional classes, they generated 36 per cent of leisure travel from the London area airports. In many Third World countries with low average disposable incomes, international air travel may be limited entirely to the 5–10 per cent of the population with the highest incomes. Elsewhere, international leisure travel may be more widespread but still with a predominance of higher-income earners.

Apart from sex, age and household income, passenger surveys may also ascertain other socioeconomic features of the passengers on a route. These may include size of family, the number of people travelling together, the social class of passengers, the type of industry or profession that business travellers are engaged in, and so on. An appreciation of the socioeconomic characteristics of passenger demand in each market is helpful to airlines in planning their advertising, promotion and sales activity. It can help them in deciding where to advertise and what features of their services to emphasize in their advertising campaigns. Such knowledge of the market may assist to a certain extent in product planning and in determining tariff policies and possibly even in forecasting. But in the latter areas, knowing the breakdown of one’s passengers by purpose of travel and trip duration and an awareness of their booking patterns may be more useful than knowing their socioeconomic characteristics.

8.5
Market segmentation

Traditionally airlines have segmented their markets on each route by trip purpose. Some airlines do this simply by dividing their passengers into business and non-business or leisure passengers. Others make a three- or fourfold division into business, leisure, VFR and other. Market segmentation in this way is invaluable since the different market segments have different growth rates and respond differently to internal variables such as fare changes or to external factors such as exchange rate fluctuations or economic recession in a particular country. Understanding the size and the characteristics of each market segment on each route is essential for forecasting demand, for many aspects of product planning such as scheduling or in-flight service, and especially for pricing. Airlines without such detailed knowledge of their markets are likely to get into difficulties when trying to match supply and demand.

In recent years there has been a growing awareness among airline managers that this simple approach to market segmentation based on trip purpose has some shortcomings. First, it tends to place too much emphasis on the demographic and socioeconomic features of the passengers. Age, sex or social class are perhaps less important than appreciating passenger needs and requirements when travelling by air. Surely it is more important for an airline to know whether a passenger will cancel their reservation at the last moment or whether they are prepared to pay a lower fare for an inconvenient departure than it is to know their sex or age? Secondly, air trips may increasingly be multipurpose. A business trip is combined with a holiday, or a wife accompanies a husband on a business trip, while many visits to friends and relatives are considered as holidays. Thirdly, traditional market segmentation oversimplifies the motivational factors involved in travel decisions. All business air travellers cannot be grouped together and assumed to have similar demand characteristics and needs, any more than can all holiday passengers. A senior manager or engineer requiring to go to another country immediately because of an unexpected crisis has different transport requirements and demands from a salesman who plans his regular overseas sales trips months in advance. Equally, the family holidaymaker buying their annual two-week inclusive tour package holiday at a sunshine resort places different demands on the air services from the holidaymaker going independently and making their own accommodation arrangements or the couple going for a weekend break to Paris from London or to Hong Kong from Manila.

Many airline planners now believe that market segmentation should be based not on a straightforward fourfold division categorized by journey purpose but on a more complex division related partly to journey purpose but partly also to passenger needs. Thus the business segment may be further subdivided into routine business and emergency business. The holiday segment of the leisure market could be split into an inclusive tour segment, a multi-destination touring segment and a weekender segment. Other ways of segmenting the market can also be used depending on each airline’s appreciation of what are the key segments of its market. The point about more complex market segmentation is that each segment should have distinctive needs and expectations, such as the need or otherwise to change reservations or routeings, the need to make stop-overs, the ability to pay particular fare levels, expectations in terms of in-flight service and comfort, and so on. Variations in needs are shown in Figure 8.1 for four of the many possible market segments on a medium-haul route such as London-Athens or Singapore-Hong Kong. It can be seen by comparing weekend and two-week holidaymakers that even in the leisure market there may be distinct segments with their own needs and expectations. The significance of this more

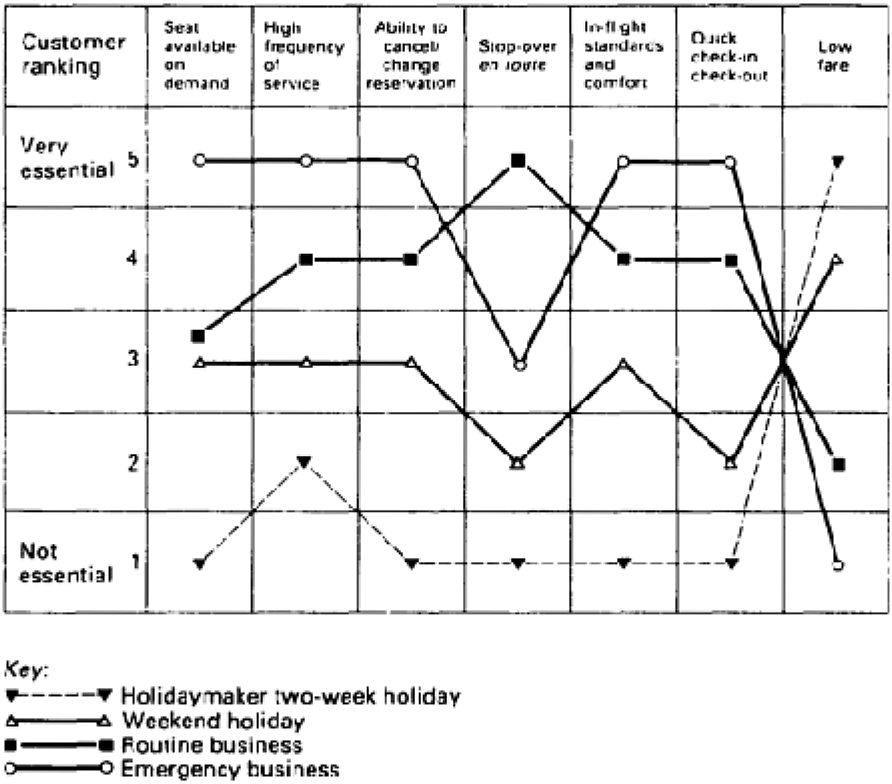

Figure 8.1 Market segmentation by trip purpose and passenger needs

Note: Only a sample of possible market segments is shown here

Source: Compiled by author.

sophisticated approach to market segmentation is that it can help airlines in their forecasting, but it can be especially helpful in product planning and pricing. It can help them in relating fares more closely to the costs imposed by the different segments and also in working out the various conditions attached to different fares to prevent slippage of passengers from high- to low-fare categories.

Another approach is to segment markets both in terms of motivation and requirements but also in terms of psychological make-up of passengers. Thus Eastern Airlines in the United States identifies eight different groups of passengers, including the 'demanding', the 'self-reliant', the 'naive' or the 'fussy planner', each of which have different requirements. Interestingly, the 'demanding' group were estimated to account for only 9 per cent of fliers but generated 21 per cent of trips and 27 per cent of revenue (Blake, 1989). 'Demanding' passengers are, according to Eastern Airlines, creatures of comfort.

They are luxury oriented and will spend extra money to get what they want. They take the fastest, easiest route and are very specific about their needs while travelling. In the late 1980s British Airways categorized its business passengers as ‘attention seekers’, ‘comfort cravers’ or ‘schedule seekers’, each with different demands and flying behaviour. Leisure travellers were ‘schedule seekers’, ‘service seekers’ and ‘nervous nellies’, though the latter were unlikely to be told this! The aim of such market segmentation was to gain a better insight and understanding of passenger needs so as to make the correct marketing decisions. There is a problem, however. The more complex and sophisticated the market segmentation, the more complex and costly is the market research which is necessary to establish and monitor the market segments and their needs. Smaller airlines will tend to stick to a more traditional approach.

8.6
The peak problem

Like many transport industries, particularly those dealing with passengers, the airline industry is characterized by marked daily, weekly and seasonal peaks and troughs of demand. The pattern and intensity of the peaks and troughs vary by route and geographical area. Peak flows become a serious problem when they begin to impose cost penalties on the airlines involved. In meeting demand at peak periods an airline may have to provide extra capacity not only in terms of aircraft and flight crews or cabin staff but also in terms of staff and facilities in other areas such as sales or engineering. Such extra capacity may be under-utilized during the off-peak periods. The greater the ratio of peak to trough traffic, the more difficult it becomes to ensure utilization of peak capacity in off-peak periods. Such peak capacity then becomes very costly to operate since it must cover all its fixed and overhead costs during the short period that it is actually in use. Expressed another way, one finds costly equipment and staff required for the peak sitting around virtually unutilized or, at best, under-utilized in periods of low demand.

Seasonal peaks in demand for air services to and from each country or on particular routes arise as a result of either institutional or climatic factors. The distribution and length of school holidays, the patterns of annual holidays for factories and offices, religious festivals such as Christmas, the Chinese New Year or the Haj pilgrimage, and the distribution of major cultural and sporting events are the main institutional factors creating seasonal traffic peaks. Climatic factors are important through their effect on holiday patterns and because they disrupt surface modes of travel. Where institutional and climatic factors coalesce then seasonal peaks become very marked. In the European area, traditional summer holidays for schoolchildren and employees coincide with climatic conditions in the Mediterranean basin which are ideal for seaside holidays and which are markedly better than in northern Europe. During the summer months there is an outpouring of people moving southwards from northern Europe. The effect on airline peaks is dramatic, particularly for the non-scheduled operators who cater for much of this demand. In North America, the Christmas holiday season coincides with very cold winter weather in Canada and parts of the United States while Florida and the Caribbean bask in warm sunshine. These conditions create a peak of demand for air services to the Caribbean area in late December and early January.

Daily or weekly peaks are related to the pattern of working times and days during the week. Business travel creates daily demand peaks usually in the early morning and early evening and weekly peaks on Mondays or possibly Tuesdays and on Fridays. In those Muslim countries which have Thursdays and/or Fridays as days of rest, the business peaks will be different. Leisure traffic is responsible for a peaking of demand at weekends, particularly during the peak season. The split of traffic on any route between business and leisure influences the nature of the daily, weekly and seasonal variations in demand.

The daily and weekly peaks in demand generally pose a less severe handicap, since there is enough flexibility in most airlines' operations to enable them to make sensible use of spare capacity during particular periods of the day or the week. Maintenance and training flights can be programmed for such slack periods, or aircraft can be leased out for charter work. Many international airlines find that, on scheduled routes with a high business component, demand falls off at the weekend and they can reduce their frequencies on Saturdays and Sundays. A few, such as the Portuguese carrier Air Portugal, use this spare weekend capacity on charter flights to meet the needs of the leisure market, which prefers weekend travel.

It is the seasonal peaks of demand which create more problems and impose the greatest costs. Seasonal peaks are especially marked for non-scheduled airlines catering for the inclusive-tour holiday market. As previously pointed out (Chapter 7), they partly overcome their problem by flying their aircraft and crews intensively day and night during the peak period, thereby achieving very high annual utilization for both aircraft and crew. Some may also try to lease their aircraft during their low season to carriers (scheduled or non-scheduled) in other parts of the world who may have a different seasonal pattern of demand. For scheduled airlines, seasonal peaks, though less marked than for non-scheduled airlines, may be more difficult to cope with.

The peak/trough variations in monthly passenger flows in 1989 for a selection of routes radiating from London are shown in Table 8.2. On all routes except Paris, Amsterdam and Johannesburg, peak traffic exceeds off-peak traffic by at least 50 per cent. As expected, the greatest variations are on European charter services, where the peak traffic may be many times greater than the lowest month's traffic. In fact, there were no charters at all to Athens and Geneva in at least one month yet heavy charter flows in several other months. Among

Table 8.2 Seasonal variations on London routes, 1989

Routes to/from London	No. of passengers (total both ways)				Peak as % of lowest month*
	Lowest month ('000s)		Peak month ('000s)		
European scheduled:					
Athens	22	Feb	57	Aug	232
Amsterdam	125	Feb	175	Sept	140
Paris	224	Jan	272	Aug	121
European charter:					
Athens	0	Jan	34	Aug	
Geneva	0	Nov	64	March	
Malaga	21	Nov	67	Aug	310
North Atlantic scheduled:					
New York	135	Feb	283	Aug	209
Toronto	36	Feb	67	Sept	188
Los Angeles	44	Feb	74	Aug	169
Africa scheduled:					
Lagos	10	Feb	22	Sept	216
Nairobi	12	May	20	Aug	169
Johannesburg	22	May	30	Dec	140
Asia/Australasia scheduled:					
Singapore	20	Feb	35	Aug	176
Hong Kong	44	Feb	73	July	164
Melbourne	11	Feb	16	July	152
Middle East scheduled:					
Jeddah	6	Nov	20	July	333
Kuwait	9	Feb	20	Aug	232
Dubai	12	Nov	25	March	213

Note:
* Percentage calculated before rounding off of monthly traffic.
Source: Calculated using CAA, UK Airports (monthly).

scheduled routes, it is the Middle East services followed by those across the North Atlantic which have the greatest relative excess of traffic at peak periods. Airlines on the North Atlantic, where traffic is dense, have to provide about twice as much capacity to meet peak demand as off-peak. It is also noticeable that most peak months are in the European summer period, that is, July to September, and the lowest month tends to be February. There are exceptions, the most notable being on charter services to Geneva, which show a winter peak related to the skiing season. The pattern of seasonal peaks and off-peaks will be different on routes in other parts of the world.

A scheduled airline operating on routes with different peak periods can try to shift aircraft and other resources between routes according to the season so as to ensure high utilization. But Table 8.2 shows that an airline such as British Airways operating a range of services out of London, its home base, would have only limited scope to do this since on so many London routes peaks and troughs of demand fall at the same time of the year. Many other airlines face the same problem. As a result, the capacity provided by scheduled airlines on international services in the peak season is substantially higher than in the low season (Table 8.3). US airlines seem to face a particularly acute capacity peak, with airlines such as Northwest or TWA offering almost twice as many international seat-kilometres in their peak month as in their lowest month. Conversely, Asian carriers have the least peaky output profile and this may be an added cost advantage for them.

The high costs of meeting peaks of demand could be offset either wholly or partly by operating at very high load factors during peak periods or by charging higher fares at such periods. The question of peak period pricing is discussed in Chapter 11. But as far as load factors are concerned, only a few of the 18 airlines in Table 8.3 achieved passenger load factors in their peak month in 1988 of over 80 per cent and several had peak load factors below 70 per cent. At periods when demand is so high that one would expect scheduled airlines to capitalize by filling every seat, in fact about one out of every four seats on average remains empty. Such relatively low load factors at peak periods aggravate the economic penalties arising from the need to provide sufficient capacity to meet peak demands.

Several factors explain the inability of the scheduled airlines to achieve much higher load factors at peak periods. During the peak month or peak period there are considerable variations in demand; there are peaks and slumps within the peak. To maintain public goodwill and to facilitate the planning of flight operations, airlines cannot afford to change schedules and frequencies every week or even every month. Timetables are planned and published many months in advance and the daily or weekly capacity offered during a timetable period will aim at achieving load factors of over 80 or 90 per cent on certain peak days or times in the certainty that at other times load factors will slump to low levels. On routes where airlines are free to compete in terms of frequencies offered, commercial pressures may push airlines to over-provide capacity at peak periods or on peak days so that they may even fail to achieve the expected high load factors. An added problem is that on many routes there is a directional imbalance in the traffic flows. The period of peak demand in

Table 8.3 Peak/trough capacity imbalance on international services, 1988

Rank	Seat-km available in peak month as % of lowest month					
	North American Airline	%	European Airline	%	Asia/Pacific Airline	%
1					SIA	116
2					Cathay Pacific	119
3			Swissair	119		
4					Air India	121
5					Thai International	126
6			KLM	126		
7			Lufthansa	128		
8					Qantas	128
9					JAL	130
10	United	132				
11			Air France	134		
12	Air Canada	139				
13			British Airways	140		
14	American	145				
15			Alitalia	153		
16	Northwest	171				
17	Pan Am	176				
18	TWA	189				

Source: Compiled from ICAO (1989b).

one direction may correspond with an off-peak level of demand in the opposite direction. Directional imbalances in traffic levels exist on many routes and usually arise from institutional differences in the markets at each end of the route, such as the timing of annual holidays. Such directional imbalances are particularly marked on some long-haul routes such as the North Atlantic or Europe to Australia. Lastly, airlines may be unable to match the capacity they offer closely enough to the demand to ensure very high load factors at peak periods. This is because, in trying to reduce the number of aircraft types in the fleet, the aircraft on some routes may be too large in relation to the demand. Aircraft size and frequencies cannot always be tailored precisely to the demand levels in each market.

Peak problems also exist in the movement of freight by air, but they are frequently less of a problem than peaks on passenger services. With the introduction of the wide-bodied passenger jets which have very considerable freight capacity in their holds, peaks in the flow of air cargo can be met on many routes without the provision of extra peak capacity. A more serious problem in air freighting is the imbalances of flows which arise because freight travels only one way, unlike passengers, who generally make a round trip.

Coping with the seasonal variations in demand is a major headache for some airline managements since they affect so many aspects of airline operations. Pricing policies, operating schedules, maintenance and overhaul checks and advertising campaigns all need to be carefully manipulated in order to minimize the adverse effect of traffic peaks and slumps on aircraft and crew utilization and on load factors, and through these on unit costs. To mitigate the adverse impact of highly peaked demand, airlines may also lease in aircraft or try to use seasonally employed labour during peak periods. Whatever techniques are used to diminish its impact, the peak remains a problem to a greater or lesser extent for all airlines and is an underlying constraint in many aspects of airline planning and marketing.

8.7
Factors affecting passenger demand

The demand for passenger services arises from the complex interaction of a large number of factors which affect the different market segments differentially. Those factors fall broadly into two groups, which are summarized in Table 8.4: the general economic and supply-related factors that influence demand in all markets and the more particular factors that may influence demand on some routes but may be totally absent on others.

Of the general factors affecting demand, the price of air transport and the level and distribution of personal income in the markets served are perhaps the most important. Much of the growth of air travel during the last 30 years can be explained by the falling real price of air transport (as discussed in Chapter 1) and by growth in personal incomes. Accelerated rates of traffic growth in particular markets at particular times have usually been due either to rapid growth in personal incomes or to falling air fares. The more general economic conditions also impact on traffic growth. The world economic climate and the rate of economic growth in particular countries or regions of the world influence demand in a variety of complex ways. They determine the level of industrial and economic activity in each country and more generally the level and nature of international trade. The level of economic activity and trade directly influences the growth of demand for business travel. Indirectly, it also influences leisure demand since it affects the level and growth of personal incomes. Economic factors such as personal incomes or industrial activity have to be understood within a demographic context. The size and the distribution of the populations served by a route impose a major constraint on the level of potential demand. Thus, despite rapidly rising personal incomes in Singapore, the potential demand for Singapore originating air travel is strictly limited by the small size of the island's population of only 2.6 million. This explains Singapore Airline's critical need to develop fifth and sixth freedom traffic. Conversely, Japan originating leisure traffic has barely scratched the surface of the potential demand given Japan's population of about 125 million and its rapid economic growth. While rapid population growth may in theory increase the size of the air market, in practice it may have an adverse effect if it results in lower per capita incomes or in a larger population but one with a disproportionate share of young children who are unlikely to be air travellers. Both these phenomena have been evident in Morocco and Algeria, countries with birth rates well above average.

Table 8.4 Factors affecting levels and growth of passenger demand

Affecting all markets	Affecting particular routes
Level of personal disposal income	Level of tourist attraction
Scenic/climatic/ historical/religious attributes	
Supply conditions	
Fair levels	
Speed of air travel	Adequacy of tourist infrastructure
Convenience of air travel	
Level of economic activity/trade	Comparative prices
Exchange rate fluctuations	
Population size and growth rate	Travel restrictions
Historical/cultural links	
Social environment	Earlier population movements
Length of holidays	Migrant labour flows
Attitudes to travel	Nature of economic activity

The social environment is also important in all markets since it determines the number of days of holiday available for travel or leisure and social attitudes towards travel. Thus one finds in Japan that workers do not take all the holidays they are entitled to but stay at work. In the same country, though there are many working women with relatively high disposable incomes, social attitudes have only recently begun to accept the idea of women holidaymaking on their own, though this is acceptable for men. For both these reasons, and given its high wage levels, Japan represents a huge potential market for air travel which will boom as social attitudes change and people start taking more of their holiday entitlement and accepting the notion that women can travel on their own. At the other extreme, in much of western Europe two long holidays away from home, one in the summer and a shorter one in winter, are the social expectation of the middle- and upper-income groups.

Demand and supply do not interact only through the price mechanism. Various supply conditions other than price affect demand. In the short term, frequency, seat availability, departure and arrival times, number of en route stops and other supply features influence the level of demand and the distribution of that demand between competing carriers. In the long term, it is the improvements in the overall speed and convenience of air transport that have had the most significant effect on demand. This is particularly true over medium- and long-haul distances where the speed advantage of air increased so dramatically in the 1960s and 1970s that effective surface competition by rail, road or sea has largely disappeared.

In addition to the above general considerations affecting all markets, several other factors, which may be particular to individual routes, also influence demand levels. These are factors which may explain growth on some routes but not on others. Demand for holiday trips is related to the tourist attractiveness of particular destinations. In order to be attractive and have tourist potential, resort areas or towns need two things: they must enjoy certain preferably unique scenic, climatic, historical or cultural advantages; they must also have the right infrastructure to cater for tourist needs such as sufficient hotel beds of the right standard, adequate ground transport, restaurants, entertainments, shopping facilities, and so on. An attractive tourist location without the necessary infrastructure is not enough to generate a significant volume of demand for holiday travel, as many Third World countries have found. The two must go hand in hand. Tourist facilities in themselves may not be enough. They must be priced correctly for the market they hope to attract and in relation to competing destinations. Changes in the relative price levels of hotels and other facilities in a tourist resort area may accelerate or retard traffic growth on particular air routes. Changes in the relative costs of holidays in a country may come about as a result of internal economic conditions or even government decisions. But they may also be generated by fluctuations in the exchange rates. Often switching of tourist demand from one destination to another or a sudden acceleration of outward-bound tourists from a particular country can be related to changes in the relevant exchange rates. When in 1986 the value of the US dollar collapsed against most European currencies and the yen, falling from DM2.91 to DM2.17 and then DM1.80 in 1987, Europe became less attractive for American tourists. Conversely, because of the fall in the value of the dollar, travel from Europe to the United States was stimulated in the late 1980s. Exchange rate fluctuations or even political factors may induce governments to impose travel restrictions on their own citizens. These may take the form of bans on external travel, the imposition of travel taxes for outgoing travellers or restrictions on the amount of foreign exchange which can be taken out for travel purposes. During the 1980s, Taiwan, South Korea, the Philippines, Indonesia and Thailand all restricted travel for some time by one or more of these measures. When in 1989 Taiwan allowed its citizens to travel to mainland China there was a sudden boom in air traffic between Taipei and Hong Kong. Equally the democratization of eastern Europe in 1990 and the easing of travel restrictions would lead to a surge of demand on air routes that were previously rather thin.

Ultimately, of course, leisure travel is also related to taste. Tourist destinations can inexplicably fall into or out of favour. In 1988, when air travel from the UK to most Mediterranean destinations remained more or less static, the number of passengers flying to Turkey shot up by 84 per cent, much of it on charter flights. This surge was attributed largely to a switch of demand from other destinations, notably Greece whose traffic actually declined by 5 per cent in 1988. Comparative inclusive holiday prices may have favoured Turkey, but it was also a question of changing tastes.

The visiting friends and relatives demand is clearly affected by earlier population movements and migrations, which are very specific to particular routes. The heavy volume of demand on routes between France and Morocco, Algeria or Tunisia is related to the large number of immigrants from these countries living and working in France. There is little VFR traffic on routes between North Africa and the UK. On the other hand traffic demand between the UK and Canada, the West Indies, Pakistan and Australia or from Singapore to southern India or Sri Lanka can be explained only by earlier population movements. The same is true of the demand between the United States and Israel or the United States and Ireland. Many earlier migrations of population were related to the colonial period of history. Colonial ties have also resulted in linguistic and cultural links between particular pairs of countries which generate certain types of leisure travel but also considerable student travel. Large numbers of Singaporean, Malaysian or Hong Kong students go to the English-speaking countries, such as Australia, the UK or the United States to study. Students are an important component of demand on the air routes between their home countries and their place of study. The cultural and linguistic ties also generate travel for cultural events, for conferences, and so on. Such ties affect trading patterns and thereby they may also influence business travel. Population migrations for work or settlement are still going on. The United States, Canada and Australia are still attracting and allowing immigrants from certain other countries and these swell the number of air passengers on the respective routes. In other parts of the world during the 1980s relatively dense traffic flows were generated by movements of migrant labour, such as those from the Philippines, South Korea or Pakistan to Saudi Arabia and other Middle East states.

The demand for business travel is related to several factors, not just the level of trade and commercial interaction between two city pairs. It would seem that the nature of industrial, commercial and other activities in an airport’s hinterland is an important determinant of the level of business travel demand. Certain activities appear to generate more business trips than others. In Britain, manufacturing industry generates a disproportionately high level (close to 40 per cent) of business travel but accounts for only 27 per cent of employment (CAA, 1989b). Administrative capitals obviously generate a great deal of government-related travel. Equally there is some evidence that major international ports generate a disproportionate amount of business air travel. Then there are very specific industrial situations which may stimulate, often for a short term, a rapid growth in demand for air services. The exploration and development of a new oilfield or the construction and commissioning of a new industrial complex would be two such examples.

The pattern and growth of demand on any route can be understood only by reference to the economic and demographic characteristics of the markets at either end of the route and to the supply features of the air services provided, of which price is the most important. However, when examining traffic growth on an individual route one must also consider any particular or localized circumstances affecting demand on that route, such as the tourist attractiveness of one or both ends of the route, the historical and cultural ties between the two markets served, the impact of exchange rate fluctuations, earlier or current population movements, and so on. These various factors provide an explanation of the growth and current level of demand on a route. Changes in any of them will affect the growth of demand in the future. None the less, the overall demand for air travel, like that for most goods or services, seems ultimately to be most closely related to its price and to the income levels of its consumer. The impact of price and income on demand are therefore worthy of more detailed consideration.

8.8
Income and price elasticities of demand

Historically, leisure travel has shown a marked responsiveness to personal income levels. Early surveys of air passengers, such as those done at the University of Michigan (Lansing and Blood, 1964), established that two things happen as people's personal incomes rise. First, they spend more on all non-essentials. This includes greater expenditure on travel by all modes. Second, air transport, which is the high-cost but more comfortable and convenient mode for longer journeys, becomes more competitive with surface travel and there is a shift of demand from surface modes to air. In other words, higher incomes result in greater expenditure on longer-distance holiday and VFR travel, and at the same time a higher proportion of that expenditure goes on travel by air rather than surface. The relationship between income changes and demand for air travel can be measured by an income elasticity. This is arrived at quite simply by dividing the percentage change in demand generated by an income change by the percentage change in personal income which brought about that shift in demand:

$$\text{income elasticity} = \frac{\%\ \text{change in demand}}{\%\ \text{change in income}}$$

Thus, if a 3 per cent increase in personal income results in a 6 per cent growth in demand for air travel, then the income elasticity is 6 per cent divided by 3 per cent, which is +2.0. This means that every 1 per cent variation in income will induce a 2 per cent change in demand.

In examining traffic development on a route or group of routes over time in order to establish what the impact of income changes has been, a number of problems arise. The first is how to isolate or exclude the impact of other variables, such as fare changes, on demand. This is done by using multiple regression techniques, which in turn pose certain methodological problems discussed in the next chapter. Secondly, there is the question of how to measure personal income. Ideally one would like to use a measure of the personal disposable income (after adjustment for inflation) of the population in a market or of the populations served at either end of a route. But disposable income data are not always available and countries tend to calculate it differently. Proxy measures have to be used for disposable income. Gross national product (GNP) or gross domestic product (GDP) are frequently used but may be converted into per capita gross domestic product. The latter is itself problematical in that it assumes a fairly even distribution of income among a country's population, which frequently is not the case. Both the British Airports Authority (BAA plc) and the UK's Civil Aviation Authority in their forecasts use an index of consumer expenditure as a readily accessible measure of the income available to consumers in different countries. Thirdly, since air travel for leisure is a relatively new form of expenditure, one can assume a higher rate of growth in the early stages of increasing incomes and then a gradual saturation as people on high incomes get to the stage where they cannot easily consume more leisure travel (see Table 8.5 below). If income elasticities are changing over time, it may be misleading to base forecasts on elasticities derived from past data. Lastly, there may be difficulties in establishing different income elasticities for the different segments of the leisure market, such as inclusive tours or independent holidays, or for VFR travel.

One would not expect the demand for business travel to be closely related to per capita income since business travellers' expenditure patterns are related not to their own personal incomes but to the needs of their employers. On the other hand, several studies have found that gross domestic product or some other measure of a country's national income or wealth does correlate with the volume of business traffic generated. It is not difficult to accept that business activity and travel will increase as a nation's total wealth grows. Thus it has proved possible to establish income elasticities for business travel but based on changes in national rather than in per capita income.

Most demand studies in recent years have produced results indicating income elasticities for various categories of passengers which are usually between 1.5 and 2.5. In 1976 the then British Airports Authority carried out a forecasting study of traffic for 12 major west European airport authorities (BAA, 1978). Using data for the period 1965–75, it produced aggregated income elasticities which were as follows:

	Income elasticity
Short-haul leisure	2.3
Long-haul leisure	2.0
Short-haul business	1.6
Long-haul business	1.2

These figures indicate the lower income elasticities for business travel which are a feature of most studies (e.g. DoT, 1978, 1981; and CAA 1989a). Subsequently, in 1989 using more recent data and on a more disaggregate basis, BAA plc calculated income elasticities which it could use for forecasting traffic demand through London's airport. The predicted income elasticities for the international leisure segments are shown in Table 8.5. The BAA no longer calculates income elasticities for business demand since it finds that trade is a more significant variable for business travel than income. Amsterdam airport does the same (Veldhuis, 1988). Yet, even when using trade as an income-related variable, one finds that business travel is relatively trade inelastic. Amsterdam airport has found that the trade elasticity of business travel is between 0.8 and 1.0.

The responsiveness of demand to price or fare changes can also be measured in terms of an elasticity coefficient:

$$\text{price elasticity} = \frac{\%\ \text{change in demand}}{\%\ \text{change in price/fare}}$$

Unlike income elasticity, price elasticity is always negative since price and demand must move in opposite directions. If the fare goes up, demand is expected to fall and vice versa. So there is invariably a negative sign in the equation. If fares go up 3 per cent and demand drops 6 per cent, then the price elasticity is (−6%)÷(+3%)=−2.0.

Most of the problems previously mentioned which have to be faced when estimating income elasticities also arise in price elasticity studies, but there are some additional ones too. In examining traffic and fare data, for a route or several routes over a period of time, which fare should one choose to indicate price changes? Not only will there be several fares on each route, but the number of fares and their relative levels may have changed over time. Problems multiply when fares vary by season of the year. Some analysts might use the basic economy fare or the most widely used fare or, if it is available, the average yield obtained by the airline. Alternatively, some have overcome this problem by establishing different price elasticities for different fare groups (Straszheim, 1978). It is the real level of the fare in constant value terms that is significant, not the current level. Therefore fares have to be adjusted for price inflation so as to establish the real cost of air travel in relation to the cost of other goods and

Table 8.5 Predicted income elasticities for international leisure trips to and from London's airports

Leisure segment	1989–93	1994–8	1999–2005
Short haul:			
UK resident	2.0	1.8	1.7
Non-UK resident	1.8	1.8	1.7
North Atlantic:			
UK resident	2.0	2.0	2.0
Non-UK resident	1.6	1.8	1.5
Middle East:			
UK resident	2.0	2.0	2.0
Non-UK resident	2.0	2.0	2.0
Long haul (excluding N. America and Middle East):			
UK resident	2.0	2.0	2.0
Non-UK resident	2.2	2.2	2.2

Source: BAA plc (unpublished).

services. On international routes this means making different adjustments at each end of the route. An additional problem in establishing fare elasticities is posed by the inclusive tour (IT) passengers, who have no knowledge of the cost of the fare within their total holiday package price. Moreover, IT fare changes will have a disproportionately small impact on the total holiday price paid by the prospective IT consumer.

In so far as business travellers do not pay for their own travel, one would expect them to be relatively insensitive to fare changes. This should be reflected in lower price elasticities for business travellers or for high-fare traffic categories which are composed primarily of business travellers. An examination of price elasticities in some studies shows this to be true. Whereas non-business travel tends to have price elasticities greater than −1.0, the price elasticity of business travel is less than −1.0 and in the case of first-class travel on the North Atlantic it was as low as −0.65 (Straszheim, 1978). This was before the days of separate business-class cabins. Conversely, the most price sensitive market segments are those at the lower end of the market, that is, the high-discount fare groups and, in Europe, the inclusive tour segment of the market. The same study of North Atlantic traffic mentioned above (Straszheim, 1978) found that the price elasticity for full economy passengers was −1.5 while for the high-discount market it was as high as −2.7.

Economic textbooks deal at length with the concept and the mathematics of elasticity. It is not opportune to discuss the complexities of the concept here. Suffice it to say that, in order to make pricing and other marketing decisions, airline managers need to have a feel for the price elasticity of the various market segments on the route or routes they are dealing with. Without such a feel, they may make major planning and pricing errors. They basically need to know whether their markets are price elastic or inelastic. If the price elasticity of demand in a particular market is greater than −1.0, that is, if it is −1.1, −1.2 or more, the market is considered to be elastic. This means that a change in the price or fare has a more than proportional impact on demand. If the fare is reduced, demand will grow more than in proportion. Though each passenger will be paying less than before, many more passengers will be travelling, with the result that the total revenue generated will go up. Conversely, a fare increase in an elastic market has such an adverse effect on demand that total revenue will decline despite the fare increase. When the price elasticity is less than −1.0, as in the case of the first-class market on the North Atlantic where it may be around −0.65, demand is inelastic. Fare changes have a proportionally smaller impact on demand levels. In such market conditions, fare increases will generate greater total revenue because demand will not fall off very much. On the other hand, fare reductions will stimulate some traffic growth, but it will be proportionally less than the drop in fare, so total revenue will decline.

The easiest way of appreciating the pricing and revenue implications of different price elasticities is to consider a simple example. Let us assume that on a short-haul international route an airline is flying a daily return service with a 200-seater aircraft. It is the only operator and the fare is $100 one way. The daily traffic and revenue on the route can be summarized thus:

Total seats offered per day (200 each way)	=400
Business passengers (approx. 50 each way)	=100
Leisure passengers (approx. 50 each way)	=100
Daily seat factor	50%
Revenue from business market (100×$100)	=$10,000
Revenue from leisure market (100×$100)	=$10,000
Total revenue per day	=$20,000

Because of an increase in fuel costs, the airline needs to increase revenue on the route by about 4 per cent. In the short term, costs cannot be reduced in other areas, so the marketing manager is required to generate the additional revenue through tariff changes. The instinctive reaction would be to increase fares by 6 per cent or so. However, earlier market research had established that, while business demand is relatively inelastic to fare changes, with an elasticity of −0.8, the leisure market is price elastic with an elasticity of −2.0. Using these price elasticities the marketing manager estimates the traffic and revenue impact of a 10 per cent increase in the fare from $100 to $110.

The business price elasticity of −0.8 tells him that, for every 1 per cent increase in the fare, the airline will lose 0.8 per cent of its market. Thus a 10 per cent fare rise results in an 8 per cent loss of business travellers (i.e. change in demand =+10%×−0.8 =−8.0%). So their daily number will decline from 100 to 92. Leisure traffic, being more elastic to price changes, will drop more, by 20 per cent (or −2.0 per cent for each 1 per cent increase in fare), to 80 passengers on average each day. The revenue implications of a 10 per cent fare increase are surprising:

Impact of $110 single fare

92	business passengers at $ 110		=	$10,120
80	leisure passengers at $110		=	$8,800
172	passengers	Total revenue		$18,920
		Seat factor	=	43%

Revenue from business travellers would go up because, though fewer would travel, the drop in traffic is more than compensated for by the higher fare they are all paying. But leisure passengers react in larger numbers to the higher fare and total revenue from this segment of the market would go down markedly. The net result is that, if the airline followed an instinctive reaction and increased the fare by, say, 10 per cent, it would end up with a significant fall in traffic, and a collapse of the seat factor from 50 per cent to 43 per cent. This in turn would lead to a drop in total revenue. Too often airlines fail to appreciate that increasing fares may reduce rather than increase their total revenues.

What would be the effect of reducing the fare by 10 per cent to $90? Both business and leisure demand would increase—the former by 8 per cent (i.e. −10% ×−0.8=+8%) and the latter by 20 per cent. Using the price elasticities as before, the traffic and revenue implications can be calculated:

Impact of $90 single fare

108	business passengers at $90		=	$9,720
120	leisure passengers at $90		=	$10,800
228	passengers	Total revenue		$20,250
		Seat factor	=	57%

The lower fare would generate 28 more passengers each day and the seat factor would jump to 57 per cent, a creditable improvement from the current 50 per cent. Most of the additional passengers would be leisure passengers, who are more price elastic, and revenue from this sector of the market would increase. While there would also be more business travellers, business revenue would decline because the 8 per cent increase in passenger numbers would not be sufficient to compensate for the 10 per cent drop in the fare paid. Total revenue would increase by $520, which might do little more than cover any additional costs such as in-flight catering imposed by the extra 28 passengers. Cutting fares would produce a better revenue result than increasing the fares, but it still fails to generate the additional revenue required.

Examination of the above figures suggests that revenue could be maximized by a two-fare price structure. The airline should charge the business travellers more because their demand is relatively inelastic to price. But it should charge less to the price-elastic leisure market, knowing that lower fares will generate proportionally more demand and thereby increase total revenue from this market segment.

Impact of two-fare price structure

92	business passengers at $110		=	$10,120
120	leisure passengers at $90		=	$10,800
212	passengers	Total revenue		$20,920
		Seat factor	=	53%

By introducing separate fares for each market segment, the airline can increase its total revenue by 4.6 per cent and its seat factor by three points to 53 per cent. The net revenue gain might be less because there may be some extra costs involved in carrying 12 more passengers. This solution also presupposes that the airline can create effective tariff 'fences' to prevent slippage of business passengers into the low-fare market. Simply put, the above example illustrates the principle that, in price-elastic markets, low fares may increase total revenue and that conversely, where demand is inelastic, higher fares will generate higher total revenue.

It must be emphasized that even on a simple route the best pricing solution is dependent on two variables, the price elasticities of the different market segments and the market mix that is the proportion of the total market represented by each segment. In the above example, the pricing policy adopted might be different if business travellers represented 90 per cent of the market or if the price elasticity of leisure demand was −2.4 instead of −2.0.

In order to produce medium-term forecasts of European scheduled passenger traffic, the Association of European Airlines (AEA, 1989) has estimated price and income elasticities of demand for air travel between each country in Europe and the rest of Europe (Table 8.6). These show that scheduled air travel within Europe is generally not very price sensitive, though the highest price elasticities are found among poorer countries. Conversely, intra-European travel demand is relatively sensitive to income changes (measured in terms of GDP), with particularly high income elasticities among the countries with lower per capita incomes.

The concept of demand elasticity can be taken further to establish the reaction of passenger demand to changes in other variables. For instance, it is possible to calculate a journey time elasticity of demand. This would show that business travel is the most responsive to reductions in journey time and VFR demand probably least responsive. There is also the concept of cross-elasticity. This measures the impact on the demand for air travel of changes in the price of competing goods or services. One study has established the cross-elasticity of demand for international leisure air travel from Australia with respect to changes in domestic air fares or domestic hotel rates

Table 8.6 Price and income elasticities of demand for scheduled air travel within Europe

Country	Price elasticity[a]	Income elasticity[b]
High-income countries:		
Scandinavia	−0.31	+2.41
France	−0.50	+1.90
Switzerland	−0.54	+1.86
Germany	−0.75	+2.64
Low-income countries:		
Portugal	−0.19	+3.04
Turkey	−0.62	+3.11
Ireland	−0.92	+1.52
Greece	−1.21	+5.59

Notes:
[a] Price is measured in terms of average yield per passenger on intra-European routes.
[b] Income is the real gross domestic product of each country (i.e. adjusted for inflation).
Source: AEA (1989).

(Taplin, 1980). Changes in fare structure and levels on the North Atlantic have resulted not only in changes in the total demand but also in significant shifts of demand between fare types, between scheduled and charter and also to some extent between seasons, since fares vary by season. One or two studies have attempted to establish cross-elasticities within the air market (Kanafani *et al.*, 1974). Others have established an exchange rate elasticity of demand (CAA, 1989a).

Different studies even of the same markets seem to produce different income and price elasticities. Airlines may have difficulties in choosing between them. Larger ones may carry out their own studies to establish elasticities on the routes they are most interested in. If they can overcome the data and methodological problems, they must still face up to the fact that the elasticities are based on historical traffic data, which may be influenced by particular variables other than fare or income which have not been included in their analysis. There is the additional problem that price, income or other elasticities are changing over time. This is inherent and inevitable. Since elasticities are based on proportional changes in demand, such proportions change as the total demand changes. In the example used above, once the fares have changed from the $100 starting level to a new fare generating a different level of demand, then the price elasticities at that new demand level will have changed too. The change may be a relatively small one, but it will result in a different price elasticity of demand.

The pragmatic and methodological problems involved in establishing elasticities should not induce airlines to abandon the concept. Some understanding of elasticities is so crucial for pricing, marketing and forecasting that they cannot be ignored. Even an approximate appreciation of price and income elasticities for the major market segments will help airlines make more soundly based decisions.

9
Forecasting Demand

9.1
The need for forecasts

Forecasting is the most critical area of airline management. An airline forecasts demand in order to plan the supply of services required to meet that demand. Broadly speaking, tactical or operational decisions stem from short-term traffic forecasts covering the next 6–18 months or so, and are included in the airline's operating plan and budget for the current and the coming financial year. Aircraft scheduling decisions, maintenance planning, advertising and sales campaigns, the opening of new sales offices are among the many decisions which ultimately are dependent on these shorter-term forecasts. There are in addition a range of strategic decisions, many related to an airline's corporate plan and objectives, which stem from long-term forecasts. Decisions on aircraft procurement, the opening-up of new routes or markets, the training of new flight crews, investment in new maintenance facilities and similar strategic decisions all stem from longer-term forecasts of up to five years or longer. Almost every tactical or strategic decision taken within an airline stems ultimately from a forecast. At the same time, forecasting is the area in which mistakes are most frequently made and the one about which there is least certainty. There is no absolute truth in forecasting, no optimum method that can guarantee accuracy. Instead, airline forecasters use any one of a range of forecasting techniques, of varying mathematical complexity, each of which has advantages and disadvantages, none of which can ensure consistent accuracy. Yet forecasts have to be made since so many decisions flow from them.

The annual budgets and the longer-term plans on which so many supply decisions hinge start with forecasts of passenger and freight traffic. Forecasting involves different type of forecasts, each of which poses different methodological problems. In the first instance, airlines need to forecast traffic growth assuming a continuation of current operating conditions with no dramatic changes in fares or in other supply factors. They will forecast the global growth of passenger and/or freight traffic on a route, group of routes or geographical region. Such forecasts represent the total demand, from which the airline then has to predict its own share and its own traffic. Such forecasts essentially involve an assumption that traffic growth will continue in the future very much as it has done in the past.

Airlines must also be able to forecast the response of demand to a change in the conditions of supply. Such changes may include an increase or reduction in the real level of fares, a change from narrow-to wide-bodied aircraft, a marked increase in frequencies or a change in departure times. A significant change in supply conditions may be under consideration by the airline itself or change may be imposed by one or more of its competitors. In either case, an airline must be in a position to forecast traffic reaction to such change.

A somewhat different forecasting problem exists when an airline is trying to forecast demand on a new route which is under evaluation. This may frequently be a route on which there have been no direct air services at all previously, or it may be a route on which the airline concerned is a new entrant. In either case the airline has no experience and little or no historical traffic data on which to base its forecasts. This is particularly so if the route has had no previous air services at all. Forecasting in such circumstances is clearly very difficult, with a high risk of error, and may require different forecasting techniques from those normally used.

Lastly, there is the question of segmental forecasting. Passenger traffic on a route is composed of identifiable market segments related partly to purpose of travel and partly to service requirements. Such segments may be further categorized by point of origin. The earlier analysis of demand factors indicated that each market segment is likely to have differing demand elasticities and to be growing at different rates. It should therefore be possible to produce more accurate forecasts by forecasting the growth in each market segment separately and then aggregating them, rather than by forecasting the total traffic from the start. Some airlines already do forecasts using two market segments, business and non-business, or possibly three based on fare type. Only a handful of airlines have the resources to carry out more extensive segmental forecasting. In the future, however, planning requirements and the need to improve the accuracy of forecasts may push more airlines to consider this disaggregate forecasting.

The aim of this chapter is not to suggest the best way of forecasting but to review some of the problems of forecasting and the alternative techniques which are most commonly used in the international airline industry, without going too deeply into their mathematics. As a result, this is not an exhaustive review, since some forecasting tools, little used by airlines, are not examined. The forecasting methods more widely used by airlines, often in combination, fall broadly into three groups of growing complexity: qualitative methods, time-series projections and causal methods.

9.2
Qualitative methods

9.2.1
EXECUTIVE JUDGEMENT

Of the numerous forecasting techniques available to airlines, executive judgement is one of the most widely used, usually to modify and adapt other more mathematical forecasts. Such judgement is based on the insight and assessment of a person, who often may not be a forecaster, but who has special knowledge of the route or market in question. For instance, the country or area managers of an airline are frequently asked to predict traffic growth on their routes. Their knowledge will include an understanding of recent and current traffic growth and of economic and other developments likely to affect future demand. They weigh up the factors involved and therefore their judgement and their predictions may be quite soundly based, but the approach is basically crude and unscientific. The more detailed and the more long-term the forecast, the more likely it is that executive judgement will prove inadequate. On the other hand, executive judgement as a forecasting tool has two distinct advantages. It is quick. Forecasts can be made almost instantaneously and do not require any detailed assessment or working out of data. In addition, the person making the forecast may be aware of extraneous and particular factors which may affect future demand on a route, which the more data-based techniques would not pick up. It is for this reason that many airlines subject their data-based forecasts to assessment and possible modification by certain key managers and executives.

9.2.2
MARKET RESEARCH

A wide range of market research techniques can be used by airlines in order to analyse the characteristics of demand for both passengers and freight. These techniques will include attitudinal and behavioural surveys of passengers and, it is hoped, those not travelling by air. They will also involve studies of hotel and tourism facilities, surveys of travel agents and business houses, analyses of trade flows and other business interaction, and so on. Such studies might be commissioned from specialist market research companies or they might be carried out by the airlines themselves. Many larger airlines in any case carry out regular and systematic surveys of their own passengers so as to build up a profile of their needs and characteristics. Others carry out such surveys on an ad hoc basis when a specific question needs to be resolved. The aim of all this is to derive empirically an understanding of how demand for air transport varies between different sectors of the population or, in the case of air freight, between different industrial sectors. This knowledge can then be used in combination with forecasts by others of sociological, demographic or economic change to predict future levels of demand.

In many circumstances such an empirical approach to forecasting may be more appropriate than the more econometric methods. On an air route where the demand for air travel is suppressed by the inadequate number of hotel beds at the destination, a study of hotel and tourism infrastructure projects at that destination may produce a better indication of future travel flows than would an analysis of past traffic trends. Equally the forecasting of air freight demand often lends itself to the use of market research studies, especially on routes where freight flows are relatively thin. On many routes the erratic and irregular growth of air freight makes time-series analyses or other econometric techniques difficult to use. Air freight forecasting models have generally been less successful than models for forecasting passenger demand. On most air routes, the goods freighted by air fall into a limited number of clearly defined commodities. Exports by air from many developing countries are usually confined to one or two commodities, while imports are quite different and cover a wider, though still limited range of goods. As a result, air freight forecasts may often fruitfully be based on market research analysis of trade developments in a few key commodities.

Market studies are particularly useful as a forecasting tool when past traffic data are inadequate or non-existent, thereby prohibiting the use of time-series and possibly of econometric forecasts too. This happens on many routes from developing countries and is obviously the case on entirely new routes. In these circumstances market research may be the only way of evaluating future demand. Market research also helps airlines to forecast demand reaction to changes in supply conditions and to gain an appreciation of their different market segments if they wish to get involved in segmental forecasting.

9.2.3
DELPHI TECHNIQUES

The Delphi approach requires the building up of a consensus forecast based on the views of individuals who are considered to have sufficient expertise to be able to anticipate future trends. The process is an iterative one, possibly involving several rounds of consultation. In simple terms, a group of experts may be asked to give their forecasts of growth in a region or market. These forecasts are used to build up a composite forecast. This is then communicated to each expert who may wish to revise their own original forecast in the light of what other experts are predicting. The individual forecasts from this second round of consultations can be used to arrive at an agreed or consensus forecast. This is the principle of the Delphi method. In practice, the consultative process can be more or less complex depending on the amount of information exchanged between the experts.

The Delphi technique is more suitable for aggregate forecasts of growth in major markets or regions than for individual route forecasts. As a result it is little used internally by airlines, but it was the basis for the industry-wide forecasts produced annually by the International Air Transport Association (IATA). These are regional forecasts for nearly 20 route areas such as Europe-Middle East or Middle East-Far East. Forecasts by direction are produced for freight traffic too. The forecasts cover the current year and a five-year period ahead and are revised each June, sometimes with interim revisions during the winter. Up to 1986 these IATA forecasts were Delphi forecasts based on a consensus of expert opinion and were arrived at in a series of steps.

The first step involved the development of explicit forecasting assumptions at a meeting of airline forecasters and key experts from outside the airline industry. The purpose of this meeting was to develop the best possible background scenarios and explicit regional assumptions for the changes in the real level of tariffs and in the major economic indicators affecting demand. The assumptions and data bases were communicated to the airlines participating in the forecasting exercise. The airlines were then requested to submit their own forecasts for the industry as a whole and for each route area or market on which they operated. Airlines were free to use whatever forecasting method they preferred in arriving at their own forecasts and could even make alternative key assumptions if they wished to. The results of this first round were distributed to all participating airlines for review before the finalization meeting. This took place in early June. The experts reviewed the consolidated regional forecasts, made adjustments in the light of more recent developments and may also have considered econometric forecasts made by some member airlines.

The IATA forecasts were then finalized and widely distributed throughout the world. These forecasts represented a consensus of expertise within the airline industry. However, this Delphi approach was very time consuming and in recent years IATA has reverted to a simpler approach based on a compilation of individual airline forecasts. The IATA annual forecasts are used by smaller airlines as inputs into their own forecasting processes and by larger airlines as a counter-check to their own internal forecasts. Airport authorities, aircraft manufacturers and governments also refer to the IATA forecasts.

9.3
Time-series projections

Time-series or trend projections represent the forecasting technique most widely used by international airlines. Many smaller airlines do little else. Essentially the technique involves a projection into the future of what has happened in the past. It assumes that whatever factors affected air traffic in the past will continue to operate in the same manner in the future. The only independent variable affecting traffic is time, and as time progresses so will traffic.

To establish the relationship between traffic (the dependent variable) and time (the independent variable), it is essential to have accurate and detailed traffic statistics for the route in question. Without such data, trend projections cannot be used. The first step in the forecasting process is to plot the time-series data on a graph so as to show monthly or annual traffic totals against the appropriate month or year. Drawing a freehand curve through the points should indicate whether the traffic trend on the route is exponential or linear (Figure 9.1). An exponential trend is one where traffic seems to grow by a constant percentage with each unit change in time. This means that the absolute increase in each time period in passenger numbers or freight tonnes is greater than in the previous period. This is because each successive growth is a constant percentage but of a larger preceding total. The equation of the exponential curve is given by

$$\text{traffic } (y) = a(1 + b)^t,$$

where *a* is constant and *b* is the rate of growth and *t* is time. A linear or straight-line trend is one where the traffic increases by a constant absolute amount with each unit of time. It is expressed in the form

$$\text{traffic } (y) = a + bt,$$

where *a* and *b* are constants and *t* is again time. Because changes for each unit of time are by a constant amount and the total traffic is growing, the percentage growth is gradually declining. There is therefore a fundamental difference between the impact of exponential as opposed to a linear growth trend on forecasts of traffic growth. Exponential growth means ever greater annual or monthly traffic increments, though the percentage change may be more or less constant. Linear growth would indicate constant increments and declining percentage changes. Deciding which trend best represents developments of a route will therefore have a major impact on forecasts, especially longer-term ones. There is also the possibility that growth on a route may be linear in its early stages and then become exponential or vice versa. An added problem is that at times it might be difficult to decide whether an exponential or linear trend fits the data best, yet choosing between them will produce quite different forecasts.

It has been observed that some air routes or markets, after achieving very rapid growth for a number of years, reach a plateau where traffic growth flattens off. It is frequently assumed that this plateau level is reached when the market is in some sense saturated. If this has happened or is happening on a route, the trend of past traffic data may best be described by growth curves which asymptotically approach an upper limit such as a logistic curve or a Gompertz curve. Both of these are S-shaped and indicate declining absolute and relative growth as markets reach maturity. In practice, international airlines tend not to use logistic or Gompertz trend curves for forecasting. Most time-series forecasting is either exponential or linear. Of these, the former is probably more widely used both because of its simplicity and also because past air traffic trends do often appear to be exponential.

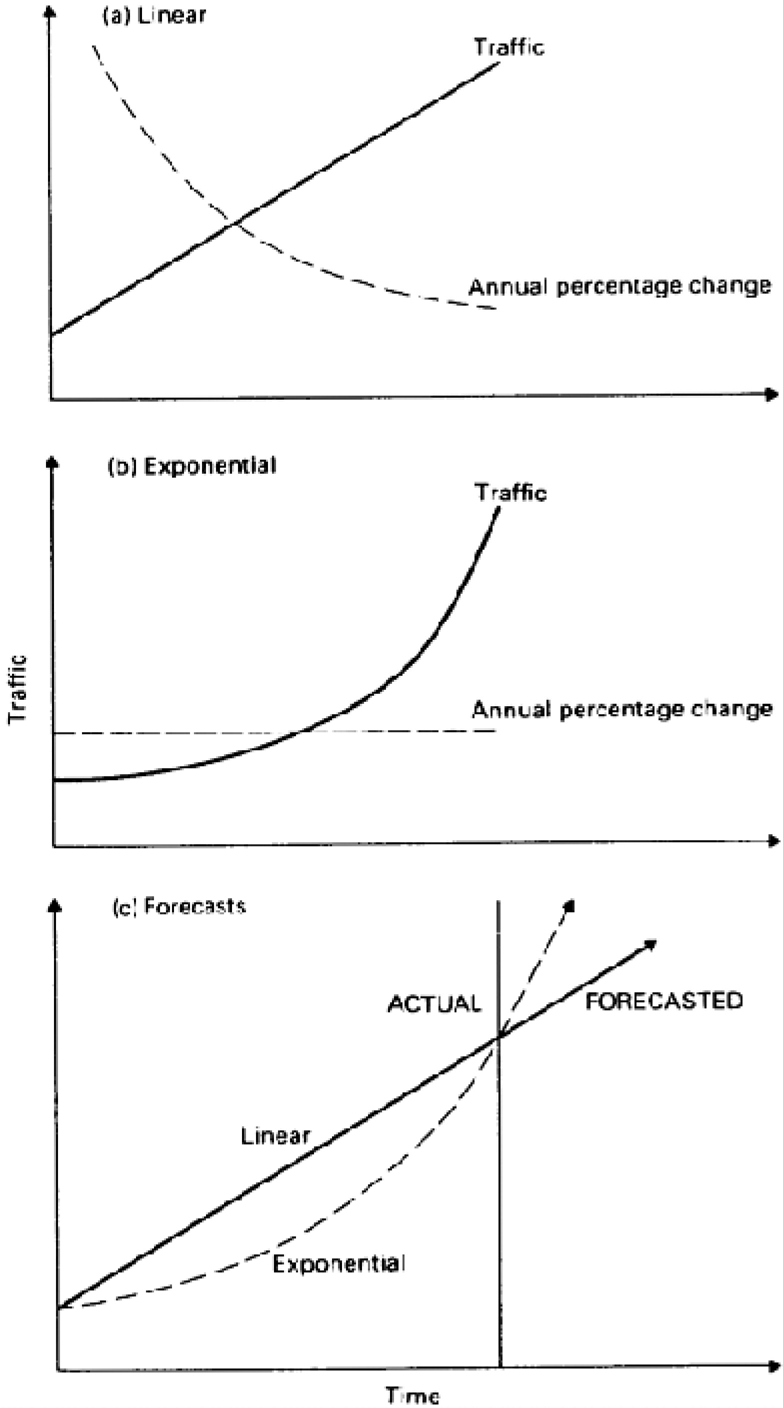

Figure 9.1 Types of traffic growth

(a) Linear, $y=a+bt$

(b) Exponential, $y=a(1+b)^t$

(c) Forecasts: linear and exponential

The workings and implications of different time-series techniques can best be appreciated by using them to make forecasts for an actual route. The case study chosen is London to Nice, a short-haul scheduled route with, until recently, relatively little charter traffic and little indirect traffic transiting via Paris or elsewhere. The case study assumes that one is now in 1984 and wishing to forecast the traffic on the route for 1988, five years hence. For reasons of simplicity the forecasts for individual years prior to 1988 are not discussed.

To make time-series forecasts, a minimum of 7–10 years of past traffic data are required and some forecasters suggest that one should not forecast for a longer period ahead than about half the number of past years for which statistics are available. For the London-Nice route, traffic data for 12 years to 1983 were examined (Table 9.1). This indicated that, though passenger movements almost doubled between 1972 and 1983, growth was at times erratic, with two years, 1974 and 1977, in which traffic actually declined. In practice, many larger airlines would hesitate to forecast so far ahead on the basis of time-series projections alone. Nevertheless, a five-year forecast does enable one to see clearly the impact of different techniques. While the analysis which follows relates to annual traffic volumes and forecasts the annual traffic for 1988, the same forecasting methods could be used with monthly or weekly traffic data. Problems of seasonal traffic fluctuations might arise, but these could be adjusted for.

The London-Nice data underline some of the difficulties faced in forecasting. To start with, examination and plotting of the traffic data do not make it easy to decide whether past growth is linear or

Table 9.1 Total passenger traffic, London-Nice (both ways), 1972–83

Year	Terminal passengers	Annual change	Three-year moving average passengers	Annual change
	’000	%	’000	%
	1	2	3	4
1972	140.6			
1973	148.5	+5.6	143.8	
1974	142.4	−4.1	151.6	+5.4
1975	163.8	+15.0	158.6	+4.6
1976	169.6	+3.5	166.9	+5.2
1977	167.4	−1.3	174.0	+4.3
1978	185.0	10.5	187.4	+7.7
1979	209.9	+13.5	206.7	+10.3
1980	225.1	+7.2	225.4	+9.0
1981	241.2	+7.2	245.0	+8.7
1982	268.8	+11.4	259.3	+5.8
1983	268.0	−0.3		

Year	Terminal passengers	Annual change	Three-year moving average passengers	Annual change
	’000	%	’000	%
	1	2	3	4

Source: CAA UK Airports: *Annual Statements of Movements, Passengers and Cargo* (for years 1972 to 1985).

exponential. As a result, both exponential and linear forecasts will be made in the analysis which follows. Another major problem facing forecasters using time-series analysis is how far back they should go in examining past traffic data. In the case of London-Nice, 10-year data to 1983 meant 1974 would be the first year. This was known to be a year in which traffic slumped because of the first oil crisis. There was subsequently a very large jump in traffic in 1975. Using a maverick low year as the starting point might produce less accurate forecasts. So forecasters may decide, as has been done here, to go back and extend the time series by two years to 1972. This then raises a different question. Are data and traffic so far in the past a good reflection of what will happen five years in the future? Would it not be logical to take a shorter time series? Is the recent past a better indicator of the future than the more distant past? There is no absolute answer to this enigma. Forecasters must choose the time series which they feel in each case will best allow them to make a realistic forecast. To do this they must ensure that their stream of data embodies the underlying trends and encompasses complete cyclical variations if any exist.

9.3.1 EXPONENTIAL FORECASTS

Average rate of growth

Many airlines, especially the smaller ones and those that have relatively new routes with only a short stream of data, base their fore-casts on the average of the past rates of growth. This approach has the advantage of simplicity. In the London-Nice case, adding up the annual percentage change each year from 1972 to 1983 and dividing by eleven, which is the number of observations, produces an average annual growth of +6.2 per cent. Using the formula

$$y = a(1 + b)^t,$$

where *a* is the actual traffic in 1983, *b* is the growth rate and *t* is the number of years forecast, then

$$1988 \text{ traffic} = 268 \times (1{\cdot}062)^5 = 362{\cdot}0.$$

In this and subsequent equations, traffic volumes are thousands.

In the London-Nice case, the number of observations is relatively small, only 12; and this is so with many airline forecasts. But it does raise some doubt about whether +6.2 per cent is the true average growth rate. It is possible to estimate mathematically what the possible range of values for the true growth rate might be. The true growth rate at a 95 per cent level of confidence would be 6.2±4.2. If one were to adjust the 1988 forecast accordingly, the range would be very wide. It is for this reason that most airline forecasters would ignore the implications of having a relatively small number of observations.

Moving average growth

The use of annual average growth rates should be based, in theory, on data series which are long enough to show what are the random variations and what are shifts in underlying trends. Where the time series is not very long and where there are very marked fluctuations in traffic growth from year to year, as in the case of the London-Nice data (Table 9.1), some forecasters will use moving averages as a way of flattening out wild traffic variations so as to understand the underlying trends. In order to do this, normally three (or more) observations are added together and the average calculated. This is then given as the actual observation for the middle of the three years (or months if one is using monthly data). For London-Nice the actual traffics for 1972, 1973 and 1974 were added together and divided by three. This produced a three-year moving average of 143, 800, which was the traffic attributed to 1973, the middle year (column 3 of Table 9.1). Then 1972 was dropped and the average for 1973, 1974 and 1975 calculated and attributed to 1974 and so on, the final moving average being for 1982. The choice of the number of observations for the moving average is up to the forecaster, whose aim is to eliminate sudden short-term traffic variations without losing sight of longer-term changes. But moving averages cannot be used with small data sets since one effectively loses data at each end. Examination of the moving average data for London-Nice in Table 9.1 (columns 3 and 4) shows a flattening out effect. Traffic does not decline in any single year and the growth in the good years is not as high as the unadjusted annual figures would suggest. The highest growth was 10.3 per cent in 1979, following which there seems to have been a downward trend in the underlying growth rate.

The annual average rate of growth can be calculated from the annual changes in the moving average figures (column 4 in Table 9.1). In this case it was 6.8 per cent. Using this to forecast 1988 traffic, then

$$1988 \text{ traffic} = 259{\cdot}3 \times (1{\cdot}068)^6 = 384{\cdot}8.$$

The use of a moving average here seems to have identified a faster underlying growth than was evident previously.

Exponential smoothing

Some forecasters believe that the recent past is a better pointer to the future than the more distant past. It follows that, in projecting past traffic growth into the future, greater weight should be given to the more recent observations. Mathematically, the technique for doing this is similar to the moving average but adjusted to give a particular weighting to recent as opposed to more distant observations. In a simple form,

$$y+1=\alpha y+\alpha(1-\alpha)y_{-1}+\alpha(1-\alpha)^2y_{-2}+\alpha(1-\alpha)^3y_{-3}\ \ldots,$$

where α is a smoothing factor ($0<\alpha<1$), y is the number of passengers in year y, and $y+1$ is the first-year forecast. The greater the value given to α, the greater will be the weight given to the more recent observations. The forecaster can decide the value of α. The above formulation is relatively simple but some smoothing techniques can be quite complex. The best known is the Box-Jenkins model. This is a sophisticated and complex model requiring a large number of observations. Though airline forecasters make reference to Box-Jenkins (Nguyen Dai, 1982), few if any actually use it. Simpler formulations are available. One of these is Brown's double exponential smoothing model and another the Holt-Winters model. Both use a smoothing technique to deal with time-series data containing a trend variation. Since the London-Nice traffic data showed a clear trend pattern, the Holt-Winters model was used. The 1988 forecast produced on this basis was 326,200 passengers. This is much lower than the other exponential forecasts because the effect of the smoothing technique is to give much greater weight to the fact that in 1983 traffic declined marginally. While exponential smoothing techniques have been widely used in some other industries, their use is still fairly limited within the airline industry. There is, however, a growing awareness that, by giving greater weight to the more recent observations, forecasters may be in a position to improve the accuracy of time-series projections.

9.3.2 LINEAR TREND PROJECTIONS

Simple trend

The underlying assumption is that a straight line best represents the trend of the traffic over time and that traffic increases by a constant amount with each unit of time. The technique involves drawing a straight line through the time series so as to produce a best fit. This is normally done by the least squares method, though other mathematical techniques are also available. The least squares criterion requires that the line fitted to the data should be the one which minimizes the sum of the squares of the vertical deviations of the data points from the line. Some of the points are likely to be above the line, and therefore positive, and some below the line, and so negative. These would cancel each other out if one were merely trying to minimize the sum of the deviations. By using the squares of the deviations this problem is avoided.

In fitting a line of the form $y=a+bt$ to the time-series data so as to satisfy the least squares criterion, there remains the problem of how closely the straight line corresponds to those data. The goodness of fit is measured by an index known as the coefficient of correlation *(R)* or the square of this quantity (R^2), which is strictly speaking the coefficient of determination. In practice the R^2 coefficient is used most frequently. If the fit of the straight line to the data is very poor, the value of R^2 approaches zero. If the fit is very good, the value of R^2 will be close to 1.0. Within the airline industry, experience suggests that accurate predictions using linear trend lines require very high coefficients of determination. They should be above 0.90 and preferably higher.

Fitting a trend line to the London-Nice data produced the following result:

$$y = 111{\cdot}9 + 12{\cdot}7t, \qquad R^2 = 0{\cdot}939.$$

This indicates that a trend line starting at 111,900 passengers and growing by 12, 700 passengers per year *(t)* produces a good fit with the actual traffic in each year since the coefficient of determination at 0.939 is high. To forecast traffic in 1988 one needs to add 12,700 passengers for each year of the 17 years from 1972 to 1988 to the starting figure of 111,900:

$$\text{1988 traffic} = 111{\cdot}9 + (12{\cdot}7 \times 17) = 327{\cdot}8.$$

Trend projections are simple and easy to use. But they can be used only if the data exhibit some regularity without wide fluctuations. Many air routes, however, do exhibit very pronounced traffic variations, with large jumps in traffic followed inexplicably by sudden slumps. In such conditions, fitting trend lines with an adequately high coefficient of determination may prove difficult. One possible solution is to use moving averages.

Moving average trend

Unusually large variations in the past traffic volumes can be reduced by calculating moving averages and establishing a new time series. This should now contain only the trend component in the traffic and it should be easier to fit a trend line. Using the moving average data for London-Nice (as previously given in column 3 of Table 9.1), the following trend line and forecast were calculated:

$$y = 119{\cdot}9 + 13{\cdot}1t, \qquad R^2 = 0{\cdot}961$$
$$\text{1988 traffic} = 119{\cdot}9 + (13{\cdot}1 \times 16) = 329{\cdot}5.$$

On London-Nice, the use of a moving average trend produces a forecast which is very close to the one based on the unadjusted trend. This is because the London-Nice traffic does not exhibit wide fluctuations and therefore using a moving average trend has relatively little impact. It has been done here only for illustrative purposes.

As a result of using alternative time-series techniques, five different forecasts of the London-Nice passenger traffic in 1988 have been produced. They are summarized in Table 9.2. The difference between the highest and the lowest forecast is around 58,000 passengers a year, equivalent to five round-trip flights a week with an Airbus A320 at about a 65 per cent seat factor. The range is very wide and could play havoc with any airline's strategic fleet planning decisions. Which forecast should the forecasters and planners go for? As a group, the exponential techniques in this particular case produce higher forecasts than the linear trends. This seems to be frequently so in airline forecasts and may be an additional reason why airlines prefer working with exponential rather than linear projections. They prefer to be optimistic in their forecasts.

What did happen on the London-Nice market by 1988? The year-by-year growth after 1983 seems to have been relatively rapid (Table 9.3). Only in 1986, the year of Chernobyl and a poor year in many markets, did traffic growth slow down. By 1988, 392,800 passengers

Table 9.2 Alternative time-series forecasts of London-Nice traffic in 1988

Forecasting method	Number of passengers forecast
Exponential forecasts:	
Average annual rate of growth	362,000
Moving average	384,800
Exponential smoothing (Holt-Winters)	326,200
Linear trend projections:	
Simple trend	327,800
Moving average trend	329,500
Difference between highest and lowest forecast	58,600

Table 9.3 London-Nice traffic, 1983–8

Year	Terminating passengers '000	Annual change %
1983	268.0	
1984	278.1	+3.8
1985	305.6	+9.9
1986	308.7	+1.0
1987	341.4	+10.6
1988	392.8	+15.0

Source: UK Airports: Annual Statements of Movements, Passengers and Cargo (for years 1983–8).

were travelling on the route. Comparison with the summary of forecasts (Table 9.2) suggests that growth in this market is clearly exponential rather than linear. The linear forecasts were much too low, while two of the exponential forecasts, based on the annual or the three-year moving annual rates of growth, were relatively close to the 1988 outcome. The exponential smoothing forecast was not very accurate, but this was no doubt due to the fact that 1983 had been a year of slight decline. Had one used 1982 as the final year, when traffic grew 11. 4 per cent, then an exponentially smoothed forecast, which places greater weight on the most recent years, would have produced a much higher forecast. This suggests that exponential smoothing may be too dependent on what has happened most recently and may distort the longer-term trend. Moreover, this technique, though called *exponential* smoothing, is mathematically more akin to linear forecasting. This may explain its low 1988 forecast.

The London-Nice case study supports the view of many airlines that traffic growth is more likely to be exponential than linear. But there will be routes where linear trend projections may produce more reliable forecasts. In practice, every airline's forecasting group has developed in the light of its own experience a preference for a particular approach to forecasting involving only one or two of the methods proposed above. Few airlines would bother to calculate more than a couple of time-series forecasts.

Throughout the world the majority of airlines use time-series projections as the starting point for their forecasting exercises. They are simple to use provided that adequate statistical information on past traffic flows is available. They require little else. They are also likely to be reasonably accurate for shorter-term forecasts. It is relatively easy to forecast tomorrow's traffic if you know today's, or to forecast next week's traffic if you know the average traffic handled in recent weeks. Beyond 18 months or so, the risk of error with time-series forecasts increases as various external factors begin to impact on demand. Time-series projections allow airlines to make individual forecasts for each route. Annual forecasts can be disaggregated into monthly forecasts reflecting seasonal variations without too much difficulty. Alternatively, time-series forecasts can be built up using monthly rather than annual data.

Although they are widely used, time-series forecasting methods do have a fundamental underlying weakness. They are based on the assumption that traffic growth and development are merely functions of time. As time changes, so does demand. Yet our earlier analysis of demand showed that many factors affect the level of demand, such as the level of trade or of personal income, and that these factors are themselves changing over time. Even if these did not do so, there are numerous supply factors, of which the most critical is the tariff level, which are invariably changing and affecting demand in the process. It is clearly an oversimplification to relate demand purely to changes in time. Time can be only a very poor proxy for a host of other critical variables. The longer ahead the time-series projection, the less likely it is to be accurate, as there is more time and scope for demand to have been influenced by changes in one or more of the many independent variables.

There are two ways in which airline forecasters can try to overcome this underlying weakness. Most airlines start by making time-series projections. They then modify these projections on the basis of market research findings and executive judgement and turn them into forecasts. In this way they can allow for the impact of the expected changes in demand factors and of planned changes in supply which they themselves control. As an alternative, a few airlines, usually larger ones, may try to use causal forecasting techniques, which relate traffic growth not to time but to a series of assumed causal factors.

9.4 Causal models

The underlying principle of all such models is that the demand for passenger transport or for air freight services is related to and affected by one or more economic, social or supply factors. Therefore, the starting point must be to identify and select the factors, known as the independent variables, which must be assessed in order to forecast the dependent variable, which is the level of passenger or possibly freight traffic. The second step is to determine the functional relationship between the dependent variables and the independent variables selected. This means specifying the form of the model to be used. Normally for airline forecasting it will be a regression model. Other model forms such as gravity-type models are used in other areas of transport but less frequently in air transport. The third step in the forecasting process involves the calibration of the model and the testing of the mathematical expression for the relationship between the dependent and the independent variables. Should the tests show that the relationship established through the model is significant and statistically robust then one can move on to the final step. This involves forecasting the independent variables or using other people’s forecasts in order to derive from them the forecasts of air traffic.

9.4.1 REGRESSION MODELS

Most econometric forecasts of air traffic tend to be based on simple or multiple regression models, where traffic is a function of one or more independent variables. The two variables most frequently used are the air fare and some measure of per capita income. Thus, for a route such as London to Nice, one might consider a model of the form:

$$T = f(F, Y, t), \tag{9.1}$$

where T is the annual number of passengers travelling between London and Nice; F is the average fare in real terms; Y is an income measure such as gross domestic product or consumer expenditure per head; and t is some underlying time trend. Fare level, income levels or other economic variables have to be adjusted for inflation and expressed in constant value or real terms. The choice of fare is critical. Ideally only change in the lowest fare should be considered as only this should affect the total market; changes in other fares would affect only the market mix. On many routes it is not as clear-cut as that, since the number of seats for sale at the lowest fare may be strictly limited in number. Many analysts will choose the average yield rather than the lowest fare as the fare variable. Income levels pose the additional problem of identifying those whose income one considers is the variable affecting demand. In the above case, should one use a global figure of UK per capita income and another for French income or should one try to establish the income levels in London and those in Nice? If one adjusts the fare level for inflation, one would have to make adjustments to the fare in French francs for Nice-originating traffic and a different adjustment to express the sterling fare in constant terms. This kind of problem would induce many forecasters to develop two separate directional models for the route based on origin of travel. For London-originating passenger traffic going to Nice the formulation would be

$$T_L = f(F_L, Y_{UK}, t_L), \tag{9.2}$$

where T_L is the London-originating passenger traffic on London-Nice; F_L is the real sterling air fare from London; Y_{UK} is the per capita income in the UK; and t_L is the time trend for London-originating traffic.

In order to convert fares, income or other independent variables into number of passengers, a constant *(K)* has to be incorporated into the equation

$$T_L = Kf(F_L, Y_{UK}, t_L). \tag{9.3}$$

Most airline forecasting models assume that the relationship between the independent variables is multiplicative, that is to say, the effects of each of the variables on traffic tend to multiply rather than to add up. The independent variables must represent quite different influences on demand, otherwise the multiplicative relationship may not apply. Expressing the multiplicative relationship between the dependent and the independent variables in logarithmic form turns the relationship between the logarithms into a linear one:

$$\log T_L = K - a \log F_L + b \log Y_{UK} + c \log t_L + u, \tag{9.4}$$

where u is an error term and a, b and c are model parameters, and the higher their value the more impact changes in the corresponding variables will have on the traffic level.

It is not essential for the model to be log-linear, but many empirical studies of demand have found this to be a useful and relevant form.

Many forecasters may decide to go further and relate the percentage change of traffic from one year to the next to the corresponding percentage change in the independent variables, in this case fare and income. The model is then expressed as follows:

$$\Delta \log T_L = K + a \Delta \log F_L + b \Delta \log Y_{UK} + c \log t_L + u, \qquad (9.5)$$

where Δ log is the logarithm of the percentage change variable in question over the previous year. Effectively *a* and *b* are now the demand or traffic elasticities. The value of *a* is the fare elasticity of UK-originating traffic on the London to Nice route, and *b* is the income elasticity of that traffic. It is through regression models of this kind that the price and income elasticities discussed in the preceding chapter are derived.

Having specified the regression model and the independent variables to be initially included, the model is calibrated to past traffic levels and changes in the independent variables. It is usual for time-series data to be used, that is, past data over a period of time. Less frequently a model may be calibrated using cross-sectional data, that is, data at one point in time but covering many routes. Using an iterative process based on the estimation of ordinary least squares, the regression model establishes the value of the constant term *(K)* and of the coefficients *a*, *b* and *c*.

It is normal for several model formulations to be tested before the independent variables to be used for forecasting are finally selected. While fare and income levels are the most frequently used, many others have also been found to give good results on particular routes or markets. Models for forecasting business travel may well use trade as an index of industrial production instead of income as a variable (CAA, 1989a; BAA, 1981). Models on routes where holiday traffic is dominant may include hotel prices, currency exchange rates or some other variable that is especially relevant to tourism flows. Quality of service variables may also be introduced into the model. The simplest of these is a speed or journey time variable, though a few more complex models have included frequency, load factor or some other service variable (Ippolito, 1981).

Having fitted the data and established the value of the constant *(K)* and of the coefficients, forecasters need to find out how statistically sound their model is. They can use it as a forecasting tool only if they are convinced of the reliability of the relationships the model purports to have established. A number of statistical tests can be used for this purpose. The most straightforward is the coefficient of multiple determination (), which measures the closeness of fit of the time-series data to the regression model. A very close fit will produce a coefficient approaching 1.0, whereas a low coefficient of, say, 0.5 or less would indicate a poor fit. Using time-series data one would ideally expect to obtain a coefficient of 0.9 or more if one wanted to use the model for forecasting with some degree of confidence. The coefficient may also be used to choose between models with different combinations of independent variables.

While the value tells forecasters how well traffic variations fit variations in the independent variable, it does not tell them how traffic is related statistically to each of the independent variables separately. This is done by partial correlation coefficients. These measure how closely traffic is related to any one of the independent variables when all other variables are held constant.

Other tests to establish the validity of the model and the significance of the relationships it purports to measure include Student's *t* test and the *F* statistic. The latter is an alternative to the coefficient of multiple determination and is found by comparing the explained variance of the data with the unexplained variance. It is not the aim of the present book to deal in detail with the conduct and significance of the various statistical tests which can be carried out. These are covered adequately in many statistics textbooks and in one or two specialist air transport texts (Taneja, 1978).

While academic economists have developed quite sophisticated and apparently robust econometric models for forecasting air traffic, airlines tend to use fairly simple models, which often may not be as statistically sound as, in theory, one might wish. One such model was developed in 1977 for forecasting Air Algerie's traffic between Algeria and France. The model took the form

$$\log T = K + a \log GNP + b \log F + C \log S, \tag{9.6}$$

where *T* is the number of passengers carried by Air Algerie between Algiers and Paris; *GNP* is a measure of the combined real GNP of France and Algeria weighted in proportion to the share of Algerians in the total traffic; *F* is the average yield per passenger-kilometre on all Algeria-France routes; *S* is the average speed of all Algeria-France air services.

Effectively the independent variables were income, price and a quality of service variable which was speed. The time series on which the model was based was for the eight years 1968–75. This was rather short, though a similar model for total air traffic between the two countries had a 10-year data base. Using the ordinary least squares method, the coefficient worked out as follows:

$$\begin{array}{l} \log T = 1{\cdot}0963 + 1{\cdot}4476 \log GNP - 1{\cdot}4135 \log F + 0{\cdot}2471 \log S, \\ \qquad\quad (0.7890)\ (8{\cdot}3352) \qquad\qquad (-2{\cdot}3490) \qquad\qquad (0{\cdot}6656) \end{array} \tag{9.7}$$

where the respective Student *t*-values are given in parentheses below the main equation, =0.9732, the standard error is 0.0381, *F*(3.5)=60.60 and the value of the Durbin-Watson statistic is 3.24.

The model established a price elasticity of −1.4 on the Algiers-Paris route and an income elasticity of +1.4. Since the high *t*-test values validated the significance of the coefficients, the model was used to carry out 10-year forecasts to be used for fleet planning purposes.

Whereas the Air Algerie model was used for specific route forecasts, econometric models are used to forecast traffic development in wider markets. For example, the UK Civil Aviation Authority has divided the traffic at the London airports into 11 discrete market segments based on purpose of travel, place of residence of passengers and type of route. Each market segment has its own causal model and its traffic is forecast separately. For instance, leisure traffic by UK residents on the North Atlantic is a function of UK consumer expenditure, North Atlantic fares and tourist ground costs, which are affected by the sterling-dollar exchange rate (CAA, 1989a). The model formulation was:

$$\log UK\text{–}NA\ LS = 0{\cdot}015 + 2{\cdot}12\Delta \log CE - 1{\cdot}03\Delta \log TC - 0{\cdot}2\Delta \log AF, \qquad (9.8)$$

where *UK-NA LS* is leisure passengers between the UK and North America, *CE* is UK consumer expenditure, *TC* is tourist ground costs (as affected by exchange rates, etc.) and *AF* are the air fares. The model suggests that this market is much more elastic to changes in tourist costs, other than transport, (elasticity of −1.03) than to changes in the air fare (elasticity of −0.2). A separate model forecasts leisure traffic from North America to the UK. The model formulation is similar, but US gross national product replaces UK consumer expenditure as the income-related variable. The BAA plc (British Airports Authority) breaks the London airports' markets into more than 30 distinct segments and has developed a different regression model for each (BAA, 1981).

Another example is the Association of European Airlines (AEA), which has developed a series of regression models to forecast air passenger flows between individual countries. After trying alternative formulations using historical data over 20 years, the AEA concluded that airline traffic was best forecast by a multiplicative relationship between the combined gross domestic product of the two countries concerned and the average revenue of the carriers on the route (weighted by the proportion of sales in each country). Both GDP (the proxy for income) and average revenue (the proxy for air fares) are deflated by the private consumption deflators in each country to arrive at real changes in income or fares expressed in constant terms (AEA, 1987).

Very high coefficients of multiple determination are not in themselves a guarantee of causality or even of a close relationship between the independent and the dependent variables. A high coefficient of determination may be produced if the error terms produced by the regression equation fall into a pattern. This is called autocorrelation, and may occur either when a significant independent variable has been left out or when there is a marked cyclical variation in the dependent variable. One can test for autocorrelation using the Durbin-Watson *d* statistic. The values of *d* which will enable one to assess whether autocorrelation is present are related to the number of observations and the number of independent variables. As a general rule, if the Durbin-Watson statistics are below 1.5 or above 2.5 the forecaster will be concerned with the possibility of autocorrelation. The high Durbin-Watson statistic of 3.24 on the Algiers-Paris model (equation 9.7 above) would suggest the existence of negative serial correlation. Another problem which might exist despite high coefficients of determination is that of multicollinearity. This occurs if the independent variables are not statistically independent of each other. For example, air fares and fuel prices may move more or less in unison. Therefore including both as independent variables would result in multicollinearity and would pose difficulties in interpreting the regression coefficients. In particular, they could no longer be strictly considered as elasticities. One can test for multicollinearity by using a matrix showing the correlation between the independent variables. Variables showing a high correlation, say 0.85 or higher, should not really be included in the same model. The possibility of autocorrelation and multicollinearity are two key problems for the airline forecaster using econometric models. There are other more obscure ones, such as heteroscedasticity, which are dealt with in detail in the specialist texts (Taneja, 1978).

Having developed and tested models such as those described above, an airline needs to obtain forecasts of the independent variables used in order to be able to derive from them forecasts of future air traffic. In doing this, particularly for longer-term forecasts, one should not necessarily assume that the elasticities remain constant over time. It is inherent in the way that elasticity is measured that it must change over time as total traffic grows. Because of this, many forecasters build changing elasticities into their predictive processes. Changes in elasticity values can be derived mathematically or they can be assumed. The BAA, for example, in its own forecasts assumes a decline in the income elasticities of most market groups (see Table 8.5).

It is while forecasting the independent variables that some form of sensitivity test may be introduced into the forecasting process. Airlines might consider what would happen to the economy of a particular country and its per capita income if industrial growth did not turn out to be as fast as predicted by the government concerned. Alternatively, they might evaluate the impact of a disruption of oil production in the Middle East on the price of fuel and ultimately on economic growth or on the future level of air fares. These sensitivity tests may produce band forecasts suggesting a range of possible traffic outcomes rather than point forecasts.

For decisions dependent on forecasts over a two-year time span or less, airline managers tend to prefer point rather than band forecasts. Decisions have to be taken and giving a range of forecasts is no help to the decision makers. They want precise traffic estimates. They expect the forecasters to have assessed the risks and the sensitivity of the forecasts to external variables and to have made the point forecasts in the light of such assessment. When it comes to strategic decisions stemming from the airline's corporate plan, band forecasts become useful. They should force the airline to maintain flexibility in its long-term planning decisions. An airline must avoid taking decisions which lock it into a size and level of production which it cannot easily vary. This is particularly true of aircraft purchase or other major investments. Band forecasts emphasize the uncertainty inherent in forecasting.

9.4.2
AIR FREIGHT MODELS

The factors affecting the growth of air freight are complex and often fickle. The tonnage of freight moving on any route is subject to sudden and unexplained variations. There is the added complication that, unlike passengers, who tend to return to their point of origin, freight movements are unidirectional. There is a multitude of commodity freight rates on any route and such rates have also tended to be less stable then passenger fares. Much freight capacity is produced as a byproduct of passenger capacity, and as a consequence there is frequently an overprovision of freight capacity with a strong downward pressure on freight rates. Tariffs charged often bear little relationship to the published tariff, so that even establishing tariff levels is difficult. As a result of all these complexities, it has often been found difficult to relate past freight growth to one or more independent variables, particularly in relation to individual routes, though one of the early studies did develop a model relating freight tonne-kilometres to freight rates, an index of US industriai production and a time trend (Sletmo, 1972).

The few causal freight models which have been developed have tended to be used for forecasting global air freight demand or demand in large markets rather than on individual routes. For example, aircraft manufacturer McDonnell Douglas has produced directional inter-regional air freight forecasts using simple regression models. For instance, in a North Atlantic westbound model, freight tonne-kilometres were found to be positively related to the German mark-US dollar exchange rate and to US real gross domestic product, and negatively related to the real cargo yield (Douglas, 1989).

The International Civil Aviation Organization (ICAO) uses econometric models for its long-term forecasts of the world's scheduled air traffic (ICAO, 1990). Using data for the period 1960–88, ICAO has developed two separate models, one for passenger traffic and one for air freight. The freight model takes the form:

$$\log FTK = 1{\cdot}09 + 1{\cdot}47 \log EXP - 0{\cdot}55 \log FYIELD, \qquad (9.9)$$

where *FTK* is freight (18.7) tonne-kilometres, *EXP* (6.6) is world exports in real terms, *FYIELD* is freight revenue per freight tonne-kilometre in real terms, and figures in brackets are the *t*-statistics and the R^2=0.995.

Most route-by-route forecasts for freight are based on a combination of executive judgement, market research and, where appropriate, time-series projections. Frequently such forecasts are on a commodity-by-commodity basis since the number of separate commodities being freighted by air on any route is usually fairly limited. A few airlines, such as the US cargo carrier Flying Tiger, have tentatively tried to use both time-series projections and regression models, but with uncertain results (Garcia-Fuertes, 1980). In the late 1970s, British Airways also experimented with econometric models for freight flows, but with little success, and subsequently has placed greater emphasis on time-series analysis and on assessing the factors affecting particular commodity flows. The development of causal models of individual commodity flows may ultimately prove more rewarding than attempts to model total freight flows on particular routes.

9.4.3 GRAVITY MODELS

Time-series analyses or regression models are of little use when trying to forecast traffic on new routes, where there are no historic traffic data, or on routes where traffic records are inadequate or non-existent. Traditionally, this problem has been overcome by using a combination of market research or executive judgement. Another possible approach is to use a gravity model. This was the earliest of the causal models developed for traffic forecasting. It has been relatively little used in aviation, even though gravity formulations have played a crucial part in many road traffic forecasting and assignment models.

The gravity model concept has a long history. It was in 1858 that Henry Carey first formulated what has become known as the 'gravity concept of human interaction'. He suggested that social phenomena are based on the same fundamental law as physical phenomena and that 'gravitation is here, as everywhere else in the material world, in the direct ratio of the mass and in the inverse one of the distance' (Carey, 1858). One of the first applications to transport was by Lill (1889), studying movements on the Austrian state railways in 1889. Subsequently the concept was taken over by highway engineers who developed gravity models for forecasting road traffic. The first recorded use for aviation was in 1951, when D'Arcy Harvey, working for the US Civil Aeronautics Administration, developed the gravity concept to evaluate the air traffic flow between two communities (D'Arcy Harvey, 1951).

Translating the concept into aviation terms, one starts with the simple formulation that the air traffic between two points is proportional to the product of their populations and inversely proportional to the distance between them; so that:

$$T_{ij} = K \frac{P_i \ P_j}{D_{ij}}, \tag{9.10}$$

where T_{ij} is the traffic between two towns i and j, K is a constant, P_i and P_j are the populations of the two towns, and D_{ij} is the distance between them.

The top half of the equation, namely the populations, contains the generative variables while the bottom half contains the impedance variables, in this case distance. This is a simple causal model with population size and distance as the independent variables affecting traffic flow. As the concept has been developed, both generative and impedance factors have been modified and the model has become more complex. For instance, the level of air fares has often been considered a better measure of impedance than distance. It has also been thought necessary to modify crude population numbers to take account of purchasing power, nature of economic activity of that population, and so on.

An early study in 1966 involved replacing the population in the interactive formula by the product of the total air traffic of each of the cities concerned (Doganis, 1966). Total airport traffic was thought to provide a good measure of a region's income levels, of the type of economic activities within it and of the effective catchment area of its airport. Using airport traffic obviated the need to incorporate other economic variables into the model. It was also found that raising the distance term to a power other than unity improved the correlation of the model when tested against actual traffic levels. This model took the form:

$$T_{ij} = K \frac{A_i \ A_j}{D_{ij}{}^P} \tag{9.11}$$

where T_{ij}, K and D_{ij} are as before, but A_i and A_j are the total passenger traffics of the two airports at either end of the route and P is distance raised to a power of between 1 and .

Subsequent studies using gravity models to predict traffic on new or potential routes include one in 1981 by the Economist Intelligence Unit for the European Commission. This used such a model to predict air traffic on intra-regional air services in Europe (EIU, 1981). A more recent study, also carried out for the European Commission, involved forecasts of air traffic between airports in the southern regions of the European Community, some of which did not already have direct air links (PCL, 1989). Various model formulations were calibrated on 47 existing air services for 1987. The one which produced the highest correlation of 0.97 took the following form:

$$T_{ij} = K \frac{(A_i \ A_j) \ Q^{3/4}}{F^{1/2}}, \tag{9.12}$$

where K is a constant, A_i and A_j are the scheduled passenger traffics at each of the two airports, $Q^{3/4}$ is a service quality variable raised to the power of three-quarters, and $F^{1/2}$ is the normal economy fare raised to the power of half. The quality of service variable *(Q)* was a measure of equivalent weekly frequencies which makes allowance for intermediate stops and type of aircraft. Whereas a weekly nonstop jet service is given a Q value of 1.0, a one-stop service is valued at 0.5 and a turbo-prop service at 0.7. Services involving two or more en route stops are ignored.

The value of a gravity model approach is its ability to forecast demand on new routes. Thus, using the model just described, it was possible to forecast the passenger demand between two cities such as Venice and Madrid which did not have air services in 1989 by feeding into the equation the projected forecasts of total air traffic for each of these airports in that year, the current economy air fare and the likely types of air services that could be viably provided. The latter is the quality of service variable and involved some iteration to arrive at the optimum combination of traffic and service level. While using airport traffics as one of the generative factors in a gravity model appears to improve the robustness of the model, it has a major disadvantage in that the model cannot be used where there is no existing airport traffic at one or both ends of the route. In such circumstances one has to revert to using population size perhaps weighted by income levels.

9.4.4
ASSESSMENT OF CAUSAL MODELS

The strength of causal forecasting models is that they are logical. They relate demand to changes in factors which one would expect to have an impact on demand. The models chosen must therefore be logical too, despite the findings of any statistical tests. A model with a high coefficient of determination should not be used if the independent variables are intuitively wrong. The forecaster's direct experience of market conditions and knowledge gained through market research can provide an insight into demand behaviour which may ultimately be more useful than that obtained through statistical analysis and mathematical correlation. The models used must be logically consistent. If they are, it follows that, if one can forecast the independent variables for three or more years, then one should be able to derive longer-term traffic forecasts with a lower risk of error than if one were using time-series projections where demand is related purely to changes in time. Herein lies the strength of causal forecasting but also its weakness. For, by using a causal model in the interests of logical consistency and greater accuracy, airline forecasters transpose their problem. Instead of having to forecast air traffic, they must now use someone else's forecasts of the independent variables and, if these are not available, they must make their own. Many governments, central banks and other institutions do make forecasts of gross domestic product, consumer expenditure, trade and other economic indicators which might be used as independent variables. Such economic forecasts are not always reliable, nor are they necessarily long term. Where more than one institution is forecasting a particular variable, the forecasts do not always agree. If the air fare is one of the independent variables used, then this should in theory be easy for an airline to forecast since it is under airline control. In practice it is difficult for the airlines to predict fare levels more than two or three years hence, without getting embroiled in forecasting oil prices or changes in other factors that may affect future fare levels.

Causal techniques pose some further problems too. Like time-series analyses they also depend on the availability of historical data. Clearly, to calibrate regression models in particular one needs not only good air traffic data but also adequate and accurate statistics going back many years of independent variables being used in the model. In most developed countries these should be available. In many Third World countries, adequate data are either unavailable or possibly unreliable. Where data are available, the complexity of the modelling work is daunting and time consuming, especially if an airline wishes to develop separate forecasts for key markets or major routes, each requiring separate models.

It should be borne in mind that econometric forecasting, despite its inherent logic and mathematical complexity, is not a mechanistic exercise. Judgement is involved at all stages, from the model specification to the choice of independent variables, and more especially in the choice between alternative forecasts of those independent variables.

9.5
Choice of forecasting technique

It is clear from the preceding analysis that there is no certainty in forecasting; no forecasting tool that can guarantee the accuracy of its predictions. Even very similar forecasting methods may produce widely diverging forecasts. Whatever the uncertainties, however, airlines cannot avoid making forecasts because so many other decisions stem from them. Their forecasters must make a choice between the numerous forecasting techniques open to them. Several factors will determine that choice.

The starting point is to determine the prime objective of the forecast. Is it to forecast traffic growth; is it to predict the reaction of demand to some new development such as a fare increase or frequency change; or it it to forecast the traffic on a new route? While all techniques enable one to make a forecast of traffic growth under normal conditions, only a few are suitable for forecasting traffic reaction or demand on a new route (Table 9.4). If an airline is planning to open up an entirely new route, it has little choice but to use a qualitative technique or a gravity model.

Having determined the forecasting techniques suitable for the type of forecast being undertaken, then speed and data availability become important criteria. A quick forecast means either executive judgement or a straightforward time-series projection. Data availability is crucial for certain of the techniques. Time-series projections need accurate and detailed traffic data over a reasonable period of time. Regression models need all that but also adequate data on the independent variables included in the model. If either traffic data or data on the various socioeconomic variables are unavailable and unobtainable, then the forecaster is obliged to turn to qualitative methods. Cost may be an important consideration too. Smaller international airlines may not be prepared to meet the high costs of market research, while sophisticated causal forecasting for them would mean using consultants, and consultants do not come cheaply. In fact, many smaller airlines are dependent on aircraft manufacturers for their long-term forecasts.

If speed, data availability and cost are not a constraint, then airlines might choose between the forecasting techniques open to them on the basis of their predictive accuracy. This is a difficult judgement to make. The various techniques are listed in Table 9.4 and their accuracy for short-, medium- and long-term forecasts is indicated on a three-point grading of poor, fair and good. However, the gradings are to a certain extent subjective and influenced by one's personal experience and judgement. Different forecasters would use different gradings. Inevitably most techniques are fairly accurate for

Table 9.4 Attributes of airline passenger forecasting techniques

	Qualitative methods			Time-series projections				Causal models	
	Executive judgement	Market research	Delphi	Annual average growth	Exponential smoothing	Linear trend	Linear trend on moving average	Regression analysis	Gravity model
Accuracy:									
0–6 months	Good	Good	Fair/good	Fair/good	Good	Fair/good	Good	Good	Good
6–24 months	Fair	Good	Fair/good	Poor/fair	Fair/good	Poor/fair	Fair	Fair/good	Fair/good
5 years	Poor	Poor/fair	Fair	Poor	Poor/fair	Poor	Poor/fair	Poor/fair	Poor/fair
Suitability for forecasting:									
Traffic growth	Good	Good	Good	Good	Good	Good	Good	Good	Good

	Qualitative methods			Time-series projections				Causal models	
	Executive judgement	Market research	Delphi	Annual average growth	Exponential smoothing	Linear trend	Linear trend on moving average	Regression analysis	Gravity model
Traffic reaction	Fair	Good	Fair	n.a.	n.a.	n.a.	n.a.	Good	Poor
Traffic new routes	Poor	Fair	Poor	n.a.	n.a	n.a.	n.a.	Fair	Good
Ability to identify turning points	Poor/ fair	Fair/ good	Fair/ good	Poor	Fair	Poor	Poor/ fair	Good	Poor
Ready availability of input data	Good	Poor/ fair	Poor	Good	Good	Good	Good	Poor/ fair	Fair
Days required to produce forecast	1–2	90+	30–180	1–2	1–2	1–2	1–2	30–90	20–60
Cost	Very low	Very high	Moderate	Low	Low	Low	Low	High	High

Note: n.a.=not applicable.

short-term forecasts and some are also reasonable for two-year forecasts. Beyond that time span there is some doubt, but it is likely that qualitative or causal techniques will produce the more accurate forecasts. These techniques are also the most likely to be able to identify and predict turning points in the underlying growth trends. In theory, causal models should produce the better results, but some aviation experts suggest that there is no compelling evidence that econometric techniques produce more accurate air traffic forecasts than do the simpler and more straightforward approaches (de Neufville, 1976).

Within most international airlines a range of forecasting techniques is used. Faced with differing planning requirements, airlines carry out both short- to medium- and longer-term forecasts. The former tend to be based on time-series projections, frequently modified by executive judgement and by market research findings. The precise time-series technique or techniques used by each airline will depend on its experience and the judgement of its forecasters. Where new routes are being evaluated, the airline’s preference may well be to use market research methods to forecast potential demand. For longer-term forecasts beyond a year or two, many smaller airlines continue to use time-series projections, despite doubts about the accuracy of such methods for longer time spans, while some of the larger airlines switch to causal models. Ultimately, so many exogenous and unpredictable factors may affect air transport demand that forecasts beyond 3–5 years ahead must be thought of as being very tentative.

10
Product Planning

10.1
Key product features

As international regulation of air fares, of capacity and of in-flight service has been increasingly relaxed or, in some markets, abandoned altogether, the airline industry has become progressively more competitive. That competition focuses on the products that different airlines offer to their customers. As regulations diminish, then the opportunities for product differentiation widen and airlines have a much greater range of choices open to them. Product planning is deciding what product features to offer in each market segment in which an airline is hoping to sell its services or products. For each airline, product planning is crucial in two respects. First, it provides the key link in matching potential demand for air services with the actual supply of services which it offers in the market it serves. Each airline controls its own supply of services but can influence the demand only through its product planning. Much, therefore, depends on product planning. Secondly, as previously mentioned, product planning has a direct impact on operating costs (sections 6.4–6.6 above).

In deciding what products to offer in the different markets it has entered, an airline has to bear in mind a number of objectives. It must consider its overall marketing strategy, which will have emerged as a result of its demand analyses and forecasts (Chapters 8 and 9 above). It must set out to attract and satisfy potential customers in the different market segments that it has identified. This means using its understanding of the needs and requirements of these different market segments. Such understanding will have been acquired through a range of market research activities, including passenger and other surveys, the monitoring of its own and its competitors' past performance, and so on. Lastly, an airline will want to maximize its revenues and profits, not always in the short term but certainly in the long run. In brief, the ultimate aim of product planning is to attract and hold customers from the market segments that an airline is targeting and to do this profitably.

An airline's potential customers will be influenced by five key product features in making travel decisions and, more importantly, in choosing between airlines:

(1) the costs to them of different airline services, in other words, the fares and fare conditions;
(2) the schedule-based features of the services being offered;
(3) aspects of comfort;
(4) the ease and convenience of gaining access to an airline's services, and
(5) the image which is associated with different airlines or airline products.

An airline must therefore decide how to combine these various product features to meet customer needs in different markets. This is a complex process because customer requirements will vary not only between different market segments on the same route but also between neighbouring routes and geographical areas. For any particular airline product in a given market, different combinations of these five product features can be offered. To a certain extent there may even be a trade-off between them. Greater comfort can be offered, for instance, by reducing the number of seats in an aircraft, but this may necessitate selling at higher fares.

It would seem that the fare level is the most critical product feature for many market segments, especially in many price-sensitive leisure or VFR markets. It may be less important for business markets which are price inelastic, though even here marked fare differentials between airlines may have an impact. Fares are also the most dynamic product feature in that they can be changed almost daily, at least in deregulated markets. Thus the whole question of pricing and revenue generation merits the more detailed examination provided in Chapter 11. If markets are price inelastic or where fares of different carriers are very similar, because of either regulation or competitive pressures, then the other product features become relatively more important in determining the market penetration of different airlines.

10.2
Schedule-based features

From a consumer viewpoint, the critical schedule-based features in any market are the number of frequencies operated, their departure and arrival times, the routings taken and in particular whether flights are direct or involve one or more stops en route. Conversely, aircraft type is not seen as important, though on some short-haul routes a jet may be preferred to a turbo-prop. Different market segments will have differing schedule requirements. Short-haul business markets generally require at least a morning and an early evening flight in each direction on weekdays so as to allow business trips to be completed in a day. Weekend flights may be less important for business travellers but crucial for short-stay weekend holiday markets. Frequency requirements will also vary depending on the type of market, the length of haul and the level of competition. For instance, offering a once-daily service when a competitor has 10 flights a day is unlikely to make much impact on the market.

In the early 1980s, the Scandinavian airline SAS asked its passengers what were the most important factors for them in choosing a flight when making their reservations. More than two-thirds of those surveyed said that departure/arrival times were very important and two-thirds claimed that non-stop direct services were also very important. Other factors were relatively unimportant in travellers' choices. Interestingly, only 3 per cent claimed aircraft type as an important factor in their decision. It was in response to such surveys that SAS effectively grounded their four new A300 Airbuses in 1982 and concentrated on using their smaller DC-9s and later MD 81s and MD 82s with fewer than half the seats of the Airbuses. The smaller aircraft enabled SAS to offer higher frequencies and to operate direct on thinner routes for which the Airbuses would have been too large. Such a marketing strategy led inevitably to very high unit costs (Table 8.1 above). However, by concentrating on schedule-based product features, SAS was able to attract business traffic which was prepared to pay the higher fares that such a strategy necessitated. In fact, SAS claimed that, in 1989, 50 per cent of their intra-European traffic was in business class.

Other surveys all reinforce the importance of schedule-related features. Such features appear to be the core element of the scheduled airline product on short-haul routes and arc probably the most important factor for all business travellers. A 1987 survey by the International Foundation of Airline Passenger Associations of more than 25,000 passengers, most of whom were likely to be business travellers, shows this clearly (Table 10.1). Respondents were asked to identify the three most important features when choosing an airline. Punctuality, convenient schedules and frequency stand out as being by far the most frequently mentioned for shorter sectors of less than 2 hours, with around half of respondents putting it among their list of three. Comfort-based features are much less important on these short sectors. Generally speaking, schedule-based features were more important than comfort for short or medium-haul flights. However, for the longer sectors, comfort-based features, particularly seating comfort and the quality of in-flight service, increase in relative importance and frequency becomes less important. Low fares were also perceived as being of limited importance, reflecting the business nature of much of the travel undertaken by the respondents.

According to this survey, there is no simple worldwide pattern of needs. Passengers' priorities differ from one region of residence to another. North American residents attach unusual importance to pricing, including low fares (moderately important elsewhere), and frequent flyer programmes, which are of little importance in other regions. For European residents the overwhelming importance of schedules, frequency and punctuality for short European flights contrasts with low interest in seating comfort and in-flight service.

The survey summarized in Table 10.1 also highlights the importance of punctuality. Numerous surveys, especially in the United States, have emphasized growing passenger concern with poor on-time performance. It was this which in 1987 induced the then US Transportation Secretary, Elizabeth Dole, to introduce a ruling requiring airlines to submit on-time performance records to operators of computerized reservation systems and travel agents so that they could be seen, if required, by passengers when booking flights. The second leading cause of consumer complaints in the United States was

Table 10.1 Importance of product features in airline choice: survey of 25,000 respondents, 1987

Feature	The three features identified as most important when choosing an airline			
	Under 2-hour flight		2–5 hour flight	
	%	Rank	%	Rank
Schedule-based features:				
Punctuality	54	1	36	4
Convenient schedules	48	2	42	1=
Frequency	45	3	21	6
Aircraft type	9	11=	12	8
Comfort-based features:				
Seating comfort	18	5=	42	1=
Check-in & boarding	15	7	9	9=
In-flight service	12	8=	33	5
Carry-on baggage space	12	8=	6	12
Reassigned seats	9	11=	9	9=
Others:				
Safety and security	33	4	39	3
Low fares	18	5=	15	7
Efficient reservations	12	8=	9	9=

Source: Compiled from IFAPA (1988).

lost or delayed baggage. Here, too, airlines were required to provide comparative statistics on how often they lose, delay or damage baggage. The UK Civil Aviation Authority (CAA) followed the US lead on punctuality but not on baggage, which is less of a problem in European markets. Since 1989, UK airlines have had to submit punctuality data to the CAA on a route-by-route basis for major domestic and international routes. These are then published with some months' delay and, unfortunately, in a form which makes them virtually inaccessible to passengers or travel agents. Analysis of the CAA data up to 1990 showed that punctuality was significantly better on European routes with a high business component, such as LondonZurich, than on neighbouring leisure-dominated routes. Clearly the airlines concerned, notably British Airways, were as a matter of policy giving higher priority to maintaining timetables in business markets.

The main reason why schedule-based features together with the fare are generally the most important product components is that they can be seen and quantified objectively. They are explicit and precise: one can compare one scheduled departure time with another, or the total journey time of a direct as opposed to a one-stop service. By comparison, assessment of comfort, convenience or image-based product features, such as the quality of an airline's in-flight service or of its distribution system, is subjective. Customer perception of these product features will vary for each trip and between different customers on the same trip. They cannot easily be quantified or compared between different airlines.

10.3
The hub-and-spoke concept

As a result of deregulation in the United States, 'hubbing' has been developed by all the major companies as a crucial schedule-based product feature. It has major implications both for airline economics and for competition policy and thus merits more detailed examination.

The concept of hubbing is that flights from different airports which are the spokes of a network arrive at the hub at approximately the same time. The aircraft are then on the ground simultaneously, thereby facilitating interchange of passengers and baggage between aircraft in a short period of time before they depart in quick succession back out along the spokes. This process, which involves a wave or 'bank' of arrivals followed shortly after by a wave of departures, can be described as a complex. The transfer time between flights in the same complex should be close to the best attainable. A US airline with a major hub will operate several complexes during the day. American Airlines schedules about eight complexes daily at Dallas-Fort Worth.

An airline able to develop and operate a hub-and-spoke system with a series of complexes enjoys numerous potential advantages. The increase in city-pair coverage that can be obtained as a result of hubbing is much more dramatic than is often realized. If three point-to-point direct links from cities A to B, C to D and E to F are replaced by six direct services from each of these six airports to a hub at X, the number of city-pair markets that can be served jumps from three to

21. This advantage increases in proportion to the *square* of the number of routes or spokes operated from the hub. Thus, if a hub has *n* spokes, the number of direct links is *n* to which must be added $n(n-1)\div 2$ connecting links. The progressively greater impact of adding more links through a hub can be seen in Table 10.2. It is because of this relationship that British Airways was able to claim in 1990 that by taking a 20 per cent stake in Sabena World Airlines, which would serve 75 European regional cities through a Brussels hub, more than 2,000 city pairs would be linked (BA, 1990). As the table shows, this was an underestimate! The ability to reach a large number of destinations gives the airline operating the hub system considerable market appeal.

A number of further marketing advantages flow from the increase in city pairs served. By channelling what may be a large number of separate but thin city-pair flows onto a service going into the hub, the density of traffic on that particular spoke may be built up sufficiently to allow high-frequency operations. In other words, the additional traffic generated by the connections may allow an airline to operate

Table 10.2 Impact of hubbing on the number of city pairs served

Number of spokes from the hub *n*	Number of markets connected via the hub	Number of direct markets terminating at the hub *n*	Total city pairs served
2	1	2	3
6	15	6	21
10	45	10	55
50	1,225	50	1,275
75	2,775	75	2,850
100	4,950	100	5,050

a larger number of flights. As this will happen on many spokes, the frequencies of possible connecting services via the hub joining two distant spokes, with low traffic between them, increase. Not only does this stimulate traffic but it also inhibits potential competitors from starting a direct service between the two spokes, since they may be unable to compete in terms of frequencies or departure times. The hub operator may also drop its fares on connecting services to undermine any direct competition. It can do this easily by cross-subsidizing this service from other routes where it faces no direct competition. Moreover, where two airports at the periphery of a hub-and-spoke system warrant direct service between them, the hub airline may offer that service to pre-empt a new entrant.

One of the most important benefits to arise from complexed hub-and-spoke operations is the extent to which individual airline networks can become self-sufficient in meeting demand, enabling operators to keep passengers on their own services rather than lose them to interline connections. This has been illustrated clearly since deregulation in the US. Although the proportion of passengers using a transfer connection to accomplish their journey increased only marginally, from 48 per cent in 1978 to 53 per cent in 1984, the proportion of all passengers making an on-line connection with the same carrier rose from 25 per cent to 45 per cent. Conversely, by 1984 the proportion of passengers interlining or changing airlines en route had dropped from 23 per cent to only 8 per cent.

Complexing of flight schedules ensures that the probability of the first outgoing service to any particular destination being by the same airline as the delivering flight is disproportionately high. Interlineable fares therefore no longer become necessary, and, even if a parallel journey from a competitor exists on one leg of a connecting journey, there will now usually be a severe financial penalty for using it. In other words, the hub carrier will offer a lower through fare on its own services than can be obtained by using two separate carriers. The passenger also gains in terms of convenience and reliability from single airline service. The four largest US computer reservation systems (CRS) have supported this trend by giving listing priority to on-line connections over interline ones. Frequent-travel incentive programmes further encourage the use of on-line connections with the same airline rather than interlining onto a different carrier.

The result of all this is to ensure that an important airline at a particular hub in terms of routes and frequencies will become even more dominant in its share of transfer passengers.

Certain pairs of links created by hubbing will generate substantially more traffic than others. Such demand can be stimulated by offering through services. Unlike traditional scheduling methods, whereby aircraft return on the same route from which they originated, they can now proceed on through the hub to the location with which there is most market potential. This is something European airlines rarely do.

While hubbing can be an effective marketing tool it imposes certain cost penalties on the operating airlines. These are largely associated with the extra passenger handling that is involved compared with direct flights. Each passenger making a connection is involved in two boardings and disembarkations, a transfer of baggage at the hub and the use of two or three departure or arrival lounges. The costs of handling must be high. Moreover, the complexing of flights at the hub and the need to transfer passengers and baggage in the shortest possible time create tremendous peak pressure on staff and facilities compared with a normal operation where demand is spread through the day. To meet such peaks of demand, extra staff will be needed and not only additional but also more sophisticated baggage- and passenger-handling equipment and facilities. Hub-and-spoke networks will tend to reduce the average sector distance flown by an airline's aircraft and this will push up the unit costs (section 6.5 above). All direct operating costs will be higher, including airport landing charges since landings will be more frequent. In a European context, where airport charges are especially high, this may be a severe cost penalty. Each passenger has to be transported much further than if they were being flown direct. So this must also push up the costs for connecting passengers. To set against these higher costs, the consolidation of several thin traffic flows into a denser flow along a spoke to a hub offers scope for cost reduction—first, through the use of larger aircraft with lower unit costs, and secondly through the ability to push up the annual utilization, that is the flying hours, of each aircraft. In theory, consolidation of flows should allow airlines to achieve higher seat factors, but there is little evidence of this in the United States.

Consumers clearly benefit from hub-and-spoke systems in that they can fly to many more points with higher frequencies and, where necessary, shorter connecting times than was the case before hubbing became so finely developed. On the other hand, passengers who as a result of hubbing are deprived of direct services which might otherwise be operated are clearly worse off. Their journey times may be longer and their fares higher. There may be other disadvantages too. Hubbing is very dependent on excellent punctuality, and delays anywhere can throw whole ‘complexes’ into disarray, with serious knock-on effects. The short transit time between arriving and departing flights can create havoc in trying to handle large volumes of connecting baggage. It is not surprising that passenger awareness of and concern with punctuality and misdirected baggage has increased significantly in the United States as hubbing has spread.

Once airlines have established dominance at a hub through control of a disproportionate share of the flights offered and traffic uplifted, it is very difficult for another airline to set up a rival hub at the same airport, because it is unlikely to get enough runway slots to offer a similar range of destinations. The hub operator will also control most of the terminal gates. If the new entrant chooses to compete on just a few direct routes from the hub airport, it will face a competitive disadvantage vis-à-vis the hub airline in terms of ensuring adequate feed for its own services. The alternative may be to set up an entirely new hub at a relatively underdeveloped airport, as American Airlines did at Raleigh-Durham in Virginia. Hub dominance, which is becoming more widespread, raises the risk for passengers of abuse of such oligopoly power, particularly in relation to fares.

Significantly, the average fare per mile in 1988 at the eight most concentrated hubs in the United States was higher than the national average. Adjusting for the average trip distance and the size of the market serviced at these eight hubs (where one airline boarded 70 per cent or more of the passengers), fares were on average 18.7 per cent higher than similar markets for other airports. This finding by a US Department of Transportation Task Force supports the conclusion that high hub concentration and market dominance leads to higher fares for passengers travelling to and from such cities on hub-and-spoke networks (Dept. of Transportation, 1990). Control of a hub has increasingly been seen in the US congress as being potentially if not actually anti-competitive. The criteria which have been suggested for assessing monopolistic influence are 40 per cent of emplanements at an airport by a single airline and 60 per cent for two airlines (Avmark, 1989).

The US airlines have appreciated the operational and marketing benefits of hubs and have begun to develop overseas hubs in Europe and Tokyo (section 3.10.5 and Figure 3.1 above). Most European airlines have failed to use their hubs as marketing tools. They have always operated a hub-and-spoke system, because of constraints imposed by bilateral air services agreements, but they have generally not built up a pattern of arriving and departing complexes to take advantage of that system. They have paid lip-service to the concept but have failed to learn from US experience. This can be seen by the lack of effective timetable coordination at their hubs.

On-line schedule coordination can be measured using a connectivity ratio, which shows the degree to which linkages are more than just purely random. It allows for varying volumes of flights operated and different minimum connect times at each of the hubs. A ratio of 1.0 suggests connections are no better than would be expected with a random pattern of schedules. A ratio of 2.0 suggests twice as many connections as would be achieved on this random basis. Among the European majors, Austrian at Vienna, Swissair at Zurich and KLM at Amsterdam stand out as having integrated schedules, with a connectivity ratio around 2.0 (Table 10.3). Conversely, British Airways and Alitalia offer on-line connections that are little more than random overall, while Air France's and Olympic's connections are even worse. These are the airlines that have the greatest need to use their hubs more effectively and to learn from US experience.

US experience shows that an effective future hub must possess three features: a central geographical position in relation to the markets it is to serve; ample runway capacity; and a single terminal building for the hub airline. Strong local demand, although helpful, is less necessary. Complexing of schedules for connection purposes is essential, as it is only by this means that a quality service can be provided in a large number of target markets.

As European air transport is progressively liberalized, will European airlines develop more effective hub-and spoke systems, perhaps using relatively less developed airports such as Brussels or Lyons in France? Two problems may limit the effective spread of hubbing. First, most of scheduled air transport in western Europe involves short sectors of less than 2 hours where having to make an en route connection significantly lengthens the journey time. Moreover, unlike the United States, on many of these sectors high-speed trains will make non-stop air services a competitive requirement. Secondly, the European Commission is likely to be increasingly critical of the potential abuse of dominant airlines at hub airports.

10.4 Comfort-based product features

The schedule-related features of an air service appear to be more important in most markets than comfort-based features, but they cannot be adjusted rapidly. In many cases they cannot be changed at all, either because an airline already has a network and schedules which meet market needs or because of external constraints such as the bilateral air services agreements or an absence of available runway slots. Yet, as markets have become more competitive, the need for product innovation has intensified. Since schedules, in most cases, can be changed only in the medium term, if at all, airline product development has often concentrated on improving comfort-based features, which can be changed more readily and quickly. Three aspects of the airline product are important in determining passenger perceptions of comfort.

Table 10.3 European hub performance, 1989

Airport	Hub airline	Connectivity ratio[a]
Vienna	Austrian	2.2
Amsterdam	KLM	1.9
Zurich	Swissair	1.9
Frankfurt	Lufthansa	1.6
Brussels	Sabena	1.6
Copenhagen	SAS	1.4
Rome	Alitalia	1.2
London-Heathrow	British Airways	1.1
London-Gatwick	British Airways	1.1
Madrid	Iberia	1.0
Paris CDG	Air France	0.9
Athens	Olympic	0.9

Note:
[a] The connectivity ratio is the good connections actually achieved as a ratio of connections possible if all schedules were purely random.
Source: Dennis (1990).

The first is the interior layout and configuration of the aircraft, which affects the width and pitch of each seat and thereby determines the space available for each passenger. Space seems to be the key comfort variable. There is a trade-off between seating density and unit costs in that the more seats that can be put into the aircraft the lower are the operating costs per seat. Thus deciding on seating density has major cost implications (see Table 6.6 above). Other aspects of the interior lay-out which an airline must decide on, since they affect the nature of the product it is offering, include the number of separate classes of cabin and service, the number of toilets, the types of seats installed, interior design and colours used, and so on.

The second important area where decisions have to be made is that of in-flight service and catering standards. This covers the nature and quality of food and beverages provided, the number of cabin staff, the availability and range of newspapers and magazines, in-flight film entertainment, give-aways for first- and business-class passengers as well as for children, and so on. A great deal of effort goes into planning airline meals and meeting target catering standards. Again there are cost implications and as a result the composition of meals is planned down to the precise weight of a pat of butter or the weight of the sauce going on a meat dish. While airlines place much emphasis in their advertising on the quality of their food and wines, there is little evidence that gastronomic preferences determine choice of airline for a journey. However, catering standards together with the quality and attentiveness of the cabin staff may create a certain image for a particular airline which may be important in marketing terms.

Lastly, the services offered to passengers on the ground are a key component of the product. An airline has to consider whether to provide its own check-in and handling staff or to use another airline or handling agent. It must decide what is an acceptable average waiting time for check-in for its passengers, since this will determine how many check-in desks it needs for each flight. More desks cost more money. Then the airline must determine the nature of any special ground facilities for first- and business-class passengers, such as special lounges, office services, car parking valets, or the provision of limousine service to collect and deliver passengers from their homes or offices. Surveys suggest that many business travellers are primarily concerned with speed through the terminal rather than comfort as such. To speed up the check-in process, particularly when baggage is involved, airlines have been experimenting with automated check-in and the ATB (automated ticket and boarding pass) as well as off-airport check-in at hotels (SAS) or railway stations (Lufthansa, British Airways). The ground environment and quality of service provided can have an important influence on a passenger's perception of an airline, but they are inevitably affected by the actions and efficiency of the airport authority. This is why more and more airlines are wanting to operate and possibly own the terminals they use. This is fairly common in the United States but rare elsewhere.

It is primarily in the comfort-based aspects of the airline product that distinctions between the products offered to different classes of service by the same airline become most apparent to passengers. This means that airline product planners have a complex task. They must specify differing comfort-based product features for the different market segments they are trying to attract. Not only may product features have to be varied by class of cabin and type of ticket but the same cabin class may require different product features on different routes or geographical areas. Thus business class in Europe does not have the same product specification as business class on Europe to Asia services. The range of business-class product features found on the London-Far East route in 1989 can be seen in Table 10.4.

Because they can be more easily changed and more readily advertised, comfort-based product features are continuously being monitored and revised. There is a constant requirement to respond to product changes introduced by competitors and an even greater need for an airline to be the first to introduce innovative changes. As international regulations have been relaxed, allowing airlines greater product innovation, one has seen rapid product development. This is clearly illustrated in the development of business class as a distinct third class on long-haul routes. In the early 1980s, business class started as a separate section of the economy cabin for passengers paying full economy fares. Then at a second stage business class was

Table 10.4 London-Far East: business-class product features, May 1989

Airline	Special name	Use airport lounge	Seat pitch (inches)	Width of seat (inches)
European airlines:				
Air France	Le Club	Paris	38	18.5
British Airways	Club World	Yes	40	20.0
Swissair	Business	Zurich	38	18.8
Asian airlines:				
Cathay	Marco Polo	Club members only	38	20
JAL	Executive	No	40	19
Malaysia[a]	Golden Club	Yes (shared)	42 (200)	20.75
			44 (300)	20.25
SIA	Business[b]	Yes	38	20
Thai	Royal Exec.	Yes (shared)	40	21
New entrant:				
Virgin Atlantic	Upper Class	Yes	55	21.5

Notes:
[a] Malaysia Airlines offers different seat pitch on B747 200 and 300 series aircraft.
[b] Changed to Raffles in summer 1990.

given its own cabin but with seating density that was little better than that of economy but with improved catering. The third stage in the product development was the introduction of wider seats with longer seat pitch at a much lower density. In many cases, such as that of Thai International, these were the old first-class seats which were being replaced by sleeperettes. The next stage in the development of the business product is emerging. That is a further upgrading in terms of space per passenger possibly involving the fitting of sleeperette seats in business-class cabins. Virgin Atlantic led the way in 1989 with its so-called Upper Class on services from London to New York and later Tokyo (Table 10.4). Thus, in a period of about 10 years, long-haul business class has gone through four product phases. British Airways meanwhile early in 1990 introduced a fourth class, 'Economy Select', on its flights to Dallas and Houston from London-Gatwick for a trial 8-month period. Passengers paying the full economy fare were being offered their own cabin, separate check-in and better seats than other economy passengers. Would this product innovation succeed and herald the reconfiguration of long-haul aircraft into four distinct cabins?

10.5
Convenience features and the role of CRS

Convenience, as a product feature, is concerned with the ease of customer access to airline reservation and ticketing services and the quality of such services. A key decision area in any airline's marketing is how to distribute and sell its products and, in particular, how far it should use its own shops and sales outlets in addition to independent travel agents. Since airlines must pay commission on sales through agents, they have a vested interest in trying to sell through their own sales outlets or directly over the phone, provided the costs of such sales outlets are less than the commissions they would otherwise have to pay. On the other hand, the major benefit of agents is that they are very numerous and widely scattered giving airlines a much wider distribution network at relatively lower cost than they could achieve themselves.

Part of an airline's product planning is to assess the number, location and nature of its sales outlets as well as other distribution methods, from travelling salesmen, to telephone reservations or automatic self-ticketing. Making a flight enquiry or a reservation and buying a ticket all normally involve personalized contact between the passenger or his representative and the airline. The ease and quality of that interaction, which may involve several contacts for just one air journey, is an important product feature which can directly affect a passenger's perception of an airline. The layout and spaciousness of the sales office, the speed with which people are seen, the availability of open lines to the telephone reservations system, the helpfulness of counter or telephone staff, are some of the convenience-based features which must be carefully planned and for which service targets must be set. As with other product features, there is a service-cost trade-off. As the service level improves, so the costs go up. An airline must find the right balance to meet market requirements and expectations. British Airways, for instance, has 1,000 telephone sales agents in Britain alone, of whom 300 deal exclusively with travel agents while the rest deal with calls from both the public and agents.

Most airline ticket sales are through travel agents. British Airways provides a good example of the importance of agents. In 1990 in the United Kingdom, its home market, British Airways had over 40 travel shops and sales outlets of its own but was dependent on 8,700 travel agents who were either approved by the International Air Transport Association (IATA) or members of the Association of British Travel Agents. These travel agents generated around 70 per cent of the airline's UK sales by revenue, while 25 per cent came from the airline's own outlets and the remaining 5 per cent from sales by other airlines. World wide, close to 80 per cent of British Airways' sales are through travel agents or wholesale tour operators. In the United States, according to the Department of Transportation, 80 per cent of ticket sales for all airlines are by travel agencies.

There can be no doubt that the role of the travel agent in airline distribution is critical. Despite the fact that they have no direct control over travel agents or their staff, airline marketing managers need to ensure two things: first, that agency staff provide an efficient, speedy and reliable service to any potential customer; secondly, that, where alternative airline products are available, agents' sale staff give preference to their own particular airline. They have tried to achieve both these objectives through equipping agents with direct links to their own airline's computer reservation system and through paying commissions to buy agent loyalty. In the United States and a few other markets, airlines have also tried to ensure passenger loyalty through 'frequent-flyer' incentive programmes. Under such schemes passengers are awarded points for each flight on a particular airline. As their points total builds up they are entitled to increasingly attractive free flights or other travel benefits. Free flights will normally be offered only on low load factor services, so the airlines can claim that the cost of their schemes is low. Frequent flyer programmes have been aimed at the full-fare business travellers who generate relatively more airline revenue. Many businesses, however, have begun to appreciate that such schemes have led to higher fares and unnecessary journeys and are beginning to control their employees' travel more tightly.

Deregulation and increasing competition has meant that airlines have had to increase their commission payments to agents to ensure that their tickets were being sold. This is most evident in the US domestic market. In 1978, before deregulation became effective, most of the US domestic trunk carriers were paying out 4–5 per cent of their revenue as commission. By 1988 the average figure was 8–10 per cent, and one or two carriers such as Pan Am were paying well over 10 per cent of their revenue. In some US markets by 1990, airlines were having to pay 20 per cent or more of the ticket price to agents. This was particularly the case for the smaller airlines and for foreign carriers with only a limited marketing base in the United States such as Thai International or Malaysia Airlines. Outside the United States, attempts by IATA and individual airlines to hold commission rates at low and fixed levels were gradually being eroded in many markets. The higher commission rates arise from the incentives offered by airlines to agents to book passengers on their flights rather than the competitors'. A major incentive is the override commission. This enables an agency to claim a higher commission rate than the normal when it gives an airline a higher share of its ticket sales or surpasses certain agreed sales targets. Through their extra override commissions, airlines try to tie agents into selling primarily or exclusively their tickets.

The other way of tying agents in is by offering to install the airline's own computer reservation system (CRS) in the agents' outlets and shops. Each airline owning a CRS encourages agencies, through free installation and other incentives, to install its system since its share of tickets sold is normally higher when an agent is using its CRS. Numerous studies show a strong association between agents' CRS affiliation and the share of bookings on the airline owning the system (Dept. of Transportation, 1990). There are several reasons for this 'halo' effect. Travel agents often have more confidence in the accuracy of information on the airline owning the CRS than in the information on other airlines also shown on the same computer. Some agents also claim that all reservation and ticketing functions can be completed more rapidly for flights of the CRS vendor airline than for other airlines. In addition, the on-going business relationship between the agent and the vendor airline itself creates loyalty. Since most agents are reluctant to have several computer systems installed, the airline which gets its CRS into an agent first clearly enjoys a privileged position. The halo effect can be seen in the fact that between 1980 and 1986 the domestic passenger load factors on both American Airlines and United, which own the two largest CRSs, were consistently above the industry average in the United States. This cannot have been due just to superior marketing and service.

The advantage enjoyed by the airline offering the CRS has been reinforced in the past by bias in the way airline schedules were displayed. US experience suggested that 80 per cent of bookings were made from flights shown on the first page of the computer screen and 50 per cent from the first two lines. Host airlines therefore manipulated their listing criteria so as to ensure that their own flights appeared at the top of the first computer page. For instance, a Galileo executive complained at the end of 1987 that British Airways' Los Angeles-London flights appeared on page 11 of the Sabre CRS display of direct services between the two cities (Gallacher, 1988). The way that bias was introduced into data presentation has been documented elsewhere (e.g. AAE, 1987; Lyle, 1988; Whitaker, 1988). In the United States, rules to eliminate anti-competitive bias in screen displays, introduced in 1984 by the Department of Transportation, were not wholly successful. They were due to expire at the end of 1990 and were being reviewed. In Europe in 1989 both the European Civil Aviation Conference, covering 23 states, and the European Commission introduced tougher codes of conduct for any CRS operating within their member states (see section 4.3.6). The Commission also took action under Article 86 of the Treaty of Rome to ensure that Sabena and later KLM listed smaller airlines, previously refused access, in their reservation systems.

Through government intervention and self-restraint, the issues of display bias and of ensuring equal and fair access to any CRS by all airlines are being resolved. Other problem areas remain, however. One is how to deal with the 'halo' effect; that is, how to avoid the unfair advantage in bookings through travel agents enjoyed by the airlines which own the CRS used by the agents. Another is the high fees charged by CRS owners for bookings made on other airlines' flights.

Profits earned by CRS owners have been excessively high. In 1986, American Airline's Sabre CRS produced a profit of $178 million out of a total revenue of $372 million, while United's Apollo system generated $136 million profit from revenues of $318 million. The smaller systems, apart from Datas II, were also highly profitable. In most cases, airlines owning a CRS made relatively higher profits from their investments in these systems than from their airline investments. Moreover, control of a CRS enabled their owners to survive the period of mergers and consolidations which beset US airlines in the second half of the 1980s. Airlines in the United States without their own CRS were in an impossible situation. To gain access to the markets and the agents they had to join the existing CRS, but in doing so they merely generated additional CRS profits for their competitors. Smaller airlines could not afford to set up their own systems both because of the cost, running into several hundred million dollars, and because of the difficulty of getting any new system installed in travel agencies that already had one of the existing CRSs.

Certainly in the United States, airline bookings were dominated by two major systems, Sabre and Apollo (Table 10.5). The dominance of these systems appeared to be creating a CRS oligopoly. This was highlighted early in 1989 when Delta Airlines announced a merger between its own Datas II computer reservation system and the Sabre system. The new system would have controlled close to 50 per cent of the market (Table 10.5). This was too much for the Department of Justice, which threatened to try to block such a deal on anti-trust grounds. The deal collapsed, but a year later in 1990 a merger between the two smallest US reservation systems, Datas II and Pars, created a new system called Worldspan. This time there was no opposition from the Justice Department.

The marketing power of the larger CRSs can be gauged not only by their market share in the United States but also by the number of outlets linked into their systems. In 1990 Sabre had 13,000 United States outlets and 1,900 international outlets. Covia's corresponding figures were 9,750 and 1,125; Worldspan's 11,000 and 1,350, and SystemOne's 6,900 and 790. The European and Asian CRS, which began to come on line in 1990, had many fewer total outlets by comparison, though their international outlets were more comparable.

The huge marketing power of the super CRSs, the undue sales benefits they appear to bestow on their airline owners through the 'halo' effect, their high profits and the potential risk of bias in their schedule displays led to mounting calls for airlines to disinvest themselves from their CRS. For instance, in the UK the House of Commons Select Committee on Transport published a report in 1988 claiming that airline ownership of CRSs was against the public interest and was open to abuse (HMSO, 1988). It recommended that a long-term solution through airline divestiture of CRS should be explored, that in the meantime ownership of each individual CRS should be spread among more airlines and that CRSs should be restructured as separate companies with shares available for sale. Since 1988 two parallel developments have gone some way to meeting the Select Committee's recommendations and in the process have reduced the risks of abuse of dominant power by airlines' CRSs. The first is the trend towards multiple ownership. The second is the loosening of links between CRSs and their airline owners.

Table 10.5 Market share of US computer reservation systems, 1988

CRS	Airline owners (1989)	Share of bookings in US (1988) %
Sabre	American	43.1
Apollo	United (50%)	27.9
(Covia)	US Air	
	BA	
	KLM	
	Swissair	
	Alitalia	
SystemOne	Texas Air	13.9
Pars	TWA	9.4
	Northwest	
Datas II	Delta	5.7
		100.0

Source: US Department of Transportation.

Multiple ownership has come about because the very high investment costs of setting up a new large CRS in the late 1980s could not be financed by individual airlines. They had to group together both to share the costs and to share their existing sales outlets in order to get the sufficiently wide distribution system needed to justify the initial investment. European airlines set out to create a single CRS but failed, and two parallel systems, Amadeus and Galileo, were set up in 1987, owned by two groups of airlines. Subsequently other multi-carrier groupings emerged in other parts of the world, such as Abacus in South East Asia. To develop rapidly and catch up with the five US systems these new CRSs needed partnership deals and technological knowhow from the Americans. Many linkages emerged. By the end of 1987, Galileo, owned by nine European airlines, granted Covia, United Airlines' CRS, an equity stake. Subsequently, the four major Galileo partners—British Airways, KLM, Swissair and Alitalia—bought a 38.7 per cent share in Covia, while US Air took 11.3 per cent and Air Canada 1 per cent. In turn by 1990 Covia became a 30 per cent partner in Gemini, the CRS being developed by the two Canadian airlines, while Galileo was involved in setting up a CRS for Arab airlines. Amadeus, the other European CRS owned by four major carriers but with nearly 15 other partners, has been having its software developed by Texas Air's SystemOne and had a partnership agreement with the Abacus CRS, which is owned by five East Asian airlines. Abacus in turn is a partner in Infini, All Nippon Airways' own reservation system. As previously mentioned, the merging of Datas II and Pars into Worldspan in 1990 created a CRS jointly owned by three airlines—Delta (40 per cent), Northwest (33.3 per cent) and TWA (26.7 per cent). Abacus was expected to take a 5 per cent share in Worldspan too. During the 1990s such linkages and cross-shareholdings will multiply. This will make bias towards one airline increasingly difficult, especially as the major CRSs will all be listing each other's airlines as well as their own.

A new technical development has also helped in the elimination of bias. The Datas II-Pars merger into Worldspan in 1990 was allowed by the US Justice Department because the partners involved planned to develop an entirely new and independent 'no host' CRS, the first in the United States. This is a CRS which is separate from an owner airline's own internal reservation system and does not give the owner airline any preferential treatment. As a result, an agent using the system can be assured of the same level of reliability and accuracy for all participating airlines and equal treatment by them all, since the CRS in no way favours the owner airline. This should remove the causes of the 'halo' effect (Simpson, 1990). The 'no host' technology had already been adopted by both Galileo and Amadeus. Other CRSs were likely to follow suit.

Their size and multiple ownership, together with complex agreements to supply technology to each other, have all tended to push CRS companies to become increasingly independent of their airline owners and to operate as businesses in their own right. Early in 1990, Texas Air sold 50 per cent of SystemOne to Electronic Data Systems of General Motors, the first major non-airline involvement in CRS. The high rates of return and their excellent long-term prospects will inevitably attract further external investment into airline CRSs.

Airline marketing managers must appreciate that CRSs are much more than a worldwide distribution system through which they can give travel agents and potential customers access to flight information, instant reservation and ticketing. The systems enable airlines to monitor and control sales in real time so as to improve passenger and freight yields. They provide subscribers with information and booking facilities for hotels, car hire, theatres, restaurants and other entertainments, as well as details of passport, visa and health requirements in different countries. In addition, for the airline partners they provide an invaluable database on their customers—when and where they bought their tickets, the fare they paid, where they live, their credit cards, smoking habits, seat preferences, travel patterns, and so on. All these data, broken down and analysed by market segments and route, can provide a crucial input into an airline's marketing and product planning. No international airline can afford to remain aloof from a large CRS serving its markets unless possibly it is a small niche carrier.

It is going to be critical for airlines not only to join global or regional computer reservation systems but also to make optimum use of the database CRS can provide in order to maximize their revenues and improve their marketing. Airlines that fail to do this in the years ahead will find themselves losing the competitive battle.

10.6
Airline image

The final group of product features are those associated with the image that an airline wishes to create, both among its own customers and among the public at large. This is done in a variety of ways: through the nature of its advertising and promotions, through the airline's logo, its colour schemes, and the design of its aircraft interiors, sales offices and airport lounges, and through the quality of service provided by its staff in the air and on the ground. The success of SIA's 'Singapore Girl' advertising campaigns during the 1980s created the image not only of helpful, smiling, attentive cabin staff but also of an airline that took care of its passengers. This image was an important factor in enabling SIA to maintain unusually high passenger load factors throughout the period. A key element in image building is to ensure that what is promised before the flight actually materializes and meets passenger expectations when the flight takes place. This is why marketing and product planning must be all-embracing, covering what is produced and how it is produced as well as how it is sold.

As markets have become more competitive, a number of airlines have introduced the concept of 'branding' to try to differentiate their products from other airlines' products selling at the same fares. The first step in this process on international flights was seen in the mid-1980s when airlines began to give their business class distinctive names, even though the product offered in terms of space and comfort was broadly similar. Some examples are shown in Table 10.4 above. Then in 1988 British Airways set up brand teams to develop and launch two distinct products, Club Europe and Club World for the European and long-haul business traveller. The aim was to plan and produce two separate products, each of which would have the same distinctive British Airways product features and quality on whichever route or geographical area they were being offered. These product features would differentiate Club Europe and Club World from other airlines' business class by creating a distinct image and product. British Airways claimed this policy was highly successful. Passenger numbers in Club World increased by 27 per cent in the first two years after its introduction. On a number of routes, notably on the North Atlantic, where Club World passenger load factors regularly exceeded 80 per cent, British Airways was forced to increase capacity in response to demand. In some markets the airline was able to charge a premium over the normal business-class fare for its own distinctive product. As international regulations on fares and capacity decrease further, then branding will increasingly become an important competitive tool affecting an airline's market image.

11
Pricing Policies and Fare Structures

11.1
Objectives of airline pricing policy

Pricing is a crucial element in airline management. It is the mechanism whereby the demand for air services is matched with the supply. The airline's primary aim must be to sell the capacity it is prepared and able to offer at prices which will generate sufficient demand to ensure an adequate level of profit. A great deal hinges on what each airline considers an adequate profit. For some state-owned airlines, it may mean little more than breaking even. For others, it may be measured in terms of an adequate rate of return to shareholders or a target rate of return on the value of the assets employed. Some airlines may go further and set out not only to produce a target rate of return on their current assets but also to generate an adequate reserve fund to self-finance, as far as possible, the acquisition of new assets. Singapore Airlines appears in recent years to have followed this last objective. Thus even the profit objective in airline pricing may have different implications for different airlines. There is also a temporal dimension to the profit objective. While some airlines may be concerned more with current profits, others may place the emphasis on longer-term profitability. They may be prepared to forgo profits in the short term to ensure their longer-term objective.

International airlines will normally have a clear profit objective, but it will be only one of a number of corporate objectives. These other objectives may also impinge on pricing policy. Expansion into new routes and new markets figures large in many airlines' corporate objectives. Expansion may be an objective in its own right or the ultimate aim may be rapid growth or the attainment of a particular size of operation. Many airlines want to be big! There may be cost advantages from growth, but ultimately the purpose of growth seems to be more akin to a revenue-maximizing objective. If development of new markets or rapid growth are objectives of an airline's pricing policy, then the pricing strategies it adopts must be coloured by this fact. We have already seen in discussing the impact of deregulation (section 3.10.2 and Table 3.1 above) how new entrants, such as

Braniff, moving into markets with established carriers, have tried to capture market share by offering lower tariffs.

The adverse cost impact of large seasonal or even daily variations in demand may induce airlines to use the pricing mechanism as a way of evening out those fluctuations. This might be done by using high tariffs to restrain peak demand and lower tariffs to stimulate off-peak traffic. Such a policy may adversely affect the total revenue generated compared with a policy of expanding the supply of services at the peak periods. However, revenue maximization may be less important in the short term than reducing unit costs through a reduction in the peakiness of demand and hence of supply.

Pricing has a further role. It should in theory be a guide to new investment. Where the number of consumers who are prepared to pay the full cost, including a reasonable profit, of the goods or services they consume exceeds the supply, then the producers have a clear indication that, if they can supply more at the same or a lower price, demand will be sufficient to generate further profits. Conversely, if consumers in total do not generate sufficient revenue to cover the full costs of particular services, then it would be foolhardy to invest in the expansion of such services. If pricing is to be used as a guide to further investment, then the prices of different services should reflect their costs of production. If not, demand may be artificially high or it may be suppressed. On two or three occasions very low tariffs on the North Atlantic, as in 1978–9, generated a surge in demand which pushed up load factors to high levels. Many airlines misread the signs and increased the capacity on offer. This was a recipe for financial suicide. The low tariffs were feasible only if mixed with a certain proportion of high-fare business and first-class traffic. Putting on extra services to cater exclusively for the low-yield traffic was ruinous since the revenue generated was insufficient to cover the costs. The pricing mechanism as a guide to further investment must be used with care.

In short, few international airlines have a single overriding objective in their pricing policy, though the attainment of profitability looms large, especially for privately owned airlines. Most want their pricing policy to achieve a number of internal objectives. But they may also have externally imposed objectives. Some national airlines are required by their governments to stimulate incoming tourism. This may well require a low-fare policy irrespective of its repercussions on the financial fortunes of the airline itself. The attempt to attain different pricing objectives simultaneously may produce conflicts and contradictions in pricing policy. Such conflicts and complexities in pricing are further increased because the same airline may be pursuing different objectives on different parts of its network. It may be trying to maximize profits on some routes, especially those in which there is little or no tariff competition, while on other routes its prime objective may be increasing its market share or its rate of growth. Inevitably within any airline different pricing objectives will prevail at different times and in different parts of their operations.

11.2
The inherent instability of airline tariffs

Profitability, which appears to be an important objective for most airlines, depends on the interplay of three variables: the unit costs, the unit revenues or yields, and the load factors achieved. Airline managers must juggle with all three to produce a profitable combination. This is a dynamic and interactive process made more difficult by the pricing instability inherent in the airline industry. The industry is characterized by short-run marginal costs which are close to zero. The marginal cost of carrying an extra passenger on a flight which is due to leave with empty seats is no more than the cost of an additional meal, an airport passenger charge and a few pounds of fuel burnt as a result of the extra weight. The problem is that, even when operating with high load factors of 70 per cent or more, there will be many empty seats. These cannot be stored or sold later. If they are not sold at the moment of production, the seats and the seat-kilometres generated are lost forever. The same considerations apply to unsold freight capacity. An airline committed to operate a published schedule of services for a particular season or a tour operator committed to a series of charter flights find that their short-run total costs are fixed and cannot be varied. Therefore it makes business sense to try to maximize revenues. Having sold as much capacity as possible at normal tariffs, the airline or tour operator is tempted to sell any remaining empty seats at virtually any price above the very low marginal cost of carrying the additional passengers.

The problem is to prevent slippage or diversion of traffic prepared to pay the normal tariffs into the low tariffs. If that happens then the total revenue generated may decline. In markets where tariffs are regulated and enforced, diversion is prevented or minimized by the conditions (the so-called 'fences') which circumscribe the availability of the very low tariffs (see section 11.6 below). In markets where tariffs are not regulated or, if regulated, are not enforced, the low marginal cost of carrying an additional passenger (or freight consignment) has a strong downward pressure on all tariffs, including the normal economy, business or first-class fares. The inherent instability in such markets is made much worse if there are no controls on capacity or if the entry of new carriers is easy. It is in conditions of over-capacity that airlines are most likely to resort to marginal cost pricing. After the total deregulation of the US domestic system, the relationship between costs and tariffs in the early 1980s largely disap-peared. Tariffs were determined by competitive factors, and on many routes tariffs approached long-run marginal costs while on others only short-run marginal costs had any relevance to pricing. Since short-run marginal costs were close to zero and long-run marginal costs were below average costs, losses and airline collapses and mergers ensued until a more oligopolistic and less competitive market structure emerged.

In less regulated international markets, the price instability is aggravated by a number of additional factors. One of these has already been mentioned and that is the tendency of new entrants in established markets to try to capture market share by undercutting existing tariffs. For instance, when All Nippon Airways launched its transpacific services in July 1986 it cut the minimum selling price for Tokyo-Los Angeles by $100 from $550 to $450. The most significant factor and the most widespread, even affecting regulated markets, is the availability of sixth freedom capacity. While the point-to-point, third and fourth freedom carriers on a route may be trying to maintain an adequate mix and level of different tariffs, sixth freedom carriers operating via their own home base may be prepared to charge almost anything to fill empty seats with traffic that they would otherwise not have had. The sixth freedom operators' tariffs will be particularly low if they want to compensate passengers for having to stop over for a night en route to their destination. In 1990, the lowest fares between the UK and South East Asia were with Aeroflot via Moscow or JAT via Belgrade, while, between London and Bangkok Biman Bangladesh Airlines was the cheapest. If such sixth freedom carriers begin to capture significant market shares, the direct carriers must react by reducing their own fares. When the sixth freedom operator is also a new entrant into that market anxious to capture some market share, then fares are likely to plummet. In 1987, Malaysia Airlines started its services across the Pacific to Los Angeles. A few months later in February 1988 it was the price leader on the Pacific as it struggled to establish itself. It offered travel agents return tickets Los Angeles-Bangkok via Kuala Lumpur at a net selling price of only $520. Korean, another sixth freedom operator on the same route, had a minimum price of $650–750, while Thai International, the established third/fourth freedom operator, was selling at no less than $800. In most long-haul international markets a great amount of spare sixth freedom and sometimes fifth freedom capacity is slushing around and depressing tariffs. On some routes there may be the additional problem of the marginal carrier, that is the airline for which the route is marginal to its total operation. It may therefore be unconcerned by low fares on the route, particularly if it sees them as a way of attracting traffic onto the rest of its network. This has certainly happened with new entrants on the North Atlantic or the transpacific routes.

On other routes, price instability may be increased by the actions of financially weak or subsidized carriers. Surprisingly it is the weak or loss-making airlines which drop their prices most in competitive markets in order to generate sufficient cash flow to meet their day-to-day payments. During the 1980s, Garuda, Indonesian and Philippine Airlines offered the biggest discounts on services to South East Asia as they were losing money and became desperate to improve their cash flow. In 1986, People Express, as it struggled to survive, slashed its fares, offering the first 30 seats sold on its London-New York services for $99 and the next 70 seats for $149. Despite these efforts, it virtually collapsed later in the year. Some national airlines may continue operating on certain routes at yields and load factors which are uneconomic because of their ability to rely on subsidies to cover their losses. In the process, however, they depress the market for other carriers. Lastly, the tendency for airlines to sell seats en bloc or on a part-charter basis to tour operators or travel agents reduces the airlines' ability to control the tariffs at which those seats will ultimately be sold to the public.

The low marginal cost of carrying additional traffic, together with the other factors discussed which undermine price stability, mean that international airlines often have a strong incentive to reduce tariffs or introduce illegal discounts. The characteristics of international airline operations are such that tariffs are not enforceable unless the airlines themselves decide to enforce them. Even government controls are ineffective without airline acquiescence, since airlines can find countless ways in which to circumvent regulatory tariff restrictions. Without airline self-control and enforcement of tariffs and tariff conditions, the inherent instability of air transport markets may well push tariffs to levels at which no operator can make a profit except for short periods. It is this fear above all else that pushes airlines to try to reach agreement between themselves on tariffs and on enforcement. A striking example has been the yield improvement programmes instituted by the Orient Airlines Association, several of whose member airlines have been standard-bearers of deregulation and critics of the International Air Transport Association (IATA). Yet they continue to come together periodically to establish minimum selling prices or maximum discounts on air services between their countries.

11.3 Alternative pricing strategies

In developing their pricing strategies, international airlines must bear in mind both their pricing objectives and the inherent instability of airline tariffs. Broadly speaking, two alternative strategies are open to them. The first is to relate each tariff to the costs incurred in providing the services used by those paying that tariff. This is 'cost of service' pricing, more frequently referred to as cost-related pricing. The alternative is to base tariffs for different categories of service not on costs but on what consumers are able and willing to pay. This is market pricing or demand-related pricing, though in more traditional textbooks the concept has been called 'charging what the traffic will bear'.

During the last decade several regulatory authorities and European governments (CEC, 1981) or the Commission of the European Communities (CEC, 1984) argued most strongly in favour of cost-related pricing. The UK Civil Aviation Authority as long ago as 1977 outlined the fundamental principles to be pursued in developing airline pricing policies (CAA, 1977c). It suggested that 'charges… should be at the lowest level which will cover the costs of efficient operators, including an adequate return on capital; each charge should be related to costs, and that tariff provisions should be rational, simple and enforceable…'.

The arguments in favour of cost-related pricing hinge on the twin issues of equity and economic efficiency. It is considered inequitable that some consumers of air services should be charged more than the cost of providing those services either to generate excess profits or in order to cross-subsidize consumers who are paying less than the full cost of the services they consume. From this point of view, the 50 per cent discount for children under the age of 12 is clearly inequitable. It does not cost less to carry a child than an adult and, by charging children only 50 per cent of the fare, other adults have to pay more to compensate for the revenue loss. If tariffs are not cost related then they may well be discriminatory. That means that certain consumers will be discriminated against not on the basis of costs they impose but on the basis of their age, or their marital status, or for instance, because they want to spend fewer than six nights at their destination.

There are efficiency implications as well. If prices are above cost for some services, then demand for those services will be suppressed even though it would be profitable to supply that demand at prices that were cost related. Conversely, prices below cost may generate excess demand for particular services and induce airlines to expand such services even though consumers are not meeting their full costs. This would clearly be a misallocation of resources. Unless tariffs are cost related, inefficient, high-cost airlines will continue to operate, protected by high tariffs. Consumers are thereby denied access to lower-cost facilities. In reasonably competitive markets where there are several existing airlines or potential new entrants, tariffs for different services will tend to the level of the most efficient operator, as happens in the European charter market. In markets where there is no price competition or ease of entry for new carriers, there are no competitive forces to push tariffs to the level of the lowest-cost operator. Tariffs will be agreed bilaterally or through IATA and will represent a compromise between the pricing strategies of the carriers on the route, each with different cost levels. There may also be a tendency to charge what are effectively monopoly prices for certain inelastic market segments. Market forces cannot ensure that tariffs reflect the costs of the most efficient suppliers. Regulatory authorities and other bodies, such as consumer associations, have argued that it is primarily in regulated markets that cost-related pricing is needed to ensure equity and that tariffs reflect the costs of efficient suppliers. Cost-related pricing is supported both on social grounds in order to reduce discrimination between consumers and on economic grounds in the belief that it creates pressures towards improved airline efficiency and a sounder allocation of productive resources.

On the other hand, several arguments can be put forward against the principle of cost pricing. The first of these is that there is no satisfactory way for transport industries to allocate costs to particular users because of the incidence of joint costs and of the high proportion of fixed costs that have to be allocated arbitrarily. Joint costs arise when in producing one service another is inadvertently provided. A daily scheduled flight aimed at a business market produces freight capacity whether or not there is a demand for freight services. Its operations will also inevitably result in vacant seats which might be sold off to meet tourism demand. How is one to allocate the costs of that flight between business passengers who were the prime objective in setting up the flight, and freight or holiday travellers? Any allocation of joint costs must have an element of arbitrariness in it. The same applies to certain fixed direct operating costs and to indirect costs. In practice, many but not all of the problems of airline cost allocation can be overcome, as shown earlier (section 5.5). But some arbitrariness remains and it is argued that many airlines end up calculating what is more akin to an average cost for all users rather than a separate cost specific to different categories of users.

Another argument against cost-related pricing is that on some routes such a pricing strategy would not generate sufficient revenue to cover costs and would therefore fail to ensure the continued operation of services. On a simple route with one fare and one class of service, a cost-related fare may not generate sufficient demand to ensure profitability. On the other hand, if two market segments with different price elasticities can be identified, then the airline concerned may generate higher revenue by charging two separate fares to the two market groups even though there may be no difference in the cost of transporting them. Without discriminatory but market-related tariffs the services might be abandoned and all consumers would be worse off. Such a case was illustrated in section 8.8 when discussing the concept of price elasticity.

Lastly, attempting to improve efficiency by setting tariffs at the levels of the lowest-cost operator may be meaningless in international air transport. Most air routes are dominated by the third and fourth freedom carriers of the two countries at either end of the route. These airlines may have quite different costs for reasons quite unconnected with questions of efficiency. The prevailing wage levels in each country may be different, as may the price of fuel or other factor inputs. Exchange rate movements may also have an adverse impact on one airline’s costs. Cost-related pricing would produce a different set of tariffs for each airline, yet the lower tariffs may not necessarily be those of the most efficient carrier in terms of the resources used.

From an airline viewpoint, demand-related pricing strategies make much more sense. A scheduled airline that is committed to a published timetable of flights and has brought together the productive resources to operate that timetable finds that its short-run total costs are more or less fixed. In those circumstances it needs the freedom to price its services in such a way as to be able to generate sufficient revenues to cover its costs. This may mean charging more than cost to price-inelastic segments of the market and less than cost to elastic market segments. In competitive conditions, competition between carriers will ensure that market-related pricing is not abused to produce excessive profit for the airline. Where effective competition does not exist, then there may well be a danger of excessive profits being made through discriminatory pricing with or without some capacity control. Government intervention to monitor costs, tariffs and airline profits may be necessary to prevent this happening, though there must be some doubt about how effective government intervention can be. Some deregulation of tariffs and capacity controls would be the most effective way of minimizing the likelihood of excessive profits. Meanwhile, airlines can argue that they should have the freedom to offer a range of services at a range of prices which meet some or all segments of demand in a way which ensures the continued supply of such services whether or not individual prices are cost related.

While in the short term a strategy of market-oriented tariffs makes sense as a way of maximizing revenues, it does not in itself guarantee profitability, especially in price competitive markets. Because of the inherent instability in airline tariffs owing to very low short-run marginal costs, market-related tariffs may reach such low levels that the total revenue generated is insufficient to cover total costs. This is particularly so if extra capacity is provided to cater for the demand generated by the low tariffs. While revenue maximizing might be a short-term pricing objective, in the longer term airlines are likely to adopt a profit-generating or loss-minimizing objective.

In order to achieve such objectives through their pricing strategies, airlines must be in a position to do three things. First, they must, in each of their markets, have a fundamental understanding of the different market segments and of their requirements as discussed earlier in Chapter 8 (section 8.5). Secondly, they must ensure that each separate category of traffic they carry, whether passengers or freight, covers where possible the costs which it imposes on the airline. This, together with the need to evaluate the feasibility of aircraft investments, of new routes and of different products, pushes airlines to consider carefully the costs of the different services they provide. Whatever pricing strategy they are forced to adopt by the market conditions on each route, the starting point for their pricing procedures should be and normally is an evaluation of the costs of the different services they provide. Understanding the relationship between pricing and costs is fundamental to effective airline management and this is discussed in the next section. Lastly, because in many markets airlines will decide or will be forced to introduce fares which are market related rather than cost based, they must introduce effective yield management in order to ensure that they maximize their revenues. In brief, the key to successful revenue generation is market knowledge, cost awareness and yield management.

11.4
Setting passenger tariffs

The starting point for any price-setting exercise is the costing of a particular route or flight. In allocating costs to routes, airlines have to make some arbitrary decisions, particularly with regard to the allocation of certain overhead and fixed costs. Studies of European and other international airlines have indicated that there tends to be considerable uniformity in the allocation methods used and these have been discussed in section 5.5. Where there are marked divergences in the allocative process they tend to be in smaller cost items which have a relatively minor impact on the total route costs. Three major cost categories need to be identified. The first are the costs which are directly attributable to each route, that is, those costs which were previously described in Table 5.3 as the variable direct operating costs. They are the costs which would be escaped if a particular service or route was not operated at all. They include fuel costs, variable flight and cabin crew costs, landing and en route charges, and so on. Most of these are easy to identify and cost specifically for each route. The one difficult area is that of direct maintenance. This is allocated on the basis of either block hours flown on each route or a combination of block hours and number of landings. If a station at an airport on a route is used only for the services being costed, then all the staff and other ground expenses associated with that station should be attributed to the service. The second cost category is that of the fixed or standing direct costs. These comprise aircraft standing charges, that is, depreciation and insurance, the fixed annual flight and cabin crew costs, and engineering overhead costs. Most airlines convert these costs into a cost per block hour for each aircraft type. They then allocate them to each route on the basis of the block hours generated on that route. The third category of costs that needs to be allocated is that of indirect operating costs. These include: the station and ground costs that are not route specific; passenger service costs on the ground, including passenger insurance; ticketing, sales and promotion costs; and the general and administrative overheads. These tend to be allocated on the basis of some output measure.

In allocating costs to specific routes for pricing purposes one may wish initially to exclude certain of the above costs which are passenger or freight specific so that they can be allocated to particular categories of traffic later on. On the passenger side, these include the costs of in-flight services such as meals, free drinks, papers and give-aways, as well as the costs of cabin staff or passenger sales and ticketing. The costs of particular ground facilities such as first- or business-class lounges should also be identified. Having established the joint costs of a particular route or flight, but excluding the freight- or passenger-specific elements, these joint costs have to be split between passengers and freight. This might be done on the basis of the capacity payload or usable volume available for the two types of traffic (IATA, 1988) or on the basis of the tonne-kilometres expected to be generated by each, or even on the forecast revenue split (see section 12.5 below). On routes primarily intended for the carriage of passengers, some airlines might allocate virtually all the costs to the passenger side. This is a grey area in which it is difficult to argue that any solution is optimal. Once a proportion of the joint route costs have been allocated to the passenger side, the passenger-specific costs need to be added to these. The next step is to calculate the cost per category or class of passenger.

To understand the process whereby one arrives at a cost per passenger it is easiest to examine an example. To do this one might consider the case of a DC-10 on a long-haul flight with three cabins, each with a different seating configuration and seat pitch producing 24 first, 31 business and 168 economy seats. If the route cost per economy seat is assumed to be 100, then it is possible to establish what the cost of the first- and business-class seats should be after allowing for the extra space they require because there are fewer seats abreast and a longer seat pitch. Such an analysis (line 5 of Table 11.1) indicates that, purely on the basis of their space needs, the ratio of fares in the three classes should be 243:144:100. IATA analyses of costs based on space required in different classes come broadly to the same conclusion with ratios of 250:150:100, though they vary between airlines, aircraft types and routes (IATA, 1988). In our example, an adjustment might also be made for the greater proportion of space allocated to toilets and galleys, though this has not been done here. What if the planned load factors of the three classes were different too? Airlines often plan to achieve average year-round load factors of no more than 50 per cent or 60 per cent on first- and business-class traffic so as not to turn any high-yielding demand away. On the other hand, they will use various pricing mechanisms to try to ensure load factors well above 70 per cent in the economy cabin. Differences in planned load factor can be used to convert the cost index per seat into an index of cost per passenger (lines 6 and 7 of Table 11.1).

Lastly, the passenger-specific costs need to be added in to the costing exercise. These include the cost per passenger of the different in-flight services such as meals, drinks, films, headsets and newspapers and of any exclusive ground facilities. The higher ratio of cabin staff to passengers in first and business should also be adjusted for. In broad terms, passenger-specific costs in business class on a

Table 11.1 Unit costs of different classes on long-haul DC-10

		First (F)	Business (J)	Economy (Y)
1	Cost per economy seat			100
2	Seat pitch (inches)	55	38	34
3	Seat cost index allowing for seat pitch	162	112	100
4	No. of seats abreast	6	7	9
5	Seat cost index allowing for pitch plus seats abreast	243	144	100
6	Planning load factor	50%	60%	80%
7	Cost per passenger adjusted for load factor	486	240	125
8	Cost per passenger including passenger-specific costs	506	250	130
9	Cost per passenger if *Y*=100	389	192	100

long-haul flight are likely to be about twice as high and for first-class passengers about four times as high as those in economy class.

Typical passenger-specific costs have been added to the passenger cost indices in Table 11.1, producing a final index of relative costs per passenger of 389:192: 100. The significance of these indices is that, having earlier calculated to total cost per flight of operating a DC-10 on the route in question, the relative tariffs which need to be charged for each fare class can be derived. If purely cost based, the business fare should be twice as high as the normal economy fare, and the first-class fare four times as high. A study of IATA airlines' actual costs has shown similar relationships (IATA, 1984).

The analysis so far has indicated that it is possible to identify the costs of transporting passengers in three separate cabins each offering different products in terms of seat density, comfort and in-flight service. If basing fares purely on cost, this would result in a simple structure of three separate fares, or two separate fares if aircraft are configurated in a two-cabin layout. A simple tariff structure such as this may be adequate on routes where capacity and fares are closely controlled and regulated and where competition from charters or indirect sixth freedom carriers is minimal. In more competitive market conditions or in situations where total demand at the cost-related fares is insufficient to cover costs, airlines may need to introduce some market-related fares. These will inevitably be various categories of low promotional fares aimed at generating new segments of demand or at diverting demand from other airlines or other routings. In economic terms the aim would be to take advantage of the high price elasticity of demand of the low-fare market segments.

In this context, airlines may introduce off-peak fares at less than cost to generate off-peak demand and, it is hoped, an increase in total revenue. However, they may well need to do more than that. Airlines will try to identify the needs and demand characteristics of particular market segments on a route (an example was given in Figure 8.1). They must assess whether existing tariffs and tariff conditions are attractive to each particular market segment and are generating sufficient demand from that segment. If particular market segments are not adequately catered for, the airlines may need to examine their costs and fares to see whether either can be adjusted to meet the needs of those market segments. In doing this airlines are conscious of the low marginal cost of carrying additional passengers and of the short-term need to maximize revenue. This awareness has led to the development of a number of different pricing strategies.

Some of the current tariff strategies can be understood by reference to Figure 11.1. This shows the demand on a long-haul route for a daily DC-10 flight with a three-cabin configuration similar to the one previously analysed from the cost point of view. The figure shows the demand expected in a particular week, say six months from now, and is based on the airline's forecast of traffic and its knowledge of the distribution of traffic during the week. At the front of the aircraft, 24 first-class seats are blocked off and sold at first-class fares and 31 seats are sold at business-class fares. There will be daily variations in demand for these two classes, but the airline has based the two tariffs on achieving relatively low average load factors of 50 per cent in first and 60 per cent in business (as in Table 11.1). These give enough scope for meeting weekly peaks. In the economy-class cabin, where there are 168 seats, projected demand at economy or similar fares peaks on Saturdays and Mondays but is relatively low on other days, especially mid-week. The airline expects to find itself with a great deal of spare capacity in the economy cabin on all days of the week except Saturday. At existing fares, which are cost based, it cannot generate more

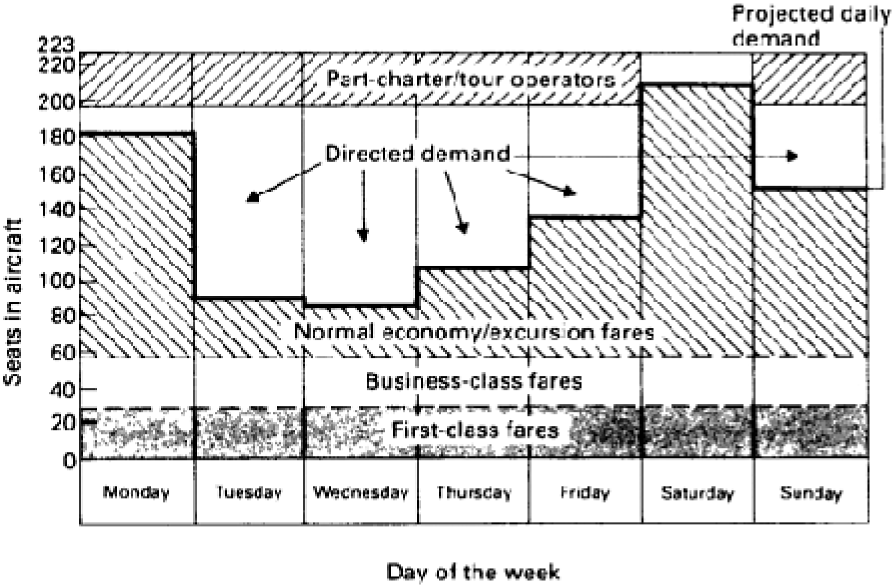

Figure 11.1 Projected demand for daily DC-10 with three-cabin configuration: forecast demand for one week in six months' time

Note: Directed demand fares—in advance (e.g. APEX and Super APEX) and last minute (e.g. stand-by, instant and late purchase).

demand. So the fares must be reduced in order to stimulate new market segments. This might be done in a number of ways. One partial solution would be to sell a block of seats to one or more tour operators or travel agents on a part-charter basis or some other basis which enables them to package the seats into inclusive holidays or to sell them in some other way. Ideally these seats should be sold at low prices and well in advance and the tour operators should be committed to pay for the seats contracted whether or not they are eventually resold by them. No part-charter or tour-based seats would be contracted for on Saturdays, since normal demand is sufficiently high.

Having sold some seats en bloc, the airline can also introduce the concept of directed demand to sell the remaining seats which it expects to remain unsold at the normal economy tariffs. Directed demand means pushing passengers into flights or days of the week which are of the airline's choosing. In the case illustrated in Figure 11.1, directed demand fares would not be available on Mondays days or Saturdays. Such fares normally take two forms: they are either fares requiring advance purchase, perhaps a minimum of 15 or 30 days before departure, such as APEX or budget fares. This enables airlines to ensure that such demand is directed to particular flights or days of the week. Passengers have a reduced choice but pay a price below the normal economy fare. The second type of directed demand fares are those that can be purchased only at the last moment or within 24 hours or so of departure. Passengers paying stand-by, late purchase or instant fares can travel only if seats are empty at the time of departure. These tend to be the cheapest fares.

Other types of fares are used to sell off spare seats, but block sales to tour agents and various categories of directed demand fares are the most common. It could be argued that such fares are cost related in the sense that they reflect the very low short-run marginal cost of selling an additional seat. Alternatively, it could be said that, by insisting that certain of these fares can be bought only directly from the airline, the commission paid to travel agents is saved. Other cost savings may include the absence of stop-over or interlining rights. So these fares should be priced lower than normal economy. In practice, the pricing of these various promotional fares tends to be market related. It is influenced by competition from charters or other scheduled carriers and by the price elasticity of demand at the lower end of the market. A major problem with these low market-oriented fares is how to prevent passengers prepared to pay higher fares from switching to the lower tariffs. 'Fences' of various kinds have to be introduced to prevent slippage. These are discussed later. Another aspect of this same problem is how to prevent large numbers of bookings at low fares from reducing the capacity available for selling at the normal economy or excursion fares and thereby reducing the total revenue per flight. This is the role of yield management.

The practical application of these different pricing strategies can be seen by examining British Airways' passenger tariffs on the London-Hong Kong route in the summer of 1989 (Table 11.2). It is evident from Table 11.2 that the ratio of first and business to economy fares was 274:149:100. Though British Airways operated Boeing 747 aircraft on this route, the fare structure had emerged in the early to mid 1980s under the innovative influence of British Caledonian, which had been flying DC-10 aircraft. Thus, our earlier analysis of DC-10 seats costs is very relevant. It suggests that, on space grounds alone, the cost ratio for the three classes should be 243:144:100 (line 5 of Table 11.1). This indicates that the pricing strategy on the London-Hong Kong route was cost related but did not allow fully for different load factors or levels of in-flight service in the three classes. The group inclusive tour fares corresponded to the concept of part-charter or tour fares, and there was a range of directed fares involving both advanced and late purchase. Some of these were half or less of the normal economy fare. Given that the majority of passengers in the economy cabin will have been travelling on these lower fares, it is likely that the average passenger fare in that cabin would have been around 60–70 per cent of the full economy fare. In that case, the ratio of first, business and economy fares would have been 274:149:70. If indexed to 100 this would give 391:212:100, which is very close to the cost-based relationship of the different fare groups shown in Table 11.1 (bottom line). The Hong Kong example shows that airlines may well use cost-related and market-related pricing in combination, adapting their pricing strategies to market and competitive conditions as British Airways obviously does.

Table 11.2 London-Hong Kong fares, 1989

Tariff[a]		British Airways' one-way fare[b] £	Index Y=100
First class		1,436	274
Executive/club/business		846	161
Executive point-to-point		764	149
Economy—point-to-point		524	100
Excursion (90-day)		982 (return)	94
Advance purchase	– basic	271	52
	shoulder	309	59
	peak	371	71
Late/instant purchase	– basic	260	50
	shoulder	288	55
	peak	348	66
Group inclusive tour	– normal	857 (return)	82
	– point-to-point	612 (return)	58

Notes:
[a] Student. ships' crew and government fares also available.
[b] Cathay Pacific fares were similar with minor exceptions.
Source: Air Tariff (monthly) (Hounslow: Air Tariff Ltd).

11.5
Choice of price and product strategies

The fare charged is only one aspect of the product or service provided by an airline to different classes of passenger. Other product features include frequency, timings, the quality and nature of ground and in-flight services, and so on. These have been analysed in Chapter 10 though price is often the most important. In planning the supply of services on each route it serves, an airline must also decide on the various price and product mixes which it feels will generate the level of demand it requires. In markets which are less regulated and where there is a high degree of price competition, the pricing options available are much wider but the choice between them more difficult to make.

The starting point for deciding on a pricing strategy—that is, the structure and level of tariffs and the product features associated with them—must be an assessment of demand and of the airline's pricing objectives. Is an airline setting out to meet a particular profit target, to expand rapidly, to capture market share, or does it have some other objective it wishes to achieve? Given the objectives of its pricing policy, an airline must examine the costs of the different products it can put into the market in relation to its assessment of what potential consumers want and are prepared to pay for. It must also consider its own positioning within each market. Is it setting out to meet the needs of all market segments, or is it trying to attract only certain segments? It could concentrate on only the high fare and high product quality end of the market, as Swissair and SAS have done in recent years. By going for the top end of the market, such airlines aim for high-yield traffic and accept that this may mean lower load factors (Table 8.1 above). Some airlines choose a single-product, single-fare strategy. This usually involves a very low fare, requiring very high load factors to break even. This was the People Express strategy and until recently the strategy adopted by Virgin Atlantic. A pricing strategy must also be acceptable to the airline's own government and to the government at the other end of the route, unless the route is one where tariffs are effectively deregulated. The other government's response will be dependent on the interests of its own airline and in particular on the relationship of the tariffs proposed to its own airline's costs and objectives.

In more price-competitive markets the pricing strategy may need to be dynamic and change in response to price or product changes introduced by competing airlines. Airlines have many difficult decisions to make. Should they match a competitor's lower fares when they know the competitor has lower unit costs or is heavily subsidized by its government? What proportion of its capacity should an airline offer at price-competitive fares? Is there any point in undercutting a competitor's tariff if it is going to match those lower tariffs? These and other considerations will affect the pricing strategy and tariff levels that airlines adopt in each of their markets. The ultimate aim must not be forgotten, however: that is, to bring supply and demand together in such a way that the airline achieves its corporate objectives.

11.6
Passenger fare structures

11.6.1
FIRST-, BUSINESS-, AND ECONOMY-CLASS FARES

Partial or total deregulation of airline tariffs on many routes, together with differences in the pricing strategies of major international airlines, have made it increasingly difficult to identify what one might call normal fares. Up to the late 1970s, most international air routes had two basic fares, a first-class and an economy fare. The first-class fare was generally 30–40 per cent higher than the economy fare. On a handful of routes there was also a supersonic fare for Concorde services, which involved a 15–20 per cent surcharge on the first-class tariff. Under the IATA tariff agreements which prevailed on the majority of international air routes, the conditions of service that went with each of those fares was also specified. These included the maximum permitted seat pitch, the contents of meals, minimum bar prices, and so on. During the 1980s such controls of conditions of service have been abandoned in many major international markets, even on routes where IATA tariffs still prevail.

That simple pattern of two basic fares also changed. Deregulation of tariffs on air routes to and from the United States, the introduction of three-class cabin layouts on many long-haul services and a generally more flexible attitude to pricing among many governments and airlines resulted in a more variegated and complex pattern of basic fares. In addition to the first-class and economy fares, there is now also a business- or executive-class fare, which is sold under various names, but which in price terms is positioned between first and economy. Even that three-tier structure of normal fares is complicated on some routes by the availability of a premium level of first-class or business fares which gives passengers access to a particular part of the cabin or to a quality of service not available at the normal fares. On many European and East Asian routes there may be a published first-class fare but no first-class capacity available since many European and South East Asian carriers abandoned first class altogether on short- and medium-haul routes and now offer only business and economy cabins. It should also be borne in mind that, as a result of the introduction of country of origin rules or the double disapproval concept into many United States bilateral agreements and in one or two elsewhere, there are routes where each airline's three basic fares may differ from those of its competitors.

Point-to-point tariffs have an agreed IATA mileage attached to them. This is normally the great circle distance between the two points. In travelling from one point to the other, passengers can deviate from the IATA distance by up to 20 per cent in mileage terms (15 per cent on some longer routes) without any increase in the normal fares. This freedom may not apply to some of the promotional fares. The free 20 per cent add-on to the permitted distance allows passengers to take quite circuitous routes to reach their ultimate destination, often with stop-overs en route at no extra cost. This is particularly so on tickets to distant destinations, where a 20 per cent deviation on a distance of several thousand kilometres can give passengers considerable scope for round-about routeings. On a few very long-haul routes there may be several sets of normal fares depending on the routeing taken. This is done partly to avoid misuse of the 20 per cent add-on. Thus, between London and Sydney there is one set of fares for services via the eastern hemisphere or the trans-Siberian route, and higher fares for travel via the Atlantic or the polar routes.

11.6.2
PREFERENTIAL FARES

Preferential fares are those which are available only to passengers who meet certain requirements in terms of age, family kinship or occupation. They are usually expressed as a percentage discount on the normal fares and are generally applicable over large geographical areas. The most widely accepted and used are the 50 per cent discount on the economy or more expensive fares for children under 12 years of age and the 90 per cent discount for infants under 2, but without the right to a seat. Child discounts on promotional fares, if available, are frequently lower. In Europe the discount is only 25 per cent, while on Pacific routes it is generally 33 per cent. In particular traffic conference areas, there may be discounts for students travelling to or from their place of study, there may be spouse discounts for husbands and wives accompanying their partners on business trips or publicly available group discounts. There may also be discounts for military personnel or ships' crews. Seamen fares, involving a 25 per cent discount on the economy fare, are particularly widespread. Traditionally, the aim of preferential fares has been partly developmental, to encourage demand from particular groups within the community, and partly social, through the choice of groups to be encouraged, that is families with young children or students. Interestingly, child discounts are not normally available on charter flights.

11.6.3
PROMOTIONAL FARES

Promotional fares are various low fares, usually with one or more restrictions on their availability, which offer passengers significant savings on the normal economy fares. Though sometimes referred to as discount or deep discount fares, they are not of general application, as most preferential fares tend to be, but are separately negotiated and agreed for each point-to-point link. Promotional fares have tended to be most widely used on routes where there is charter competition, such as within the Europe-Mediterranean region or on the North Atlantic, and on routes where there is considerable overcapacity arising from the operating of fifth freedom or indirect sixth freedom carriers. They have been least developed on routes where the airlines concerned have wanted to maintain high fares or have believed that demand was likely to be inelastic to fare reductions. The latter is the case on many international routes to and within Africa.

The early development of promotional fares was aimed at stimulating particular market segments, such as off-peak demand or the demand for inclusive tours, while taking advantage of the low marginal cost of scheduled air services once airlines were committed to a published timetable. Off-peak fares, night fares and group (GTX) or individual inclusive tour (ITX) fares were of this kind. Subsequently a wide range of promotional fares has been developed. The economic rationale for some, such as advanced or late purchase fares, has been examined earlier. Fundamentally there can be only one justification for them. They must increase an airline's net revenue and, it is hoped, its profits too. They can do this only by increasing traffic by a greater amount than is needed to overcome both the revenue loss (arising from the lower fares and the possible diversion of higher fare traffic) and the cost increase caused by the higher volume of traffic. Promotional fares involve considerable risk. There is the risk that newly generated traffic will not come up to expectations or alternatively that it might be so heavy that it will displace higher-fare traffic. Tight reservations space control is necessary to ensure that this does not happen. The other risk is that too many passengers will be diverted from full fares or other high fares and will travel at the promotional fares, thereby deflating total revenue. To minimize this risk, 'fences' or conditions are attached to each promotional fare. Such fences will not last very long unless they are seen by the public to be reasonable or 'fair'. Each promotional fare tends to have one or more of the following fences.

Duration limits

Most promotional fares have a minimum and maximum stay limitation. Within Europe, several categories of promotional fares include a requirement that the passenger must stay at least one Saturday night at the destination and no more than one month or, in some cases, three months. On the North Atlantic, a 7- or 14-day minimum stay with a two-month maximum is common. Inevitably duration limits mean that passengers must buy return tickets. The primary aim of most duration limits is to prevent usage of these fares by normal business travellers who, as previously pointed out (section 8.3), prefer short trips to avoid weekends away from home.

Departure time limitations

It is also common to limit the availability of many promotional fares to particular times of the day, or days of the week or seasons. The aim here is to generate off-peak demand or to try to fill up seats that would otherwise be expected to remain empty because of the timing or day of particular flights.

Purchase time restrictions

In order to be able to direct demand more effectively than can be done with departure time limitations, restrictions on the timing of purchase have been introduced for many promotional fares. These require either advance reservation and simultaneous full payment a minimum number of days before departure or late purchase, normally within 24 hours before the flight or actually at the time of departure. Advance payment also reduces airline costs by improving its cash flow.

Routeing conditions

Many promotional fares can be bought only as round-trip fares. In some cases, the return trip must be booked at the time of reservation and neither the outward nor the return booking can subsequently be changed except by forfeiting a substantial part of the fare. The aim is to reduce passenger flexibility, thereby making the fares unattractive to business passengers or independent holidaymakers, while at the same time ensuring high load factors by cutting out last-minute changes and no-shows. Higher load factors, by reducing unit costs, justify the lower fares. A number of additional routeing restrictions might also be used as a way of reducing the costs of handling low-fare traffic. These include: reduced or no stop-overs between the origin and ultimate destination; a point-to-point restriction which prevents both stop-overs and use of the 15 per cent distance add-on rule; and a no 'open jaw' rule to force passengers to start their return trip from the original destination point. Some very low fares may preclude interlining; that is, they cannot be used by the passenger except on the airline which issued the ticket. This prevents any revenue loss by the airline from pro-rating (see below) of the ticket with other carriers. In a few cases, restrictions aimed at reducing costs may be combined with normal fares. For instance, on the London-Hong Kong route there is a low point-to-point business fare (Table 11.2).

Inclusive tour requirements

There is, lastly, a range of promotional fares which are not publicly available but which can be purchased by travel agents or tour operators and used to package into inclusive tours. Such packaged holidays normally include accommodation but might involve some other element such as car hire or tickets for a cultural or sports event instead of or in addition to the accommodation. On some routes there is a single inclusive tour fare, while on others there maybe a separate IT fare for individuals and a lower fare for groups. IT fares have been aimed at meeting the needs of the independent holidaymaker. At the same time, on some routes they may allow scheduled airlines to compete with charters in the package holiday market. As such they are a defensive response.

Most promotional fares, whose names tend to differ by region, will have conditions attached to them involving several of the above limitations. On certain routes the complexities of the numerous fares available and the conditions attached to them have posed administrative problems for both airline staff and travel agents and have become counter-productive in marketing terms. Airlines are under both internal and external pressure to simplify tariffs. In this process of simplification the concept of 'unbundled' fares has gained ground. More and more low, unbundled fares now give the passenger none of the traditional flexibility or rights, which were costly for the airline. They provide nothing more than direct, uninterrupted carriage from origin to destination and back at the times and on the flights originally booked for.

On some routes with well-developed promotional fares, a high proportion of the total traffic may be travelling on such fares. IATA estimates that at least three out of every four passengers on the North Atlantic are travelling on promotional fares of various kinds. In other very competitive markets, too, airlines have found themselves selling virtually their entire economy cabin at promotional fares. On London to South East Asia routes, APEX fares have become in effect the standard economy fare, with hardly anyone paying the full economy tariff.

A study by the International Civil Aviation Organization (ICAO) of the September 1987 tariffs on a large sample of city pairs around the world found that advance purchase excursion (APEX) and other similar low promotional fares (e.g. European PEX and Eurobudget) had become increasingly prevalent and were available on about half of all city pairs. They predominated on routes between Canada, Mexico and the United States, across the North and South Atlantic and across the Pacific. Often referred to as deep discount fares, these were found to be on average 45 per cent lower than the normal economy fares (ICAO, 1988b).

11.6.4
CONCEPT OF FARE ZONES

An innovation in pricing strategy was introduced in May 1982 with the signing by the United States and 10 member states of the European Civil Aviation Conference of a memorandum of understanding setting up agreed fare zones on the North Atlantic. Reference 'fares' were established in each direction on the North Atlantic based on an agreed cost formula. In practice the reference fare was based on the Standard Foreign Fare Levels (SFFL) which had been established in 1980 by the Civil Aeronautics Board on the basis of US airline costs. Five pricing zones, or bands, each covering one fare type, were then established in relation to the reference fare. For example, the economy-class fare zone was from 20 per cent below to 20 per cent above the reference fare. Any airline offering an economy fare at any level within the agreed zone would have it automatically approved by both governments on that route. It could also set a particular fare outside its zone, but in that case specific approval would be needed from the governments concerned. If airline costs, such as the price of fuel, rise or fall, the reference fare or the SFFL can be adjusted through the agreed cost formula or through arbitration. Since the fare zones are expressed as percentages of the reference fare, they move up or down automatically with that fare.

The 1982 memorandum of understanding has been renewed regularly since then. The advantage for North Atlantic carriers is that if IATA or bilateral fares fall within the bands or zones they are automatically approved by the United States and other governments. Some IATA tariff agreements have also introduced fare bands but with a somewhat different objective. The IATA-agreed business-class fare on London to New York may be expressed as a zone to allow airlines to offer different elements of service. For instance, while the normal business class may be eight abreast on a Boeing 747, an airline with a premium six-abreast business class might charge 25 per cent more and still be within the business fare band. Fare zones are an attractive innovation in that they can be used to introduce a more competitive pricing environment while maintaining some regulatory controls over the level of the reference fare and the width and relative level of the different zones. This is a compromise position which governments or airlines hostile to total deregulation of pricing might accept. For this reason the concept of fare zones is likely to be more widely adopted. Early in 1984 the European Commission espoused the concept of what it called ‘zones of flexibility’. The December 1987 package of measures liberalizing air transport contained provisions for the introduction of such tariff zones for discount fares within Europe (section 4.3.3. above).

11.7 The role of yield management

For a long time it was thought that the ‘fences’ or booking conditions attached to different fares were a sufficient safeguard to ensure that yields or revenues were not diluted by high-fare passengers switching to low fares. However, they failed to ensure that revenues on each flight were being maximized. In many cases the opposite happened. The introduction of new low fares as a result of tariff liberalization created a surge of demand at these lower fares. Airlines found themselves putting on extra capacity to meet this demand, but with so much low-yield traffic on each flight they often failed to cover their costs even though load factors increased. This happened in the United States following deregulation, especially with low-fare airlines such as Braniff or People Express, and on the North Atlantic in the early 1980s. Even as late as 1989 Philippine Airlines’ fares between Manila and the United States were so low that it was capturing 70 per cent of the market, operating at very high load factors and yet was losing money on the route. Yield management became an essential marketing tool as a result of US deregulation and the complexity of fares and fare types that emerged within a very competitive and rapidly changing market. It involves the manipulation of an airline’s reservations control system in order to maximize passenger revenue. This is done by trying to sell each seat on each flight at the highest possible price so as to get the most income from that flight.

Yield management is based on the simple economic concept of utility as expressed through the demand curve. There is a maximum price which each consumer is willing to pay for a good or service. That price is equivalent to the utility or benefit they get from consuming it. They will happily pay less for it, but will not pay more. Different consumers gain varying levels of utility from a particular good or service and therefore each will buy it only if the price is no greater than that utility or benefit. For air services as for most products, the lower the price the greater the demand. By summing up the demand for a service at different price levels we can draw a demand curve. On a simple diagram showing air fare on the vertical axis and seats demanded on the horizontal axis, one could draw the demand curve for an air service between two cities. This has been done for a hypothetical route in Figure 11.2a. It shows a downward-sloping demand curve, indicating the number of seats which would be bought at different fares.

An airline wishing to provide this service with a 100-seater aircraft has estimated a one-way total operating cost of $3,500. It sets a target seat factor of 70 per cent, which means carrying 70 passengers. If pricing was purely cost based, then the airline would charge a $50 one-way economy fare. At that fare the demand curve tells us that the airline would get only 50 passengers, thereby generating an income of only $2,500, which would result in a substantial loss (Figure 11.2a). The load factor achieved would be 50 per cent not 70.

The demand curve also tells us that many passengers who paid $50 would have been willing to pay more. They are getting a good deal. The utility or benefit they get from using the service is greater than the price paid. The difference between the $50 fare and the utility they enjoy is called the 'consumer surplus' and is measured by the shaded area in Figure 11.2a. One aim of yield management is to maximize revenue by transferring some of the consumer surplus to producers, that is, the airlines.

The demand curve also shows us one more important fact: half the seats are empty if the fare is $50, but there are people who would fly at fares below $50.

The airline, aware both of the consumer surplus issue and the need to fill up empty seats, now decides to introduce a three-part tariff: a full economy fare of $70, an excursion fare of $50 and an advance purchase APEX fare of $20. There are various conditions attached, notably that the APEX fare must be bought in advance. In practice, because of the ability to buy cheap seats in advance, many passengers opt for the APEX fare and sales boom. However, in the end too many seats (40) are sold at this cheap fare, leaving insufficient seats, only 40, for passengers prepared to pay more, who generally book later. The outcome is shown in Figure 11.2b. The seat factor has shot up to 80 per cent, but though revenue has also increased to $3,200 it is still inadequate to cover costs. Moreover, since many passengers are still paying less than they would be prepared to pay, the airline is still failing to capture for itself an adequate share of the consumer surplus.

In theory, to maximize revenues and capture the consumer surplus the airline should sell each seat at the maximum that each passenger is prepared to pay, from $100 down to $1 for the 100th passenger. But to try and maximize revenue more realistically, it might introduce four separate fares: a full economy fare of $80, an excursion fare of $60, an APEX fare of $40 and a Super APEX fare of $20. If it could sell 20 seats at each of these fares, its total revenue would be $4, 000 per flight producing a profit of $500 with a seat factor of 80 per cent (Figure 11.2c).

The fundamental problem is how to ensure that 20 seats are sold at each fare and more especially how to avoid the earlier situation where too many seats were being sold at the lowest $20 fare. This is the function of yield management. It is the day-to-day monitoring and control of seat availability in each fare group on each flight to ensure that revenue is maximized. This is done by highly trained

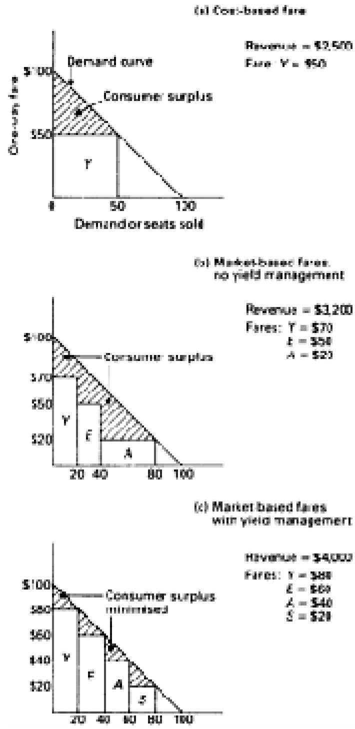

Figure 11.2 Interplay of demand curve and pricing strategies

(a) Cost-based fare

(b) Market-based fares, no yield management

(c) Market-based fares with yield management

Note: Fare types—*Y*=full economy; *E*=excursion; *A*=APEX; *S*=Super APEX

staff using the constantly updated information on sales and other key data in the reservations computer. Booking conditions attached to different fares and seat availability are the tools used to channel seats to the passengers paying the higher fares. The tariff conditions or ‘fences’ should separate the demand for particular fare types into discrete segments, which have different booking characteristics. The control of seats available for sale should then direct that demand onto flights where it is needed to maximize revenues.

The need for yield management arises because, whereas one would like to fill the aircraft early with high-fare passengers, such passengers tend to book at the last minute, while many low-fare passengers do not mind booking early. In practice, all fare types are being sold simultaneously in many locations at the same time. So the danger of an airline losing control of the total sales in each fare group is very real.

To overcome this, fares on each route are allocated to different reservation or booking classes. This is crucial, since some routes, such as London-New York, may have up to 60 fare types. Most large airlines will work with 10–12 booking classes, and could go up to 20–25, but many airlines can still only cope with three classes. Assuming that flights come onto the reservations system a year before the departure date, 12-month forecasts of demand for different booking classes are used to allocate the number of seats available to each booking class on each flight. When the seats allocated to a particular class are sold out, then that booking class is withdrawn from sale, even though seats may be available in other classes. If, later on, sales in these other classes fail to come up to the forecasts, the previously closed booking class may be reopened for sale.

The forecasts of sales by class are reviewed periodically up to one month before departure, and booking classes may be closed or opened accordingly. However, it is during the last month that most of the critical decisions and changes are made by the yield managers or controllers. A large airline may employ up to 100 of these working in groups controlling particular parts of its network. Using data from the reservations computer on sales to date and past booking trends, they must make rapid and critical decisions closing, opening or wait listing particular booking classes on each individual flight scheduled during the coming month. The aim is always to maximize revenue per flight. If sales are going badly as the departure date approaches, it may mean allocating more seats to lower fare types. Conversely, if demand is high, low-fare booking classes may be closed very early on and before they are sold out. It is a complex and critical task that could not be done without a sophisticated computer reservation system. In British Airways, the European yield manager will have around 2,500 European flights at any one time on which decisions are pending on whether to change the number of seats allocated to any particular booking class. The yield controller’s task is made particularly difficult by a number of factors.

In the first place, accurate forecasting of demand by booking class is the key to success, but demand is influenced by many external variables. The closer to the departure date, the more accurate forecasting becomes. The yield controller must monitor not only current sales but also external developments which may affect future sales. Secondly, the same fare type sold in one country may be worth more when sold in another because of fare and currency variations. Thus the cheapest Kuala Lumpur to London return fare in 1989 was only $845 if sold in Johor Bahru in Malaysia, and $1,060 if sold across the causeway in Singapore. If the same seat was sold in London it would have generated about $1,400 revenue. If sold in Australia as part of a Sydney-London trip, the revenue would have been greater still. It becomes particularly difficult trying to control and manage sales in different markets, but it is not impossible. There is a risk, however, of upsetting local sales staff who can sell at the published fares but are stopped from doing so by the yield managers at head office. A third problem area is how to deal with interline passengers on multi-sector routes. The pro-rating or allocation of the through fare to the separate sectors flown usually means that an airline may get very low yields from carrying interline passengers on some of its sectors. Some US yield management schemes reject such traffic even if seats are available. An alternative might be to insist on a full fare for that sector. This means publishing in advance the pro-rate provision one is prepared to accept. Group traffic provides an important volume of business but poses yet another problem. Group bookings are made long in advance when they are easy to accept but are usually firmed up only 3–4 weeks before departure, and the take-up rate (that is, the number of passengers compared with the number of seats originally booked) may be verv low. Requests for advance deposits may help to alleviate this problem. In addition, agents offering groups may be vetted on the basis of their past performance before bookings are accepted Then there is the problem of no-shows. They average 15–20 per cent for most airlines, but may be well over 50 per cent on some flights. Overbooking can compensate, but one can still end up with offloading passengers or having empty seats. Getting the overbooking right for each flight means more revenue and more satisfied passengers. To do this one must develop models to predict no-show rates, introduce booking conditions which discourage no-shows or even penalize passengers who fail to turn up by cancelling their onward bookings. Yield management must also tackle the question of cheating. This is done by agents or the airlines' own sales staff who, to meet their sales target, book passengers in one booking class which is open but actually sell them a fare which is in another class which has been closed. Checks have to be introduced to control this. Lastly, in markets where fares are not strictly regulated, yield managers must constantly monitor the fares being offered by competitors. While they must maximize revenues, they must also have an eye to market share. Losing market share may mean higher unit costs.

It has been estimated that US airlines have been able to increase their revenues by 5–10 per cent as a result of effective yield management (Cross and Schemerhorn, 1989). Thus it is crucial in ensuring profitability, especially for those airlines that do not have much scope for further reduction in their cost levels. The wider, more complex and more competitive an airline's network becomes, the greater is the need to introduce yield management. It is an essential concomitant of market-related pricing. While some consumers end up paying more than would otherwise be the case or travelling in more congested aircraft, consumers as a whole should be better off. By mixing high- and low-fare passengers to generate higher revenues, flights are operated that would otherwise not be viable. A wider range of fare types can be made available, while protecting last-minute access to seats for those who must travel at short notice. It is hoped that the frequency of offloading overbooked passengers should be reduced.

11.8
Geographical differences in fare levels

Annual analyses by ICAO of the normal economy fares on international routes around the world show considerable variation in fare levels between geographical areas (Table 11.3). Economy fares per kilometre on international routes in Europe are the highest in the world and they are more than twice as high as international fares within the Asia/Pacific region where regional fares are the lowest. On long-haul intra-regional routes the divergence between unit fare levels is lower but still quite marked, with the lowest fares being found on the North Atlantic and across the North Pacific. Wide differences between route groups in the unit level of economy fares can be caused

Table 11.3 Differences in average normal economy fares by distance and international route group, September 1987

Route group	US cents per passenger-km by distance (km)						
	250	500	1,000	2,000	4,000	8,000	12,000
Regional routes:							
Europe	54.8	41.1	30.8	23.1	17.3		
Middle East	31.9	25.8	20.8	16.8			
North America	26.4	19.9	15.0	11.2	8.5		
Africa	25.6	21.8	18.5	15.8	13.4		
South America	20.2	17.6	15.3	13.2	11.5		
Asia/Pacific	18.7	17.0	15.4	13.9	12.6	11.4	10.8
Intra-regional routes:							
South Atlantic					12.5	13.4	13.9
Europe-Asia/ Pacific			15.8	14.7	13.7	12.7	12.2
North Atlantic					14.4	13.2	12.5
North-Mid Pacific[a]					16.5	11.2	8.9
World average	36.6	29.4	23.6	19.0	15.2	12.2	10.8

Note:
[a] 1986 fares.
Source: ICAO (1988b).

by any one of several factors. The most important is likely to be the differences in the unit costs of operating in different geographical areas as a result of variations in the costs of inputs such as fuel or labour or in the pattern of demand. The degree of price competition also appears to have pushed down the economy fares, particularly in markets where there is also considerable frequency and capacity competition. There may in addition be an element of cross-subsidization, with above-average fare levels on some routes compensating for fares that are perhaps too low on others. However, the level of economy fares might not in itself be a sufficient indicator of the prevailing fare levels on any route if there are a large number of promotional fares on that route. European fares are a case in point. While economy fares within Europe are particularly high, European scheduled routes which face charter competition tend to have a wide range of low promotional fares as on the London-Athens route discussed earlier (Table 7.1).

A better measure of regional variations in fares actually paid is a comparison of unit revenues per passenger-kilometres, since this reflects both the variations in basic fare levels and differences in the range and availability of promotional fares. A 1989 ICAO study identified the unit revenues (yields) and costs per passenger-kilometre for 17 route groups (ICAO, 1989). Yields and costs for two groups of regional and long-haul routes are shown in Table 11.4. This confirms that, on regional services, fares and yields are highest in Europe and lowest on routes in the Asia-Pacific region. In long-haul markets, the lowest yields, as was the case with fares, are found across the Pacific and on the North Atlantic. The close correlation which exists, in most cases, between the relative levels of unit costs and unit revenues is clearly apparent when these are indexed (columns 2 and 4 of Table 11.4). In a few markets, notably Africa and South America, yields are too low in relation to costs and many airlines operating in these regions have been unprofitable.

Our earlier analysis of airline operating costs showed that unit costs declined as sector distance increased. It is not surprising, therefore, to find that unit fares also decline with distance, as shown in Table 11.3 and as is evident from comparing the unit passenger yields on long-haul routes and shorter regional routes in Table 11.4. In fact, ICAO analyses show a close correlation between increasing route distance and falling unit fares in most major markets (ICAO, 1988b). It is important to recognize that, even if there is a consistent relationship between fare level and distance, that relationship may not be entirely cost based. There are strong indications, at least within Europe, that the taper in fares with distance is less than the taper in costs (ECAC, 1981). This is true of both economy and promotional fares. As a result, the break-even passenger load factor tends to be much lower on longer routes than on shorter ones.

Other cost variables appear to have even less impact on fare levels. Fares show no close relationship to the traffic density on a route, even though thick routes lead to cost economies. The differentials between the first-class, business and economy fares do not always reflect the cost differences which arise as a result of the different space and service features of the three classes. Traditionally, first-class fares have been under-priced in relation to the costs imposed by first-class passengers. This was one reason why first class was progressively abandoned by many European airlines from 1980 onwards. While fare differentials between different classes have increased in recent years as a result of improved costing (on the lines of the exercise carried out on a long-haul DC-10 earlier in this chapter), there are numerous routes where the differentials do not adequately reflect cost differences.

Table 11.4 Differences in unit passenger revenues and costs by international route group, 1987

Route group	Revenue per passenger-km US¢ (1)	Index[a] (2)	Costs per passenger-km US¢ (3)	Index[a] (4)
Regional within				
Europe	17.6	215	16.0	219
Middle East	13.4	163	12.0	164
Africa	10.9	133	12.9	177
South America	9.3	113	10.0	137
Asia Pacific	8.2	100	7.3	100
Intra-regional				
North to South America	7.7	131	7.5	123
South Atlantic	7.5	127	8.0	131
Europe to Asia/Pacific	6.4	108	6.4	105
North and Mid Pacific	6.2	105	6.1	100
North Atlantic	5.9	100	6.1	100

Note:
[a] Lowest within each grouping indexed at 100.
Source: Compiled by author from ICAO (1989a).

11.9 Determinants of airline passenger yields

For an airline, the level of passenger fares is less important than the yield it actually obtains. Yield is the average revenue per passenger, passenger-kilometre or passenger tonne-kilometre performed. These all measure the average revenue per unit of output sold. The projected yield per passenger on a route will indicate to airline planners the break-even seat factor; that is, the percentage of available seats that they need to fill in order to cover the passenger-related costs. The higher the yield, the lower will be the break-even seat factor.

The range of passenger yields achieved by different airlines, some of them based in the same geographical area, is surprisingly wide, even though many factors such as average sector distance, strength of home currency, and so on, will affect the yields (Table 11.5). European carriers have exceptionally high passenger yields, while the lowest passenger yields are generally achieved by Asian carriers other than JAL. Yet, by combining low passenger yields with low costs and relatively high load factors, one can achieve profitability, though of course overall performance depends on the combined passenger and freight yields. The outstanding example is Singapore’s SIA, whose

Table 11.5 Passenger yields on scheduled services, 1988 (US cents per passenger t-km performed)

Rank	North American Airline	US¢	European Airline	US¢	Asia/Pacific Airline	US¢
1			Swissair	129.8		
2			Alitalia	125.3		
3			Lufthansa	125.0		
4			Air France	114.7		
5			British Airways	114.5		
6					JAL	113.3
7	Air Canada	92.8				
8	Northwest	82.4				
9			KLM	82.3		
10	American	80.0				
11					Thai International	76.3
12	United	76.1				
13					Cathay Pacific	75. 7
14	TWA	73.2				
15	Pan Am	72.2				
16					Qantas	72.1
17					Air India	67.3
18					SIA	60.2

Source: ICAO (1988a).

passenger yield is exceptionally low—only about half that of some European airlines. But SIA's passenger load factor in 1988 was 78 per cent, 8 percentage points or more higher than that of all the European and North American carriers in Table 11.5 except Air Canada (71 per cent). This, together with SIA's low costs, ensured high profits. SIA's low yield and high load factor are clearly interrelated. Its low pricing strategy was used to increase its market share on many routes and to push up its load factors. The low comparative costs of SIA and other Asian carriers have enabled them to pursue low-fare strategies.

The passenger yields indicated in Table 11.5 are global figures for each airline's total operations including its domestic services. Direct comparisons may therefore be somewhat misleading. Yet, even when operating on the same or neighbouring routes, airlines end up achieving markedly different yields as evidenced by European carriers on their intra-European services in 1989 (Table 11.6). Lufthansa earns more than twice as much per passenger-kilometre as Air Portugal or Olympic. Why do yields vary so widely between carriers? The discussion so far has tacitly assumed that an airline can determine its revenue levels and its yields through the pricing strategies it

Table 11.6 Passenger yields of European airlines on international services within Europe, 1989

Airline	US ¢ per passenger-km
Lufthansa	25.0
Sabena	23.9
SAS	23.7
Swissair	23.2
Air France	21.6
Alitalia	20.5
KLM	18.7
Aer Lingus	18.6
British Airways	18.4
Iberia	14.4
Air Portugal	12.2
Olympic	9.5

Source: Association of European Airlines.

adopts and in particular by the structure and level of passenger tariffs. In practice this is only partly so, since the relationship between fares and yields achieved is much more complex and is influenced in varying degrees by a number of factors, of which the fare structure itself is only one.

It has already been pointed out that marked differences exist in the level of fares between regions and even between neighbouring routes. In addition, the number, availability and level of discount and promotional fares will also vary. But the yield per passenger on a route depends less on the level of the individual fares and more on the traffic mix; that is, the number of passengers travelling at each of the different fares. While an airline in many cases may not be a free agent with regard to the structure and level of fares on its routes, it has somewhat greater freedom in determining the traffic mix on its flights. It does this through its positioning in the market, through its selling and marketing strategy and, ultimately, through the effectiveness of its yield management. The degree to which an airline can achieve its desired traffic mix may depend on the degree of real price competition on each route. If competitive pressures become too strong, it may have to abandon or change its targets.

Given the inherent instability in airline pricing discussed earlier, one finds that in some markets there may be illegally discounted fares in addition to the approved promotional fares. They are illegal in the sense that they have not been approved by the governments concerned. It is on routes where there are many fifth freedom carriers and numerous opportunities for sixth freedom operations that discounting is most prevalent. Such routes include South East Asia to the Middle East or Europe to East Asia. Less frequently airlines may introduce illegally low fares if they have been unable to persuade other carriers or governments that the approved fares are just not low enough. They may want lower fares as a means of stimulating the total market. Thwarted by the regulatory system, they may go it alone. Airlines set on discounting tend to conform to tariff regulations in their own countries and to ignore the rules abroad. There are numerous tricks of the trade that airlines use. One is to sell a ticket at an illegal discount but show a legal fare on the ticket while marking the ticket as non-endorsable. This means the passenger cannot use it for carriage with any other airline. As a result the ticket will not go through interairline clearing and the discrepancy between the fare paid and the fare shown on the ticket will not become apparent. A secret coding on the ticket will tell the airline's own accountants the actual ticket price paid. Illegal discounting of normal or promotional fares, either out of choice or as a result of competitive pressures, further dilutes the average yield.

Another major source of revenue dilution arises from the prorating of revenue from interlining passengers. An interline passenger travelling with a single ticket on two or more sectors is charged the end-to-end fare, not the sum of the separate fares on each sector. Because of the taper of fares with distance, the end-to-end fare to be charged is normally less than the sum of the separate fares. Pro-rating is the method used to share the revenue earned between the different sectors flown. Since 1989 the basic principle used is to share the revenue in proportion to the distance of each sector. But shorter distances are given greater weight to allow for higher costs. The method of pro-rating using weighted distance is illustrated in Table 11.7. For a club-class ticket used to fly London to Athens via Hamburg the revenue dilution is considerable. The airline carrying the passenger on the London to Hamburg leg receives 42 per cent less than the full club fare for that sector. On the Hamburg to Athens leg the revenue short-fall is 66 per cent, or almost two-thirds. The same basic method is used to pro-rate cheaper fares as well, if such fares allow interlining. Pro-rate calculations based on distance have become increasingly complex in some markets, especially where airlines on the same routes offer different fares.

Pro-rate dilution is greatest when passengers take advantage of the 20 per cent additional mileage rule to travel on a circuitous route between their origin and their destination, particularly if travelling long haul. The end-to-end fare has then to be split over several sectors. Pro-rate dilution will also increase if a domestic sector is included in the ticket and the domestic airline insists on receiving the

Table 11.7 Pro-ration of London-Athens club ticket used LondonHamburg-Athens, summer 1990

	Separate club fare	Distance[a] (miles)	Pro-rate calculation based on weighted distance factors[b]	Revenue dilution
London-Athens	£280			
London-Hamburg	£157	450		−42%
Hamburg-Athens	£566	1,270		−66%
Total		1,720	£280.00	

Notes:
[a] London-Athens distance is 1,494 miles, but permitted mileage is 1,791, or 20% higher. Therefore routeing via Hamburg is permitted.
[b] Weighted distance factors (found in IATA's Pro Rate Factor Manual) are London-Hamburg 1,167 and Hamburg-Athens 2,416. Adding them together gives 3, 583.

full fare or a high proportion of it, leaving even less revenue to be shared between the international sectors. Pro-rated interline traffic may represent as much as one-third or more of an airline's total traffic and it is particularly prevalent on routes serving geographical gateway airports such as Heathrow, Amsterdam or Singapore, which are major interlining centres.

The impact of pro-rate dilution is frequently distorted by exchange rate fluctuations which produce gains or losses when converting revenues earned aboard into the national currency of the airline concerned. The greater volatility of exchange rates since the early 1970s has increased the risks of revenue dilution from sudden movements in exchange rates.

The final source of revenue dilution is that arising from long-haul passengers even where there is no interlining involved. This is because of the taper of unit fares with distance. An airline carrying its own passengers on a 6,000 km sector with two stops en route will earn less than if it had carried three separate short-haul passengers, each of whom flew on only one of the three sectors on the route. Thus Qantas, each of whose passengers travels on average around 6,650 km has a distinct revenue disadvantage, while the shortness of many European sectors is one explanation of why European airline yields are so high (Table 11.5).

The yields which an airline achieves on each of its routes will depend partly on the level of the normal fares, on the availability and level of promotional fares, and on the degree of illegal discounting, if any. Within that framework of fares it is the traffic mix which ultimately determines the total revenue earned and thereby the unit yield. That is why effective yield management is so important. But revenue will be diluted by pro-rating of interline tickets and possibly by exchange rate fluctuations. The proportion of interline traffic is therefore a further important determinant of the yield. The final yield will bear little relationship to any single published fare. This further complicates the issues of airline pricing. In deciding on its pricing strategy and in working out the tariffs for different market segments, airlines must balance and juggle with all these factors which transform the various fares into an average yield. It is the yield in conjunction with the achieved load factor and the unit costs which will determine whether an airline's financial targets can be met.

12
The Economics of Air Freight

12.1
Air freight trends

Many of the concepts and principles of airline economics discussed so far apply equally to the cargo side of the industry. At the same time, particular issues and difficulties arise in the carriage of air freight which require separate analysis and treatment. The importance of freight is too often underestimated, yet just over one-third of the output of the international airline industry is generated by freight rather than passengers and for some airlines it is considerably more than this (Table 1.6). The contribution of freight to total revenue, however, is only one-eighth, but it makes a significant contribution to the profitability of many air services. In order for it to continue to do so, airline managers need to have a clear understanding of the air freight industry and of the particular problems facing it.

During the 1960s the annual rate of growth of international air freight had been very high, averaging close to 20 per cent and outpacing passenger growth by several percentage points. In the decade that followed, annual growth rates were halved, falling to an average of around 10 per cent. In the 1980s, growth rates declined further to around 9 per cent, though they were higher than this in the last two to three years of the decade. Though air freight continues to grow faster than passenger traffic, the gap between the growth rates of the two sides of the industry has recently been much smaller.

Until the mid-1970s European and North American airlines were dominant in the carriage of international air freight, attracting between them close to three-quarters of the freight traffic (Table 12.1). Since then their dominant position has been eroded by the exceptionally rapid penetration into the freight markets by East Asian and Pacific region airlines. Over the last 15 years or so these airlines have expanded their international freight traffic particularly rapidly, growing at annual rates well above the world average and significantly higher than those being achieved by European or North American airlines. As a result, there has been a fundamental restructuring of the international air freight industry, with the centre of gravity shifting towards East Asia and the Pacific. As a group the Asian and Pacific carriers overtook North American airlines in the carriage of international freight by the end of the 1970s and they are now in the

Table 12.1 Regional distribution of international air freight

Region of airline registration	Regional share of international freight/km		Average annual growth in freight/km
	1972	1988	1978–88
	%	%	%
Europe	44.8	37.0	+7.7
Asia and Pacific	12.3	31.4	+13.8
North America	29.0	18.5	+8.6
Latin America/ Caribbean	5.8	5.0	+6.4
Middle East	5.0	5.4	+7.4
Africa	3.1	2.7	+7.1
World	100	100	+9.3

Source: ICAO (1990).

process of rapidly overtaking their European counterparts as well. Forecasts by the International Civil Aviation Organization (ICAO) suggest that by the year 2000 Asian/Pacific airlines will dominate the air freight markets, carrying around 43.5 per cent of the world's international freight (ICAO, 1990). Already by 1988 four of the Asian carriers—JAL, SIA, Cathay Pacific and Korean—ranked among the world's 10 largest international freight carriers, with JAL ranked the second largest overall.

Three-quarters (76 per cent) of the world's air freight is international and about one-quarter is domestic. But much of the domestic freight—in fact well over half of it—is carried within North America. A noticeable characteristic of international air freight is the degree to which it is dominated by three major route groups, namely the North Atlantic, the Europe to the Far East/Australasia route and the north and mid-Pacific routes. These three route groups together generate around two-thirds of the total freight tonne-kilometres performed on international air services, with the North Atlantic and transpacific routes being relatively larger than the Europe-Far East routes. Interestingly, the very largest freight carriers such as Lufthansa, JAL, Air France, Flying Tiger or British Airways are all heavily engaged in at least two of these three route groups. This seems to be a prerequisite if an airline aims to be really big in air freight.

While in the early days air freight was considered essentially as a way of filling up spare capacity on passenger aircraft, its very high rate of growth in the 1960s induced many airlines to introduce scheduled all-cargo services. These could be introduced only where freight traffic was already dense enough to support them, but they had a strong stimulatory effect on demand. Narrow-bodied aircraft in a passenger configuration had relatively little capacity available for freight and it was in any case unsuitable for large or awkward shipments. All-cargo aircraft, even narrow-bodied ones, facilitated the carriage of large unit loads and consignments and accelerated the introduction of specialized handling and sorting equipment, which speeded up the movement of freight. Improved handling and the flexibility to ship freight independently of passenger aircraft, which, among other things, permitted the use of night hours, allowed airlines flying all-cargo aircraft to reduce freight transit times while offering considerably more capacity.

As a result, scheduled all-cargo operations generated new traffic and captured a growing proportion of it. On most major routes the proportion of freight carried on scheduled freighter aircraft grew rapidly till the early to mid 1970s and has declined steadily since then to a level of 35 per cent or less. The North Atlantic illustrates this trend clearly. In 1969, as much as 62 per cent of freight on the routes across the North Atlantic was being carried in freighters. This was the peak year for freighters. By 1983 their share of the market had declined to 31 per cent. Five years later, all-cargo flights carried only 26 per cent of Atlantic freight. Routes across the north and mid Pacific are an exception to this trend. The share of the freight traffic carried by all-cargo has remained consistently high at around 60–75 per cent because passenger aircraft were unable to meet the rapidly growing demand for freight space on air routes from East Asia to the United States. Elsewhere, the relative decline of scheduled freighter services has continued. Many airlines, British Airways and TWA among them, have ceased to operate freighters altogether. Other airlines which are major freight carriers, such as Lufthansa, have reduced the number of freighters in their fleets, particularly for short-to medium-haul routes, or, like KLM, have concentrated on using combi aircraft, where the main deck is split between passengers and cargo.

Within Europe, most regional air freight is trucked by road. It is cheaper and faster to do it this way, especially as distances are relatively short and most major centres are within an overnight road journey of each other. Even long-haul freight is trucked by road for the first part of its journey. British Airways operates a European freight interchange facility in Maastricht in south-east Netherlands. Trucks (generally leased in) collect freight from all over Europe, including Scandinavia and Spain, and deliver it to Maastricht. There it is sorted and packed into separate containers ready for shipment to their final destination anywhere in the world. The loaded containers are then driven in bond from Maastricht to be loaded direct and in time onto the right British Airways aircraft at Heathrow or Gatwick. In this way British Airways can compete with SAS in Scandinavia for freight destined for the United States or Mexico. But SAS also competes for long-haul freight in the UK market by trucking it by road to Copenhagen. Europe’s motorways are criss-crossed nightly by heavy lorries carrying ‘air’ freight!

One further aspect of the relative decline of all-cargo services has been the eclipse, especially within Europe, of non-scheduled cargo services. By 1988 less than 10 per cent of international freight tonne-kilometres were carried on non-scheduled charter flights. Their share had been significantly higher in the late 1970s when non-scheduled charter airlines had been at their peak. Traffic rights for scheduled cargo services are governed by the bilateral air services agreements, whereas cargo charters (like passenger charter flights) have been outside the regulatory structure and subject only to ad hoc permits from the two countries at either end of the route. The freedom to operate outside the bilaterals, together with the growing deregulation of freight operations in the United States, the UK and some other European countries, led to a rapid development of cargo charters from the mid-1970s.

Charter airlines such as Cargolux, IAS Cargo (later British Cargo Airlines) and Transmeridian grew rapidly to serve markets such as those of Nigeria, the Middle East or parts of the Far East where the rapid growth of demand for freight services could not be adequately met by the scheduled airlines. These charter airlines offered a ‘firefighting’ service, coming in to ease major problems created by port congestion or by sudden surges of demand in particular countries. In addition, their greater pricing flexibility and their low costs based on operating fully depreciated narrow-bodied aircraft enabled them to undercut the cargo tariffs of the scheduled airlines.

By 1980, however, many of the cargo charter airlines, of which there were many in Britain, faced difficulties and one by one they went out of business. The fuel price increases of 1978–9 hit these airlines particularly badly as they were operating older and less fuel efficient narrow-bodied aircraft. Many of their markets also declined as economic recession began to bite. At the same time, scheduled airlines began making serious inroads into these markets by more flexible and competitive pricing and by offering considerably greater freight capacity as they introduced wide-bodied passenger aircraft on more and more routes. Moreover, Third World countries that had previously welcomed cargo charters decided that their own national airlines should participate in the air freight market and restricted charter operations. Thus in 1983, when Cathay Pacific launched its first scheduled Boeing 747 freighter service to Europe, the Hong Kong government cut back the freight tonnage uplift previously permitted to charter airlines such as Cargolux. As a result of all these pressures, the specialist cargo charter airlines have declined in number and relative importance. By 1990 no large cargo charter airline of any significant size survived in Britain, even though several had been in existence a decade before. Two or three small cargo airlines were still operating, but only by capturing a particular niche market. This was the case with the Channel Express, which carried vegetables and flowers from the Channel Islands to the mainland, and with Heavylift Cargo Airlines. Cargolux, Europe’s largest all-cargo airline and a major operator of cargo charters, managed to survive only through an injection of capital from Lufthansa. Those charter airlines remaining are finding it difficult to survive under the pressure of so much belly-hold freight capacity on scheduled passenger flights. Cargo charters are still needed to meet sudden surges of demand or awkward or bulky shipments, but increasingly they tend to be provided by airlines such as Air France, El Al or Saudia operating freighters that are otherwise used on scheduled cargo flights.

12.2
The challenge of the integrated carriers

The biggest change in the air freight industry in the last 20 years has been the growth of the express parcels sector spearheaded by Federal Express in the United States. Launched in 1971, this company realized that the traditional airlines were ignoring two key needs of a large segment of the potential freight market. This was for high-speed carriage and rapid handling of small parcels, many of an emergency or crucial nature such as legal documents. The second requirement was for door-to-door service with no other intermediary. With these two product features in mind, Federal Express set up a parcels 'hub' in Memphis, Tennessee, and in effect introduced hubbing long before the passenger airlines appreciated its benefits (section 10.3 above). Complexes of aircraft arriving in Memphis from all over the United States within an hour or so of each other in the middle of the night were able to swap their parcels and leave to return to their origins within a couple of hours. Operating in this way, Federal Express was able to guarantee overnight delivery anywhere in the United States and could ensure it by providing its own collection and delivery vans in the cities it served. The freight product was redefined. Instead of weight and price being the key product features, convenience, speed and reliability became the critical aspects of the product. Services were segmented and priced on the basis of speed of delivery. In 1990, Federal Express carried documents or packages not exceeding 68 kg or 3.3 metres in length and width combined. It offered services including 'Overnight Letter', 'Priority One' (delivery within the USA by 10.30 the next business day) and 'Standard Air', which offered delivery no later than the second working day. Forwarders and other middlemen were cut out.

The express parcels business in the United States boomed, its growth rate outstripping that of the more traditional air freight sectors. During the 1980s, courier and parcels companies which had previously used scheduled airlines for their courier services and express deliveries, as well as road trucks, followed the Federal Express example and set up their own airline operations. A number of such *integrated* carriers had emerged by 1990, including Emery Worldwide, Airborne Express, United Parcel Services (UPS) in the United States and DHL Airlines and TNT which were stronger in Europe. Unlike Federal Express, they did not limit their business to parcels but accepted larger consignments as well. They used their own aircraft but also bought space from the scheduled passenger and freight airlines as appropriate. The essence of such integrated carriers is that they provide a total product, including pick-up and delivery, transportation, customs clearance, paperwork processing, computer tracking, and invoicing. A single system can handle all kinds of cargo world wide and guarantee delivery within specified time periods.

The success of the integrated carriers in the United States can be gauged by the fact that in 1978 they had close to 20 per cent of the US domestic cargo market, but by 1989 their share had shot up to 90 per cent of an $11 billion market (Boesch, 1989). It can also be seen in the fact that the last major US cargo airline to survive, Flying Tiger, was itself taken over by Federal Express in 1989, thus creating by far the largest air freight carrier in the world. However, Federal Express had difficulties reducing Flying Tiger's operating losses after the take-over (Jennings, 1990).

Having captured the major part of the US domestic market by the late 1980s, the integrated carriers then turned to developing their international operations. In 1985, Federal Express established its European hub at Brussels airport and in June of that year began its first transatlantic service. It opened its first route across the Pacific to Tokyo three years later. This expansion internationally was accompanied by the rapid purchase of courier and road-based freight companies in many parts of the world, including Lex Wilkinson, a medium-sized British distribution company. Other US integrated carriers followed a similar approach in expanding overseas. In Europe they were helped by the liberalization of air transport which was gathering pace. A number of non-European integrated freight carriers, such as the Australian TNT, set up European subsidiary companies to take advantage of the opportunities being opened up in Europe. But TNT, like others, also bought up small express parcel and distribution companies as well as airlines as a way of expanding its European networks most rapidly.

A major issue facing the traditional passenger-oriented airlines during the 1990s is whether they can successfully meet the challenge of the integrated carriers or whether they are doomed to lose much of their freight traffic. To survive that challenge they must capitalize on their major assets, which are high-frequency passenger flights to a wide variety of destinations, and combine these with a high-speed door-to-door integrated service. Their response to the challenge has been mixed. Surprisingly, both KLM and SAS, which had been moving in this direction by buying into small express parcels operations, both pulled back. In 1988, SAS sold its Cologne-based company Air de Cologne to TNT. Early the following year, KLM sold its XP parcels business also to TNT. Yet in May 1990 Lufthansa and JAL joined a Japanese trading company Nissho Iwai in buying a share in DHL's two holding companies. This is a major alliance linking two of the world's top three freight airlines with a major integrated door-to-door operator. It gives these airlines direct access to the lower-size end of the freight market, which has seen the most rapid growth and in which the traditional airlines have been losing market share.

12.3
The demand for air freight services

Since air freight is much more heterogeneous than passengers there are several ways of categorizing it. One may, for instance, consider the commodities being shipped, or one can classify freight by the weight of individual consignments or by the speed of delivery required. As with passenger traffic, it is valuable to try to segment the freight market in terms of the motivation of the shipper, since this has implications for the type of air freight services which need to be provided and for their pricing.

The most obvious role for air transport is the carriage of *emergency* freight. This includes urgently required medicines such as vaccines and spare parts for machinery or for equipment of various kinds which may be immobilized until the arrival of the replacement parts. Increasingly during the last two decades such emergency freight has involved documents of various kinds, such as business contracts or other legal papers, medical records, financial papers, articles and reports, as well as films, photographic negatives, artwork and computer tapes or disks. Many such shipments were best handled by the express parcels operators or by the companies providing courier-accompanied services. They provided the basis for the growth of the integrated air carriers discussed above. However, there is a threat on the horizon. The electronic (facsimile) transmission of documents had already begun to undermine the economics of the traditional courier services by 1990. Will it do the same to the express parcels sector or is the latter's traffic base sufficiently mixed to withstand a diminution of document traffic?

Air is also used in emergency when surface communications become congested or are disrupted by natural or other causes or when the national postal services are slow or inadequate. In all such circumstances speed is of the essence and cost of shipment is relatively unimportant. Demand to meet emergencies is irregular, intermittent and unpredictable in volume and in the size of individual consignments. It is therefore difficult for airlines to plan for. The need of shippers for high frequencies and good last-minute space availability means that, if adequately catered for, emergency freight demand results in low freight load factors and high unit costs.

Goods with an *ultra-high value* in relation to their weight are also normally carried by air primarily because of the much higher security offered. Speed is important not in its own right but because it reduces the time during which the goods are at risk. Gold, jewellery, diamonds, valuable metals and rare furs or works of art fall into this category. Security is of overriding importance, while cost of air freighting, given the value of the goods being shipped, is unimportant.

Both emergency and high-value freight require a high quality of service. Shippers of such consignments normally want to reserve space on specific flights with a guarantee of on-time arrival. They demand preferential handling and clearance through customs and up-to-date information on the progress of their shipments. From this point of view, too, such freight is more costly to handle.

The majority of air freight shipments involve what is called *routine* freight, where the shipper's decision to use air transport is based on an assessment of available transport options and is not a response to a sudden and unexpected problem; nor is it imposed by security considerations. There are many categories of routine air freight. A simple and widely used division is into perishable and non-perishable freight. In the case of *perishables*, the market for the commodities being shipped is dependent on air transport. The commercial life of the products—fish, out-of-season vegetables, newspapers, newsfilm, high fashion textiles, to name but a few—is short and the gap between producer and consumer must be bridged before that commercial life expires. Only freighting by air can do that. The freighting costs are quite high in relation to the price of the product, but they can be justified if the final consumers are prepared to pay a premium because no local substitutes are available. In the case of foodstuffs, the premium consumers are willing to pay for unusual or out-of-season produce is limited. As a result, the demand for air freight is fairly price sensitive. For all foodstuffs being shipped by air there is a tariff level at which the demand virtually dries up because the final market price of the products is no longer attractive to consumers. Since the initial price of many foodstuffs is quite low, that critical tariff level may itself be quite low. Airline pricing strategy then becomes crucial. To develop new flows of perishable freight, airlines may need to offer tariffs well below prevailing levels on the routes in question. The bulk of perishable freight movements are highly seasonal, with very marked and often short-lived demand peaks followed by long periods when demand dries up completely. This happens with the movement of early grapes from Cyprus to the UK, where the period during which air freighting is viable may last only two to four weeks. The seasonality of much routine perishable freight means that high year-round load factors are difficult to maintain. On the other hand, the demand patterns are known in advance and airlines can try to stimulate off-peak demand.

Routine *non-perishable freight* is shipped by air because the higher transport costs are more than offset by savings in other elements of distribution costs. Any one of a variety of costs may be reduced as a result of shipment by air. Documentation and insurance costs will normally be lower, but the biggest direct cost savings are to be found in packaging, ground collection, delivery and handling. These are all transport-related costs. There may also be savings in other areas from reduced stock-holdings and therefore lower warehousing costs and from the lower capital tied up in goods in transit. The high interest rates prevailing in many countries in recent years have made shippers and manufacturers very conscious of the high costs of maintaining large inventories. This has pushed them to re-examine their logistics chain with the aim of reducing their stock-holding to a minimum. This has led to the concept of 'just in time' (JIT). Air freighting is particularly suitable for JIT logistics chains because of its speed and its dependability. These indirect benefits of air freighting tend to be more marked on long-haul routes where a shipment which may take 20–60 days or more by sea and land may reach its destination by air in an elapsed time of two days or less. Taken together, the total distribution costs by air should be lower than or close to those of competing modes for air to be competitive.

Routine non-perishable freight consists largely, of fragile high-value goods such as delicate optical and electrical goods, clothing and machinery of various kinds, as well as semi-manufactured goods needed in various production processes such as micro-chips. These benefit not only from the higher speed but also from the increased security provided by air transport in terms of reduced damage and loss. This, together with the high value of these commodities, sometimes means air may be preferred even when its total distribution costs are not the lowest. For instance, some shippers or manufac-turers may use air freight as a way of breaking into and testing new and distant markets without the need to set up expensive local warehousing and distribution systems. If they are successful, they may then switch to lower-cost surface modes.

Shipments of routine non-perishable freight tend to be regular, known in advance and often of relatively constant size. Although speed is important, small delays of a day or two in collection or delivery can be coped with by the shippers. Non-perishable freight is less price sensitive than perishable freight because of its higher value, but it is nevertheless responsive to the total distribution costs of air transport, especially in relation to the costs of competing surface modes.

Most goods being shipped by air have a high value to weight ratio. Since cargo rates are generally based on weight, the higher the value of an item in relation to its weight, the smaller will be the transport cost as a proportion of its final market price. Therefore, the greater will be the ability of that good to absorb the higher air transport tariffs. This tendency for high-value goods to switch to air transport is reinforced if they are also fragile and liable to damage or loss if subject to excessive handling, or if the surface journey times are very long, involving the tying up of considerable capital in transit. Consumer demand in many industrialized countries is switching more and more towards goods with high value to weight ratios such as cameras, video machines, home computers, calculators, expensive shoes, and so on. It is goods such as these that lend themselves to shipment by air, so the future prospects for air freight must be good. More importantly from the airline’s point of view, it is the countries manufacturing such goods that will become the largest generators of air freight demand. This is one reason why the growth of freight traffic among South East Asian airlines has in recent years far outstripped that of other regions and why JAL, Korean, Cathay Pacific and Singapore Airlines are now among the top 10 airlines in terms of international freight tonne-kilometres.

While freight can be categorized and split into market segments in terms of shippers’ motivation, it remains very heterogeneous with a wide range of different manufactured and semi-manufactured goods, raw materials and agricultural products that may have little in common. The commodity mix will vary from route to route, but some broad generalizations can be made. World wide, about one-third of total international air freight is composed of manufactured goods (Groups 6 and 8 in the Standard International Trade Classification) and another one-third is machinery and transport equipment (SITC Group 7). The remaining third or so is made up of a variety of commodities, among which fresh foodstuffs and other agricultural products, medical and pharmaceutical goods and chemicals are all relatively important. The heterogeneity of goods going by air poses numerous marketing problems for airlines, particularly when trying to identify and develop new markets.

Another aspect of this heterogeneity is that freight comes in all shapes, sizes, densities and weights. There is no standard unit or size for a freight consignment or any standard unit of space such as a seat. Freight density is crucial to the economics of air freight. Cargo payload on an aircraft is limited by weight but also by volumetric capacity. Since tariffs are based on weight, an airline can maximize freight revenue on a flight by carrying dense, heavy freight that fully utilizes its weight payload. Low-density shipments may fill up the cargo space with a low total weight and a lower total revenue. Surcharges are frequently applied to shipments having a density below a certain level. An airline must try to achieve an average density in its freight carryings which makes maximum use of the volumetric capacity and payload of its aircraft. Because of the variety of goods being shipped, the risk is that volumetric capacity is used up before the payload capacity.

The difficulties of handling large numbers of relatively small individual shipments of different size, shape, weight and density created considerable pressures towards unitization of air freight, both as a way of speeding up its handling and in order to reduce handling costs. As a result, most air freight now moves in a variety of unit load devices (ULDs), which fall into four major groups. There are various built-up or half-pallets which may be rigid or flexible. Some are no more than a rigid base with netting to cover the goods being shipped. Secondly, there are IATA-approved lightweight fibreboard or plywood containers or boxes which fit on to full-size or half-pallets. The third group are rigid containers, which come in a number of standard sizes designed to fit into the holds of wide-bodied aircraft. These rigid airline containers now account for the larger proportion of total air freight since much of that freight is being moved on wide-bodied passenger aircraft or freighters. Lastly, there are ISO inter-modal type containers which can be used only on wide-bodied freighters such as the Boeing 747F. These various unit load devices may be used and filled by the shippers or the forwarders and presented for carriage to the airline. On many routes the lower costs of handling such ULDs may be passed on to them through low tariffs related to particular ULDs. The fact that much of its freight comes forward in ULDs, each perhaps packed with a variety of different goods, perhaps originating from different shippers, is an added complexity in the marketing of air freight services.

While passengers generally fly round trips or at least return to their origin, freight clearly does not. As a result, considerable imbalances in freight flows can arise. While freight flows on some major inter-national freight routes such as Amsterdam to New York are more or less balanced in each direction, on most routes there is a marked imbalance. On major freight routes it is common to find that the traffic in the densest direction is twice or almost twice as great as in the reverse direction, as is the case on the Hong Kong to Frankfurt or the Bangkok to Hong Kong routes. On secondary but still important freight routes, the imbalances tend to be even more marked, with the dense flows sometimes as much as four or five times greater than the return flows, as happens on the Hong Kong to Los Angeles route.

On many routes the tonnage imbalance is aggravated by pricing policies that try to stimulate demand on the low-density direction by offering lower tariffs. The result may well be an even more marked revenue imbalance as the low tonnages in one direction end up paying the lower cargo rates. Where freight is being carried largely on passenger aircraft, weight and revenue imbalances are easier to absorb, though sometimes airlines may find themselves with inadequate belly-hold capacity in one direction. But large imbalances are particularly detrimental for the operation of all-cargo services, since they result in low overall load factors with no possibility of compensating revenue from passenger sales. The absence of assured return loads creates marketing and pricing problems which are unique to the cargo side of the industry.

12.4
The role of freight forwarders

The process of moving freight is considerably more complex than that of moving passengers, involving packaging, more extensive and complex documentation, arranging insurance, collection from the shipper, customs clearance at origin and destination and final delivery. The complexity involved has encouraged the growth of specialist firms which carry out some or all of these tasks on behalf of the shipper and provide an interface between shipper and airline. Such firms may be relatively small IATA-approved or non-IATA agents which feed their shipments directly to the airlines or to large freight consolidators. The latter will be handling freight directly for their own customers but may also be collecting and consolidating consignments from smaller agents. There is considerable fragmentation within the industry, with shippers, forwarders, consolidators and airlines all involved to varying degrees with different consignments. Such fragmentation has made the marketing and product planning of freight particularly difficult for the airlines. Any one of the chain of activities necessary to move freight by air may go wrong and undermine the total service being offered, yet the airline may have no control over that activity. It is also frequently torn between marketing and selling its service direct to the shipper or concentrating its selling efforts on the forwarders.

Large forwarders and consolidators have expanded vertically to develop new markets and sources of freight, since they deal directly with the shippers, and to provide more and more services, such as ground collection and delivery, which were previously often undertaken by the airlines themselves. Large forwarders may publish their own flight schedules and tariffs. In many markets, such as UK-North America, a handful of large consolidators may come to control over half the freight being shipped. This gives them considerable market power. By consolidating numerous small shipments into large consignments they can obtain substantial bulk discounts. In other words, they buy in bulk and sell retail. On certain routes they can go even further. If the tonnage they ship is high, they can play off the airlines against each other and obtain very low special rates, particularly on routes where there is over-capacity. In this process airline yields are pushed down but the ultimate shipper may not be given the full benefit of the lower rates the consolidators obtain.

As over-capacity on many major air routes spread, so airlines tried to stimulate total demand or to increase their market share by offering special discounted rates to large forwarders or consolidators. Large numbers of small agents could not generate sufficient freight to take advantage of these special low rates. They were also wary of shipping via large consolidators for fear of losing their customers to them. Economic pressures from smaller agents eventually led to the establishment of a new specialist, the freight wholesaler. They are a relatively recent but growing phenomenon. They buy space in bulk at rates comparable to those of the large consolidator and resell to smaller agents. Unlike consolidators, they provide none of the ancillary services such as surface distribution or packaging and therefore pose no threat to their customers. They are simply brokers of freight capacity.

The growing concentration of freight demand in the hands of small numbers of consolidators and wholesalers created two key difficulties for the airlines that supply freight services. First, it cut them off from the ultimate customers, with the result that they were possibly less aware of and less responsive to customer needs and new opportunities. Some airlines tried to overcome this by establishing their own freight-forwarding subsidiaries. Second, and potentially more damaging, was the downward pressure on cargo yields which resulted from the activities of consolidators or wholesalers. The impact on airline yields can be gauged from the example of a 500 kg consignment on the London to Nairobi route illustrated in Table 12.2. The ready availability of low contract rates on this route in 1985, well below the lowest specific commodity rates, encouraged consolidators and wholesalers to buy space at these rates, though these were still lower than the general or specific commodity rates. The result was that the airlines were often receiving less than half of the monies paid by the shippers for the transport of their goods; the balance was going to the middlemen. The dilution of freight revenue in this way clearly undermines the profitibility of air freight. The growing power of these middlemen, and in particular their ability to force down cargo tariffs when and where there was space capacity, was a continuing problem for international airlines during the 1980s.

In Europe, the creation of the single internal market by 1993 led to a spate of mergers and take-overs among freight forwarders and consolidators as they positioned themselves for the new opportunities ahead. In Germany, two large groups had emerged by 1990—Kuhne and Nagel, which was British owned, and Schenker, which together were thought to cater for up to one-third of the German air freight

Table 12.2 Impact of consolidators and wholesalers on airline revenues: London-Nairobi case, 1985

500 kg low-density consignment,[a] London-Nairobi

	£ per kg
Tariff structure:	
Normal general cargo rate	5.22
Quantity general cargo rate for 100 kg plus	4.11
Lowest specific commodity rate (motorcycles)	1.67
Contract rates	0.90–1.60
Selling rates:	
Airline's contract rate to consolidator/wholesaler	0.90
Consolidator/wholesaler resale rate to forwarder	1.00
Forwarder's rate to shipper	1.20–1.50
Revenues earned:	
Shipper pays forwarder for 700 kg at, say, £1.50/kg	1,050
Forwarder 'splits' volumetric weight with consolidator/wholesaler. Pays 600 kg at £l.00/kg	600
Consolidator/wholesaler consolidates with dense cargo to lose volumetric weight penalty. Pays airline 500kg at £0.90/kg	450
Airline revenue as percentage of shipper's payment	43%

Note:
[a] Volumetric weight for charging=700 kg.
Sources: Compiled by author from various sources.

market. In the United Kingdom, a number of companies were merged to create Rockwood International Freight in 1988, though one of the merged companies was sold off two years later. By 1989 Rockwood, Air Express International, MSAS, LEP and Emery Air Freight together controlled just over one-third of the UK air freight market.

Yet, while concentration among consolidators grew, at the end of the 1980s their market power began to diminish for a number of reasons. In the first place, competition among consolidators to get shippers' business had gradually forced down the rates charged and reduced consolidators' profit margins. This was an added stimulus to mergers. Secondly, many larger shippers became more sophisticated in their approach and negotiated directly with the airlines to get an agreed rate, even if the shipments were ultimately hauled by a forwarder or consolidator. Moreover, cargo rates offered by airlines were increasingly published in the trade press so even small shippers could ascertain easily what their shipments should be charged at. Another innovation introduced by Air France and subsequently adopted by Lufthansa was to insist that the waybill showed the cargo rate actually paid and the commission (normally 5 per cent) charged by the forwarder. In this way the forwarder could not exact a large middleman's profit, as in the London-Nairobi case above, without the shipper becoming aware of it. But perhaps the greatest threat posed to the freight forwarders was the arrival on international markets of the integrated carriers, which could cut the forwarders out altogether.

12.5 The economics of supply

12.5.1 BELLY-HOLD CAPACITY

Most air freight travels in the belly-holds of the passenger aircraft and traditionally it has been regarded as a byproduct arising from the supply of passenger services. Provided freight revenues covered those costs, such as ground handling, sales and marketing, or extra fuel burn, which could be directly attributed to carriage of freight, then any revenue in excess made a contribution towards offsetting the costs of passenger services. The significance of this contribution can be gauged from the fact that in 1982 British Airways estimated that 51 per cent of its freight revenues on passenger aircraft went to cover freight-related costs, while the balance of 49 per cent could be used to cover the other costs which would be incurred whether or not freight was carried on the aircraft (Table 12.3). On this basis, belly-hold freight appears to make a valuable contribution to airline profitability.

The byproduct approach to costing, however, leaves open the question of whether freight should bear its share of other costs. Should the major costs of operating a flight be considered to be joint costs which need to be split and allocated in some way to both passengers and freight? This argument is strengthened by the fact that the lower freight decks of wide-bodied aircraft have possible alternative uses as galleys or lounges. Freight must at least cover the opportunity cost of forgoing these alternative uses. However, the allocation of joint costs inevitably involves some arbitrariness. The International Air Transport Association Cost Committee recommends that the profitability of cargo carriage on passenger and combi aircraft is assessed after costs have been fully allocated between cargo and passengers as follows:

Table 12.3 Distribution of revenue from cargo carried on passenger aircraft: British Airways, 1982

Revenue needed to cover direct cargo costs:	%
Cargo handling	21
Additional fuel	11
Sales and cargo promotion	8
Insurance and commission	5
Other overseas costs	4
Administration	2
Sub-total	51
Cargo contribution to other costs	49
Total cargo revenue	100

Source: Bass (1983).

(a) Direct operating costs should be apportioned on the basis of the useable volume of the aircraft allocated to each.
(b) Cargo-specific or passenger-specific costs, such as ground handling, marketing, and, in the case of passengers, in-flight service costs, should be separately identified and allocated as appropriate.
(c) Administration and other overhead costs should be split between passengers and cargo in proportion to the sum of all the other costs (i.e. (a)+(b) above).

If costed on this basis, cargo carried on passenger aircraft was, according to the IATA Cost Committee, very marginal throughout the 1980s. In some years, as in 1986, it just covered its operating costs including interest but made relatively little contribution to profits. In other years, 1987 was one of them, cargo on passenger aircraft failed to cover its fully allocated costs (IATA, 1988). Thus, if joint costs are allocated in this way, then the overall contribution of belly-hold freight becomes marginal. Nevertheless, the carriage of such freight on some individual routes, such as Europe to/from East Asia, may still be highly profitable. A few airlines, Air France among them, do their cargo costing in this way. But most prefer to think of belly-hold cargo as a profitable byproduct rather than a marginal joint product.

From both the suppliers' and consumers' points of view, belly-hold freight offers numerous advantages. It is certainly low cost if costed on a byproduct basis. The higher frequency of passenger services is attractive to shippers, particularly for emergency-type freight, and they are prepared to pay a premium for the better service. This, together with the fact that passenger aircraft tend to carry a higher proportion of small shipments which do not get bulk or quantity discounts, means that average freight yields from belly-hold freight on most routes are markedly higher than average yields on freighters. Narrow-bodied passenger aircraft had relatively little capacity for freight and even that was sometime restricted by take-off limitations. The ability to generate an additional 10–15 per cent of revenue from freight has been an added incentive for many carriers to switch to wide-bodied aircraft. Passengers benefit from this switch because the seat-kilometres of the larger aircraft are appreciably lower than those of the aircraft they replace. In the process, however, there are indications that too much belly-hold capacity is now available on many routes, with the result that there are strong downward pressures on cargo tariffs.

12.5.2
ALL-CARGO AIRCRAFT

In the 1960s the carriage of freight on passenger aircraft, particularly narrow-bodied ones, faced a number of operational problems. Passenger aircraft could not handle large or outsize consignments and, since passengers were given priority, freight was more likely to be offloaded if take-off weight limits were exceeded. Moreover, the timings and routeings of passenger services did not always match the needs of freight shippers. To overcome these problems and to stimulate freight demand, many airlines introduced freighter aircraft. The penetration of such aircraft into the freight market and their subsequent decline were described earlier, but not the causes of that decline.

The major economic advantage of the freighter is that it increases its payload by half or more compared with the same aircraft in a passenger configuration. By stripping out unnecessary passenger-related facilities, thereby saving weight, a Boeing 747 freighter may carry a cargo payload of 100–110 tonnes; the same aircraft with a main passenger deck and belly-hold freight has a typical payload of around 60–70 tonnes. The greater payload should reduce the tonne-kilometre costs of freighters by one-third or more. Yet in the past all-cargo services have frequently been unprofitable and have declined in relative importance because the airlines have been unable to maintain the fine balance between costs, yields and load factors which is essential to profitability.

In the first instance, the costs of all-cargo services were more adversely affected by the fuel price increases of 1973/4 and 1978/9 than those of passenger aircraft. This was because fuel costs for freighters are a higher proportion of total costs, particularly if they are narrow-bodied aircraft. On scheduled freighter services, fuel and other variable operating costs may represent around 50 per cent of total costs but may go up to 60 or 70 per cent. Consequently, costs can be significantly reduced in the short term by cutting the number of services. As fuel prices escalated, airlines found that they could save money by switching their freight to passenger aircraft or even to road trucks and reducing their freighter services. Within two years of the 1973/4 fuel crisis, Lufthansa had cut its freighter fleet from 17 to 6 aircraft and all freight travelling less than 600 km was carried by road or in Airbus belly-holds. KLM followed the same policy in 1983 when it started phasing out its DC-9 freighters.

The full costs of carrying freight on all-cargo aircraft can be readily identified so that, in theory, tariff strategies could be adopted to ensure that revenues exceeded costs. In practice, the economic recession apparent in many countries in the early 1980s, together with an excess of belly-hold capacity as airlines introduced more wide-bodied passenger aircraft, led to the collapse of cargo rates in many important markets such as the North Atlantic. Moreover, yields on all-cargo freight, much of it travelling at bulk discount or contract rates, have been appreciably lower than those from freight on passenger aircraft. As a general rule, airlines have found that yields from all-cargo services had been around 10–15 per cent lower than the yields achieved from the carriage of freight on passenger aircraft (IATA, 1988 and see Table 12.4). As a result, where airlines have managed to sustain high load factors on freight services, then freighter services have proved profitable. On many international air routes, all-cargo load factors have not been high enough to compensate for the low yields, with the result that freighter services have tended to be unprofitable.

The dramatic fuel price increases of 1973/4 and 1979, below-average and falling yields and insufficiently high load factors have over the years undermined the economic viability of all-cargo services on many routes. The result has been the abandonment of freighter services by many airlines and an increase in the proportion of freight travelling in belly-holds.

A surge in demand for cargo space in the late 1980s placed increased emphasis on freighter operations and improved their viability. In 1987 and 1988 the all-cargo operations of IATA member airlines produced a small surplus after covering all their operating costs and interest charges (IATA, 1988). But not all freighter markets are equally profitable. Generally, longer-haul routes are profitable whereas shorter regional operations tend to be loss-making. The factors which appear to be necessary to ensure continued viability of long-haul freighter services are a high level of demand, preferably from both ends of a route, an insufficient volume of cargo space on passenger aircraft and some limitation on the provision of all-cargo services. In many long-haul markets, limitation is being achieved by the third and fourth freedom carriers operating freighter services jointly rather than in competition. This is done by SIA and British Airways between London and Singapore and by Cathay Pacific and Lufthansa on their Hong Kong-Germany services. Such joint operations avoid overprovision of freighter capacity, which tends to undermine cargo rates. The North Atlantic is one of the least profitable of the long-haul routes, largely because there is too much capacity available. Conversely, the more limited freighter services between Europe and East Asia have ensured reasonable profits for most all-cargo operations in this market.

The danger of over-capacity is present in all markets and as a consequence many airlines are loath to operate freighter aircraft and prefer to concentrate on carrying belly-hold cargo. Yet there is still a role for the freighter. Many carriers will continue to operate freighters as a necessary adjunct to their overall freight service. They need them to provide a better overall service for their customers by using them to transport the 10 per cent or so of freight that is too large or dangerous for belly-holds as well as the larger consolidations. All-cargo schedules can also be geared to the needs of shippers. On some routes, where the demand for passengers is thin, belly-hold capacity may in any case be insufficient to meet cargo needs. This may also be so on routes where payload or range restrictions reduce the effective cargo capacity on passenger flights. The introduction of very long non-stop flights with Boeing 747–400 or other aircraft has resulted in the loss of cargo capacity on routes where extra fuel needs require payload cutbacks to fly the longer sectors. Lastly, carriers may use all-cargo services, which may not be viable in their own right, to carry cargo on trunk routes for onward distribution on passenger flights, where the revenue generated may make a contribution to overall profitability.

12.5.3 COMBI AIRCRAFT

There are routes where the enormous payload of wide-bodied aircraft in all-cargo configuration is too large for the potential freight demand, while belly-hold capacity may be insufficient or unable to cope with bulky consignments. In such circumstances, the wide-bodied combi aircraft, on which passengers and freight are carried on the main deck, may prove a commercially attractive proposition. By adjusting the main deck space allocated to passengers or freight in response to the demand mix and seasonal variations of each route, total revenue can be maximized. For instance, at times of peak passenger demand the whole cabin may be used for passengers.

In a combi operation, the allocation of joint costs to the freight side is essential. Freight revenue must be seen to cover its share of capacity costs, since without freight on the main deck the passenger service would use a smaller aircraft or a lower frequency and reduce its total costs. This means that freight pricing must move towards a full cost-recovery basis rather then be based on the byproduct pricing strategy adopted for beliy-hold freight. Market conditions will determine whether this can be done. The method of allocation varies between airlines, but a number of airlines—KLM and Air France among them—have done the exercise and have convinced themselves of the commercial advantages of combi aircraft. Air France allocates 68 per cent of a Boeing 747 combi's joint costs to passengers and 32 per cent to freight. This is based on the fact that a combi 747 has only 32 per cent of the pallet capacity of an all-cargo 747. Thus 68 per cent of the aircraft's freight capacity is lost to passengers, who must cover that share of the joint costs. In 1988, Air France, one of the largest freight operators, carried as much as 35 per cent of its total freight traffic in combi aircraft. Another 55 per cent went in freighters and only 10 per cent went on passenger aircraft. It is certain that for many airlines combi aircraft will have a continuing role to play, particularly on the thinner long-haul routes.

In earlier years much greater use was made of convertible or quick change (QC) aircraft, which were used for passengers for most of the time and were then re-configured for freight services during the night or at off-peak periods. While at one time they were quite widespread, especially within Europe, QC operations are now less common. They have been adversely affected by airport night bans, by the high costs of changing the aircraft's configuration, particularly when done twice within 24 hours, and the ready availability of so much belly-hold capacity. However, some of the integrated companies, such as TNT, which have moved into airline operations using freighters primarily for overnight express parcel shipments, would clearly benefit from flying their aircraft in a passenger configuration during the day.

12.6
Pricing of air freight

12.6.1
STRUCTURE OF CARGO TARIFFS

As with passenger fares, international cargo tariffs have traditionally been agreed by the airlines through IATA and subsequently approved by governments. With liberalization of tariffs, especially on routes to the United States, and with over-capacity in many markets, IATA cargo tariffs have tended to become less significant world wide, though for most countries, especially in the Third World, they provide the basis for the pricing of air freight. Since August 1984, tariffs have been published in the local currency of the point of origin.

The majority of international city pairs involving major and secondary cities have an IATA *general cargo rate*. Like all air freight rates, it is expressed as a rate per kg, or on US routes per lb, and there may be a minimum charge per consignment. Originally, general cargo rates were one-eightieth of the passenger fare on the same route on the grounds that a passenger and their baggage were estimated on average to weigh 80 kg. An examination of general cargo rates around the world shows that the rate per kilometre tapers with route distance. But the taper, which in theory is cost related, is neither regular nor always evident. In addition there are significant variations in the general cargo rate for opposite directions on the same route. Thus the general rates from African points south of the Sahara to Europe have traditionally been as low as two-thirds or less of the rates for cargo originating in Europe. Similar north-south imbalances in rate levels have also existed on air routes between North and South America. Such rate variations have clearly been aimed at reducing the imbalances in freight flows and more particularly at generating more northbound traffic.

On the majority of routes, one or more additional tariffs may be available which will be lower than the normal general cargo rate. First, there may be *quantity general cargo rates* where the rate per kg or lb decreases as the size of the consignment increases beyond certain agreed weight break-points. While most routes may have only one or two quantity rates (45 kg and 100 kg are common break-points), routes to and from the United States tend to have many more breakpoints, with successively lower rates as consignment weight increases.

While the quantity general cargo rates encourage consolidation into large consignments, they fail to stimulate the air freighting of particular goods or commodities. This is done by *specific commodity rates* which are individual low rates for specific and clearly defined commodities. Some routes may have only one or two commodity rates, while others may have 40 or more. Such rates will reflect and encourage the types of goods most likely to be shipped by air on each route. Many commodity rates also include quantity discounts, with lower rates as shipment size increases. The level of the commodity rates varies widely, but on occasions they may be as low as 20 per cent or less of the general cargo rate. While the original aim of specific commodity rates was to attract goods which would otherwise not travel by air, commodity rates are now frequently agreed to even for high-value, low-weight goods which could bear the cost of the general cargo rates.

The third type of discount rates are those related to particular unit load devices, known as *ULD rates*. Such rates are not available in all markets. There is a fixed minimum charge per ULD, which declines proportionally as the size of the pallet or container increases. The minimum charge is for a given weight, known as the pivot weight. If the contents in the ULD weigh more than the pivot weight, then they are charged on a per kg basis, but the rates are normally lower than the quantity general rates or most of the specific commodity rates. The tariff structure, based on a minimum charge and low rates above the pivot weight, encourages shippers and forwarders to pack as much into the ULDs as possible. Moreover, by mixing shipments of different weight and density in a container, they can reduce the average cargo rate they pay to the airline. The aim of ULD rates is also to encourage shippers to use containers or other unit load devices which, from an airline viewpoint, are easier and cheaper to handle than disparate consignments.

A somewhat different category of cargo tariffs are the so-called *class rates*, which involve a rebate (for unaccompanied baggage or newspapers) or a surcharge (for gold or human remains, for example) on the general commodity rate. They have been applied to certain commodities whose carriage calls for special treatment. They are expressed as a percentage discount or surcharge on the general cargo rate, though such discounts and surcharges seem to reflect demand elasticity rather than the costs of the special treatment these shipments require. Only a small proportion of freight travels at these class rates.

In recent years, pressure from cargo charters on a few routes, excess cargo capacity on many routes and the trend towards liberalization of airline pricing have together produced significant changes in the structure of tariffs in several major markets. *Freight-all-kinds* (FAK) rates became widespread on the North Atlantic from about 1980 and subsequently spread to some other markets. These are low rates based on weight, not the commodity or the type of ULD. Originally they applied only to large consolidated shipments, but in very competitive markets minimum weight limits have often been abandoned. FAK rates are published separately, their main purpose being to simplify the profusion of commodity and other rates.

Even more significant is the increasing use of *contract rates* directly negotiated by airlines with large shippers or forwarders guaranteeing to provide a minimum tonnage over a given period. The growing market power of freight forwarders and the competitive pressure on airlines to sell excess capacity have created a situation on the North Atlantic, on the North Pacific and some other routes where very low contract rates dominate the market and where freight pricing bears little relation to published IATA tariffs. Contract rates may fall to 20 per cent or less of the general cargo rate (Table 12.2 above). In competitive markets with considerable spare freight capacity slushing around, it is likely that only small and emergency consignments move at published freight rates, while well over half the freight tonnage is shipped at contract rates.

12.6.2 PRICING STRATEGIES

The review of the structure of cargo tariffs suggests that they bear only a tenuous relationship to cargo costs. Different commodities on the same route may be charged at widely different rates, with no marked differences apparent in the costs of handling and freighting them. General cargo rates vary markedly between sectors of similar length being operated with similar aircraft. Rates on the same route differ in opposite directions. The taper of rates per kilometre with distance is neither consistent nor closely related to costs. While IATA and some airlines have tried to dress up the cargo tariffs as being somehow cost related, there can be little doubt that the underlying philosophy, especially for commodity rates, is ultimately one of ‘charging what the traffic will bear’, that is, market-oriented pricing. Such a pricing strategy was encouraged by the byproduct view of air cargo. As a byproduct of passenger services, the carriage of freight appeared to impose low additional costs, and any revenue in excess of these low costs made a contribution to the overall profitability of the services.

It could be argued, as the UK Civil Aviation Authority has (CAA, 1977b), that market pricing is discriminatory since it entails charging some shipments more than the costs they impose and others less. This is undoubtedly the case, but it is difficult to see how market pricing could be avoided given the nature of the air freight market. It has two distinctive characteristics which bedevil any attempt to establish cost-related tariffs. First, the existence of freight consolidators and wholesalers not only cuts off the airlines from their true customers and distorts the pricing mechanism but also gives such large freight agents considerable market power. Secondly, the carriage of freight is inherently more competitive, even in regulated markets, than is the carriage of passengers. This is because most freight, except for emergency freight, is indifferent to the routeing it is offered in order to move from its origin to its destination. A shipper is unconcerned if a shipment goes from New York to Lisbon via Amsterdam or Frankfurt or Copenhagen with a six-hour transhipment at one of those airports, provided it gets to Lisbon within the expected time. Few passengers would put up with circuitous and lengthy journeys. Thus in most cases there are numerous routeings (and airlines) that freight can use to get to its destination. This ensures a degree of interairline competition which may be absent for passengers on the same routes. If one superimposes on these market characteristics the availability on most air services of surplus belly-hold capacity, then any attempts to establish cost-related cargo tariffs will inevitably be futile. Airlines have little choice but to pursue a strategy of setting rates aimed at maximizing revenue. In prevailing market conditions this means on most major routes charging what the traffic will bear.

In an environment of market-oriented pricing where consolidators and wholesalers have had a major influence on what the shippers ultimately pay, current trends indicate that cargo tariffs are moving towards a three-tier pricing structure related to the speed of delivery. The highest or premium cargo rates are being charged for services guaranteeing overnight delivery. In effect this means that shipments move on the next available passenger flight. The target market is emergency freight and small parcels. It is this market which is most threatened by the integrated carriers. The special commodity, FAK or contract rates are being used for belly-hold cargo and occasionally all-cargo services offering a two-four day delivery. The trend here is increasingly towards FAK or contract rates that reflect the market conditions on each route. It is only on routes where belly-hold capacity is limited in relation to the demand for freight space and alternative routeings are difficult or costly that the structure of complex and relatively high specific commodity rates is likely to survive. Thirdly, the lowest charter-competitive rates are likely to be available for large and regular shipments where delivery may be delayed for up to a week or so. Some of this traffic may go on scheduled all-cargo services. With all three tariff types, lower quantity rates may additionally be offered for larger shipments.

The expansion of the integrated courier and express parcels carriers, such as Emery Worldwide or UPS, into the more traditional freight markets has reinforced this trend towards a tariff structure based on delivery time.

12.6.3
FREIGHT YIELDS

The prevailing cargo tariff levels in the major markets served by an airline and that airline’s traffic mix are clearly the major determinants of an individual airline’s freight yields. Particularly important is the degree to which the general cargo rates have been eroded by the introduction of low specific commodity rates, FAK rates and ultimately by contract or other deep discount rates. This will be determined by market conditions, notably the availability of spare capacity and the degree of inter-airline competition. Commodity mix and consignment size are important in determining the rates paid to the airline. The length of haul of those consignments also impacts on yields since cargo rates per kilometre tend to decline with distance. Similar factors will also affect the freight yields achieved in different parts of an airline's network. The wide range of freight yields obtained in different geographical areas by member airlines of the Association of European Airlines (AEA) is illustrated in Table 12.4. This shows that the lowest yields in 1989 were being achieved in the long-haul markets where there was most over-capacity, notably the North Atlantic. Conversely, it is evident that on the relatively short European routes, where surface transport is very competitive, yields are exceptionally high. This suggests that much of the international air freight within Europe is composed of relatively small and high-rated consignments, often of an emergency nature.

As a general rule, yields per freight tonne-kilometre are less than half those generated per passenger tonne-kilometre. In 1988, the average yield per passenger tonne-kilometre on the international scheduled services of the world's airlines was 91.4 US cents. The average freight yield was 30.8 cents per tonne-kilometre, equivalent to 34 per cent of the passenger yield (ICAO, 1990). If domestic services are included, then freight yields are around 42 per cent of passenger yields. A similar relationship between the two yields has

Table 12.4 International freight yields of European airlines, 1989

	Revenue per t-km on:		Yield on freighters as percentage of passenger/combi yield
	Passenger or combi services	All freighters	
	US¢	US¢	%
European services	85.7	72.2	84
Europe-Mid East	42.4	33.4	79
North Atlantic	24.1	22.6	94
Other long haul	33.2	29.5	89
All AEA services	32.3	28.3	88

Source: Compiled from Association of European Airlines data.

existed for many years. The relatively low freight yields explain why freight represents about one-quarter of airline production world wide but generates only around one-eighth of airline revenues (Table 1.6). Inevitably, the airlines very heavily involved in air freighting will have overall yields (for passenger and freight traffic combined) which are lower than those of passenger-dominated airlines.

12.7
Future prospects

At the end of the 1980s, forecasts of air freight growth during the 1990s were all very optimistic. The International Civil Aviation Organization forecast an annual rate of growth in international freight tonne-kilometres between 1988 and 2000 of 8.5 per cent (ICAO, 1990). Other long-term forecasts, mostly produced by aircraft manufacturers, were around this figure: McDonnell Douglas predicted that international freight traffic would grow at 10.6 per cent per annum to 1998, while Boeing forecast a growth rate lower than ICAO's. But all long-term forecasts have one feature in common. They all foresee well-above-average growth rates for freight on air routes to and within the Pacific basin, notably on the transpacific routes, on Europe-Far East routes and on air services between countries in the Far East and Pacific region. These are the freight markets that will grow most rapidly during the 1990s.

The prospects look promising but there are two areas of concern for the world's international airlines. The first is whether continued over-capacity in many freight markets will depress freight yields to uneconomic levels. During the first half of the 1980s freight yields declined in some markets but overall stayed fairly constant. In the second half of the decade they began to rise again as freight demand picked up. In constant or real value terms, however, freight yields actually declined quite sharply during the 1980s. In the 1990s many new passenger aircraft ordered during the boom years of 1987–9 will enter international markets. There are going to be significant increases in belly-hold cargo capacity, particularly in the period up to 1993. Will the airlines be able to prevent a collapse in cargo rates? The second problem area is how to respond to the different market expectations created by the integrated carriers. If the traditional airlines are to succeed as carriers of freight, they must appreciate that there has been a logistics revolution. They must invest heavily in distribution networks, in electronic data interchange (EDI) and in other facilities which are needed to meet shippers' requirements. Their aim should be not just to transport freight by air but to add value to the shipper's products. In doing this they may be able to charge more for their services and thereby counteract any downward pressure on rates.

13
Future Problems and Prospects

The second half of the 1980s was a good period for the airline industry. After the disastrous years of 1980–3, its fortunes improved. Despite a hiccup in 1986 associated with the Chernobyl nuclear disaster and terrorism in Europe, the years 1984–9 were among the most successful in the industry's history. Yet, surprisingly, operating profits as a percentage of revenue were only about 4–6 per cent; and they dropped to only 1–2 per cent once interest and other non-operating items were included (Figure 1.4). Nevertheless, there had been a marked improvement compared with the early 1980s.

The reasons for the turn-round are not difficult to find. The first and probably the most important was undoubtedly the drop in the real price of aviation fuel from around 135 US cents per gallon in 1980 to less than 50 cents (at constant 1985 values) by 1986 (Figure 5.1). As a result both of this dramatic drop in fuel price and of lesser drops in maintenance and depreciation costs, overall unit operating costs also declined. Unit costs had been around 50–55 cents per available tonne-kilometre (at 1985 values) during the 1970s, but dropped sharply after 1980, bottoming out at around 40–45 cents by 1985 (Figure 1.1).

Secondly, the latter half of the 1980s saw a rapid surge in worldwide demand. Whereas between 1980 and 1985 the annual growth rate averaged 5 per cent, between 1986 and 1989 it shot up to an average of 8–9 per cent. Growth was even faster in some parts of the world, notably on East Asian routes. There was insufficient capacity to meet this upswing, so load factors rose from 58 per cent in 1980 to around 60–61 per cent in the second half of the decade (Figure 1.2). For international scheduled airlines the improvement was most impressive in terms of passenger load factors. These climbed from 58 per cent in 1980 to 68 per cent in 1988, with several scheduled airlines, particularly Asian ones, operating for several years at passenger load factors above 70 per cent.

Given these favourable developments it is surprising that the improved profitability was still fairly marginal overall. This was because revenue yields also declined during the early 1980s and this partly offset the impact of falling costs and higher load factors (Figure 1.3). Also, despite the overall improvement in the industry's fortunes, many airlines around the world continued to fly off course. Several US airlines, notably Pan American, and many others in Africa and South America failed effectively to match supply and demand and continued to make losses during most of the decade.

At the beginning of the decade, prospects for continued airline profits throughout the 1990s looked good. Most long-term forecasts envisaged annual growth rates of 5.5–7 per cent, which means that most of them agreed that traffic would more or less double by the year 2000; it was expected to more than double in some high-growth markets as in the Far East. But there were problems ahead. The acceleration of demand in the late 1980s and the resultant rise in load factors had led to a rash of large aircraft orders. This was facilitated by the activities of the leasing companies, which ordered numerous new aircraft on behalf of airlines that might otherwise have delayed their orders because of internal financial constraints. Between 1990 and 1999, around 700 new commercial jet aircraft are being delivered each year, of which at least a quarter will be wide-bodied. The growth in potential airline capacity is enormous. How enormous depends partly on the rate of retirement of older and noisier aircraft currently in airline fleets. Can such a rapid increase in airlines' potential supply of air services be absorbed by the projected increase in demand or will load factors and revenue yields collapse as supply outpaces demand? Will the economics of international airlines once more fly off course?

By mid-1990 there were the first signs of an impending downturn in airline fortunes. Several airlines, among them Air Canada, KLM, Air France, Northwest, and SAS, reported significant falls in their profits for the first six months of 1990 compared to a year earlier. This was attributed to a variety of factors. But the underlying cause was that traffic growth in many markets was below expectations and load factors and, in some cases, revenue yields, were beginning to fall while many airlines' costs were rising rapidly.

The Iraqi invasion of Kuwait in August 1990 turned what might have been a short-term decline in airline profitability into a potentially longer term crisis. Fuel prices rose rapidly after August as supplies of petroleum from Iraq and Kuwait dried up. By October spot prices for jet fuel were around $1.40 per US gallon, more than double the July 1990 price. Any more serious disruption of Middle East fuel supplies would clearly aggravate the situation. It was felt, however, that any further dramatic increase in the price of oil would be shorter lived than was the case in the 1970s when alternative sources of oil were more limited. Perhaps of greater concern to the airlines was the adverse effect that higher oil costs might have on major world economies and the consequent dampening of demand for air transport which might result. Already by the end of 1990 and before the start of the Gulf War many airlines were in serious trouble because of the downturn in several markets. In the United States, Eastern Airlines stopped trading in January 1991 following estimated losses in 1990 of $660 million while both Pan American and Continental were operating under Chapter 11 bankruptcy rules. Pan American and TWA were desperate to sell their London-Heathrow to United States services to United and American respectively in order to generate sufficient cash flow to keep going. European airlines, meanwhile, were announcing losses or sharply reduced profits for 1990. Sabena, for instance, was forecasting a loss of $215 million for the year.

The eruption of the Gulf War on 17 January 1991 blew a large hole in airline finances and turned crisis into potential disaster. Fear of terrorism combined with directives from many large companies to their personnel to avoid travel by air resulted in an unprecedented drop in passenger traffic levels throughout the world but more especially on European and North Atlantic routes. In the first month after the outbreak of war, European airlines registered 15–25 per cent falls in passenger numbers while on transatlantic routes traffic was often 30–40 percent down on a year earlier. It was high yield business travel which slumped particularly badly so the impact on airline revenues was even greater than the passenger numbers would suggest. The downturn in demand was very much worse than in 1986. As airline load factors collapsed the economic crisis facing the international airline industry deepened.

Drastic action was needed to cut costs and to stimulate demand. Frequencies were reduced by most airlines and several, such as Air France or British Airways, pulled out of marginal or loss-making routes altogether. British Airways abandoned Heathrow-Dublin, a route it had served for over 40 years, because increased competition had made it unprofitable. Aircraft orders were cancelled or delayed. In an effort to reduce further costs widespread staff cuts were announced. By early 1991 Iberia had revealed that it was shedding 10 per cent of its employees and Air Canada 12 per cent. KLM was cutting staff by 3,000, US Air by 3,585 and Qantas by 500. British Airways announced 4,600 job losses and that 2,000 employees would be stood down on half pay.

To generate revenue many airlines announced fare reductions or illegally discounted fares especially on those routes most adversely hit by the downturn in demand. Early in February 1991 both TWA and British Airways announced 33–50 per cent fare reductions on transatlantic services. Domestic fares in Britain and the United States also started coming down.

Such were the problems being faced that in February 1991 the European Commission agreed to a three-month package of contingency measures, which flouted its own competition rules, in order to assist European airlines adversely affected by cost escalation and falling traffic as a result of the Gulf War. Most notably, it was prepared to allow limited financial support by governments for their national carriers.

The thesis argued in this book is that airlines must husband their resources carefully in matching supply, which they control, with demand which they do not. Whatever happens in the shorter term as a result of the Gulf Crisis, international air transport throughout the 1990s will be characterized by a less stable market environment as regulatory controls are further loosened, especially within Europe, and as the larger carriers jostle for dominance in particular markets. Within a potentially unstable environment, matching supply and demand will become more difficult. US experience has shown that pushing up load factors and preventing declines in real yields become particularly difficult during the early years of deregulation. Yet this is exactly what many international airlines must do during the 1990s.

International scheduled airlines also have to learn some hard lessons from their South East Asian counterparts and from Europe's charter airlines. The former have shown the need both to increase labour productivity while keeping labour costs down and to have effective marketing based on product features which meet market expectations—the aim of such marketing being to push up load factors and thereby further reduce unit costs. The charter airlines' success has been based on reducing indirect costs to a minimum, on higher seating densities and on a very close matching of supply to demand so as to achieve very high passenger load factors.

To ensure their future profitability, international airlines must first of all significantly reduce their labour costs to levels that are comparable to those of the newer Asian carriers. This means major increases in labour productivity. For many European and North American airlines, which have not done so already, this may require large cuts in staff numbers and an easing of job demarcation between different categories of staff. The staff cuts announced in 1990 and 1991 were a step in this direction. But would cuts of this order be enough? The second area of concern must be that of indirect operating costs. Considerable costs savings can be achieved, as the charter airlines have shown, through a simplification of reservations and ticketing procedures. Simplification and automation of ticket sales and of baggage and passenger check-in should be used to reduce staff numbers and costs and facilitate air travel at the same time. Administrative overheads must also be cut to a minimum. Lastly, scheduled airlines must strive to achieve higher year-round load factors. Currently, average load factors tend to be in the mid-sixties for the better airlines and low sixties or less for the others. Airlines must aim for year-round load factors in the mid-seventies or higher. To achieve them they will need to introduce effective and sophisticated yield management techniques which ensure that the revenue on each individual flight is maximized. This may also require increased expenditure on marketing and promotion. This is the one item of indirect costs which may actually increase, but it should not get out of hand. These lessons may not be easy to accept but ignoring them will not just mean flying off course. It may well mean going to the wall.

Appendix A: Freedoms of the Air

Negotiated in bilateral air services agreements

First Freedom The right to fly over another country without landing.

Second Freedom The right to make a landing for technical reasons (e.g. refuelling) in another country without picking up/setting down revenue traffic.

Third Freedom The right to carry revenue traffic from your own country (A) to the country (B) of your treaty partner.

Fourth Freedom The right to carry traffic from country B back to your own country A.

Fifth Freedom The right of an airline from country A to carry revenue traffic between country B and other countries such as C or D. (This freedom cannot be used unless countries C or D also agree.)

Supplementary rights

Sixth 'Freedom' The use by an airline of country A of two sets of third and fourth freedom rights to carry traffic between two other countries but using its base at A as a transit point. For example, Royal Jordanian carries sixth freedom traffic between London and Middle East points via its base at Amman even though it has not been granted fifth freedom rights between these points and London.

Sixth freedom rights are not formally recognized in air services agreements, though several Confidential Memoranda of Understanding make implicit reference to them, especially when dealing with capacity issues.

Cabotage Rights The right of airline of country A to carry revenue between two points in country B. For example, Air France for many years had cabotage rights between various points within Morocco.

Cabotage rights are very rarely granted. Nevertheless, several countries whose carriers are currently flying to the United States are pressing the US government for cabotage rights.

Appendix B: Definition of Airline Terms

Payload capacity Total of aircraft capacity available for the carriage of passengers, baggage, cargo or mail. Measured in metric tonnes.

Capacity or available tonne-kilometres (ATK) This is a measure of airline output. ATKs are obtained by multiplying the payload capacity on a flight by the stage distance flown.

Revenue tonne-kilometres (RTK) or tonne-kilometres performed/carried This measures the output actually sold. RTKs are obtained by multiplying the number of tonnes carried on a flight by the stage distance.

Weight load factor Measures the proportion of the output actually sold. It is the RTKs expressed as a percentage of the ATKs.

Capacity or available seat-kilometres This is obtained by multiplying the seats available on a flight by the stage distance.

Passenger-kilometres The number of passengers on a flight multiplied by the stage distance. Passenger-km are normally converted to revenue or passenger tonne-km by assuming that 1 passenger with baggage equals 90kg (i.e. passenger-km divided by 11.111 equal passenger tonne-km).

Seat factor or passenger load factor On a single sector this is obtained by expressing the passengers carried as a percentage of the seats available for sale. On a network of routes, the seat factor is obtained by expressing the total passenger-km as a percentage of the total seat-km available.

Tonne-kilometres per hour This measures an aircraft's hourly productivity. It is the payload capacity multiplied by the average speed. The latter may be the average block speed or the cruise speed.

Stage or sector distance Ideally this should be the air route distance between two airports. Many airlines and IATA use the great circle distance, which is shorter than the distance actually flown.

Average stage length The weighted average of stage/sector lengths flown by an airline. This is most easily obtained by dividing an airline's total annual aircraft-km by the number of aircraft departures or flights recorded during the year.

Aircraft-kilometres The distances flown by aircraft. They are derived from the stage lengths and the frequencies operated over each stage.

Length of (passenger) haul The average distance flown by an airline's passengers. This is obtained by dividing an airline's total passenger-km by the number of passengers carried.

Block time This is the time for each stage between engines being switched on at departure and off on arrival.

Block speed The average speed for each stage calculated from the block time.

Flying or airborne time The time from aircraft lift-off to touch-down on the runway.

Aircraft hours The cumulative time that each aircraft is in use, calculated usually from the block times. Airborne or flying hours might also be calculated.

Aircraft utilization The average number of block hours that each aircraft is in use. Utilization may be measured on a daily or an annual basis.

Yield Measures the average revenue obtained per ATK or RTK. It is obtained by dividing an airline's total revenue by its total ATKs or RTKs.

Passenger yield The average revenue per passenger-km or passenger/tonne-km. It is obtained by dividing total passenger revenue by the total passenger-km or passenger tonne-km. Freight yields are obtained in the same way.

Flight crew Refers to the pilot, co-pilot and flight engineer if any.

Cabin crew Refers to stewards and stewardesses.

Seat pitch This is the standard way of measuring seating density on aircraft. It is the distance between the back of one seat and the same point on the back of the seat in front.

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