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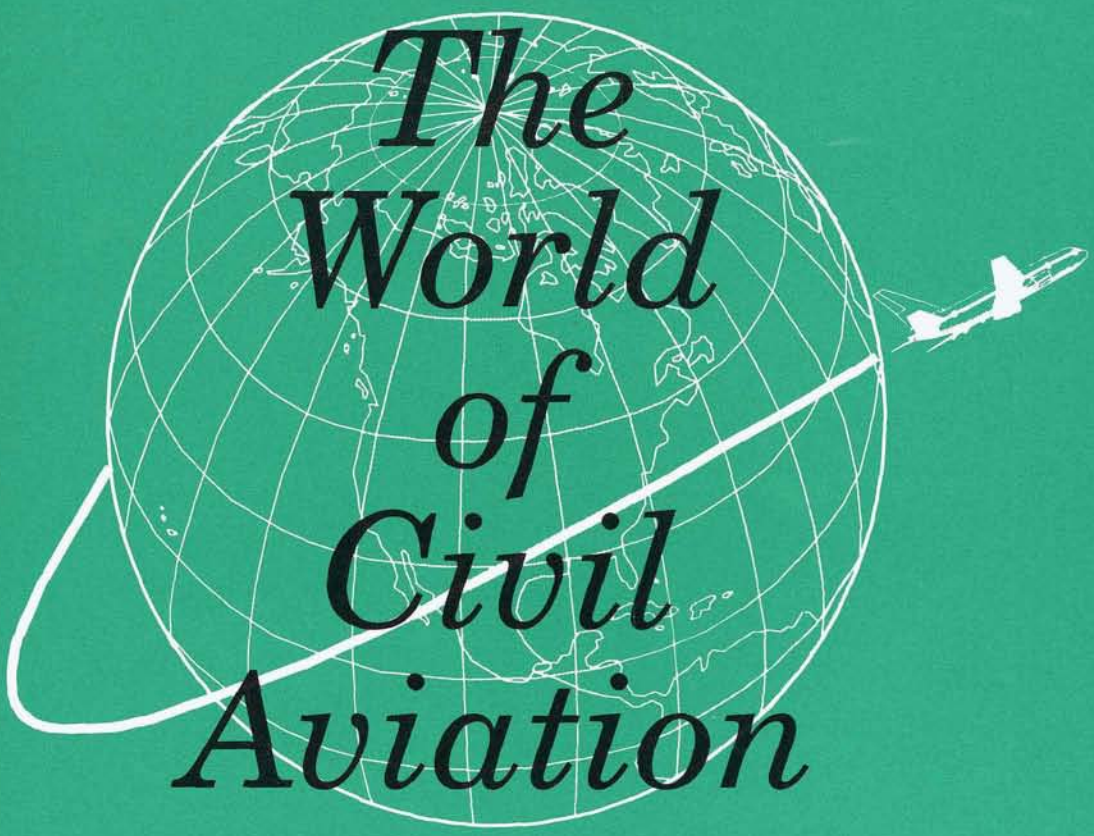

The World of Civil Aviation

1997-2000

Approved by the Secretary General and published under his authority

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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HIGHLIGHTS

DURING 1997 ...

Growth in the world economy held up ...

The world's Gross Domestic Product (GDP) grew by an estimated 3.3 per cent in real terms. On a regional basis the change in GDP ranged from an estimated increase of some 5.2 per cent for Latin America and the Caribbean to about 2.5 per cent for Europe, with that in Asia/Pacific following to just below the world average (see Chapter 1).

... and airline traffic growth was sustained ...

Overall scheduled passenger/freight/mail tonne-kilometres performed were up by 8 per cent and international tonne-kilometres by 9 per cent. There were significant differences in the traffic growth between regions, ranging from increases in total traffic of about 4 per cent for carriers based in the Middle East to some 12 per cent for those in Latin America and the Caribbean (Chapter 2).

Airline operating profits improved ...

Preliminary estimates indicate that the world's scheduled airlines as a whole experienced an improved operating profit — 5.5 per cent of operating revenues compared with 4.4 per cent in 1996 — for the fifth year in succession (Chapter 2).

... and aircraft orders were up ...

The number of turbo-jet aircraft ordered was 1 309 compared to 1 003 in 1996. The financial commitment for orders placed for these aircraft is estimated to be about U.S.$78 billion, compared with some U.S.$65 billion estimated for 1996 (Chapter 2).

Liberalization was fostered through bilateral agreements ...

The number of bilateral agreements and memoranda of understanding concluded between States was slightly down when compared with 1996, but about a quarter of these agreements provided for full-market access (Chapter 2).

Privatization of airlines continued, ...

Privatization aims were achieved during the year for five carriers compared with only two in 1996. New privatization objectives were made known for four carriers in addition to 20 other government-owned carriers targeted for privatization in previous years (Chapter 2).

... as did airline alliances, ...

Airlines continued to expand transnational alliances, including codesharing, joint services, and joint participation in frequent-flyer programmes (Chapter 2).

... and more autonomy was given to infrastructure providers ...

During the year there was further evolution in several regions of autonomous entities to operate airports or provide air navigation services, with greater emphasis being placed on active private participation (Chapter 3).

Airport construction continued ...

Asia led the way in the number of new airports under construction and major expansion projects were under way in all regions (Chapter 3).

Implementation of a satellite-based navigation system yields early benefits, ...

As a result of the implementation of a global satellite-based Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) system, new air routes were opened over the airspaces of China, the Russian Federation and other parts of Asia (Chapter 3).

... while existing air navigation facilities and services continued to be enhanced ...

Air traffic control systems around the world continued to be updated as part of the evolution process to a global ATM system. Meteorological services were also enhanced. In addition to the use of automated weather stations, computer-generated weather forecasts and nine volcanic ash advisory centres, 1997 saw the implementation of six tropical cyclone advisory centres for civil aviation (Chapter 3).

Safety remained a top priority ...

Preliminary information on aircraft accidents involving passenger fatalities in scheduled air services shows that there were 26 fatal aircraft accidents involving 916 passenger fatalities in 1997 compared to 23 fatal accidents and 1 135 passenger fatalities in 1996. The

number of passenger fatalities per 100 million passenger-kilometres decreased from 0.05 to 0.04. By year-end 57 States' administrations had been assessed through the ICAO Safety Oversight Programme (Chapter 4).

... as did security ...

There were five acts of unlawful interference in 1997, compared with 14 such acts in 1996 (Chapter 4).

And ICAO was entrusted with pursuing reduction of greenhouse gas emissions...

The Kyoto Protocol adopted in December entrusts ICAO to pursue the limitation or reduction of greenhouse gas emissions from civil aviation (Chapter 4).

BETWEEN 1997 AND 2000 ...

Airline traffic is expected to continue to grow at a lower pace ...

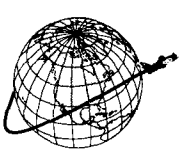
Total scheduled passenger traffic (in terms of passenger-kilometres performed) is expected to grow on average just over 5 per cent each year during the period 1998-2000, compared with an average annual rate of about 6 per cent for the ten-year period 1986-1997 (Chapter 5).

Airline finances should remain stable ...

Scheduled airline revenues (including revenues from freight, mail and other sources as well as from passengers) and airline expenses are forecast to increase at a similar pace, leading to fairly stable operating results over the next three years (Chapter 5).

Regional differences in traffic growth will remain ...

The passenger traffic of airlines registered in the Latin American/Caribbean region is expected to show the highest annual average growth, over 7 per cent, compared with an annual average growth rate of about 5 per cent for the world. The passenger traffic of airlines in Europe and the Asia/Pacific regions is expected to grow at a rate a little above the world average rate; traffic of airlines in Africa and the Middle East is expected to grow at about the world average, while airlines in North America, the world's most mature aviation market, are expected to experience the lowest regional rates of traffic growth (Chapter 6).



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Foreword

Introduction

1. This circular, *The World of Civil Aviation — 1997-2000,* is the sixth in an annual series of publications covering recent and future developments in civil aviation; the developments for the previous period 1996-1999 were published in Circular 271. In the present circular, Part I reviews the main events in or affecting international civil aviation in 1997, Part II analyses trends in the world economy and the air transport industry and presents global forecasts of airline scheduled passenger traffic through to 2000, and Part III reviews, on a region-by-region basis, the year 1997 and gives prospects through to 2000.

2. More extensive aviation statistics for 1997 may be found in the ICAO statistical yearbook, *Civil Aviation Statistics of the World — 1996* (Doc 9180/22), a compendium of the key statistics published in the various ICAO Digests of Statistics. The medium-term forecasts in *The World of Civil Aviation* are complemented by longer-term and more extensive forecasts published biennially or triennially, the most recent publication being the *Outlook for Air Transport to the Year 2005* (Circular 270).

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Sources

4. In addition to the Digests of Statistics and other ICAO publications referred to above, sources of information for *The World of Civil Aviation* include relevant and most recently available statistical publications of the United Nations; the United Nations Conference on Trade and Development (UNCTAD); the International Monetary Fund (IMF); the World Bank; the World Tourism Organization (WTO); the Organisation for Economic Co-operation and Development (OECD); the European Civil Aviation Conference (ECAC); the United States Department of Transportation (DOT); the Airports Council International (ACI);

the International Air Transport Association (IATA); the Association of European Airlines (AEA); WEFA Group (formerly known as Wharton Econometrics Forecasting Associates Group); Airclaims Ltd.; and Avmark Inc.

5. Another source of information used for *The World of Civil Aviation* was the large and constantly updated collection of research material on hand at ICAO, including completed ICAO studies, periodical and occasional publications of national administrations and international organizations, studies prepared by research agencies and individuals, and the aviation press. Finally, an information collection exercise specifically for *The World of Civil Aviation* was carried out through the seven ICAO Regional Offices.

6. The statistical data for 1997 appearing in this circular are to be considered as preliminary: experience shows that the margin of error for world totals is probably less than 2 per cent, except in the case of profit margins where it may be considerably higher. *Unless otherwise noted:*

a) all statistical data are applicable to ICAO Contracting States (185 at the end of 1997);

b) regional breakdowns are by ICAO statistical region (see map preceding Chapter 6);

c) traffic statistics are for revenue scheduled services;

d) total airline financial statistics relate to non-scheduled as well as scheduled operations of scheduled airlines;

e) the expression "tonne-kilometre" means metric tonne-kilometre; and

f) the word "billion" means one thousand million.

Monetary unit

7. Unless indicated otherwise, all references in this circular to "cents" mean "U.S. cents", and all references to "$" mean "U.S. dollars".

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PART I

THE WORLD IN 1997

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Chapter 1
Economic Influences

1.1 While growth in air traffic has historically been greater than growth in the economy, there is a strong correlation between the two and the demand for air transport is primarily determined by economic development. Developments in personal income affect the level of purchasing power and the propensity to undertake leisure travel in general and air travel in particular. Commercial activity and trade have a direct impact on the demand for business travel and for air freight.

1.2 In global terms, the world economy continued to prosper in 1997. Europe, North America as well as Latin America and the Caribbean saw a strengthening in their economic performance. However, there were weakening performances in the regions of Africa, Asia/Pacific and the Middle East.

1.3 Crude oil prices play a key role not only in the health of the world economy, but also in air carrier costs. Fuel costs have ranged between 12 and 25 per cent of scheduled airline operating costs over the past decade. Inflation, interest rates and currency markets are among other important factors which affect the world economy in general and international aviation in particular.

1.4 As background to the analysis of the world of civil aviation in 1997, which follows in Chapters 2 to 4, this chapter reviews global developments in 1997 in economic output, trade and international tourism; in inflation, interest rates and currency markets; and in crude oil and jet fuel prices. The impact of economic trends on the medium-term outlook for commercial air transport at the global and regional levels are discussed in Part II, World Outlook to 2000 (Chapter 5) and Part III, Regional Perspectives, 1997 to 2000 (Chapter 6), respectively.

GROSS DOMESTIC PRODUCT

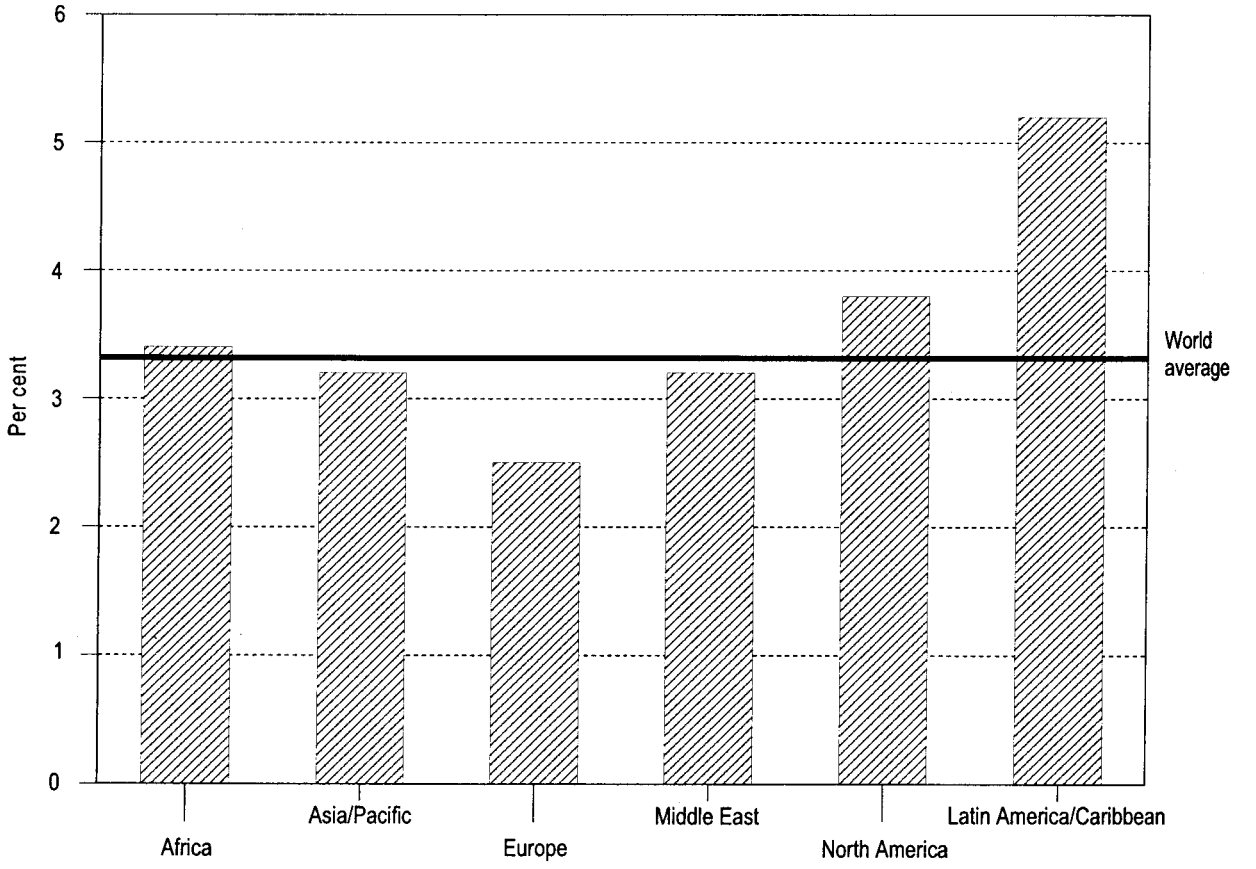
1.5 In terms of the Gross Domestic Product (GDP) development, which is the broadest available measure of economic activity, the world economy expanded by an estimated 3.3 per cent (in real terms) in 1997, compared to 3.6 per cent in 1996. This global result masks a wide spread in the economic performance of industrial and developing countries and also at the regional levels which Chapter 6 describes in some detail. Figure 1-1 illustrates the economic growth rates for the world and the ICAO statistical regions in 1997.

1.6 Industrial countries' economies expanded at an estimated average of 3.0 per cent GDP growth in 1997. Producing more than half of global output, their prospective growth had

an overall stabilizing effect for the global economy. Continuing economic recovery in North America (3.8 per cent) and a slightly improved growth path for the European Union (2.6 per cent) was backed by stronger domestic demand.

1.7 The process of transition towards market-based economies continued in countries of Central and Eastern Europe as well as the Commonwealth of Independent States (CIS) in 1997. In the aggregate, economies of these countries in transition increased their real output value (GDP) by 1.7 per cent, a marked improvement over the stagnation of the previous year (–0.1 per cent).

1.8 The economic performance of developing countries slowed down from 6.6 per cent in 1996 to 5.8 per cent in 1997. After modest growth in 1996 (3.5 per cent), the economies of the Latin America and the Caribbean region expanded at 5.2 per cent. However, the developing regions of Africa and the Middle East showed dampened performances, from 5.0 and 5.2 per cent in 1996 to 3.4 and 3.2 per cent, respectively.



Source: ICAO estimates based on the World Bank, the International Monetary Fund (IMF), WEFA Group and other economic sources.

Figure 1-1. Annual change in real GDP, 1997/1996

1.9 Developments in Asia/Pacific were obscured by substantial declines in financial markets in South-East Asia and a weak Japanese economy. GDP growth dropped from 5.4 per cent in 1996 to 3.2 per cent in 1997. Among the industrialized countries, Japan is most directly exposed and affected. Accounting for more than a fifth of global output, the economies of Asia's developing countries grew in the aggregate nevertheless at an average 6.7 per cent rate, fueled by market-oriented structural reforms and investment in infrastructure.

TRADE DEVELOPMENTS

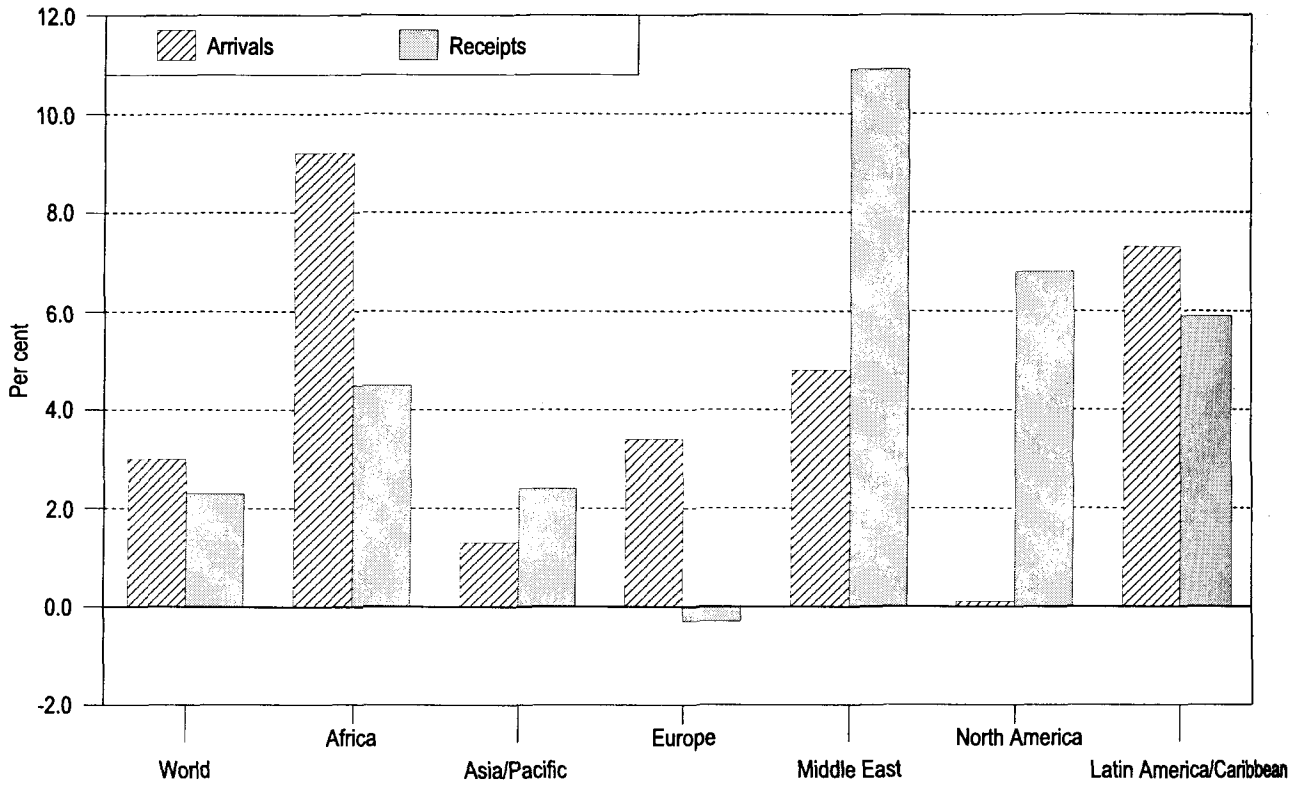
1.10 In 1997, worldwide trade in goods and services grew strongly at more than 9 per cent in terms of volume (compared with 6.3 per cent in 1996) out of which trading of manufacturing goods still had a predominant role at 11.4 per cent average annual growth rate. This acceleration is mainly accounted for by stronger trade activities among industrial countries (11.7 per cent). In comparison, developing countries and countries in transition towards market-based economies traded in the aggregate 7.7 per cent more goods and services, both exports and imports, the same year. Current account imbalances began to widen among major trading blocks and nations. The U.S. trade (current account) deficit continued to rise moderately (2.1 per cent of GDP) in 1997, the European Union's surplus increased steadily (1.4 per cent) while the Japanese surplus rose markedly (2.2 per cent).

1.11 As in previous years, international trade developments surpassed the GDP growth path backed by a widespread adoption of liberalization policies and multilateral treaties in international trade, encompassing trade in services for the first time (Uruguay Round 1994). The air transport industry itself adopted regulatory measures towards greater liberalization as discussed in Chapter 2. These trends continued to have a positive impact on a steadily growing traffic demand for air freight and passenger travel alike.

TOURISM

1.12 The demand for international air travel is related in part to the demand for international tourism. In 1997 international tourism grew slower worldwide and showed greater volatility among the regions. The World Tourism Organization (WTO) estimated a world total of 613 million international tourist arrivals and 444 billion dollar tourist receipts that year, representing an annual growth rate of 3 per cent and 2.3 per cent, respectively. The 1997 results reveal a slowdown compared to 1996 when arrivals and receipts grew by 5.5 per cent and 8 per cent, respectively.

1.13 These trends are a result of stagnation of international tourism not only in East Asia and the Pacific (1.1 percentage growth in arrivals) but also in North America (0.1 percentage growth in arrivals). Europe, the largest market with a 59 percentage share in world international arrivals, showed a modest performance in 1997 (3.4 percentage growth in arrivals). By comparison, the smaller markets of the Middle East, Latin America and the Caribbean as well as Africa showed a relatively stronger performance. Figure 1-2 provides regional market shares in terms of annual percentage changes in tourist arrivals and receipts.



Source: WTO.

Figure 1-2. Annual change in global tourist arrivals and receipts by region of destination (1997/1996)

INFLATION, INTEREST RATES AND CURRENCY MARKETS

1.14 Inflation in most industrial countries stabilized at low levels or continued to fall during 1997, leading to an average rate of 1.8 per cent. Consumer prices in industrial countries were on a steady decline despite sharp fluctuations in commodity prices, including oil, since the early 1980s.

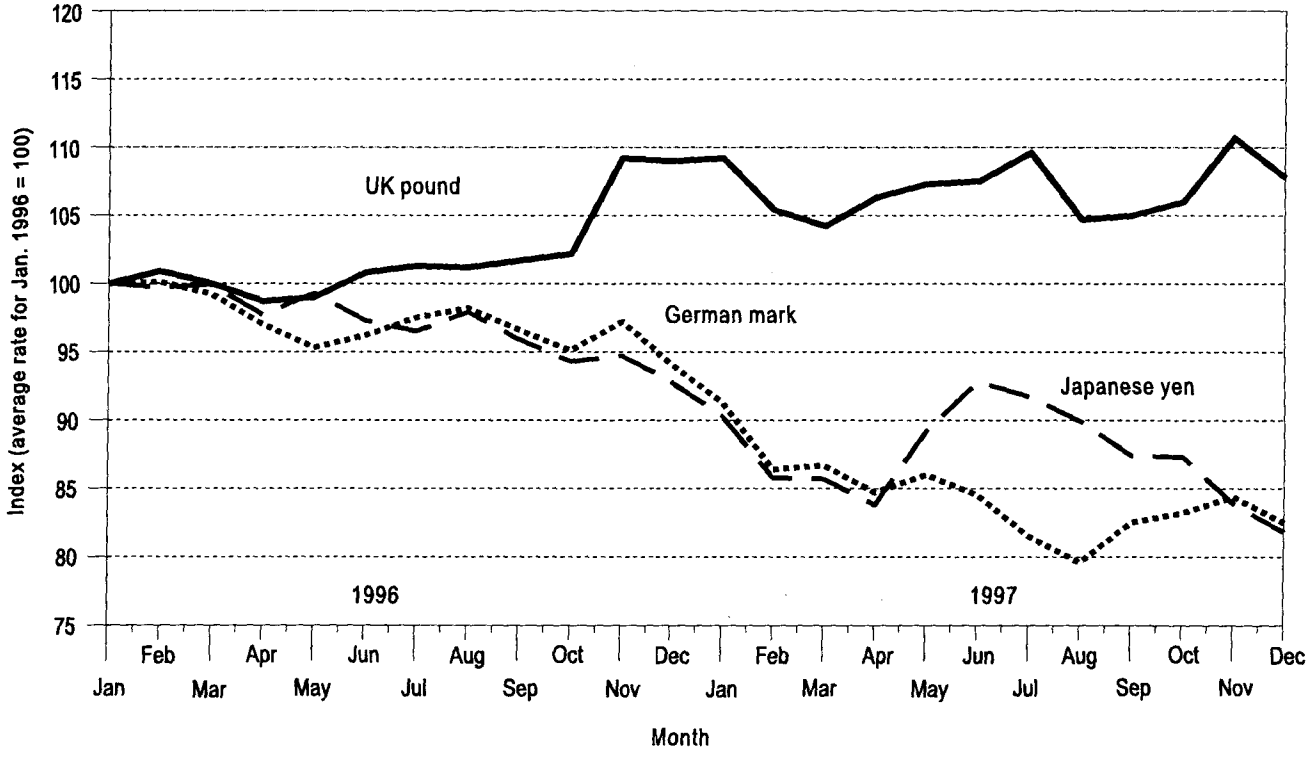
1.15 In most major industrial countries, nominal long-term interest rates have continued a downward trend, while short-term interest rates showed mixed results in 1997. In Japan short-term rates had been very low since mid-1995, at around 0.5 per cent, while long-term rates have averaged below 2 per cent since mid-1997. In this environment of relative price stability and low cost of financing in the industrial countries, cost pressures on airlines and other civil aviation business were generally subdued.

1.16 Currency exchange rates responded to the international differences in asset values, interest and inflation rates, trade balances and various speculative pressures in individual countries. In 1997, among the currencies of major industrial countries, both the German mark and the Japanese yen continued to fall drastically against the United States (U.S.) dollar,

while the United Kingdom (U.K.) pound had reached a 17-year high by year-end (Figure 1-3). Large depreciations of a number of Asian currencies contributed to a further strengthening of the U.S. dollar.

1.17 Movements in exchange rates affect relative prices of international travel markets and hence the related demand and subsequent geographical distribution of traffic flows. For example, the appreciation of the U.K. pound against the dollar is likely to reduce costs of air tickets and other travel-related expenses for United Kingdom residents travelling to the United States and other destinations where the currencies are devalued against the U.S. dollar.

1.18 Fluctuations in exchange rates affect the profitability and balance sheet of airlines. If the proportion of an airline's expenses incurred in the foreign currency exceeds the proportion of its foreign currency revenues, then the devaluation of the local currency would tend to reduce the airlines operating profit. On the other hand, there could be a profit associated with that part of the airlines debt denominated in a depreciated foreign currency, but an appreciated foreign currency would increase the debt burden.

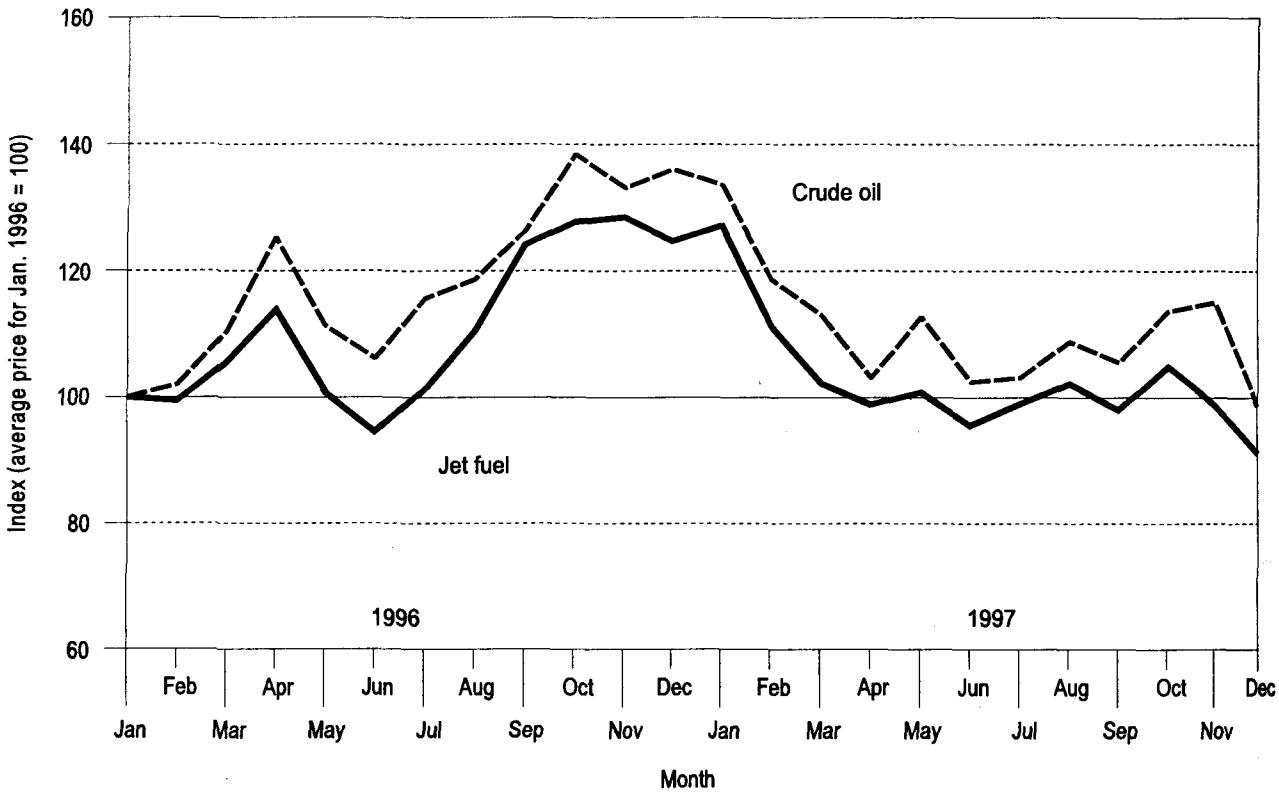


Source: IATA five-day rate.

Figure 1-3. Currency variations with respect to the U.S. dollar (January 1996 to December 1997)

CRUDE OIL AND JET FUEL

1.19 In 1997, the average annual price of jet fuel in U.S. dollars fell from 60 cents per gallon in 1996 to 56 cents per gallon (Figure 1-4). This resulted in reduced operating costs to the airlines, which had a noticeable effect on the overall profitability of the airlines.



Source: Petroleum Economist and the Journal of Commerce.

Figure 1-4. Trends in crude oil and jet fuel prices (January 1996 to December 1997)

Chapter 2
Air Carriers and their Fleets

2.1 This chapter reviews developments in 1997 regarding the economic regulation of air carriers; market entry and exit by air carriers; air carrier ownership, alliances and cooperative ventures; the service levels and the fares and rates they offer; the distribution of their products; their traffic, their fleets and their finances. Some information on developments in general aviation activities in 1997 is also included.

ECONOMIC REGULATION

Air transport agreements and negotiations

2.2 According to publicly available sources, States concluded a total of 80 bilateral air service agreements and amendments in 1997, ten less than the total for the previous year. In regional terms, the trend toward more inter-regional agreements and amendments as opposed to those between States within the same region continued, but at a lesser pace. In 1997, there were 50 inter-regional agreements and amendments in contrast to 59 in 1996; the number of intra-regional agreements and amendments remained almost the same as in 1996 with a total of 30.

2.3 About half of these agreements and amendments for which information was available contained some form of participation measure to ensure effective and sustained participation in international air transport, the most common being a gradual increase in capacity and/or traffic points. A dozen contained broadened ownership and control criteria, most frequently in the form of a requirement that the designated airline be incorporated in and have its principal place of business in the designating State. The number of agreements and amendments in 1997 that provided for multiple designation of air carriers more than tripled to 35 from 11 in 1996. The number of agreements and amendments dealing with airline codesharing reached 16 in 1997, a slight increase over the previous year.

2.4 Of the 50 new bilateral agreements about which some information was available, 17 could be classified as traditional, with provisions for single designation, named traffic points and governmental approval of capacity and tariffs. Of the 33 non-traditional bilaterals, 18 provided full-market access (where air carriers determine the points to be served, capacity and tariffs between the two countries) whereas five provided full traffic rights with some limitation on capacity or tariffs. The ten other non-traditional bilaterals contained one or more elements associated with the progressive liberalization of market access such as

multiple designation, phased capacity increases, or unrestricted all-cargo operations. Reflecting a general and continuing sensitivity with fifth freedom traffic rights, 12 bilateral agreements (nine non-traditional and three traditional) left this element for subsequent agreement.

2.5 In terms of measures to adjust commercial matters to a more competitive environment, a provision on currency conversion and remittance of earnings was the most common, appearing in 32 of the 50 agreements, followed by employment of non-national personnel (29), sales and marketing of air transport products (26), payment of air carrier expenses in local currency (19), and allowing an airline to perform its own ground handling and/or to have access to competitive alternatives (17).

2.6 Of the 18 amendments to bilateral air service agreements about which some information is known, two provided for multiple designation and capacity increases; seven provided for increases in traffic points and capacity, five increased capacity, three increased or changed traffic points and one provided exemption from double taxation.

2.7 Several bilateral negotiations were complicated either by issues of the competitive implications of the approval and/or grant of immunity from competition laws for airline alliances or of airport slot allocation, or both. By the end of the year, long-standing bilateral negotiations between, for example the United States and, France and Japan, were reportedly close to conclusion, but those between the United Kingdom and the United States were continuing.

2.8 In negotiations at the regional level, the European Commission met with the United States in 1997 to discuss aspects of a common aviation area other than traffic rights (such as for CRSs, competition and airline ownership rules). In December, the European Council of Ministers referred a proposal by the Commission to include market access and traffic rights in these negotiations to the Council's Committee of Permanent Representatives for a report in March 1998. The Council authorized the Commission to begin negotiations with ten Eastern and Central European States and the initial discussions with each State concerned covered the present market situation and existing bilateral agreements, market access, harmonization of laws and potential problems. By the end of the year, the Commission and Switzerland appeared to be close to resolving differences concerning surface transport, which would permit conclusion of an agreement on air transport.

2.9 The entry into force on 20 June 1997 of Article 83 *bis* of the *Convention on International Civil Aviation* concerning the lease, charter or interchange of aircraft spurred interest in the economic regulatory aspects of aircraft leasing. Approximately 45 per cent of the commercial airline jet fleet is currently leased. Based on publicly available information, 41 bilateral air service agreements (almost all concluded in the last five years) involving 38 States contain a variety of clauses dealing with the use of leased aircraft. In July, the European Civil Aviation Conference adopted a Recommendation on Leasing of Aircraft, which defined several types of leases and described the information that should be required by regulatory authorities for their approval.

Regional regulatory developments

2.10 In developments concerning regional approaches to international air transport, Transport Ministers of States in the South American region began discussions on a common air transport policy for this region. The Caribbean Community Air Service Agreement received seven of the eight ratifications required to bring it into force. A Task Force of the African Civil Aviation Commission on the Yamoussoukro Declaration recommended practical implementation measures such as shifting the focus to subregional efforts and to strategic airline alliances as well as removing deadlines from the Declaration. A group of West African States formulated the Banjul Accord containing guidelines for airline cooperation and the exchange and use of traffic rights in a six-State area. In Asia/Pacific, transport ministers of the members of the Asia Pacific Economic Cooperation (APEC) forum met in June and endorsed, *inter alia*, the policy options developed by the APEC transportation working group aimed at increasing competitive air services within the region. Pursuant to the decision of the meeting, a small working group initiated work on developing implementation recommendations.

2.11 In October the European Commission, for the third time, sought the approval of the European Council of Ministers for authority to apply Union competition rules externally so that the same competition regime, including exemptions for certain activities, applicable to air transport within the European Community, would apply to air transport on Community/third country routes. The proposal provides for consultations and, where necessary, negotiations in the event of a conflict between Community competition law and the laws, regulations or administrative provisions of third countries or the provisions of air service agreements between European Union (EU) Member States and third countries.

2.12 In other actions, the EU: adopted a regulation establishing a compensation system for victims of aircraft accidents, proposed increasing the amount of compensation for passengers who are denied boarding, issued a new proposal concerning airport user charges, suggested amendments designed to make its aircraft noise regulation more stringent, and reached a common position for safety assessment procedures for non-Community aircraft. With respect to this last item, the European Civil Aviation Conference adopted a recommendation on the same subject with a model bilateral safety clause providing for a system of consultations and ramp inspections of foreign aircraft.

State aid

2.13 In April, the European Commission (EC) accepted release of the final installment of the French Government's subsidy to Air France which had been granted to that carrier in 1994. One month later, six European airlines supported by two governments launched a legal challenge to the French carrier's right to receive state aid, arguing that the EC's approval was not justified and challenging the decision to impose conditions on Air France only for the duration of its 1994-1996 restructuring plan and not to impose them at all on Air Inter which later became Air France Europe.

2.14 During 1997, the EC also cleared the last tranche of government aid to TAP Air Portugal and a $1.6 billion cash injection by the Italian Government for Alitalia paid in three tranches with the last one scheduled for May 1999. The conditions imposed on Alitalia included a range of restrictions on fleet expansion, safeguards over fare levels, the promises to cut the workforce by 7 per cent in four years and to sell its 30 per cent stake in Hungarian airline Malev.

2.15 Responding to a British Midland complaint, the European Commission ordered the Belgian Government to stop aiding Sabena by allowing it to pay lower landing charges in Brussels. Another complaint was filed with the Commission by Air Europe Express alleging that Iberia was using its latest cash injection from the Spanish Government to subsidize fares on routes with competition from other domestic carriers.

2.16 Elsewhere, the Indian Government decided to inject $90 million into Indian Airlines of which over 60 per cent came as a compensation on losses suffered by the carrier after its fleet of Airbus A320s was grounded following a crash of that aircraft type in 1990. Kuwait Airways was to receive a $330 million capital injection to help reduce its debts as a prelude to restructuring and possible privatization. Canadian Airlines International was helped out of a critical financial situation when the Canadian federal government and two provincial governments provided the carrier with financial relief in the form of fuel tax rebates. Air Aruba, ALM Antillean Airlines and Qatar Airways were also among the carriers which received financial support from their governments. In the United States, the Essential Air Service (EAS) funding increased somewhat in 1997 to $25.9 million from its ten-year low of $22.6 million in the previous year. The year 1997 was the last year of traditional EAS funding from the budget; in future, revenues generated by a new overflight charge are slated to go to the EAS fund.

Airport access

2.17 A lack of airport slots (the time assigned for an aircraft to take off or land) at congested airports has increasingly become an issue in bilateral relations. By the end of 1997, there were 132 slot controlled international airports, 118 year-round and 14 during the peak season. During 1997, the European Commission devoted considerable time and effort trying to revise its airport slot allocation code. The United States DOT granted some exemptions from the high density rule at two airports to provide slots to encourage domestic competition and additional air services.

MARKET ENTRY AND EXIT

New and discontinued carriers

2.18 Excluding the Russian Federation, during the year about 110 air carriers with at least one aircraft with maximum take-off mass not less than 9 tonnes (20 000 lbs) were reported to have started operations; a further 120 were constituted but, by the end of the year,

had yet to commence operations. These numbers were virtually the same as those for the previous year. However, a considerably smaller number of carriers, less than 50, went out of business, reflecting a healthier climate within the industry. For the Russian Federation detailed information was not available, but it has been reported that during the year, while 36 new airlines began operations, 65 airlines went out of business.

2.19 The majority of the new entrants were either small regional or domestic operators. Of the new entrants that started operations in 1997, air carriers based in Europe accounted for 40 per cent and those based in Asia/Pacific accounted for a quarter. Compared with the previous years, a very low proportion of air carriers, less than 10 per cent of the world total, started operations in North America.

2.20 Over 45 per cent of new entrants commenced international passenger services with two-thirds of these operating non-scheduled flights. About a quarter of new entrants started domestic passenger services. Nearly one in five of the new entrants started all-freighter operations with more than half of them operating international scheduled flights.

2.21 Among the airlines that ceased operations in 1997 were many with just a few years or even months of operations and some long-established names such as Lineas Aereas Paraguayas S.A. (LAPSA) and Venezolana Internacional de Aviacion (VIASA) both of which had been in business for more than a quarter century. About two-thirds of the newly defunct air carriers were located in Europe and North America, with international non-scheduled passenger operators in Europe and domestic scheduled passenger airlines in North America, constituting the majority of carriers which ceased operations there.

2.22 On the basis of schedules published in multilateral airline schedule guides, it is estimated that at the end of 1997 there were some 705 air carriers worldwide providing scheduled passenger services (international and/or domestic) and about 70 operating scheduled all-freight services. Compared with the same period in 1996 this represents a net overall decrease of about 15 air carriers.

OWNERSHIP, ALLIANCES AND COOPERATION

Privatization

2.23 During 1997, the trend towards partial or full privatization of government-owned airlines continued. Five airlines achieved their privatization aims, while privatization objectives or plans were made known for another four airlines. Furthermore, preparations for privatization continued during the year for some 20 government-owned carriers which had been targeted during the previous years (see Table 2-1).

2.24 Among reported developments were the following: after several years of preparation two major Chinese carriers, China Eastern Airlines and China Southern Airlines, successfully listed their shares in foreign stock exchange markets, marking a major step in the country's effort to restructure its state-owned enterprises. China's flag carrier, Air China, also announced its plan for similar stocklisting in the coming years.

Table 2-1. Government-owned airlines targeted for partial or full privatization (1997)

Targeted during 1997	Targeted before 1997 and still under preparation	Aim achieved during 1997
Air China	Aeroflot (Russian Federation)	China Eastern Airlines
Air Botswana	Air France	China Southern Airlines
Bahamasair	Air Lanka	China National Aviation Corporation
Lithuanian Airlines	Air Niugini	Estonian Air
	Air Pacific (Fiji)	Lufthansa-German Airlines
	Air Tanzania	
	Balkan-Bulgarian Airlines	
	El Al (Israel)	
	Garuda Indonesia	
	Iberia (Spain)	
	Indian Airlines	
	Kuwait Airways	
	LOT-Polish airlines	
	MALEV-Hungarian Airlines	
	Mozambique Airlines	
	Royal Air Maroc	
	South African Airways	
	Sunair (South Africa)	
	TAROM (Romania)	
	Thai Airways International	

2.25 In Europe, Lufthansa became a fully privatized airline when the German Government completed the sale of its remaining 36 per cent stake in the local stock market. The Estonian Government approved the selling of a 66 per cent stake in its national carrier Estonian Airlines to the Danish airline Maersk Air. Romania's parliament passed legislation to pave the way for the privatization of its national carrier TAROM; the Government planned to sell 70 per cent of its stake. The Government of Portugal also planned to sell up to 49 per cent of its national carrier TAP-Air Portugal in the coming two years.

2.26 Elsewhere, many carriers that had been targeted in previous years for privatization such as Garuda Indonesia, Thai Airways International, El Al of Israel as well as South African Airways and LAM (Mozambique Airlines), continued their restructuring during the year in preparation for partial privatization. The privatization plans of several carriers (e.g. Air France, Pakistan International Airlines, CSA (Czech Republic)) had to be altered or deferred because of local circumstances or the economic condition of the airlines concerned.

2.27 The number of carriers targeted for partial or full privatization has risen from 35 to 61 over the past three years. By the end of 1997, 17 of the targeted airlines had achieved their privatization aims, some 30 are currently at different stages of preparation while plans for the remainder have been withdrawn. In addition to the airlines listed in Table 2-1 for which privatization information was available, some other airlines may also be at different stages of preparation for privatization.

National consolidation

2.28 In 1997, several major airline consolidations were reported at the national level. In China, in line with the Government's policy to rationalize the structure of the airline industry, China Eastern Airlines took over China General Aviation. Air France and Air France Europe (formerly known as Air Inter) completed their merger to operate as a single carrier. In Lithuania, a merger agreement was reached between Lithuanian Airlines and Air Lithuania, to form a single national carrier. In Chile, Lan Chile acquired 99.5 per cent of another major carrier Ladeco with the latter continuing to operate as a separate entity.

2.29 In Europe, Swedish domestic carrier Skyways took over regional commuter Highland Air. Sabena acquired a 15 per cent stake in a Belgium regional airline City Bird. Iberia took full control of Aviaco by buying up the remaining 67 per cent stake. A Russian domestic carrier, Vnkovo Airlines concluded a merger agreement with charter carrier Orel-Avia while another carrier AO Vladivostok-Avia agreed to merge with Sakhlin Airlines to form a new airline named Far East Airlines.

2.30 In the United States, Northwest Airlines acquired regional carrier Express Airlines. American Airlines reached an agreement to buy Shuttle Inc. from US Airways. PAN AM completed its acquisition of Miami-based Carnival Air Lines while Valujet Airlines merged with Orlando-based AirWays with a new corporate identify as AirTran. Elsewhere, Canadian charter airline Royal Aviation acquired CanAir Cargo. Newly established Egyptian airlines, Orea Air and Rasian Air, agreed to merge their operations.

Transnational ownership

2.31 During 1997, the trend towards partial foreign ownership of airlines continued. Several governments adopted a new policy or amended existing rules on foreign investment in national carriers. The Government of Brazil raised the permitted foreign ownership level from 20 to 49.5 per cent, while the Government of Peru decided to allow such ownership up to 70 per cent. The Indian Government adopted a new policy, which would limit foreign ownership in its carriers at 40 per cent by investors other than airlines and airports. The Russian Government also introduced rules that would bar foreign majority ownership in joint venture airlines. In the meantime, many airlines continued to make or adjust equity investment in foreign carriers, some as part of a strategy to forge or strengthen alliances, others reflecting changes in partnership relationships.

2.32 In Europe, British Airways raised its shareholding in Deutsche BA from 49 to 65 per cent, but ended its partnership with USAir by selling its 25 per cent stake in the latter. KLM acquired a 30 per cent stake in Norwegian regional airline Braathens SAFE while Martinair increased its shareholding in Colombian carrier Tampa from 40 to 79 per cent. Swissair Cargo purchased a 24.5 per cent stake in Cargolux (owned by Lufthansa Cargo) while Cross Air bought a 35 per cent stake in French regional carrier Europe Continental Airways. Lufthansa also acquired a 13.2 per cent stake in French carrier Air Littoral but reduced its shareholding in Lauda Air from 39.7 to 20 per cent. Iberia sold a 38 per cent stake in Chilean carrier

Ladeco to Lan Chile as well as a 10 per cent stake it held in Aerolineas Argentinas to AMR, American Airline's parent company. Alitalia sold its 35 per cent shareholding in Malev back to Hungarian interests.

2.33 In the Americas, Continental Airlines reached agreement with CINTRA, the holding company for Aeromexico, Mexicana and AeroPeru, to take a 30 per cent stake in the Peruvian airline. Northwest Airlines also reached agreement with KLM to buy back, in several stages, the 19 per cent stake owned by KLM. TACA International Airlines (El Salvador) bought a 50 per cent stake of La Costena, a Nicaraguan domestic airline.

2.34 Elsewhere, Alliance Air, the joint venture airline between South African Airways, Air Tanzania and Uganda Airlines, took a 49 per cent stake in Air Rwanda. South Korean airline Asiana gained its government approval to sell 19.2 per cent of its shares to Swiss Bank. Gulf Air and Kuwait Airways agreed to sell their 40 per cent stake in India's Jet Airways to comply with that Government's new policy on foreign investment. Qantas ended its partnership with Air New Zealand by selling its 19.4 per cent stake in the latter.

Transnational alliances

2.35 During 1997, airlines throughout the world continued to form alliances through various cooperative arrangements (such as codesharing, blocked space, cooperation in frequent flyer programmes, joint marketing, service and purchasing, and franchising) to strengthen or expand their market presence and to redefine or consolidate their position in an increasingly competitive environment. Continuing a trend, most agreements included codesharing as a collaborative element (about 77 per cent of some 160 agreements signed). The year also saw an increase in wide-ranging strategic alliances, most notably the emergence of so-called "mega-alliances", which involved some major, or a group of major, airlines with a combined route network extending to most parts of the world. Many carriers realigned their partnership relations as such groupings took shape. Over all, airline alliances have become widespread but are still evolving, with partnership relations becoming more intertwined and complex. The most active in securing alliance agreements continued to be the major carriers in the Americas and Europe (accounting for almost 80 per cent), with major airlines in the Asia/Pacific region becoming more involved (about 20 per cent). Africa and the Middle East were two regions where alliance-forming has just started with only a few agreements signed.

2.36 Some of the significant developments and changes include: in May, five carriers across three continents, Air Canada, United Airlines, Lufthansa, Scandinavian Airlines System and Thai Airways International concluded an agreement to form the "Star Alliance", which was subsequently joined by Varig of Brazil. Partners of this alliance agreed later in the year to extend the scope of their cooperation from passenger service to include cargo transport. Following the announcement in 1996 of their proposed alliance agreement, which, by the end of the year, was still pending regulatory approval, British Airways and American Airlines continued to build up their ties with other airlines in major markets, such as, American Airlines with Canadian Airlines International, Lan Chile, Iberia, Aerolineas Argentinas, and Asiana; and British Airways with Qantas, Iberia, Air Liberté, TAT and Deutsche BA.

2.37 The "Atlantic Excellence Alliance" formed by Delta Air Lines, Swissair, Sabena and Austrian Airlines expanded by adding new partners including TAP of Portugal, Tyrolean Airways of Austria, Delta Air Transport of Belgium and AOM — a French regional carrier. Northwest Airlines and KLM resolved their differences over ownership issues and strengthened their alliance by signing a ten-year joint venture agreement, which would bring more integration of their operations. They also extended their reach by concluding cooperative agreements with other carriers (including Northwest with Garuda Indonesia; KLM with Alitalia, Air UK and Braathens of Norway). Air France, which already has an extensive range of codeshare alliances, signed new partnership agreements with Delta and Continental Airlines. Eastern European airlines continued to form alliances with the Western carriers as well as among themselves (e.g. MALEV with Delta, LOT with American Airlines, Aeroflot with Continental Airlines, LOT with CSA, Transaero with Uzbekistan Airways).

2.38 In Asia/Pacific, Air New Zealand, Ansett Australia and Singapore Airlines reached agreement to form a strategic alliance. Other cooperative arrangements signed by carriers in the region included: Japan Airlines with Air France, China Eastern Airlines with Ansett Australia and American Airlines, China Southern Airlines with Delta, and Air India with Air France. Separately, an "Olympic Alliance" was also formed involving Air New Zealand, United Airlines, Thai Airways, Malaysia Airlines, South African Airways and Lufthansa to serve as official airlines for the 2000 Olympic Games in Sydney, Australia.

2.39 Airlines in Latin America continued to secure alliance agreements, mainly with major North American and European carriers (notably American Airlines, United Airlines, Delta, Northwest Airlines and Continental Airlines; Lufthansa, Swissair and TAP) and also amongst themselves (e.g. between Air Aruba/Surinam Airways, Air Jamaica and BWIA).

2.40 Elsewhere, South African Airways signed codesharing agreements with American Airlines, Varig, British Midland and Japan Airlines. Air Mauritius, Air Seychelles, Air Comores and Air France reached agreement to form a cooperative partnership. Codesharing agreements were also signed between Saudi Arabian Airlines and United Airlines, Royal Jordanian Airways and Trans World Airlines, as well as between Royal Air Maroc and Air France, and PAN AM.

2.41 While some airlines updated their alliances by cancelling outdated or non-performing agreements, others terminated theirs as a result of changed alliance relationships. During the year, Finnair ended its partnership with Lufthansa as the latter joined hands with its competitor SAS. Singapore Airlines left the eight-year-old "Global Excellence Alliance" with Delta and Swissair, to tie up with Lufthansa of the Star Alliance grouping. Virgin Atlantic discontinued its cooperation with Delta and forged ties with Continental Airlines. Canadian Airlines International established an alliance with Air Pacific and stopped its codesharing with Air New Zealand, which in turn partnered with Air Canada.

2.42 Airline alliances, especially major ones, continued to attract attention from regulatory authorities because of their potential impact on market access, competition and consumer protection. In 1997, ICAO released a study of the implications of codesharing and developed recommendatory guidance on the consumer protection aspects of codesharing for use by its Contracting States. Some proposed and existing major alliances continued to receive

close examination by relevant national and regional regulatory bodies and in some cases, certain regulatory measures were introduced to ameliorate the anti-competitive aspects of the arrangements. Furthermore, a link continued to be drawn in some bilateral negotiations between the grant of regulatory approval for some major alliances and the acceptance of more liberalized, "open skies" bilateral agreements. The European Commission's investigation of the proposed alliance between British Airways and American Airlines and other existing major alliances, launched in 1996, continued during the year and a decision was expected in early 1998.

SERVICE LEVELS

2.43 In 1997, the premium travel market remained strong as its significance for the bottom line of many airlines became increasingly more important. Amongst measures taken by airlines to increase their share of this market were the adjustment of the size of the front cabins in their fleets and the introduction of new service products. For example, Alitalia, Royal Air Maroc, and Sabena abolished first class on their international services in favour of an upgraded combined "first-business class" while Ansett Australia did the same throughout its entire network and Qantas implemented this change on its domestic routes. On the other hand, a Dutch airline, Transavia, returned to a single-class cabin on all its scheduled services, citing declining demand for a premium-class product on short routes.

2.44 Airlines also continued their efforts to achieve improvements in other areas, such as check-in, through the implementation of new technologies. Examples include the installation of self-service check-in and seat allocation equipment by British Airways at over 50 U.K. locations and by Japan Airlines at 18 domestic airports. The airport check-in function, often coupled with electronic ticketing, is becoming a standard product of major computer reservation systems.

2.45 In 1997, the growing number of in-flight medical emergencies gained more attention from airlines and aviation regulation authorities alike. This situation partly reflects an upward shift in the average age of air travelers and in part on the number of passengers with medical difficulties. In the United States, legislation was introduced that requires air carriers to provide medical training to flight crews and install new types of emergency medical equipment on their aircraft.

2.46 Carry-on luggage also became an issue in 1997 on the grounds of service and safety considerations. In the United States, American Airlines requested the Federal Aviation Administration (FAA) to set industry-wide rules limiting carry-on bags and the Association of Flight Attendants (AFA) sponsored a conference calling for a global re-evaluation of carry-on baggage policies. It also asked the FAA to adopt a clear, consistent and enforceable policy in this area. However consistent with previous action, the FAA limited its intervention to publishing, in December, a draft Advisory Circular that clarifies the current guidelines and encourages air carriers to place stricter controls on cabin baggage. Meanwhile, some major airlines in the United States introduced new restrictions on carry-on luggage. A worldwide campaign on this issue is planned for 1998 by the London-based International Transport Workers' Federation which wants firm and enforceable rules, rather than non-binding

guidance for airlines. One of the policy issues that emerged from the airlines' efforts to solve this problem was the question of whether carry-on luggage limitations should be applied equally to all passengers or should it vary depending on the class of travel or fare level.

2.47 In 1997, the in-flight entertainment (IFE) industry underwent a radical change with the leading hardware providers conceding that they have failed to deliver what they had promised, in particular, video-on-demand (VOD) or audio- and VOD (AVOD) features, while airlines have realized that they misjudged the complexity of introducing interactive IFE (IIFE) systems. With numerous examples of failures and reliability problems, many airlines were reluctant to make the huge investments in IIFE until reliability targets are met. Other airlines opted for interim solutions such as temporary reducing or deactivating the interactive features of these systems. Despite all the problems with IFEs, the World Airline Entertainment Association has estimated the airlines' expenses on entertainment and communications during 1997 at $1.4 billion, up from $1.2 billion in 1996, with $6 billion per annum expected to be spent by 2002.

2.48 Power systems for passenger computers were a new popular feature being offered by airlines. However, the rewiring and electrical design changes necessary to bring power to seats of existing aircraft require considerable investment. There was also some concern within the industry that this development might increase the chances of interference of portable electronic devices (PED) brought on board by passengers with aircraft systems. In 1997, the Radio Technical Commission for Aeronautics (RTCA) published a report on a three-year study of the problem during which 37 models of PEDs were tested. It recommended to make mandatory on all airlines the policy of asking passengers to turn off PEDs during taxi, take-off and landing and to educate the travelling public about the reason for concern and what specific PEDs will cause problems.

2.49 With the growth of global alliances, Frequent Flyer Programmes (FFP) have gained new importance, becoming one of the major instruments in an alliance's bonding. In Europe and North America, schemes related to the FFP to access the mass market, through travel-related businesses, credit cards, restaurants, stores, etc. were becoming increasingly popular. In 1997, this practice started to spread to other regions, such as Latin America, where the LatinPass programme began offering LatinMiles for sale to businesses.

2.50 Taxation of FFP's benefits became reality in 1997. From January, Swedish travellers became liable for tax on awards earned while on business and later redeemed for leisure travel. In the United States, a 7.5 per cent tax was imposed on payments to airlines for frequent flyer awards purchased by credit card, telephone, or rental car companies, television networks, restaurants and hotels, air carriers and related parties, and other businesses. This was considered as a prelude to broader taxation on FFP's benefits. The United States DOT started a review of the FFPs of nine major carriers, probing such conditions as availability and limitations on seats for free travel as well as dissemination of information about FFPs to their members. An important precedent in respect of competition rules dealing with FFPs was set in Germany where Lufthansa was obliged to open its domestic FFP scheme to participation by competing small carriers. Another part of the ruling gave companies a right to monitor their employees' accounts in order to ensure that points gathered from their business trips would be used only to pay for travel on behalf of the company.

FARES AND RATES

Tariff establishment

2.51 In 1997, the IATA multilateral tariff negotiation process continued to function against the background of uncertainty arising from governments' regulatory requirements, particularly implications of competition laws, for its tariff coordination activities. The European Commission, in 1996, had issued a regulation to amend the block exemption, which would prohibit the carriers of the European Union Member States from continuing to participate in IATA cargo tariff consultations on intra-EU routes from July 1997. The block exemption, which was granted in 1993, allowed EU airlines to participate in both passenger and cargo tariff consultations provided that they were aimed at facilitating interlining. In order to address the situation, IATA subsequently submitted an application for an individual exemption for such tariff consultations, which was still under review by the Commission in 1997.

2.52 During the year, IATA continued to adjust its tariff coordination process and structure to adapt to the changing regulatory and operating environment. There were no major changes in the IATA fares and rates level and structure although some adjustments were agreed in certain markets to address local situation requirements. However, IATA had to delay the implementation of its new fare construction rules adopted in the previous year, as the agreement remained under review by the United States DOT.

2.53 Separately, the United States DOT issued in March a rulemaking proposal which would, in certain instances, exempt United States and foreign air carriers from the requirement to file their international passenger tariffs with the Department according to certain specified conditions and categories of States. At year-end, the United States DOT was still reviewing comments from carriers and industry associations.

PRODUCT DISTRIBUTION

2.54 The principal developments in 1997 were the use of the Internet for sales and marketing of air transport, although estimated at less than 1 per cent of airline revenues, continued to grow; airlines stepped up efforts to reduce commissions, which created further tension with the travel agent community; the use of electronic ticketing expanded but still faced some technical and practical hurdles; and airline participation, pricing and booking issues, expanded coverage to other modes, and the Internet were the subject of new and proposed rules for computer reservation systems.

2.55 More airlines' Internet web sites offered on-line booking (including electronic ticketing) for international air travel and auctions of discount fares for particular periods or events occurred more frequently. The increase in on-line bookings on the Internet led IATA to establish a special code for Electronic Reservations Service Providers which would enable airlines to readily identify such bookings. However, one survey of Internet users indicated that

although 50 per cent of visits to web sites resulted in the sale of an airline ticket, the bulk of such sales were made subsequently by other means, indicating that Internet users in this survey were using the facility primarily as an information source. Plans were announced for a system for non-scheduled air carriers and tour operators to sell their products on the Internet and several major travel service providers on the Internet were reportedly generating over $1 million a week in air ticket sales on their web sites. Five major airlines began using the Internet as a means of tracking cargo shipments.

2.56 CRS vendors adopted differing strategies with respect to selling and marketing air transport through the Internet. These included a dual approach with separate systems for travel agents and the public, focusing on enhancing travel agents' ability to sell via the Internet, and facilitating access to their participating airlines by all users of the Internet — travel agents, travel service providers and the public.

2.57 The reduction in commission rates for sales of airline tickets spread to other markets as major airlines, citing the need to remain competitive, matched or introduced similar reductions made previously by other airlines. Airline strategies varied, including straight reductions in the percentage paid, combinations of reductions in percentage plus a limit on total amount, lower rates for certain types of bookings (such as those made on the Internet and/or involving electronic ticketing), and a combination of reductions and new incentives for affected travel agents.

2.58 Travel agents and travel service providers reacted to the trend in declining commission payments in several ways. These included consolidation or closing of smaller locations, using service fees, focusing on high value activities such as tour packages, ceasing to handle discount fares or airline tickets altogether, and using the Internet to broaden their client base. Travel agent trade associations gained delays in the implementation of cuts or sought legislative relief.

2.59 Spurred by significant cost-savings, more airlines introduced electronic ticketing in more domestic markets, and internationally this option became available on major airlines on several transatlantic and European routes. Electronic ticketing became available from a substantial number of travel agents and in airline Internet web sites. In domestic markets where they have been in use the longest, there was rapid growth on certain carriers and routes, such as heavily travelled routes served by low-fare carriers. Plastic cards embedded with a microchip which can store data and perform a variety of travel functions, such as booking, ticketing and billing for electronic airline tickets, designed for business and frequent flyers and in use in Europe for several years, appeared in the United States market in two forms, as a general card for hotel, rental car and airline use and as an individual airline "smartcard".

2.60 However, widespread acceptance and use of electronic ticketing still faces human and technical hurdles. Many airline passengers, particularly on international flights to less technologically developed areas, prefer paper tickets. Another uniquely international issue is convincing immigration authorities, which require round trip tickets as evidence of the ability to leave after a tourist visit is completed, to accept electronic itineraries. Where there are strikes or missed flights, and passengers need to re-book, or change airlines, passengers with

electronic tickets face greater difficulties than those holding paper tickets. On the technical side, some practical problems relating to interlining have emerged. Although an interactive agent reporting programme has been developed to permit travel agents to report electronic ticket sales to airlines, it cannot yet handle refunds or ticket exchanges.

2.61 The United States DOT considered comments from the public, airlines and travel agents concerning how and when electronically ticketed passengers should receive notices concerning such matters as oversales, domestic and international baggage liability, domestic contract of carriage terms and refund penalties, terms of international electronic tariffs, international fare increases, death/injury liability limits and refund penalties. Subsequently, the United States DOT decided that air carriers should give, or make readily available to electronically ticketed passengers, the required information no later than the time that the passengers appear at the airport for the first flight in their itinerary. The United States DOT believes that this puts all airlines on an equal footing and strikes a reasonable balance between ensuring that important information reaches consumers before they travel, without inhibiting the development of electronic ticketing and imposing additional costs that might stifle industry innovations and result in higher prices to the consumers.

2.62 In the computer reservations system industry, an agreement between CRS vendors, Galileo and GETS, in which the latter's agencies would convert to Galileo over a two-year period, effectively reduced the major CRS vendors to four. Two of the major CRSs, Sabre and Galileo, successfully sold stock to the public, with airline owners retaining control. Another major CRS vendor, Amadeus, announced plans to do so early next year.

2.63 In a rule-making proceeding, the United States DOT decided that airlines which were not CRS owners need not participate at the same level in all CRS systems in which they choose to participate. In another such proceeding, the United States DOT amended its rules to require each CRS vendor to offer one display that lists flights without giving all on-line connections a preference over interline connections and prohibit systems from creating displays that neither use elapsed time as a significant factor in selecting flights from the database nor give single-plane flights a preference over connecting services in ranking flights.

2.64 Other CRS issues were addressed in the respective general reviews of computer reservation system rules of the European Commission and the United States DOT. The Commission's review was expected to be completed in 1998; the United States DOT extended its present rules until 31 March 1999 to allow time for the completion of its review. An issue in both reviews was the extension of CRS rules to the Internet. Airlines and CRS vendors favoured extension, on the basis of a need for uniform and non-discriminatory treatment. Travel service providers using the Internet claimed the medium should remain free to develop products responsive to consumer needs, rather than those of airlines.

2.65 During 1997, nine States informed ICAO that they either followed ICAO's new Code of Conduct on the Regulation and Operation of Computer Reservation Systems or that the CRS laws and regulations applied by them were consistent or compatible with the Code. One developing State advised that the Code did not meet its needs with respect to the exemption provided for such countries; three other States were reviewing the Code.

TRAFFIC

2.66 Indicators are given below of the development of airline scheduled traffic in 1997, international and domestic, including rates of growth, load factors and the ranking of airlines, States and city-pairs by volume of airline traffic, along with some estimates regarding the development of non-scheduled traffic.

Scheduled: world totals

2.67 The total scheduled traffic (domestic plus international) carried by the airlines of the 185 Contracting States of ICAO in 1997 is estimated at about 341 billion tonne-kilometres performed, an increase of about 8 per cent over 1996. The airlines carried a total of about 1 448 million passengers in 1997, compared with 1 390 million passengers in 1996, and about 26 million tonnes of freight compared with some 23 million tonnes in 1996 (Table 2-2). The passenger and overall (weight) load factors on total scheduled services (domestic plus international) each increased by 1 percentage point to 69 and 61 per cent, respectively.

2.68 International scheduled traffic continued to show strong growth during 1997, with increases of about 9 per cent in tonne-kilometres performed, 7 per cent in passengers carried, and some 15 per cent in freight tonnes carried. International traffic accounted for some 57 per cent of total passenger-kilometres performed, 85 per cent of the freight tonne-kilometres performed and some 66 per cent of the total tonne-kilometres performed.

Table 2-2. Scheduled services of airlines of ICAO Contracting States

	Passengers carried (millions)	Passenger-km performed (millions)	Passenger load factor (%)	Freight tonnes carried (millions)	Freight tonne-km performed (millions)	Mail tonne-km performed (millions)	Total tonne-km performed (millions)	Weight load factor (%)
TOTAL (international plus domestic)								
1996	1 390	2 426 260	68	23.3	89 190	5 800	316 660	60
1997	1 448	2 570 500	69	26.1	99 830	5 990	341 140	61
Percentage change	4.2	5.9	1.0	12.0	11.9	3.3	7.7	1.0
INTERNATIONAL								
1996	411	1 377 020	69	13.6	75 500	2 450	206 530	63
1997	439	1 477 540	70	15.6	85 040	2 510	225 850	64
Percentage change	6.8	7.3	1.0	14.7	12.6	2.4	9.4	1.0
DOMESTIC								
1996	979	1 049 240	67	9.7	13 690	3 350	110 130	56
1997	1 009	1 092 960	68	10.5	14 790	3 480	115 290	57
Percentage change	3.1	4.2	1.0	8.2	8.0	3.9	4.7	1.0

Source: ICAO Air Transport Reporting Form A-1.

2.69 During 1997, domestic traffic showed more modest growth, increasing almost 5 per cent from about 110 billion tonne-kilometres performed in 1996 to some 115 billion tonne-kilometres performed in 1997.

Scheduled: regional breakdown

2.70 Between 1996 and 1997, development in total and international scheduled traffic varied considerably among regions of carrier registration with respect to both passengers and freight. In terms of total passenger-kilometres performed, the increase in traffic ranged from almost 4 per cent for the airlines registered in the Middle East to some 12 per cent for those registered in Latin America and the Caribbean (Table 2-3). International scheduled services also posted increases in passenger-kilometres performed for all regions, ranging from about

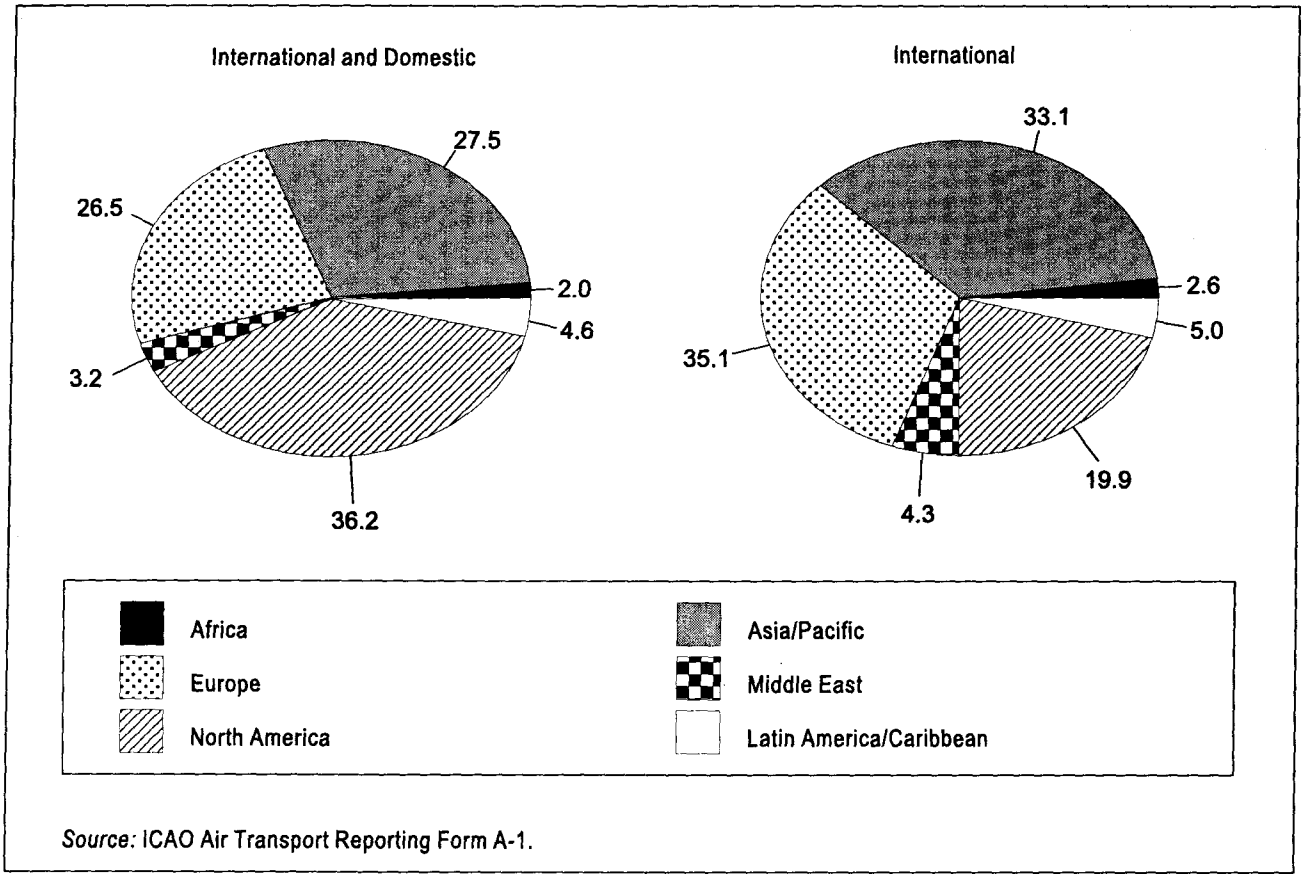
Table 2-3. Growth of scheduled traffic by region of airline registration: 1996-1997
(annual percentage change)

Region of registration	Passengers carried	Passenger-kilometres	Freight tonne-km performed	Mail tonne-km performed	Total tonne-km performed
TOTAL (international plus domestic)					
Africa	4.7	7.1	11.8	4.2	8.3
Asia and Pacific	1.0	5.0	13.7	2.3	8.3
Europe	7.4	7.1	6.6	2.8	7.2
Middle East	3.0	3.9	6.2	-2.9	4.7
North America	3.5	5.2	16.8	4.3	7.6
Latin America and the Caribbean	10.1	11.6	9.7	-8.6	11.1
Total	4.2	5.9	11.9	3.3	7.7
INTERNATIONAL					
Africa	10.0	8.8	12.6	0.0	9.8
Asia and Pacific	0.3	5.1	14.0	5.6	9.0
Europe	10.5	9.4	6.9	2.9	8.7
Middle East	3.0	3.3	6.1	-3.2	4.4
North America	4.0	5.6	22.4	-0.2	11.1
Latin America and the Caribbean	14.3	15.2	11.7	0.0	14.1
Total	6.8	7.3	12.6	2.4	9.4

Source: ICAO Air Transport Reporting Form A-1.

3 per cent for airlines registered in the Middle East to some 15 per cent for those registered in Latin America and the Caribbean. In 1997, double digit percentage increases in both total and international freight tonne-kilometres performed were recorded for carriers registered in Africa, Asia/Pacific and North America and in international freight tonne-kilometres performed for carriers registered in Latin America and the Caribbean.

2.71 The differences in regional traffic development between 1996 and 1997 caused some small changes in the distribution of this traffic. The regional distribution for total and for international scheduled traffic in 1997 is shown in Figure 2-1 (detailed traffic data by region are shown in Table A1-1 in Appendix 1). In terms of total scheduled traffic (international plus domestic) in 1997, the airlines of North America carried just over 36 per cent of the total world traffic. However, the largest share of international scheduled traffic (about 35 per cent) was carried by the airlines of Europe.



Source: ICAO Air Transport Reporting Form A-1.

Figure 2-1. Percentage distribution of scheduled traffic in 1997 according to region of registration of airline — total tonne-kilometres performed

Table 2-4. Top 30 scheduled air carriers in 1997 and their rankings in 1996 and 1988 in terms of TOTAL (international and domestic) scheduled traffic carried[1]

PASSENGER-KILOMETRES PERFORMED					FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED					TOTAL TONNE-KILOMETRES PERFORMED				
	Estimated 1997	Ranking				Estimated 1997	Ranking				Estimated 1997	Ranking		
Carrier	(millions)	1997	1996	1988	Carrier	(millions)	1997	1996	1988	Carrier	(millions)	1997	1996	1988
United	195 252	1	1	2	Federal Express	9 093	1	1	11	United	21 895	1	1	2
American	172 060	2	2	3	Lufthansa	6 310	2	2	2	American	18 607	2	2	3
Delta	160 294	3	3	4	Korean Air	5 711	3	3	8	Delta	16 991	3	3	4
Northwest	115 845	4	4	6	Air France	5 076	4	4	5	British Airways	14 044	4	5	7
British Airways	101 480	5	5	8	SIA	4 841	5	5	12	Northwest	13 843	5	4	5
JAL	79 063	6	6	9	JAL	4 360	6	6	3	Lufthansa	13 472	6	6	8
Lufthansa	71 500	7	7	13	United	4 178	7	8	10	Air France	12 059	7	8	10
Continental	70 912	8	9	5	KLM	3 971	8	7	7	JAL	11 403	8	7	6
Air France	67 918	9	10	12	British Airways	3 879	9	9	9	SIA	10 128	9	9	15
USAir	66 899	10	8	15	Cathay Pacific	3 621	10	10	14	KLM	9 464	10	11	16
Qantas	58 053	11	11	16	Northwest	3 332	11	11	6	Korean Air	9 305	11	10	18
KLM	55 603	12	13	19	American	2 994	12	12	18	Federal Express	9 093	12	12	32
SIA	55 459	13	12	14	Delta	2 446	13	13	17	Continental	7 347	13	15	9
All Nippon Airways	51 219	14	14	18	Swissair	1 889	14	16	21	Cathay Pacific	7 330	14	13	19
Southwest	45 630	15	16	33	Qantas	1 857	15	14	19	Qantas	7 258	15	14	17
TWA	40 385	16	15	7	Nippon Cargo	1 856	16	15	24	USAir	6 575	16	16	21
Korean Air	39 939	17	17	28	Asiana[2]	1 811	17	20	—	All Nippon Airways	5 519	17	17	25
Cathay Pacific	38 942	18	18	23	Polar Air Cargo[3]	1 728	18	24	—	Alitalia	5 022	18	18	24
Air Canada	36 607	19	20	20	Thai Airways	1 672	19	19	29	Air Canada	4 622	19	22	20
Alitalia	35 992	20	19	26	Alitalia	1 472	20	17	15	Thai Airways	4 467	20	21	27
Thai Airways	30 987	21	21	25	Malaysian Airlines	1 429	21	18	39	Swissair	4 368	21	23	26
Malaysian Airlines	28 698	22	22	42	All Nippon Airways	1 333	22	23	33	Southwest	4 307	22	20	42
Iberia	27 635	23	23	22	Varig	1 331	23	21	22	TWA	4 171	23	19	11
America West	26 018	24	25	34	Air Canada	1 303	24	22	23	Malaysian Airlines	3 777	24	24	41
Canadian	25 255	25	24	24	United Parcel[2]	1 240	25	26	—	Varig	3 533	25	25	28
Swissair	25 253	26	27	29	El Al	1 141	26	25	25	Iberia	3 313	26	26	23
Varig	23 927	27	26	31	Saudia	945	27	27	32	Asiana[2]	3 140	27	29	—
SAS	20 266	28	29	30	Air China[4]	930	28	29	—	Canadian	3 045	28	27	29
Air New Zealand	19 940	29	28	36	Lan Chile	920	29	39	48	Saudia	2 650	29	30	31
Virgin Atlantic	19 158	30	34	75	Continental	912	30	32	20	Air New Zealand	2 618	30	28	38

1. Most 1997 data are computer-generated estimates, thus the ranking may change when final data become available.
2. Started operations in 1988.
3. Started operations in 1994.
4. No data for individual air carriers were reported by China prior to 1993.

Source: ICAO Air Transport Reporting Form A-1 and IATA.

Table 2-5. Top 30 scheduled air carriers in 1997 and their ranking in 1996 and 1988 in terms of INTERNATIONAL scheduled traffic carried[1]

PASSENGER-KILOMETRES PERFORMED					FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED					TOTAL TONNE-KILOMETRES PERFORMED				
Carrier	Estimated 1997 (millions)	Ranking 1997	1996	1988	Carrier	Estimated 1997 (millions)	Ranking 1997	1996	1988	Carrier	Estimated 1997 (millions)	Ranking 1997	1996	1988
British Airways	99 086	1	1	1	Lufthansa	6 249	1	1	1	British Airways	13 828	1	1	2
United	76 228	2	2	11	Korean Air	5 619	2	2	6	Lufthansa	12 910	2	2	3
Lufthansa	66 385	3	4	4	Air France	5 056	3	3	3	Air France	11 330	3	3	4
JAL	62 030	4	3	2	SIA	4 841	4	4	9	SIA	10 128	4	5	6
Air France	60 751	5	9	6	JAL	4 027	5	6	2	JAL	9 791	5	4	1
American	55 878	6	5	13	KLM	3 971	6	5	5	United	9 589	6	6	14
KLM	55 595	7	8	9	British Airways	3 876	7	7	7	KLM	9 463	7	7	7
SIA	55 459	8	6	5	Cathay Pacific	3 621	8	8	10	Korean Air	8 698	8	8	11
Northwest	52 370	9	7	8	Federal Express	3 483	9	9	43	Cathay Pacific	7 330	9	9	10
Qantas	44 137	10	10	7	United	2 672	10	10	25	American	6 933	10	10	19
Cathay Pacific	38 942	11	11	12	Northwest	2 093	11	11	8	Northwest	6 845	11	11	8
Delta	36 907	12	13	23	Swissair	1 885	12	15	14	Qantas	5 758	12	12	9
Korean Air	34 206	13	12	20	American	1 862	13	12	29	Delta	4 684	13	13	33
Alitalia	28 720	14	14	19	Nippon Cargo	1 856	14	13	15	Swissair	4 330	14	16	16
Thai Airways	27 747	15	15	14	Asiana[2]	1 769	15	19	—	Alitalia	4 277	15	14	15
Swissair	24 901	16	17	17	Qantas	1 687	16	14	13	Thai Airways	4 141	16	15	17
Air Canada	24 147	17	18	21	Thai Airways	1 637	17	18	19	Federal Express	3 483	17	18	81
Malaysian Airlines	24 004	18	16	32	Alitalia	1 443	18	16	12	Malaysian Airlines	3 332	18	17	34
Iberia	21 539	19	19	15	Malaysian Airlines	1 364	19	17	34	Air Canada	3 248	19	19	22
Virgin Atlantic	19 158	20	22	53	Delta	1 335	20	22	42	Asiana[2]	2 896	20	23	—
Air New Zealand	18 340	21	20	27	United Parcel[2]	1 240	21	21	—	Iberia	2 666	21	21	18
All Nippon Airways	18 306	22	24	46	Polar Air Cargo[3]	1 223	22	26	—	Varig	2 630	22	22	23
Continental	17 376	23	33	18	El Al	1 141	23	20	16	All Nippon Airways	2 603	23	25	50
Canadian	16 781	24	21	25	Air Canada	1 059	24	24	20	Air New Zealand	2 461	24	20	31
Varig	16 717	25	25	26	Varig	1 037	25	23	18	Virgin Atlantic	2 457	25	29	56
SAS	16 157	26	23	22	Lan Chile	896	26	37	47	SAS	2 186	26	27	24
Garuda	15 592	27	26	28	All Nippon Airways	885	27	28	49	El Al	2 175	27	24	25
PAL	14 431	28	29	29	Saudia	863	28	25	26	Canadian	2 133	28	26	30
Saudia	13 061	29	27	24	Air China[4]	824	29	29	—	Continental	2 106	29	39	21
Asiana[2]	12 527	30	31	—	Air New Zealand	810	30	27	36	Saudia	2 038	30	28	27

1. Most 1997 data are computer-generated estimates, thus the ranking may change when final data become available.
2. Started operations in 1988.
3. Started operations in 1994.
4. No data for individual air carriers were reported by China prior to 1993.

Source: ICAO Air Transport Reporting Form A-1 and IATA.

Table 2-6. Top 30 countries or groups of countries in 1997 and their ranking in 1996 and 1988 in terms of TOTAL (international and domestic) traffic carried on their airlines' scheduled services[1]

PASSENGER-KILOMETRES PERFORMED					FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED					TOTAL TONNE-KILOMETRES PERFORMED				
Country or group of countries	Estimated 1997 (millions)	Ranking 1997	1996	1988	Country or group of countries	Estimated 1997 (millions)	Ranking 1997	1996	1988	Country or group of countries	Estimated 1997 (millions)	Ranking 1997	1996	1988
United States	964 430	1	1	1	United States	29 152	1	1	1	United States	116 664	1	1	1
United Kingdom[2]	157 614	2	2	4	Republic of Korea	8 038	2	4	8	United Kingdom[2]	21 952	2	2	4
Japan	151 048	3	3	3	Japan	7 854	3	3	2	Japan	20 628	3	3	3
Germany	87 983	4	5	8	United Kingdom[2]	6 671	4	2	5	Germany	14 978	4	4	6
France	80 153	5	4	5	Germany	6 329	5	5	4	Republic of Korea	13 441	5	6	11
Australia	77 915	6	6	7	France	5 253	6	6	3	France	13 258	6	5	5
China[3]	72 963	7	7	10	Singapore	4 872	7	7	9	Netherlands	11 130	7	7	9
Hong Kong SAR[4]	19 341	—	—	—	Netherlands	4 435	8	8	7	Singapore	10 128	8	8	10
Netherlands	70 702	8	8	11	China[3]	2 188	9	11	16	Australia	9 306	9	9	8
Canada	61 862	9	9	6	Hong Kong SAR[4]	2 274	—	—	—	China[3]	8 261	10	10	15
Republic of Korea	61 011	10	10	20	Australia	2 104	10	9	11	Hong Kong SAR[4]	4 111	—	—	—
Singapore	55 459	11	11	9	Canada	2 055	11	10	10	Canada	7 667	11	11	7
Russian Federation	49 278	12	12	—	Switzerland	1 891	12	13	14	Brazil	5 552	12	13	12
Brazil	41 714	13	13	12	Brazil	1 759	13	12	13	Russian Federation	5 269	13	12	—
Italy	37 728	14	14	14	Thailand	1 672	14	16	20	Italy	5 198	14	14	13
Spain	36 950	15	15	13	Italy	1 479	15	14	12	Switzerland	4 475	15	17	16
Thailand	30 987	16	16	17	Malaysia	1 425	16	15	26	Thailand	4 467	16	15	18
Malaysia	28 762	17	17	28	Israel	1 136	17	17	15	Spain	4 053	17	16	14
Indonesia	26 516	18	18	21	Gulf States[5]	1 129	18	18	33	Malaysia	3 783	18	18	28
Switzerland	26 396	19	21	22	Chile	1 033	19	21	31	Gulf States[5]	3 158	19	20	31
New Zealand	23 020	20	22	23	Saudi Arabia	945	20	20	21	Indonesia	3 102	20	19	21
Mexico	22 243	21	24	18	Russian Federation	834	21	19	—	New Zealand	2 970	21	21	24
India	22 116	22	20	15	New Zealand	790	22	24	27	Scandinavia[6]	2 681	22	22	19
Gulf States[5]	21 718	23	23	30	Spain	765	23	22	19	Saudi Arabia	2 650	23	23	20
Scandinavia[6]	21 559	24	19	16	Indonesia	756	24	23	22	India	2 489	24	24	17
Saudi Arabia	18 949	25	25	19	Scandinavia[6]	736	25	25	23	Israel	2 197	25	25	22
South Africa	17 103	26	26	26	Belgium	691	26	26	17	Philippines	2 144	26	26	25
Philippines	16 872	27	27	24	India	532	27	27	18	Mexico	2 129	27	27	23
Argentina	13 957	28	28	25	Philippines	476	28	29	28	South Africa	1 955	28	28	29
Turkey	12 379	29	30	41	South Africa	444	29	31	30	Chile	1 807	29	30	42
Israel	11 794	30	29	31	Pakistan	421	30	28	25	Belgium	1 706	30	31	26

1. Most 1997 data are computer-generated estimates, thus the ranking and the rate of increase or decrease may change when final data become available.
2. Excludes the traffic for Hong Kong for the last six months of 1997.
3. The ranking of China is preliminary. For statistical purposes the data for China excludes the traffic for the Hong Kong Special Administrative Region (Hong Kong SAR) for the last six months of 1997 and that of the Taiwan province of China.
4. Traffic for the Hong Kong Special Administrative Region (SAR) for the last six months of 1997.
5. Four States, Bahrain, Oman, Qatar and United Arab Emirates, are partners in the multinational airline "Gulf Air".
6. Three States, Denmark, Norway and Sweden, are partners in the consortium airline "Scandinavian Airlines System".

Source: ICAO Air Transport Reporting Form A-1 and IATA.

Table 2-7. Top 30 countries or group of countries in 1997 and their ranking in 1996 and 1988 in terms of traffic carried on their airlines' INTERNATIONAL scheduled services[1]

PASSENGER-KILOMETRES PERFORMED					FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED					TOTAL TONNE-KILOMETRES PERFORMED				
Country or group of countries	Estimated 1997 (millions)	Ranking 1997	1996	1988	Country or group of countries	Estimated 1997 (millions)	Ranking 1997	1996	1988	Country or group of countries	Estimated 1997 (millions)	Ranking 1997	1996	1988
United States	267 753	1	1	1	United States	15 917	1	1	1	United States	40 213	1	1	1
United Kingdom[2]	151 052	2	2	2	Republic of Korea	7 960	2	3	7	United Kingdom[2]	21 379	2	2	2
Japan	84 098	3	3	3	Japan	7 643	3	4	2	Japan	14 755	3	3	3
Germany	82 258	4	4	5	United Kingdom[2]	6 735	4	2	5	Germany	14 353	4	4	4
Netherlands	70 465	5	5	9	Germany	6 267	5	5	3	Republic of Korea	12 561	5	5	10
Singapore	55 459	6	7	6	France	5 129	6	6	4	Netherlands	11 107	6	7	6
France	53 781	7	6	4	Singapore	4 872	7	7	8	France	10 500	7	6	5
Republic of Korea	51 954	8	8	15	Netherlands	4 435	8	8	6	Singapore	10 128	8	8	7
Australia	48 554	9	9	7	Switzerland	1 887	9	10	12	Australia	6 296	9	9	8
Canada	40 928	10	10	8	Australia	1 808	10	9	10	Canada	5 382	10	10	9
Italy	29 285	11	11	14	Canada	1 669	11	11	11	Switzerland	4 448	11	13	12
Thailand	27 747	12	12	10	Thailand	1 638	12	14	16	Italy	4 344	12	11	11
Switzerland	26 160	13	15	13	Italy	1 457	13	12	9	Thailand	4 141	13	12	13
Brazil	25 537	14	14	18	China[5]	1 396	14	18	22	Brazil	3 680	14	14	16
Malaysia	24 029	15	13	25	Hong Kong SAR[6]	2 274	—	—	—	Malaysia	3 334	15	15	25
Spain	23 235	16	16	11	Malaysia	1 364	15	13	26	Gulf States[3]	3 148	16	16	27
Gulf States[3]	21 576	17	17	24	Brazil	1 358	16	15	15	Spain	2 743	17	17	14
New Zealand	19 970	18	18	19	Israel	1 142	17	16	13	China[5]	2 710	18	19	28
Russian Federation	18 135	19	19	—	Gulf States[3]	1 132	18	17	32	Hong Kong SAR[6]	4 111	—	—	—
Scandinavia[4]	16 609	20	21	16	Chile	993	19	20	30	New Zealand	2 669	19	18	23
Indonesia	16 182	21	22	21	Saudi Arabia	863	20	19	19	Scandinavia[4]	2 226	20	22	17
China[5]	15 781	22	20	30	New Zealand	778	21	21	27	Israel	2 176	21	21	19
Hong Kong SAR[6]	19 341	—	—	—	Scandinavia[4]	727	22	23	20	Russian Federation	2 145	22	20	—
Philippines	14 431	23	24	22	Indonesia	696	23	24	21	Indonesia	2 127	23	23	22
Saudi Arabia	13 061	24	23	17	Belgium	691	24	25	14	Saudi Arabia	2 038	24	24	20
India	12 877	25	25	20	Spain	675	25	22	17	Philippines	1 905	25	25	24
South Africa	11 940	26	27	33	Russian Federation	513	26	26	—	Belgium	1 706	26	27	21
Israel	11 492	27	26	26	Philippines	479	27	30	29	India	1 583	27	26	18
Belgium	11 277	28	28	28	India	443	28	27	18	Chile	1 507	28	30	43
Mexico	10 983	29	29	23	South Africa	397	29	32	34	South Africa	1 452	29	28	31
Austria	9 940	30	30	53	Pakistan	387	30	28	24	Pakistan	1 207	30	29	26

1. Most 1997 data are computer-generated estimates, thus the ranking and the rate of increase or decrease may change when final data become available.
2. Excludes the traffic for Hong Kong for the last six months of 1997.
3. Four States, Bahrain, Oman, Qatar and United Arab Emirates, are partners in the multinational airline "Gulf Air".
4. Three States, Denmark, Norway and Sweden, are partners in the consortium airline "Scandinavian Airlines System".
5. The ranking of China is preliminary. For statistical purposes the data for China excludes the traffic for the Hong Kong Special Administrative Region (Hong Kong SAR) for the last six months of 1997 and that of the Taiwan province of China.
6. Traffic for the Hong Kong Special Administrative Region (SAR) for the last six months of 1997.

Source: ICAO Air Transport Reporting Form A-1 and IATA.

2.72 In 1997, airlines registered in Europe showed the highest average annual weight load factor on international scheduled services (about 68 per cent), while those in Africa showed the lowest average load factor (some 49 per cent). Compared with 1996, the weight load factors for international scheduled services (shown in Table A1-1 in Appendix 1) represent an increase of about two percentage points for the airlines of Europe, Asia/Pacific and North America, of about one percentage point for those of the Middle East, there was a decrease of about one percentage point for the airlines of Africa, while there was no change for the airlines of Latin America and the Caribbean.

Scheduled: carrier rankings

2.73 Table 2-4 shows the top 30 air carriers in the world in 1997 in terms of the overall volume of passenger-kilometres performed, freight and mail tonne-kilometres performed and total (passenger, freight and mail) tonne-kilometres performed, compared with the ranking of the same carriers in 1996 and in 1988. Table 2-5 shows the top 30 air carrier rankings according to the same parameters but in terms of international scheduled traffic.

2.74 These tables show the rise in ranking of a number of Asian carriers associated with the relatively high growth in traffic in that region. They also illustrate the restructuring which has taken place in the air transport industry in the United States, the ex-USSR and China. In 1988, Pan American (now defunct) and TWA were the two main international air carriers for the United States both in terms of passenger and total tonne-kilometres performed; Aeroflot was the single largest carrier in the world in terms of total (international plus domestic) passenger and total tonne-kilometres performed, and CAAC was the only carrier operating in China. In 1997, United and American are the two major international United States carriers, Aeroflot (Aria) is one of the several international carriers of the Russian Federation operating a relatively small domestic network, and by the end of 1997, including the carriers registered in SAR Hong Kong, China had over a dozen international carriers.

Scheduled: country rankings

2.75 Rankings for the top 30 countries or groups of countries by volume of scheduled traffic generated by their airlines in 1997, 1996 and 1988 according to the same parameters of passenger-kilometres, freight and mail tonne-kilometres and total (passenger, freight and mail) tonne-kilometres, for overall and for international services, are presented in Tables 2-6 and 2-7. In 1997, approximately 46 per cent of the total volume of scheduled passenger, freight and mail traffic on international and domestic services was accounted for by the carriers of three countries, the United States, the United Kingdom and Japan (about 34, 6 and 6 per cent, respectively). On international services, about 34 per cent of all traffic was carried by the airlines of the same three countries, the United States, the United Kingdom and Japan (some 18, 9 and 7 per cent, respectively).

Scheduled: city-pair rankings

2.76 The 25 largest city-pair traffic flows in terms of passengers carried on international scheduled services represented a total of about 47 million passengers in 1996 (Table 2-8; owing to incomplete data it has not been possible to include figures for 1997). This represents some 11 per cent of the world total of international scheduled passengers. The table shows that of the 25 major passenger flows 13 involved international routes within eastern Asia, 7 routes were within Europe, 2 routes each across the North Atlantic and across North-Mid Pacific, and one within North America. In terms of cities, London (8), Tokyo (7) and Hong Kong (6) appear most frequently. Almost all the city-pairs shown involve over-water sectors.

Table 2-8. Scheduled passenger traffic on world's major international city-pairs
(top 25 city-pairs ranked by international passengers, 1996)

Rank	City-pair	Distance (km)	1996 (thousands)	1995 (thousands)	1996/95 %	1996/88 average
1	Hong Kong-Taipei[1]	777	3 950	4 195	-5.8	11.4
2	London-New York	5 539	3 037	2 943	3.2	4.8
3	Dublin-London	456	2 986	2 765	8.0	9.7
4	London-Paris	346	2 679	3 031	-11.6	-1.3
5	Kuala Lumpur-Singapore	335	2 478	2 315[2]	7.0	5.3
6	Honolulu-Tokyo	6 134	2 454	2 424	1.2	5.7
7	Bangkok-Hong Kong	1 743	2 400	2 185[2]	9.8	5.8
8	Amsterdam-London	369	2 353	2 137	10.1	5.9
9	Hong Kong-Tokyo	2 938	2 324	2 043	13.8	4.0
10	Seoul-Tokyo	1 227	1 911	1 910	0.1	4.4
11	Jakarta-Singapore	906	1 882	1 735	8.5	4.4
12	Bangkok-Singapore	1 444	1 685	1 580	6.6	8.1
13	Hong Kong-Singapore	2 578	1 680	1 596	5.3	9.6
14	Frankfurt-London	654	1 610	1 542	4.4	5.1
15	Taipei-Tokyo	2 182	1 600	1 600	0.0	3.7
16	Hong Kong-Manila	1 126	1 460	1 344	8.6	10.1
17	Los Angeles-Tokyo	8 752	1 282	1 112	15.3	4.3
18	New York-Paris	5 833	1 280	1 189	7.7	2.9
19	Singapore-Tokyo	5 356	1 209	1 163	4.0	8.6
20	Bangkok-Tokyo	4 644	1 173	1 049	11.8	9.6
21	New York-Toronto	587	1 166	1 108	5.2	1.4
22	Brussels-London	349	1 128	1 142	-1.2	3.6
23	London-Zurich	787	1 110	877	26.6	5.2
24	Hong Kong-Seoul	2 059	1 077	1 027	4.9	12.6
25	London-Rome	1 441	1 077	972	10.8	11.3
	TOTAL		46 991	44 984	4.5	5.7

1. For statistical purposes, the air transport operations between Hong Kong SAR, China and other regions of China may be treated as international operations.
2. Revised estimate.

Source: ICAO Air Transport Reporting Form B plus estimates for non-reporting air carriers.

Non-scheduled

2.77 It is estimated that in 1997 total international non-scheduled passenger-kilometres performed throughout the world increased by an estimated 5 per cent (Table 2-9), with the share of such traffic in overall international air passenger traffic remaining at just over 14 per cent. Non-scheduled traffic in Europe remains the largest single component of the world charter market. Domestic non-scheduled passenger traffic is estimated to represent some 8 per cent of total non-scheduled passenger traffic and about 2 per cent of total domestic passenger traffic worldwide. Non-scheduled cargo operations tend to be largely of an ad hoc nature and little information is available as to their volume.

FLEETS

2.78 The evolution of the commercial air transport fleets summarized below does not generally include aircraft fleet and manufacturer data for the Russian Federation and China. However, statistics on certain types of aircraft manufactured in the Russian Federation and employed in the fleets of States other than the Russian Federation and China are included in the tables shown unless otherwise stated. Also, unless otherwise stated, statistics of aircraft having a maximum take-off mass of less than 9 000 kg (20 000 lbs) are not included.

Orders and deliveries

2.79 In 1997, the number of turbo-jet aircraft ordered was 1 309 compared with 1 003 in 1996. The financial commitment represented by orders placed in 1997 for these aircraft is estimated to be about $78 billion compared with $65 billion estimated for 1996. In 1997, 674 aircraft were delivered compared with 491 aircraft in 1996. The backlog of unfilled orders increased from 2 501 aircraft at the end of 1996 to 3 062 aircraft at the end of 1997. The status of orders and deliveries for the year 1997 is shown in Table A1-2 in Appendix 1, which gives data by manufacturer and model for turbo-jet and turboprop aircraft.

2.80 The turbo-jet types shown in Table 2-10 were most active in 1997 in terms of orders and deliveries, accounting for about 84 per cent of the orders and for about 55 per cent of the deliveries made, and 73 per cent of the backlog of unfilled orders in 1997. The number of turboprop aircraft ordered in 1997 was 128, and 129 aircraft were delivered during the year. The backlog of turboprop aircraft was 171 at the end of the year.

Composition

2.81 Between 1988 and 1997, the number of commercial air transport fixed-wing aircraft in service with a take-off mass of 9 000 kg and over increased by over 59 per cent, from 10 712 to 16 993, as shown in Table 2-11. During this period, the number of jet aircraft increased from 8 179 to 13 489, rising from about 76 per cent to 79 per cent of the fleet, while turboprop aircraft increased from 1 932 to 3 213, or from about 18 to about 19 per cent of the fleet. On

the other hand, the number of piston-engined aircraft declined by almost 52 per cent, from 601 to 291, and now constitutes a little less than 2 per cent of the total world fleet.

2.82 In December 1997, the Airclaims Group reported 548 western-built commercial jets in storage, including 203 wide-bodies, i.e. 84 aircraft fewer than in December 1996 and less than half the number of aircraft that were in storage in January 1994. Airbus A300s and Boeing 727s accounted for one-third of stored fleets in their respective groups (wide- and narrow-bodies). Despite the overall reduction in stored aircraft, some aircraft types such as the Airbus A300 and Boeing 737 (with the JT8D engines) showed an 18 per cent increase (to 65 and 53 aircraft, respectively). According to BACK Information Services of the United States, the number of western-built jets available for lease or sale increased from 299 in December 1996 to 344 one year later including 135 wide-bodies. This increase could mainly be attributed to the number of older aircraft models, which were pushed into the market by a new cycle of fleet renewal. For instance, the Airbus A300s, Boeing 727-200s, McDonnell-Douglas DC-9-40s/50s and Lockheed L-1011s contributed some 47 aircraft to that increase. During the year, some of the oldest aircraft were permanently removed from the market, leading to a decrease in availability of some models such as the Boeing B707-320, B727-100, B747-100, and the McDonnell-Douglas DC-9-30.

2.83 In general, the 1996 trend to lower market prices for commercial jets continued during 1997 but depended on the aircraft's age within the same model. About three-quarters of all models of older aircraft showed decreases in prices whereas only half of the models of newer aircraft saw a decrease. On the other hand, an increase in prices of over 5 per cent was observed for newer jets for more than a quarter of all models whereas for older machines it happened for only one aircraft in ten. Within the wide-body market, values of all model/age combinations of the Airbus A300-600, McDonnell-Douglas DC-10 and MD-11, and the Lockheed L-1011 were down whereas for all the model/age combination for the Boeing 777

Table 2-9. Estimated international non-scheduled revenue passenger traffic, 1996-1997

Category	1996 Pass.-kms performed (millions)	1996 Percentage of total carriers	1996 Percentage of total traffic	1997 Pass.-kms performed (millions)	1997 Percentage of total carriers	1997 Percentage of total traffic	Annual change (%) 1997/96
Scheduled carriers	122 800	53	—	116 700	48	—	-5.0
Non-scheduled carriers	110 400	47	—	127 900	52	—	15.9
TOTAL NON-SCHEDULED TRAFFIC	233 200	100	14.5	244 600	100	14.2	4.9
TOTAL SCHEDULED TRAFFIC	1 377 000	—	85.5	1 477 500	—	85.8	7.3
TOTAL TRAFFIC	1 610 200	—	100.0	1 722 100	—	100.0	6.9

Source: ICAO Air Transport Reporting Forms A-1 and A-2.

Table 2-10. Main aircraft types ordered and delivered in 1997

Aircraft	Orders	Deliveries	Backlog
Airbus A319/320/321	347	127	741
Boeing 737	318	134	907
Canadair RJ	156	61	146
Embraer EMB-145	121	32	132
Boeing 767	98	42	141
Airbus A330	63	14	162

Source: Aircraft manufacturers.

Table 2-11. Commercial transport fleet[1] at the end of each year — 1988, 1996, 1997[2]

	TURBO-JET		TURBOPROP		PISTON ENGINE		
Year	Number	Percent-age	Number	Percent-age	Number	Percent-age	Total aircraft all types
1988	8 179	76.4	1 932	18.0	601	5.6	10 712
1996	12 980	78.9	3 180	19.3	300	1.8	16 460
1997	13 489	79.4	3 213	18.9	291	1.7	16 993

1. Aircraft having a maximum take-off mass of less tha 9 000 kg (20 000 lb) are not included.
2. Owing to lack of information, data for China and the Russian Federation are not included.

Source: ICAO Air Transport Reporting Form H.

values were up. For other aircraft the picture was less clear. For some of the low-priced narrow-body aircraft, small changes in nominal values translated into dramatic changes in percentage terms. For example, the Boeing 707-320B exhibited a fall in prices ranging from 40 to 75 per cent, whereas the McDonnell-Douglas DC-9,-10,-15 and -20 showed price increases in the order of 30 to 50 per cent.

Leasing developments

2.84 By the end of 1997, there were over 40 leasing companies managing about 2 140 jet aircraft, or nearly 16 per cent of the world jet commercial fleet (excluding China and the

Russian Federation), including about 1 200 jets owned by them. Nearly 60 per cent of jet aircraft available for operating leases from this source were managed by just two companies, both of which are based in the United States: General Electric Capital Aviation Services (871 aircraft) and International Lease Finance Corporation (ILFC, 400 aircraft). The former owned just 19 jets directly, with a further 440 belonging to six leasing companies controlled by the General Electric Capital Corporation, while ILFC listed 338 aircraft as its direct property.

2.85 According to data provided by the Airclaims Group, during 1997 the share of the western-built jet fleet owned by airlines further declined by more than 1 percentage point to some 54 per cent.

2.86 During 1997, the leasing rates for most wide-body aircraft models showed a recovery, with only some models experiencing marginal decreases in rates. The most significant increases in rates, in most cases exceeding 20 per cent, were seen for all models of the Lockheed L-1011 and the McDonnell-Douglas DC-10. This increase can be partly attributed to a fall in fuel prices, which has reduced the importance of the relatively high fuel consumption of these wide-body aircraft. After the increase in rates during the previous year, the leasing rates for Chapter 3 narrow-body aircraft moved marginally in both directions, although a trend to somewhat lower rates seemed to be prevailing. An exception appeared to be the various models of the McDonnell-Douglas MD-80 for which only downward changes were recorded, with the -87 and -88 models experiencing a decrease in rates of some 20 per cent. There appeared to be no prevailing trend in the change in leasing rates for the Chapter 2 narrow-body group, with some aircraft models showing a double digit increase (for example, the Boeing B707-320C hush-kitted, the B737-200Adv and -200CAdv, and the Fokker F28-4000) while similar models showed similar decreases.

AIRCRAFT TECHNOLOGY

2.87 In the four-engine long-range jet aircraft category, Airbus Industrie announced in December the launch of the A340-500 and -600 airliner programme after it had received orders and options for some 100 aeroplanes with planned deliveries of both models in the year 2002. The introduction of new versions of the current A340-300, the A340-500 to carry 313 passengers up to 15 800 km and the A340-600 to carry 380 passengers up to 13 900 km marks the manufacturer's first-time entrance into the 300- to 400-seat ultra long-range market. To counter this, the Boeing Company had revealed five separate 747-400 derivatives but by the end of the year none of them had been launched. In the Russian Federation, the Il-96M/T (309-416 seats, range 11 500 km/92 tonnes of freight, range 14 000 km) equipped with Pratt & Whitney engines, Rockwell Collins avionics and priced at $75 million took to the air in May.

2.88 The world's longest airliner, the Boeing 777-300 (73.8 m), took to the air in October with plans of its delivery to a launch customer in May 1998. This twin jet aircraft is intended partly as a replacement for the initial Boeing 747-100/200 models of which about 650 were sold. According to the manufacturer, the Boeing 777-300 provides a 20 per cent lower seat-kilometre cost than that of the Boeing 747-200. The General Electric GE90-90B powered Boeing 777-200IGW (Increased Gross Weight) entered service in February 1997 after

receiving U.S. and Joint European certification with 180-minutes ETOPS approval. In March, the -200IGW versions powered by the Pratt & Whitney PW4090 and by the Rolls-Royce Trent 892 engines were also delivered to the launch customers. Compared with the initial -200 model, the range of the -200IGW increased by more than 4 000 km to nearly 13 400 km while the maximum take-off mass grew from 247 to 287 tonnes. By the end of the year, Boeing had to slow development work on the proposed Boeing 777 ultra-long-haul (-200X) and increased range high-capacity (-300X) models due to the lack of launch customers. The planned in-service date of these models was pushed back until at least the first quarter of 2001.

2.89 The Airbus A330-200, a short-fuselage longer-range development of the A330-300 twin jet, had its maiden flight in August with the first delivery slated for April 1998. In April, the largest member of the 767 family, the -400ER, was launched offering about 15 per cent more seats than the -300ER. Its service entry has been scheduled for mid-2000.

2.90 The 1997 developments in the mid-size medium-haul aircraft market were related mostly to the Boeing third generation 737s. In February, nearly 30 years after its -100 ancestor, the first -700 took to the air, marking the first flight of the new generation variant of the best-selling jetliner in aviation history. In December, the manufacturer delivered its first -700 to the launch customer, two months late due to production problems that the Boeing Company faced in 1997. In July, the -800 made its first flight and in December the first -600 was rolled out with their deliveries to the launch airlines scheduled for March and September 1998, respectively. The -600, -700, and -800 models offer 108 to 132, 128 to 149, and 160 to 189 seats, respectively. In November, the fourth and the longest model in the Next Generation 737 family, the -900, was launched of which deliveries are to start in 2001; this aircraft can seat up to 177 passengers in a two-class layout compared with 162 in a typical -800's configuration. Following a merger of McDonnell Douglas into the Boeing Company, the latter announced that it would close the MD-80 and MD-90 production lines in mid-1999 as orders for the single-aisle twin jet transport are filled. However, the new 100-seat class MD-95-30 programme was retained for continuation under the name of Boeing 717-200 with the first delivery scheduled for June 1999.

2.91 In April, the first 220-seat extended range increased gross weight Airbus A321-200 entered service. The European Joint Aviation Authority (JAA) granted ETOPS approvals to the A319 and the A321with CFM or V2500 engines. The first 170-seat (one class) MD-90-30ER with range extended to 4 000 km was delivered in August to the launch carrier. The Rolls-Royce RB 211-535E4-powered Tu-204-120 (214 seats) was certificated in July. This was the first Russian/Western joint-venture jet-aircraft programme to be certificated in the Commonwealth of Independent States (CIS); certification under the JAA rules was expected within two years. In mid-1997, the 100-seat Tu-334 twin jet became airborne thus ending the numerous delays which this project had faced since the rollout in August 1995 due to lack of funds. Yakovlev launched an upgraded tri-jet Yak-42, the -42A, which was expected to enter production in early 1998, however the new twin-engine Yak-242 was shelved due to lack of funds. Almost two years after the first model was lost in a mid-air collision, Antonov resumed in April 1997 the flight testing of its An-70 four-engine freighter, the first aircraft in the world to be powered by propfans.

2.92 With regard to the regional aircraft market, three new models of existing aircraft were launched in 1997: the 70- to 78-seat Canadair Regional Jet Series 700 (deliveries by the end of 2000), the 37-seat Embraer EMB-135 (deliveries in the second half of 1999), and the 70-plus-seat C295 of CASA Aircraft of Spain. Two new models of existing regional aircraft were rolled out: the 32-seat twin jet Fairchild Dornier 328 JET (service entry in the second quarter of 1999), and the 70-seat twin turboprop Bombardier de Havilland Dash 8-400 (delivery in the first quarter of 1999). According to a multinational agreement finalized in May, the AE31X twin jet, formerly known as the AE-100 Air Express, will be offered in four different seats/range combinations with entry into service set for 2003. Meanwhile, in the light of growing competition, the Aero International Regional (AI(R)) consortium announced cancellation of its proposed Airjet 70 programme and Saab Aircraft decided to pull out of the regional aircraft manufacturing business by mid-1999 when it fulfils existing orders for its two turboprops (the Saab 340 and 2000). During the year, British Aerospace also closed its regional turboprop production lines. In the CIS, the Antonov AN-38 and Il-114 twin-turboprops were certificated in April and May, respectively. Another twin turboprop, the An-140, flew for the first time in September. The Russian federal government and the regional government of Tatarstan have provided financing to complete development of the 50-seat Tu-324 regional twin jet, which is expected to roll out in 1999.

2.93 In the United States, Europe and Japan, research efforts continued on high speed civil transport (HSCT) projects. The United States high speed research programme yielded a preliminary configuration of the aircraft with four engines, a cruise speed of Mach 2.4, 300 seats, a 9 260 km range, and a take-off mass of 340 tonnes. The United States studies indicated a market for 1 000-1 500 such aircraft. The Japanese Government announced plans to develop, jointly with the private sector, a similar HSCT but with a range of 11 100 km. The European supersonic research programme has accepted, as a baseline, a Mach 2 cruise speed, 250-seat aircraft with a 10 200 km range.

2.94 Two of the world's leading aircraft manufacturers have further widened differences in their approach to development of a very large commercial transport (VLCT). In January, reacting to rising costs and poor market response, the Boeing Company put on hold its plans to build two major derivatives of the Boeing 747 (known as -500X and -600X or -500MD and -600MD) on which the company had been working since it had abandoned, in 1995, development of a completely new VLCT. On the other hand, Airbus Industrie continued with plans to build the 550-650-seat (three classes) A3XX with launch envisioned by the end of 1998 or early 1999 and service entry respectively by late 2003 or in 2004. In Russia, a downscaled model of the EKIP round flying wing VLCT, claiming to be able to carry over 500 passengers at a much lower cost than traditional aircraft, was waiting for financing to start test-flying.

2.95 In 1998, there were few new demands to develop new engines. To power the Boeing 777-200IGW, General Electric used a derated version of the 409kN GE90-92, whereas Pratt & Whitney and Rolls-Royce had certificated growth versions of their PW4084 and Trent 890, respectively. Rolls-Royce started development of the 236- 250kN Trent 500, a derivative of the Trent 700 and 800. The Trent 500 was chosen to be the only engine type for the initial production of the A340-500/600 after General Electric had pulled from the exclusive 1996 agreement with Airbus Industrie to develop a new engine for that aircraft. Similarly, Pratt &

Whitney concluded that developing a new engine from scratch for the expected market would be too costly and would take too long. All three major engine manufacturers had also embarked on developing 454kN thrust versions of their biggest engines to power the proposed Boeing 777-200X/300X, but these programmes were later slowed down pending launch customers.

2.96 During 1997, all three engine types on the Boeing 777 as well as the Trent 700 engines on the Airbus A330 experienced temporary technical problems, in some cases causing the type to be temporarily grounded or withdrawn from the ETOPS programme. Rolls-Royce began operational tests of RB211-524G/H engines in which the high-pressure system was replaced with the Trent 700 core to remedy reliability and performance shortfalls of the standard engines, affecting more than 100 RB211-powered 747-400s and 767-300s. Besides reducing engine weight by about 100 kg, the modification was expected to burn fuel better by 2 per cent and lower NO_X emissions by 40 per cent. In the segment of smaller engines, the BMW-Rolls-Royce BR715 turbofan engine developed for the 90- to 130-seat regional aircraft made the first run with expected entry into service in 1999. Pratt & Whitney and Snecma decided to terminate the SPW14 engine aimed at 70-seater after AI(R) cancelled its proposed Airjet 70 programme. In the United States and Europe, researchers continued to work on a number of major programmes to drastically reduce fuel consumption, NO_X emissions, engine weight and maintenance costs.

2.97 In an effort to allow airlines greater flexibility in adjusting to changing market demands, Airbus Industrie has begun delivering the first "twelve-month" long-range wide-body aircraft, meeting the challenge it set itself two years ago to cut delivery times from 18 to 12 months. Customers can now define and freeze their own specification one year prior to delivery. The Airbus A319/320/321 production time was reduced to nine months. In September, Airbus started to produce its A300 and A310 aircraft on a "build-to-order" basis in order to cut the number of aircraft that are being stored before finding a buyer. The Boeing Company was also continuing its effort to reduce the periods between the signing of the purchase contract and delivery, aiming at six months for the 737/757 and eight months for wide-body aircraft. Ultimately, the manufacturer would like to sell its customers bulk-seating capacity, so airlines could choose models a few months prior to deliveries. The trend in long-term exclusive supplier deals between airline and manufacturer started in 1996 and was reinforced in 1997 when two more United States major air carriers signed 20-year agreements with the Boeing Company.

2.98 The major consolidation event of the year was the merger in August of two aerospace giants: Boeing and McDonnell Douglas. The Boeing Company has estimated its annual savings from the consolidation at $1 billion. In the wake of the merger, Boeing lowered the Boeing 717 price to $19 million compared with a $32 million price tag for the same aircraft previously marketed by McDonnell-Douglas as the MD-95.

2.99 In 1997, the four constituent partners of Airbus Industrie agreed to make the consortium a limited liability company by early 1999, with management control over all manufacturing functions, but postponed a decision over whether legal ownership of the factories should also be transferred. The European manufacturer was actively negotiating with Asian, European and the United States companies to join in the A3XX project with

Belairbus of Belgium, Finaviatec of Finland, Fokker Aviation (Stork) of the Netherlands, and SAAB of Sweden having signed Memoranda of Understanding (MOUs) to that effect. The Taiwan province of China signed a technology pact with Airbus, which involves providing funding to develop the A340-500/600 and was about to replace the Republic of Korea in the "superjumbo" project due to the latter's withdrawal from this project. The Government of the Netherlands presented a plan to finance the involvement of Dutch companies and research institutes in the A3XX programme. Airbus also signed an agreement with the Russian Ministry of Economics, which envisages closer cooperation in such areas as joint projects, research and development, production and certification, including establishment of a single Russian management organization to liaise with Airbus on the A3XX. The Russian Federation's potential share in the new aircraft production was estimated at 18 to 20 per cent.

2.100 British Aerospace signed a wide-ranging agreement with a Malaysian state-owned investment house, Kazanah Nasional Berhad, which could lead the latter to take up to a 50 per cent stake in Avro International and produce, in Malaysia, parts for Avro regional jets. In May, a partnership between Airbus, Alenia of Italy, Aviation Industries of China (AVIC) and Singapore Technologies to produce the AE31X became official with the signing of an MOU to form a joint company.

2.101 During the year, Russian companies and organizations were involved in many international cooperative agreements. The Boeing Company signed an MOU with Russia's Federal Aviation Service covering a range of flight safety and air traffic control issues. Pratt & Whitney decided to buy a 25 per cent stake in a leading Russian engine manufacturer, Permskiye Motory, with the intention of upgrading the PS-90A engine suitable to power the Il-96-300, Tu-204, Tu-214, Tu-330 and Il-76MF. In another deal, the manufacturer has formed Pratt & Whitney-Rus, a St. Petersburg-based company to design, develop, certificate and maintain engines for use in the CIS. Two new agreements to install Western-made power plants on the CIS-built airframes were concluded: between BMW Rolls-Royce and Tupolev in respect of the Tu-334 and between Pratt & Whitney Canada and Ilyushin in respect of Il-114. AlliedSignal Aerospace started engine deliveries to power the An-38. Honeywell and Aviapribor, a leading Russian equipment supplier, formed an alliance to supply avionics and landing systems for use in the CIS. Following plans under implementation to assemble the An-140 regional aircraft in Iran, Russia agreed to license Iran to also build turboprop engines for the aircraft. Within the Russian aerospace industry itself, the process of integration also continued. The Tupolev design bureau and its two main production plants have signed an agreement to merge, subject to governmental approval, creating the largest concern of the country in civil aircraft manufacturing. Similarly, a joint venture registered as the NK Engines finance-industrial group was created around the NK Engines design bureau and its major production Kazan Engine plant.

PERSONNEL

2.102 Many new labour contracts in 1997 were reached only after long disputes, which in a number of cases involved industrial actions. Nearly three dozen airlines were reportedly

affected by the industrial actions of their staff, with Europe being the scene of more than half of these actions. As in previous years, on a global basis pilot and flight attendant unions were the most active in staging industrial actions.

2.103 Continuing a trend that started in the United States, Air France, British Airways and Iberia were among the latest carriers to offer their employees different stock options. For two major United States airlines, successful completion of labour negotiations opened the way to implementation of massive fleet renewal programmes. In 1997 codesharing became a significant concern for unions.

FINANCES

Financial results

2.104 Preliminary estimates for 1997 indicate that the world's scheduled airlines as a whole experienced an operating profit of 5.7 per cent of total operating revenues, compared with 4.4 per cent in 1996. This is the fifth successive year of operating profits following three years of operating losses (1990-1992). The operating revenues of scheduled airlines (excluding operations within the Commonwealth of Independent States — CIS) are tentatively estimated at $291.0 billion in 1997, an increase of 3 per cent compared with the $282.5 billion earned in 1996. Expressed in United States currency, operating revenues per tonne-kilometre performed fell from 84.8 cents in 1996 to an estimated 81.5 cents in 1997. The operating expenses for the same airlines are tentatively estimated at $274.5 billion in 1997, an increase of less than 2 per cent over the $270.2 billion incurred in 1996. Operating expenses per tonne-kilometre performed decreased by about 4 per cent from 81.1 cents in 1996 to 76.9 cents in 1997.

2.105 The estimated operating result for the world's scheduled airlines is the difference between estimated operating revenues and expenses and is therefore subject to a relatively wide margin of error. For 1997, the estimated operating profit of about $16.5 billion was higher than the 1996 operating profit of $12.3 billion and in absolute terms is the best annual result since ICAO started recording these data in 1947. The higher operating profit in 1997 reflects a generally healthy economy for most of the year, leading to an increase of 8 per cent in total scheduled traffic of the world's airlines, as measured in tonne-kilometres performed. Capacity increases for passenger services continued to be kept in check and hence the average passenger load factor rose, for the fourth year in row, to reach its highest annual level of 69 per cent. Lower aviation fuel prices and the continuing efforts by airlines around the world to reduce their costs contributed to the decline in operating expenses per tonne-kilometre performed. This, coupled with lower aviation fuel prices and the continuing efforts by airlines around the world to reduce their costs, in part, contributed to the decline in operating expenses per tonne-kilometre performed. The reduction in yield (revenues per tonne-kilometre), in part, reflects increasing competition in fares and rates as well as declines in Asian financial markets in the latter part of the year. However, part of the reduction in both unit costs and revenues also reflect the higher value of the United States dollar in relation to the other world currencies.

2.106 In 1997, the United States scheduled airlines ("majors" and "nationals") as a group accounted for about 36 per cent of the total operating revenues of the scheduled airlines of ICAO Contracting States (excluding operations within the CIS). Preliminary data indicate that their operating result in 1997 was a profit of $8.7 billion, significantly higher than the profit of $6.2 billion experienced in 1996. For the airlines of the rest of the world combined (excluding operations within the CIS), the preliminary estimated operating profit in 1997 is $7.8 billion, higher than the operating profit of $6.1 billion shown for 1996.

2.107 The net result is derived from the operating result by taking into account the non-operating items and taxes. Preliminary estimates suggested that in 1997 the net result for the world's scheduled airlines would be better than in 1996 due to low interest rates, improved airline balance sheets and reduced long-term debt. Information on both operating and net results over the period 1986-1997 and distribution of operating revenues and expenses by item in 1986 and 1996 may be found in Tables 5-4 and 5-5 in Chapter 5.

2.108 The estimates of the world's scheduled airlines as a whole do not portray the considerable difference in results achieved by individual airlines. In 1996 (complete data were not available for 1997 at the time of writing), about 70 per cent of airlines experienced operating profits, with 30 per cent reporting operating losses. On a regional basis, airlines in all ICAO statistical regions, except the Middle East, experienced positive aggregated operating results in 1996, with operating profits expressed as a percentage of operating revenues ranging from 6.0 per cent for the airlines in North America to 1.5 per cent for those based in Africa. Net results ranged from a surplus of 3.8 per cent of operating revenues for the airlines based in Latin America/Caribbean to a net loss of 5.6 per cent of operating revenues for those in the Middle East (Figure 2-2).

2.109 Available data on non-scheduled carriers are insufficient to produce accurate financial estimates for 1997. In 1996, the operating revenues of the non-scheduled carriers are tentatively estimated at $8.2 billion compared with $8.9 billion earned in 1995. In 1996, these carriers, as a group, had an operating profit estimated at $0.4 billion and a net result, after taking into account the non-operating items and taxes, of some $0.2 billion.

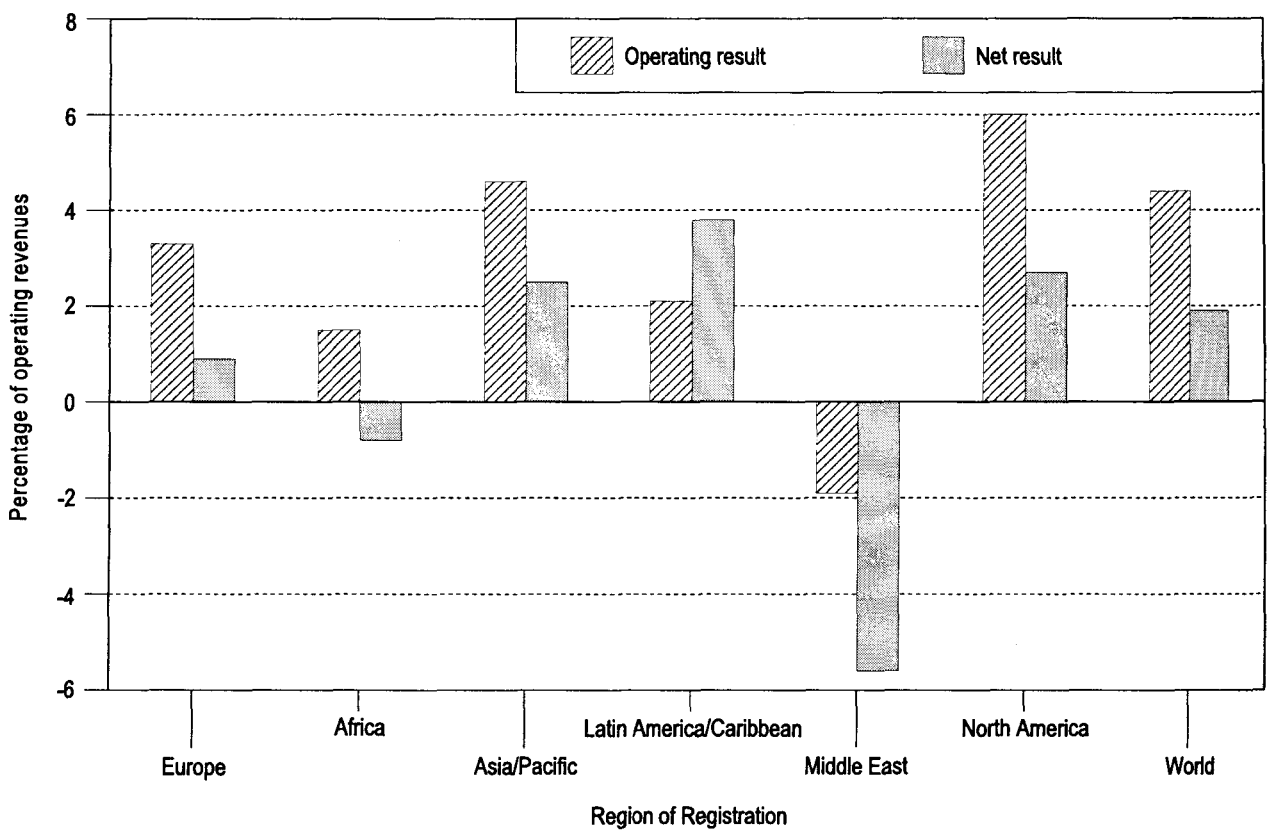
Consolidated balance sheet

2.110 At the end of the fiscal year 1996 (1997 data were not available at the time of writing), the total assets of the scheduled airlines of ICAO Contracting States (excluding operations within the CIS) stood at $341.3 billion, compared with $332.7 billion at the end of the fiscal year 1995 (Table 2-12). Of these, 25 per cent were represented by current assets, some 59 per cent by fixed assets and the remainder by other assets.

2.111 At the end of 1996, the net value of the aircraft fleet (i.e. after depreciation charges) was $159.7 billion, compared with $153.0 billion at the end of 1995, representing an increase of 4.4 per cent, accounting for about 47 per cent of total assets. Accumulated depreciation charges stood at about $135.7 billion of which $104.1 billion were for the aircraft fleet,

representing some 39 per cent of the gross value of the fleet. The remaining accumulated depreciation charges covered ground property and equipment and represented some 52 per cent of their gross value.

2.112 Between the fiscal years 1995 and 1996, the value of stockholders' equity increased by some 13 per cent (from $62.1 billion to $70.1 billion), and in relative terms it increased from 19 to 21 per cent of total liabilities. During the same period, long-term debt decreased from $114.3 billion to $109.8 billion and, in relative terms, from 34 to 32 per cent of total liabilities. At the end of the fiscal year 1996, current liabilities, including unearned transportation revenue, stood at $101.0 billion, or some 30 per cent of total liabilities, compared with some 29 per cent in 1995. Hence, during 1996 airlines used some funds to improve their balance sheets by reducing long-term debt. Unearned transportation revenue represented about 5 per cent of total liabilities and some 6 per cent of the total traffic revenue for 1996.



Source: ICAO Air Transport Reporting Form EF-1.

Figure 2-2. Financial results by region in 1996 — scheduled airlines

Table 2-12. Consolidated balance sheet Scheduled airlines of ICAO Contracting States[1] End of fiscal years 1988, 1995 and 1996

	1988		1995		1996	
	U.S.$ (millions)	% of total	U.S.$ (millions)	% of total	U.S.$ (millions)	% of total
ASSETS						
Current assets	53 200	30	84 530	25	86 400	25
Fixed assets						
Flight equipment	84 900	48	152 990	46	159 720	47
Ground property and equipment	18 000	10	28 450	9	28 780	8
Land	900	1	3 860	1	3 860	1
Investments in affiliated companies	2 800	2	10 010	3	10 160	3
Other assets	18 200	10	52 890	16	52 420	15
TOTAL ASSETS	178 000	100	332 730	100	341 340	100
LIABILITIES						
Current liabilities						
Current liabilities	42 200	24	80 170	24	83 610	24
Unearned transportation revenues	12 300	7	17 100	5	17 420	5
Long/medium-term liabilities						
Long-term debt	59 100	33	114 320	34	109 750	32
Other medium/long-term liabilities	22 400	13	59 070	18	60 420	18
Stockholders' equity						
Share capital	15 800	9	27 540	8	27 170	8
Other capital	26 200	15	34 530	10	42 970	13
TOTAL LIABILITIES	178 000	100	332 730	100	341 340	100
ACCUMULATED DEPRECIATION						
Flight equipment	54 600	78	106 150	77	104 050	77
Ground property and equipment	15 500	22	31 970	23	31 660	23
TOTAL ACCUMULATED DEPRECIATION	70 100	100	138 120	100	135 710	100

1. Excludes domestic operations within the CIS.

Source: ICAO Air Transport Reporting Form EF-1.

2.113 Long-term trends in the balance sheet elements may be discerned from comparing the figures for 1996 with those for 1988, which are also contained in Table 2-12. At the end of the fiscal year 1996, total assets stood at $341.3 billion compared with $178.0 billion at the end of 1988. Relative to the totals, the most significant difference between 1988 and 1996 was the decrease in the proportion of current assets (from 30 to 25 per cent of the total) and the corresponding increase in other assets. The proportion of fixed assets is virtually the same in both years (60 per cent of total assets in 1988 and 59 per cent in 1996); however, there was a slight relative increase in investment in affiliated companies (from about 2 per cent of total assets in 1988 to 3 per cent in 1996), and a reduction in the relative amounts represented by flight equipment and ground property and equipment.

2.114 As regards liabilities, between 1988 and 1996 there was a slight reduction in the proportion of current liabilities including unearned transportation revenue (from 31 to 30 per cent of total liabilities), long-term debt (from 33 to 32 per cent) and quite significant changes in stockholders' equity (from 24 to 21 per cent) with a corresponding increase in advances from affiliated companies and other liabilities. With regard to stockholders' equity, the decrease in relative terms was due to a decrease in proportion of share capital and self-insurance reserves and also the smaller net balance of unappropriated retained earnings (i.e. cumulative profit) at the end of fiscal year 1996.

GENERAL AVIATION

2.115 General aviation is here defined as civil aviation other than scheduled and non-scheduled commercial air transport. On the basis of worldwide statistics for 1996 and available 1997 data for those States where general aviation activity is highly developed, it is possible to draw some overall conclusions on the development of this branch of civil aviation in 1997. Excluding the Russian Federation, it is estimated that general aviation flying in ICAO Contracting States in 1997 accounted for 41.2 million hours, slightly higher than the 40.7 million hours estimated for 1996 (Table 2-13).[1] Of the total for 1997, an estimated 9 million hours (22 per cent) were flown in instructional flying, 22 million hours (54 per cent) in business and pleasure flying and 10 million hours (24 per cent) in aerial work and other flying. A total of 41 million general aviation flying hours compares with a total of about 35 million hours flown on scheduled services by airlines of the same Contracting States in 1997.

1. However, the 1997 figures for the first time include data for China.

Table 2-13. Estimated number of hours flown in general aviation activities, 1996-1997
(excluding the CIS and, in 1996, China)

Type of flying	Millions of hours 1996	1997
Instructional	8.9	9.1
Business/pleasure	22.3	22.3
Aerial work/other	9.5	9.8
TOTAL	40.7	41.2

Source: ICAO survey on aviation activities.

Chapter 3
Airports and Air Navigation

3.1 This chapter discusses developments in 1997 in the management and organization of airports and air navigation facilities and services, in the infrastructure, traffic and financing of airports, and in financial and technical aspects of air navigation services.

MANAGEMENT AND ORGANIZATION

3.2 The trend towards governments establishing autonomous entities to operate airports continued in 1997, with emphasis again being placed on more active private involvement in airport operations, management, and financing. A noteworthy development in this context was the interest shown by some European airports and private airport management companies in the United States in various airport privatization schemes around the world thereby bringing a global perspective to airport management. Similar to the well-established pattern of alliances that exist in the airline industry, some airports are now giving consideration to cooperating strategies or alliances. For example, Amsterdam (Netherlands) and Vienna (Austria) airports have agreed to enhance their cooperation by promoting each other as a first step before exploring more advanced forms of collaboration. Another example was in the Middle East, where the Governments of Jordan and Israel signed a Memorandum of Understanding on the joint use of Aqaba airport (Jordan) in order to relieve Eilat airport (Israel). There were also discussions of possible cooperation between Amsterdam airport and Aer Rianta of Ireland, which operates the major airports in Ireland, on the one hand, and the Belgian airports of Brussels and Charleroi on the other hand.

3.3 As to developments at the national level, in Canada further implementation of government plans added Victoria (British Columbia), Earlton, and Hamilton, Ottawa and Thunder Bay (Ontario), Moncton, and St. John (New Brunswick), and St. John's (Newfoundland) airports to those previously transferred from the Federal Government to local autonomous authorities, while Terminal 3 at Toronto's Lester B. Pearson airport was acquired by the Greater Toronto Airport Authority. In the United States, the Federal Aviation Administration launched a pilot project calling for proposals on private involvement in five airports to be identified by the proposals. In the Russian Federation, 34 State-owned airports are to be privatized in 1999, including Sheremetyevo and Vnukovo, two of the four airports serving Moscow — the third, Domodedovo, was privatized in 1997. Privatization projects planned or under way in Europe include Amsterdam-Schiphol (Netherlands) where the government's holding (75.8 per cent) may be sold; Berlin, Cologne-Bonn, Dusseldorf, Frankfurt and Hamburg airports (Germany); Luton airport, and Birmingham airport (United Kingdom),

where Aer Rianta (Ireland), is involved; the regional airports of Karlovy-Vary, Ostrava and Brno (Czech Republic); Aeroporti di Roma where 41 per cent of the shares were sold, Venice where 40 per cent of the shares are to be sold, and Trieste (Italy). Also, Athens and Thessaloniki (Greece) are to be privately managed and new privately financed airports are to be built in Crete and Thessalia; in Slovakia, airports are to be transferred to the new State-owned autonomous Slovak Airports Authority.

3.4 In Argentina, the operation of 33 airports was awarded under a 30-year concession to a consortium (Aeropuertos Argentina 2000) comprising both national and international partners. In Bolivia, the management of the three main airports has been awarded to Airport Group International, a privately held United States company. In Colombia, building, operating and transferring (BOT) schemes were granted at Barranquilla, Medellin, and Cali and are under way at Bogota and Cartagena. In Mexico, 35 airports have been divided into four groups. Each group consists of a combination of profitable and unprofitable airports, which each group had been offered for long-term operation under a concessionary arrangement. Creation or privatization of autonomous entities, or both, are also under way in Brazil, Chile, Honduras, Jamaica (land-side facilities), Panama, and Uruguay (Montevideo).

3.5 In Côte d'Ivoire, Abidjan airport (land-side only) will be managed by a new entity, AERIA, a major stakeholder of which is the French company SEGAP (a joint subsidiary of Sofreavia-Service and the Marseilles Chamber of Commerce); and in Egypt, authorities cleared the way for private companies to become more involved in airport management (notably under BOT schemes). In India, a new policy allowed foreign equity in airports to be significantly raised; and privatization was under active consideration for the Airports Authority of Thailand and Malaysia Airports Bhd, while in New Zealand the State was considering divestment of the two major airports of Auckland and Wellington. In Australia, the second phase of privatization was launched involving eight interstate/international airports and a number of intrastate airports. The major international airports of Melbourne, Brisbane and Perth will from now on be managed under long-term lease contracts by consortia led mostly by international interests, namely British Airports Authority, Airport Group International, and Amsterdam-Schiphol, respectively. Among the major Australian airports, only Sydney continues to be government-owned.

3.6 The trend towards providing air navigation services through autonomous entities also continued in 1997, but private involvement has not been as actively pursued as in the case of airports. In the Russian Federation, an air traffic management department, that is the State Air Traffic Management Corporation was established within the Federal Aviation Authority of Russia (FAAR). The new corporation is responsible for airspace management and the operational performance of the civil air traffic management system, including collection of overflight fees. In the United States, active consideration is being given to assign the air traffic services currently being provided by the Federal Aviation Administration (FAA) to a separate self-financing autonomous entity to be created for that purpose. In the United Kingdom, the future of the National Air Traffic Services (NATS) Ltd. as a wholly-owned subsidiary of the CAA (its present status) or as a private enterprise, outside the current public sector, remains under consideration. In Portugal, plans are to sell Aeroportos e Navegação Aerea (ANA EP), which runs airports and air navigation services in 1998/99, but air traffic management would be transferred to a new state-owned autonomous entity. In

Argentina, there are plans to privatize the air traffic control system, which is presently operated by the armed forces.

MAJOR AIRPORT PROJECTS

3.7 There were 1 146 airports in the world at the end of 1997 open to international civil aviation. During the year, a number of new airports were opened in Nanjing-Lukou and Fuzhou-Changle (China); Chongju (Republic of Korea); Eldoret (Kenya); and Bodrum/Mugla (Turkey). Work continued on major airport projects at Hong Kong-Chek Lap Kok (to be opened in 1998), Haikou-Meilan (1998), Shanghai-Pudong (1999/2000), and Guangzhou-Huadu (2005) all in China; Kuala Lumpur-Sepang (1998, Malaysia); Oslo-Gardermoen (1998, Norway); Doha (1999, Qatar); Seoul-Inchon (2000, Republic of Korea); and Athens-Spata (2000, Greece). Plans were also announced for new international airports to serve the following cities: Buenos Aires — offshore (Argentina); Arroyo Barril (Dominican Republic); San José (Costa Rica); Kobe, and Nagoya-Chubu, both offshore (Japan); Vientiane (Laos); Medan-Kuala Namu (Indonesia); Zamboanga-Mampang (Philippines); Sialkot and Islamabad (Pakistan); Pupho and Hamhung (Democratic People's Republic of Korea); Mumbai (formerly-Bombay), Goa, and Cochin (India); Madrid (Spain); Amsterdam (Netherlands), where one option involves an offshore airport; Dubai-Jebel Ali (United Arab Emirates); Sohar (Oman); and Nador (Morocco). However, the project for a third Paris airport was abandoned, and the second airport project for Bangkok and Sydney remains under consideration.

3.8 Major expansion projects were also under way in all regions in 1997. New terminals or terminal expansions were completed during the year at the airports of Palma de Majorca of Fuerteventura and El Hierro (Spain, the latter two in the Canary Islands); Prague (Czech Republic), Heraklion and Kos (Greece), Tromsoe (Norway), Guam (United States Territory of Guam), Cairns (Australia), Christchurch (New Zealand), San Salvador (El Salvador), San Pedro Sula (Honduras), Washington-National (now Ronald Reagan, United States), and Banjul (Gambia). New terminals were under construction at a number of airports around the world: Paris-Charles-De-Gaulle (France), Budapest-Ferihegy (Hungary), Cologne/Bonn (Germany), Istanbul (Turkey), Rome-Fiumicino (Italy), and Paphos (Cyprus), Nagoya (Japan), Phnom-Penh (Cambodia), Ho-Chi-Minh City (Viet Nam), Beijing, Chengdu, and Harbin (China), Ujung Pandang (Indonesia); Wellington (New Zealand), Palau (Republic of Palau), Port-Moresby (Papua New Guinea); San Francisco, Phoenix, Miami, New York J.F. Kennedy, Chicago-O'Hare, and Austin-Bergstrom (United States), Toronto-Lester B. Pearson (Canada), Port of Spain (Trinidad) and Rio de Janeiro (Brazil). Additionally, significant terminal expansion works were under way at, for example, Bangkok-Dong Muang (Thailand), Frankfurt (Germany), Paris-Orly (France), Sao Paulo-Guarulhos (Brazil), Shanghai-Hongqiao (China), Singapore-Changi (Singapore), and Sydney-Kingsford Smith (Australia).

3.9 Runway capacity was added at Tokyo-Haneda (Japan) in 1997, with additions under construction at Madrid-Barajas (Spain), Paris-Charles-De-Gaulle (France), Bogota (Colombia), Hong Kong-Chek Lap Kok (China), Manchester (United Kingdom), Leipzig (Germany), Ujung Pandang (Indonesia). Runway extension/relocation was undertaken at Funchal (Portugal) and Nice (France).

AIRPORT TRAFFIC

3.10 The 25 largest airports in the world in terms of passenger throughput, 16 of which are located in the United States, handled a combined total of about 968 million passengers in 1997 (Table 3-1). This represents about 32 per cent of the world total of scheduled and non-scheduled passengers or an average per airport of some 106 000 passengers every twenty-four hours. These 25 airports also handled a combined total of about 10.7 million aircraft movements in 1997, corresponding to an average per airport of one take-off or landing every 73 seconds.

3.11 There are significant differences between the rankings of airports by passengers and by movements. For example, Tokyo-Haneda ranks 6th in terms of passengers handled but 46th in terms of aircraft movements, Frankfurt 8th by passengers but 21st by movements, and Hong Kong 20th by passengers but 57th by movements, illustrating that a substantial part of traffic at these airports is carried on wide-body aircraft. Airports that do not make the listing by passengers, but which would make a top 25 listing by movements are Boston (8), Pittsburgh (14), Philadelphia (16), Cincinnati (18), Charlotte (19) and Seattle (22).

3.12 Table 3-1 also includes 1988 data to illustrate the longer-term rate of growth of airport traffic. Passengers handled at the large airports concerned increased at about 5.1 per cent per annum on average over the 1988-1997 period, while aircraft movements increased at some 2.3 per cent per annum, illustrating a trend to the use of larger aircraft. There were substantial differences in the rates of growth amongst individual airports.

3.13 Table 3-2 lists the 25 largest airports in the world in terms of *international* passengers handled. In marked contrast to Table 3-1, only three of the 25 airports are located in the United States. The 25 airports together, representing less than 2.5 per cent of airports serving international operations, handled about 481 million passengers in 1997, or about 49 per cent of the world total of international scheduled and non-scheduled passengers.

3.14 Over the 1988-1997 period, the number of international passengers handled at these airports increased at about 6.3 per cent per annum and the number of international aircraft movements increased at about 5.9 per cent per annum. Over this period, the highest annual growth rates recorded in terms of individual passengers were in general for airports in the Asia/Pacific region (Seoul 12 per cent, Bangkok, Hong Kong and Singapore each at 8 per cent). Seoul also achieved the highest annual growth rate in terms of international aircraft movements (13 per cent), followed by Brussels, Madrid, Paris-Charles-de-Gaulle and Singapore each at 9 per cent, and Bangkok and Hong Kong each at 7 per cent.

AIRPORT FINANCES

3.15 The financial situation of airports continued to improve, although the majority of the 1 146 airports listed in the ICAO regional air navigation plans still operate at a loss. Trends again confirmed that profitability was more prevalent where the airports were operated by autonomous entities. The share revenues from non-aeronautical sources constituted a total

Table 3-1. Scheduled and non-scheduled traffic at world's major airports
(top 25 airports ranked by TOTAL passengers, 1997)

Rank No.	Airport (ranking by total commercial aircraft movements given in brackets)	Passengers embarked and disembarked				Aircraft movements			
		1997 (thousands)	1996 (thousands)	Change 1997/96 (%)	Average change per annum 1997/88 (%)	1997 (thousands)	1996 (thousands)	Change 1997/96 (%)	Average change per annum 1997/88 (%)
1	Chicago (2)	70 295	69 154	1.7	2.4	810.6	834.0	-2.8	1.4
2	Atlanta (4)	68 206	63 303	7.7	13.0	606.6	581.0	4.4	-2.7
3	Dallas/Ft.Worth (1)	60 489	58 035	4.2	3.5	837.3	834.0	0.4	2.8
4	Los Angeles (3)	60 143	57 975	3.7	3.4	752.9	736.0	2.3	3.2
5	London-Heathrow (13)	57 849	56 038	3.2	4.9	430.7	428.0	0.6	3.0
6	Tokyo-Haneda (46)	49 302	46 632	5.7	4.9	209.7	202.0	3.8	2.5
7	San Francisco (15)	40 500	39 252	3.2	3.2	406.8	398.0	2.2	-1.1
8	Frankfurt (21)	39 613	38 761	2.2	5.6	382.7	373.0	2.6	3.6
9	Seoul (39)	36 757	34 706	5.9	15.4	235.6	214.0	10.1	13.8
10	Paris-Charles de Gaulle (17)	35 294	31 825	10.9	7.8	396.0	361.0	9.7	9.3
11	Denver (9)	34 973	32 293	8.3	1.1	452.2	421.0	7.4	2.4
12	Miami (6)	34 533	33 495	3.1	3.9	464.6	466.0	-0.3	4.5
13	Detroit (7)	31 521	30 135	4.6	5.4	459.0	454.0	1.1	4.2
14	New York-Kennedy (26)	31 229	31 155	0.2	0.0	334.3	339.0	-1.4	2.0
15	Amsterdam (25)	31 021	27 795	11.6	8.8	349.5	322.0	8.5	7.2
16	New York-Newark (10)	30 866	29 108	6.0	3.6	441.3	431.0	2.4	2.9
17	Phoenix (12)	30 536	30 412	0.4	7.5	432.6	437.0	-1.0	-0.6
18	Las Vegas (24)	30 306	30 460	-0.5	8.1	351.2	353.0	-0.5	-0.5
19	Minneapolis (11)	29 071	27 713	4.9	5.6	440.8	433.0	1.8	2.0
20	Hong Kong (57)	29 020	30 212	-3.9	7.4	164.1	159.0	3.2	7.3
21	Houston (20)	28 701	26 484	8.4	7.4	384.6	367.0	4.8	3.0
22	St Louis (5)	27 657	27 275	1.4	3.6	477.9	475.0	0.6	1.4
23	Orlando (27)	27 305	25 543	6.9	5.9	326.7	305.0	7.1	1.3
24	London-Gatwick (44)	26 962	24 337	10.8	3.0	229.7	212.0	8.3	2.6
25	Toronto (23)	26 083	24 259	7.5	3.4	366.8	347.0	5.7	2.9
	T O T A L	968 230	926 354	4.5	5.1	10 744.2	10 482.0	2.5	2.3

1. Aircraft movements for 1997 have been estimated.

Source: ICAO Air Transport Reporting Form I and Airports Council International.

Table 3-2. Scheduled and non-scheduled traffic at world's major airports
(top 25 airports ranked by INTERNATIONAL passengers, 1997)

Rank No.	Airport (ranking by international commercial aircraft movements given in brackets)	International passengers embarked and disembarked				International aircraft movements			
		1997 (thousands)	1996 (thousands)	Change 1997/96 (%)	Average change per annum 1997/88 (%)	1997[1] (thousands)	1996 (thousands)	Change 1997/96 (%)	Average change per annum 1997/88 (%)
1	London-Heathrow (1)	50 612	48 275	4.8	5.7	361.0	355.5	1.5	4.4
2	Frankfurt (4)	32 333	30 919	4.6	6.5	298.4	295.4	1.0	4.8
3	Paris-Charles de Gaulle (2)	31 549	28 665	10.1	7.7	343.7	315.6	8.9	8.8
4	Amsterdam-Schiphol (3)	30 832	27 085	13.8	8.8	336.3	309.1	8.8	7.1
5	Hong Kong (11)	28 330	29 543	-4.1	7.1	163.6	158.8	3.0	7.3
6	London-Gatwick (8)	24 385	22 029	10.7	2.4	189.2	174.6	8.4	2.1
7	Singapore (9)	23 799	23 130	2.9	8.5	172.7	166.7	3.6	9.1
8	Tokyo-Narita (17)	22 941	22 666	1.2	5.7	114.7	117.1	-2.0	2.0
9	New York-Kennedy (22)	17 345	17 453	-0.6	-0.5	98.0	100.3	-2.3	-0.9
10	Zurich (6)	16 770	14 783	13.4	5.7	218.4	202.6	7.8	5.6
11	Bangkok (19)	16 309	16 380	-0.4	7.6	113.5	110.6	2.6	6.8
12	Brussels (5)	15 814	13 358	18.4	9.7	254.6	241.4	5.5	9.2
13	Miami (13)	15 507	14 913	4.0	5.7	152.0	151.1	0.6	2.0
14	Seoul (30)	15 218	14 705	3.5	12.1	96.1	89.3	7.6	12.9
15	Los Angeles (32)	14 418	14 033	2.7	6.7	79.0	78.0	1.3	5.3
16	Taipei (20)	14 166	13 586	4.3	9.1	106.8	97.4	9.7	10.6
17	Toronto (10)	14 043	11 675	20.3	4.4	165.4	161.5	2.4	5.3
18	Copenhagen (7)	13 846	12 696	9.1	5.2	210.1	194.9	7.8	5.3
19	Rome-Fiumicino (16)	13 313	12 474	6.7	6.6	125.4	120.7	3.9	6.4
20	Manchester (21)	13 291	12 034	10.4	6.2	104.7	98.8	6.0	4.8
21	Palma de Mallorca (33)	12 291	11 338	8.4	3.6	77.3	72.0	7.4	3.3
22	Dusseldorf (18)	11 505	10 577	8.8	4.8	115.4	108.4	6.5	4.8
23	Munich (12)	11 022	9 591	14.9	7.2	152.7	132.6	15.2	7.6
24	Madrid (15)	11 014	10 172	8.3	7.0	123.9	116.3	6.5	8.5
25	Osaka (40)	10 818	10 126	6.8	11.2	63.5	56.1	13.2	22.5
	TOTAL	481 471	452 206	6.5	6.3	4 236.4	4 024.8	5.3	5.9

1. Aircraft movements for 1997 have been estimated.

Source: ICAO Air Transport Reporting Form I and Airports Council International.

airport revenue increase, in many instances exceeding more than 50 per cent of the total, notably for a number of European airports and a few major airports in Asia/Pacific. As a rule, airports with high traffic volumes generally show higher shares of non-aeronautical revenues and the shares tend to increase as traffic increases.

3.16 The shares that landing and associated airport charges represent in total airline operating expenses declined in 1996 (1997 data were not available at the time of writing). That share was 4.3 per cent in 1996, compared to 4.5 per cent in 1995.

AIR NAVIGATION FACILITIES AND SERVICES

3.17 The financial situation for air navigation services also continued to improve, particularly where air navigation services are operated by autonomous entities, reflecting the growing emphasis States are placing on recovering their air navigation services costs. The share that route facility charges represent in total airline operating expenses decreased slightly in 1996, to 2.7 per cent, compared to 2.8 per cent in 1995 (1997 data were not available at the time of writing).

3.18 Major developments during the year in the fields of aeronautical communications, navigation and surveillance, air traffic services, search and rescue, and aeronautical meteorology are described below.

Communications, navigation and surveillance

3.19 Implementation of communications, navigation, and surveillance/air traffic management (CNS/ATM) systems continued at an ever-increasing pace, allowing States to gain valuable experience. Early benefits of CNS/ATM were being realized through the opening of new ATS routes, e.g. over the vast airspaces of China and the Russian Federation as well as in other parts of Asia, while reduced separation standards were being introduced in the Pacific and in parts of Asia, based on required navigation performance (RNP). Communication via data link was increasingly used for transmission of ATM-related information, for example, for the delivery of oceanic clearances, pre-departure clearances and weather information. Many regions were conducting trials and experiments, using controller-pilot data link communications (CPDLC) and other data link applications for a broad range of ATM communications. In the field of navigation, Japan, the United States and European States are committed to the implementation of global navigation satellite systems (GNSS) augmentation systems, and progress was achieved by all of these States. Finally, automatic dependent surveillance (ADS) was being used as a supplemental means of monitoring aircraft in a number of oceanic and continental airspaces.

3.20 Work continued in a number of States and international organizations, with industry input, on developing and assessing candidate architectures for Aeronautical Telecommunications Network (ATN) subsystems. Work also continued in the development and assessment of technologies, such as time-division multiple access (TDMA) digital voice/data systems, to improve VHF communication spectrum utilization.

3.21 Controller-pilot data link communication (CPDLC), which allows controllers to communicate via data link, is being used increasingly to communicate with suitably equipped aircraft in oceanic and remote areas of the world.

3.22 Significant progress continued in a number of States and international organizations in global navigation satellite systems (GNSS) development and implementation. The ICAO GNSS Panel continued development of SARPs for GNSS. Development of satellite- and ground-based augmentations continued.

3.23 Development of satellite-based augmentation systems continued in a number of regions. This form of augmentation has the potential to support sole-means use of GNSS for all phases of flight down to Category I precision approach. Several architectures for ground-based augmentation systems that have the potential to support Category II/III precision approach applications also continue to be developed and tested. This type of augmentation may be used by some States as an alternative in support of Category I operations. A number of States have approved the global positioning system (GPS) for supplemental or primary use for some operations and some types of airspace.

3.24 A number of multinational facilities and services have been developed in line with ICAO worldwide provisions. Some of these, such as the world area forecast centre in London and the satellite distribution system for WAFS products, also known as SADIS, are intended to serve air navigation systems in several ICAO regions.

3.25 Considerable progress continued to be reported during the year in improving surveillance capabilities. This included development of automatic dependent surveillance (ADS) and implementation of new radar systems, such as monopulse secondary surveillance radar (SSR) and SSR Mode S stations.

3.26 ADS trials, called ADS Europe, were carried out using the ATN. These trials have provided valuable information on implementation of an ATN-based network and on the SATCOM infrastructure. In addition, Norway has been carrying out trials called *modified-ADS*, which involve the carriage and use of ADS by helicopters. The trial, which is also based on the ATN, has proven to be very successful; it is anticipated that the entire helicopter fleet operating in the Norwegian sector of the North Sea will be equipped by 1999, which should significantly improve safety in this remote area.

Air traffic management

3.27 Air traffic control systems around the world continued to be updated as part of the evolutionary process leading to a future global air traffic management system. Supporting CNS/ATM systems were being implemented with a view to achieving early benefits as well as meeting long-term requirements. Several ATM operational concepts, aimed at the progressive introduction of CNS technology in support of integrated ATM systems have been developed.

This comprehensive approach should lead toward a progressive and balanced implementation of CNS/ATM systems. One such effort towards implementation of a concept aimed at added levels of autonomous flight is being progressed by the United States and is known as Free Flight. Another is under development by EUROCONTROL and is known as the ATM Strategy for 2000+. Both are subject to ongoing consultations with the aviation community.

3.28 In the European region, the Central Flow Management Unit (CFMU) of EUROCONTROL now assumes responsibility for air traffic management throughout the European Civil Aviation Conference (ECAC) area, making better use of available capacity.

3.29 As an essential element of CNS/ATM systems, many States are now evaluating and, in some cases, preparing for the introduction of required navigation performance (RNP) on air traffic services (ATS) routes and in airspaces of many regions of the world. The European Civil Aviation Conference (ECAC) States introduced, in January 1998, basic RNAV requirements for all instrument flight rules (IFR) flights, equivalent to RNP 5, on the entire ATS route network of designated flight information regions (FIRs) in the ECAC area. In the Asia/Pacific region, RNP 10 operations are planned to commence in April 1998 on ATS routes in the North Pacific between Alaska and Japan, the Central East Pacific between the West Coast of the United States and Hawaii, the South Pacific and the Tasman Sea between Australia and New Zealand.

3.30 Reduced vertical separation minima (RVSM) was implemented in minimum navigation performance specifications (MNPS) airspace in the North Atlantic region between flight levels 330 and 370. The increased capacity and flexibility has provided a significant bonus to operations. Several other regions are now actively investigating the possibility of implementing RVSM in their airspace.

Aerodromes

3.31 Future larger aeroplanes with wingspans greater than 65 m (larger than the B747-400) and capable of carrying more than 550 passengers may enter service by the year 2003, and they would have an impact on the airport infrastructure. To assist States in planning to accommodate these aeroplanes, a review of the Annex 14, Volume I specifications on airport design is in progress.

3.32 States are required to evaluate and publish the strength of airport pavements using ICAO's ACN/PCN system. A review of the current procedures for pavement design/evaluation indicated the inherent limitations of the procedures currently used for the design of aerodrome pavements for some types of new larger aeroplanes equipped with six or more wheels per strut (e.g. Boeing 777). A review of the other design methods available indicated the need to identify more mature and globally acceptable procedures. In this context, a full-scale research project is being undertaken in one State which may contribute to the development of an alternate procedure.

3.33 Annex 14, Volume I, recommends halogenated carbons (halons) as one of the three complementary fire extinguishing agents for aerodrome rescue and fire fighting. However, as

a result of the *Montreal Protocol on Substances that Deplete the Ozone Layer*, the production of halons ceased on 31 December 1993. Since then, only remaining stocks of halons and recycled halons have been permitted for essential uses until a suitable alternative is identified. In this regard, research in the industry is being monitored by ICAO in order to keep the related specifications current.

Aeronautical meteorology

3.34 Progress made in the computer preparation of global significant weather forecasts by the two world area forecast centres (WAFCs) in London and Washington, has made it possible to transfer regional area forecast centres (RAFCs) responsibilities from Frankfurt, London, Moscow and Toulouse to the London WAFC. This, together with the implementation by the United Kingdom and the United States of three ICAO satellite broadcasts providing global coverage, has accelerated progress towards the final phase of the world area forecast system.

3.35 The international airways volcano watch was strengthened considerably by the implementation of all nine designated volcanic ash advisory centres in Buenos Aires (Argentina), Darwin (Australia), Montreal (Canada), Toulouse (France), Tokyo (Japan), Wellington (New Zealand), London (United Kingdom) and Anchorage and Washington (United States).

3.36 Six meteorological centres, i.e. Darwin (Australia), Nadi (Fiji), La Réunion (France), New Delhi (India), Tokyo (Japan) and Miami (United States) that specialize in tropical cyclone forecasting were designated as tropical cyclone advisory centres to extend their operations to provide advisory information to international civil aviation covering areas prone to tropical cyclones.

Search and rescue

3.37 The satellite-based COSPAS-SARSAT[1] system continued to play an important role in detecting emergency locator transmitters (ELTs) and in locating aviation distress sites.

3.38 The system also continued to expand its capability. There were six satellites in operation and several replacement satellites incorporating technical enhancements were being built. The ground system of local user terminals (LUTs) and of mission control centres (MCCs) was improved and expanded. At year-end, 38 LUTs and 22 MCCs were in operation or undergoing tests. Although global coverage was already provided on 406 MHz, additional LUTs and MCCs were planned to increase the real-time coverage of the system and reduce overall response time. A geostationary component of the system was being developed, which would provide for almost instantaneous alert.

1. COSPAS — Space system for search of vessels in distress;
SARSAT — Search and rescue satellite-aided tracking.

3.39 Since it began trial operations in September 1982, the COSPAS-SARSAT system has contributed to the rescue of over 7 800 persons in aeronautical, maritime and terrestrial incidents.

Accident investigation and prevention

3.40 The number of aircraft accidents involving passenger fatalities related to scheduled and non-scheduled operations increased in 1997 (see Chapter 4). This underlines the continuing need to improve accident prevention strategies and methods.

3.41 ICAO is closely monitoring and supporting recent incident reporting initiatives in the industry, such as the proposed "Global Analysis and Information Network", which may provide the tools required to direct future accident prevention efforts.

Controlled flight into terrain (CFIT)

3.42 Progress has been made with the development of amendments to Annex 6, Parts I, II and III and to the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, Doc 8168), Volumes I and II, in response to recommendations of ICAO and the Industry Controlled Flight Into Terrain (CFIT) Task Force and the Obstacle Clearance Panel (OCP). These amendments are scheduled to become applicable on 5 November 1998. Information has been requested from States on the availability and use of minimum safe altitude warning (MSAW) systems. ICAO is considering requirements for MSAW in association with air traffic control radars and for predictive terrain hazard warning systems for carriage in aircraft.

3.43 CFIT prevention material prepared by the ICAO and Industry CFIT Task Force, in the form of the "CFIT Education and Training Aid" and associated training videos, is being distributed, worldwide, to operators, industry and professional associations, by the major airframe manufacturers and through the agency of the Flight Safety Foundation, of Alexandria, Virginia, United States. This CFIT prevention material will be circulated to States and international organizations by ICAO in May 1998.

Human Factors

3.44 The focus of industry Human Factors endeavours widened during 1997. In addition to the drive to incorporate Human Factors requirements into the certification processes of equipment, personnel and procedures, the industry's attention was directed towards cross-cultural issues and their impact in the safe and efficient transfer of technology. This is a central question to CNS/ATM systems. ICAO has been involved in several fora where the subject was discussed. These meetings aimed at achieving industry consensus concerning practical implementation of solutions to these issues.

3.45 The final review of the annexes to the Convention to develop Human Factors-related SARPs was completed during 1997. The resulting proposal was submitted to the ICAO Council during 1998.

Training

3.46 There is an increasing need to develop training in ICAO CNS/ATM systems. TRAINAIR members have begun to meet this need through the development of CNS/ATM-related Standardized Training Packages (STPs). During 1998, four CNS/ATM-related STPs were completed by TRAINAIR members.

Chapter 4
User and Public Interest

4.1 This chapter reviews the levels of safety and security in air transport in 1997, efforts during the year to improve compensation for passengers arising from aircraft accidents, and air transport aspects of the broader social issues of environmental protection, smoking restrictions and substance abuse.

SAFETY

Scheduled operations

4.2 Preliminary information on aircraft accidents involving passenger fatalities in scheduled air services for ICAO Contracting States shows that there were 26 fatal aircraft accidents in 1997 involving 916 passenger fatalities compared to 23 fatal accidents and 1 135 passenger fatalities in 1996 (Table A1-3 in Appendix 1). Relating passenger fatalities to the volume of traffic, the number of passenger fatalities per 100 million passenger-kilometres decreased from 0.05 to 0.04 in 1997 (Figure 4-1). The number of fatal aircraft accidents per 100 million aircraft-kilometres flown increased to 0.12 in 1997 from 0.11 in 1996 (Figure 4-2), and the number of fatal aircraft accidents per 100 000 landings also increased to 0.14 in 1997 from the previous rate of 0.13 in 1996 (Figure 4-3).

4.3 The safety levels are significantly different for the various types of aircraft operated on scheduled passenger services. For instance, in turbo-jet aircraft operations, which account for about 95 per cent of the total volume of scheduled traffic in terms of passenger-kilometres performed, there were 11 accidents in 1997 with 752 passenger fatalities; in turboprop and piston-engined aircraft operations, which account for about 5 per cent of the scheduled traffic volume, there were 15 accidents with 164 passenger fatalities. The fatality rate for turbo-jet aircraft operations was, therefore, far lower than for propeller-driven aircraft.

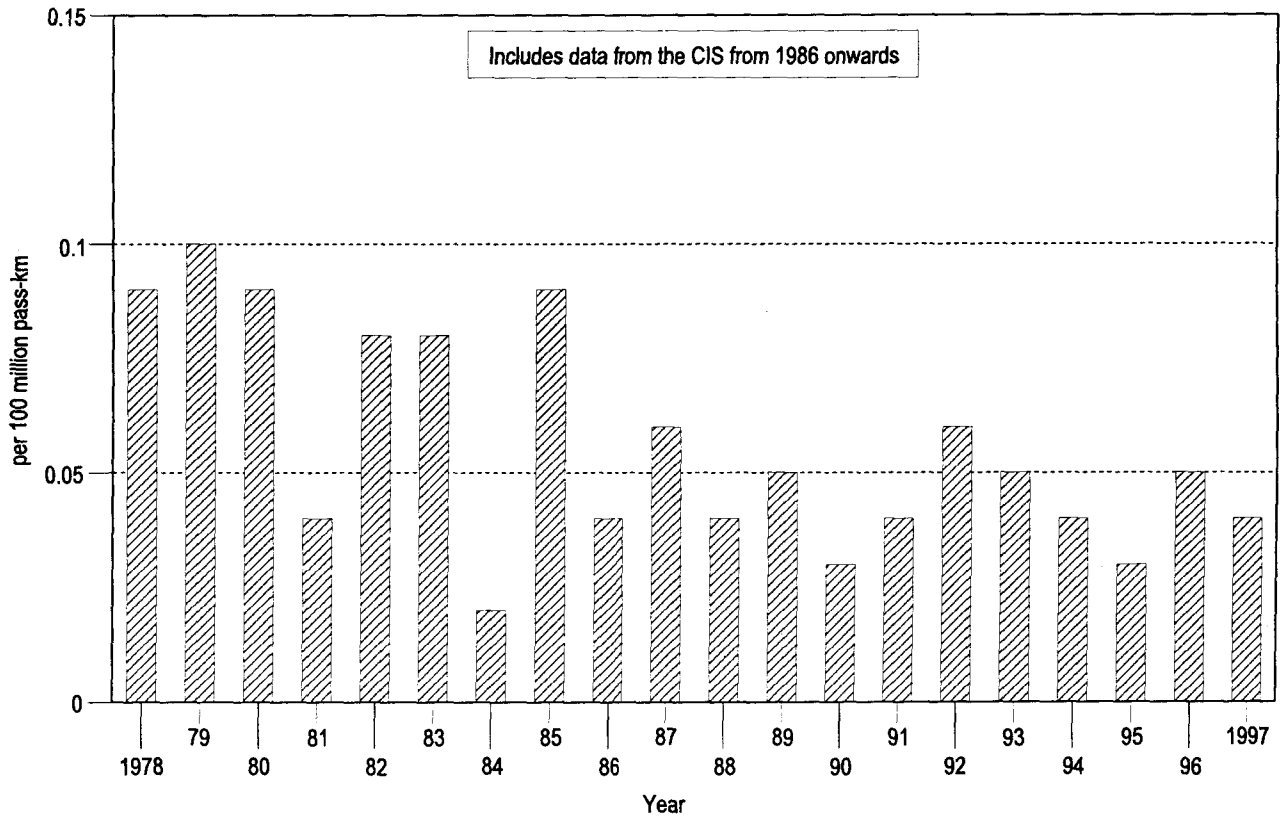
Non-scheduled commercial operations

4.4 Non-scheduled commercial operations include both the non-scheduled flights of scheduled airlines and all air transport flights of non-scheduled commercial operators. Data available to ICAO on the safety of non-scheduled passenger operations show that in 1997 there were 31 fatal accidents with 305 passenger fatalities compared to 25 fatal accidents with 479 passenger fatalities in 1996.

4.5 In non-scheduled operations performed with aircraft of more than 9 000 kg take-off mass, whether by scheduled airlines or non-scheduled operators, there were seven fatal accidents with 198 passenger fatalities in 1997.

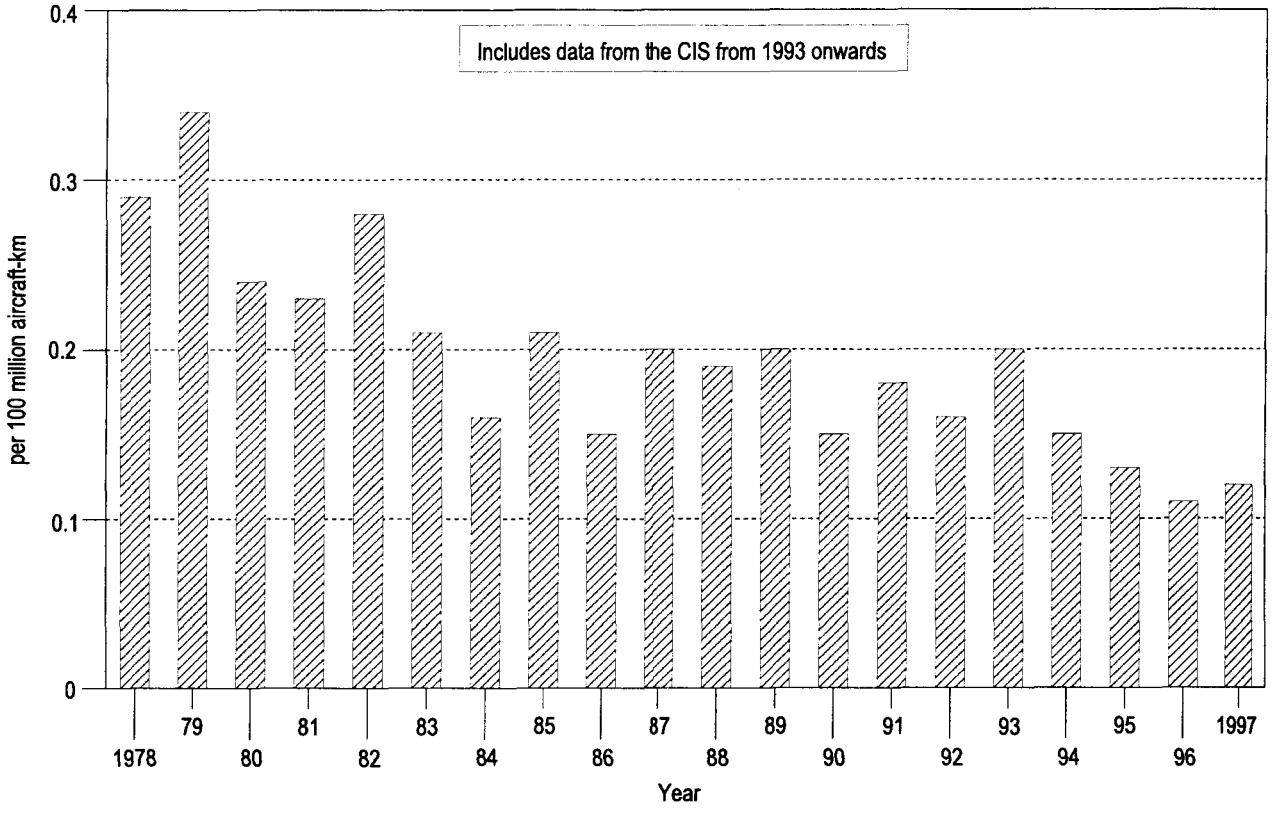
General aviation

4.6 Complete statistical information is not available on safety in general aviation operations. In 1996, it is estimated that general aviation aircraft were involved in about 830 fatal accidents and that the number of fatalities in these accidents was about 1 650. The number of fatal accidents per 100 000 aircraft hours flown was about 2.02 in 1996. In the United States, which accounts for about 60 per cent of all reported general aviation activities in the world there were 350 fatal accidents in 1997 resulting in 646 fatalities, according to preliminary information. The corresponding numbers for 1996 were 359 fatal accidents and 631 fatalities. For the United States, the rate of fatal general aviation accidents per 100 000 aircraft hours flown was about 1.42 in 1997, compared to 1.46 in 1996.



Source: ICAO Air Transport Reporting Form G and other reports.

Figure 4-1. Passenger fatalities per 100 million passenger-kilometres on scheduled services



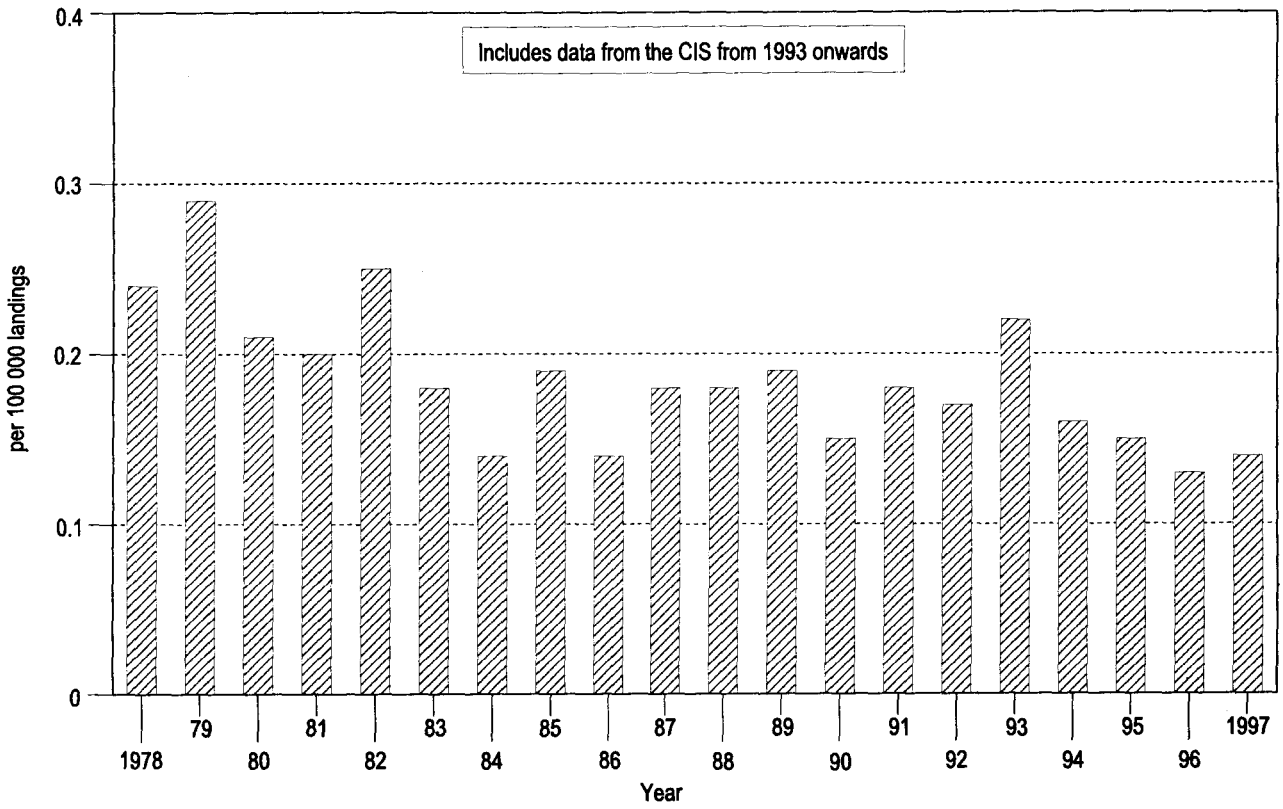
Source: ICAO Air Transport Reporting Form G and other reports.

Figure 4-2. Fatal accidents per 100 million aircraft-kilometres flown on scheduled services

Safety oversight

4.7 In 1995, the ICAO Assembly recognized the eminent role of the Organization in providing guidance with regard to safety oversight and endorsed a safety oversight programme and a mechanism for financial and technical contributions to the programme. By the end of 1997, 80 States had requested a safety oversight assessment by an ICAO team, and 57 States had been assessed by an ICAO team, 12 States had offered funds or assistance-in-kind to finance the safety oversight programme and six States had provided experts to the programme through secondment.

4.8 From 10 to 12 November 1997, Directors General of Civil Aviation from 147 Contracting States, one non-contracting State and delegates from 14 international organizations met with the objective of developing a global strategy on safety oversight. As a result of their deliberations, the DGCAs made five major recommendations, that:



Source: ICAO Air Transport Reporting Form G and other reports.

Figure 4-3. Fatal accidents per 100 000 landings by aircraft on scheduled services

a) regular, mandatory, systematic and harmonized safety audits be introduced, which should include all Contracting States, and which should be carried out by ICAO;

b) greater transparency and increased disclosure be implemented and that assessed States have reasonable time to remedy deficiencies before such information be disclosed;

c) the ICAO safety oversight programme be expanded, at the appropriate time, to all areas of civil aviation which have an impact on safety, initially to include air traffic services, aerodromes and support facilities and services;

d) safety oversight activities of countries or regions be coordinated with the ICAO safety oversight programme; and

e) donors and funding organizations be encouraged to cooperate with ICAO in making use of the technical cooperation services of ICAO for implementing their programme of assistance to civil aviation.

The recommendations from the DGCA Conference went forward to the 32nd Session of the ICAO Assembly and were approved in September/October 1998.

4.9 During the above Conference, ICAO and the European Civil Aviation Conference (ECAC) signed a Memorandum of Understanding, which provides for qualified ECAC assessment personnel to participate as ICAO assessment team members.

4.10 During 1997, the United States Federal Aviation Administration (FAA) continued to examine, under its International Aviation Safety Assessment Programme (IASAP), compliance with the ICAO safety Standards by States whose carriers fly into the United States. Along with new evaluations, at least seven States were reassessed and upgraded to a satisfactory category. Within the United States, the FAA introduced new regulations requiring regional operators to meet the same safety Standards as those operating large jet-powered airliners. The FAA also started to make public via the Internet a wide variety of United States air carrier safety information in order to enable passengers to determine if an airline has major safety problems.

4.11 The United States was also the scene of other important initiatives on safety, many of them with consequences for the rest of the world. A collaborative effort, dubbed the Industry Safety Strategy Team, was organized combining similar safety analysis projects launched in January by Boeing, Airbus and major engine manufacturers, together with the Air Transport Association of America (ATA) and the Air Line Pilots Association (ALPA). During the third quarter, the FAA also joined the Team. The Aviation Safety Program led by NASA was created with the goal to reduce the accident rate fivefold within ten years and tenfold in the next two decades. The National Civil Aviation Review Commission, completing its work that spanned much of 1997, handed its final findings to the United States DOT with nine fundamental recommendations, four of them on safety: requesting the development of a strategic plan; establishing safety management programmes; performance-orienting FAA safety programmes; and helping to improve safety in other parts of the world. A new group, the Air Travellers Association, issued its first semi-annual Airline Safety Report Card grading 260 carriers in 107 countries.

4.12 In 1997, Europe also saw some important developments in air safety. The United Kingdom's Civil Aviation Authority, France's Bureau Véritas and a consortium of German organizations formed Air Eurosafe based at the European Joint Aviation Authorities headquarters in Amsterdam with the aim of raising air safety worldwide by offering help to those countries that have difficulties meeting the minimum ICAO Standards. In June, the transport ministers of the European Union (EU) agreed on the Safety Assessment of Foreign Aircraft Programme (SAFA) under which airlines suspected of operating unsafely would be submitted to ramp inspections at EU airports from 1999 or sooner; final clearance for the SAFA requires approval by the European Parliament. In December, the ministers agreed that a new European Air Safety Authority (EASA), involving EU and its member States in a treaty with other European States wishing to join, was the preferable route to replace the existing Joint Aviation Authorities. However, another alternative, a European Commission body not involving non-member States, was also left for final consideration by a task force set up for that purpose.

4.13 The Asia-Pacific Economic Co-operation (APEC) group of air safety experts identified 92 potential safety issues in 18 participating countries, consolidated them into five major areas of concern and reported these findings to the APEC transport ministers. The latter endorsed the recommendations contained in the report, issued a Declaration of Principles on Harmonisation of Civil Aviation Safety Rules in the region, and tasked the group with proposing a mechanism to implement the recommendations. The proposed mechanism envisaged, in particular, strengthening the local Civil Aviation Authorities' role in safety oversight and reinforcement, harmonization of safety regulations and associated processes in manufacture, maintenance and operations, and training of safety personnel. The ICAO safety oversight assessment and technical cooperation programmes were considered an important part of that mechanism. In addition, ICAO was asked to develop international Standards for training aviation safety inspectors and for the universal reporting of incidents.

4.14 Among other developments, Australia decided to overhaul its safety regulations, including the requirements for charter operators to upgrade to the higher Standards demanded of scheduled airlines, and to harmonize its rules with those of the United States and other major aviation nations. The plan was to adopt the United States Federal Aviation Regulation (FAR) number system and, where possible, FAR-style language in drafting the new regulations. The Australian Government also planned to publish the names of airlines that infringe safety rules. During the year, a dispute over safety issues between the Governments of Nigeria and the United Kingdom caused cancellation of scheduled services between these two countries.

SECURITY

4.15 During 1997, there were five acts of unlawful interference officially reported or confirmed by concerned States, of which four were classified as unlawful seizures and one was an unlawful act against the safety of civil aviation. Developments in acts of unlawful interference since 1977 are shown in Figures 4-4 to 4-6 and in Appendix 1, Table A1-4.

4.16 The Ninth Meeting of the Aviation Security Panel was held at ICAO Headquarters in Montreal from 8 to 12 September 1997. The agenda addressed, among other things, issues relating to 100 per cent screening of checked baggage, the security regime of cargo, collaborative arrangements between operators and the "one-stop" security concept.

4.17 The Eleventh Meeting of the *Ad Hoc* Group of Specialists on the Detection of Explosives was held at ICAO Headquarters in Montreal from 3 to 7 November 1997. The specialists reported on work done and findings determined since the last meeting. The group was mandated to maintain the Technical Annex to the Convention on the Marking of Plastic Explosives for the Purpose of Detection until such time as the Convention enters into force.

4.18 The newly established European Regional Aviation Security Institute, located in Brussels, was inaugurated on 19 November 1997. The main objective of the institute is to establish a training centre of excellence in the European region for the enhancement of aviation security.

4.19 In 1997, the subject of unruly passengers on board aircraft remained highly publicized, involving service, security and safety issues. The first ever International Conference on Disruptive Passengers sponsored by the Air Line Pilots Association (ALPA) of the United States came to the conclusion that major obstacles to curbing the fast growth in the number of incidents were: the lack of a uniform system to track, record and share data on occurrences among carriers and government agencies; and legislative loopholes in dealing with offenders. Since the 1995 IATA resolution "calling upon States to take all steps necessary in order to enable the exercise of full jurisdiction over all offences committed outside their airspace on board aircraft operating to and from their territories", only four States: Australia, Canada, the United Kingdom and the United States, have set standards for such situations regardless of the state of registration of the inbound aircraft. The Conference also called on airlines to draft clear "zero tolerance" policies in order to deal with disruptive passengers and to support employees who take legal action against passengers for physical abuse or threats to other passengers. During 1997, the number of air carriers adopting such policies or toughening existing rules increased. Examples included, among others, Japan Airlines, which has given flight attendants permission to tie up unruly passengers, and British Airways, which has empowered ground staff and flight attendants to keep passengers who appear drunk off aircraft and to stop serving alcohol to those who appear drunk during a flight.

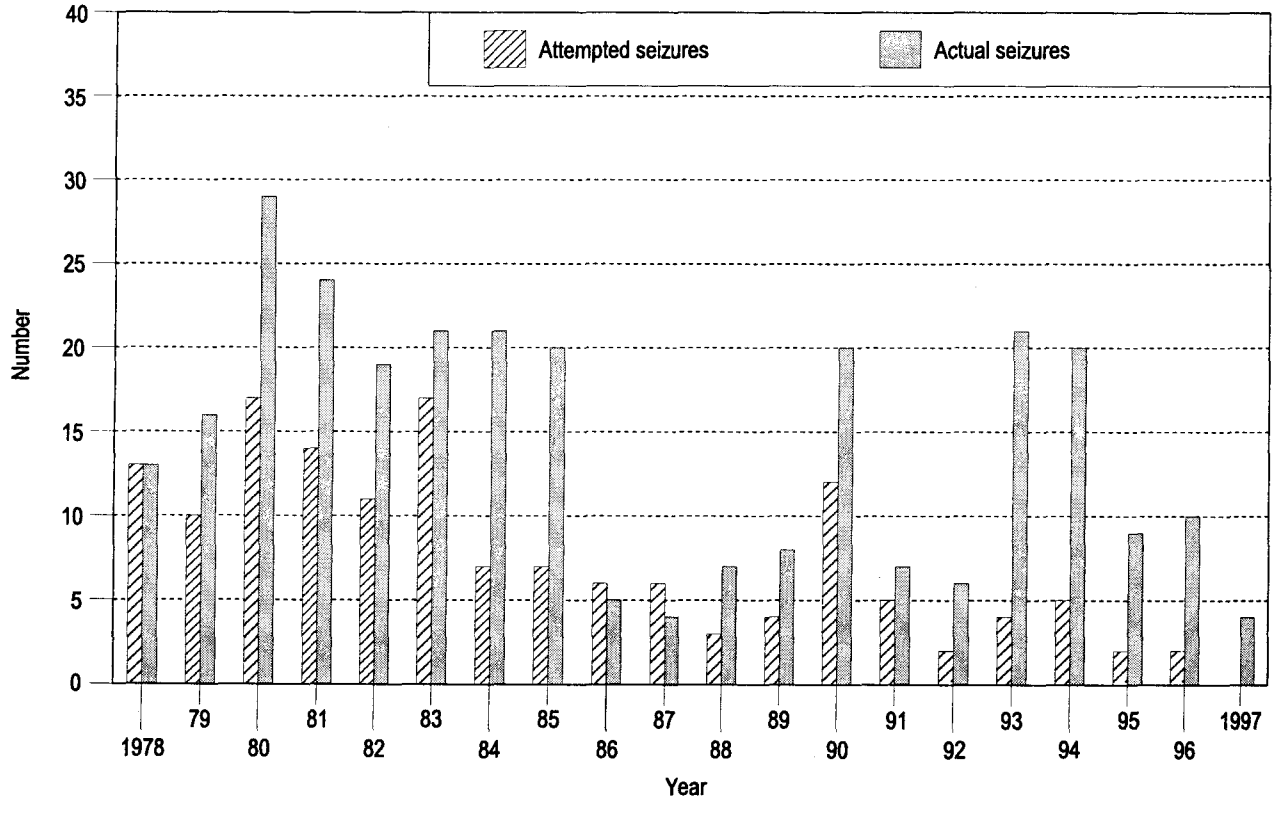


Figure 4-4. Acts of unlawful seizure

4.20 Also in 1997, the Association of Asia Pacific Airlines (AAPA) endorsed a policy statement on unruly passengers calling for an aggressive approach in prosecuting them. In the United States, the DOT expanded a pilot programme on handling abusive passengers, which has been tested at five airports, Honolulu, Los Angeles, and the three major New York area airports.

AIR CARRIER LIABILITY

Compensation for passengers and shippers arising from aircraft accidents

4.21 The 30th Session of the ICAO Legal Committee approved, in May 1997, the text of a draft Convention aimed at the modernization of the "Warsaw System" on air carrier liability.

4.22 A major feature of the *Draft Convention For the Unification of Certain Rules Relating to International Carriage by Air* is the departure from the concept of pre-specified limits of liability in case of a passenger's injury or death. Another change embodied in the draft is that liability for damages of up to 100.000 SDR (equivalent to approximately U.S. $150 000) will be based on the principle of strict liability. Recovery of damages would thus merely require proof of damage suffered.

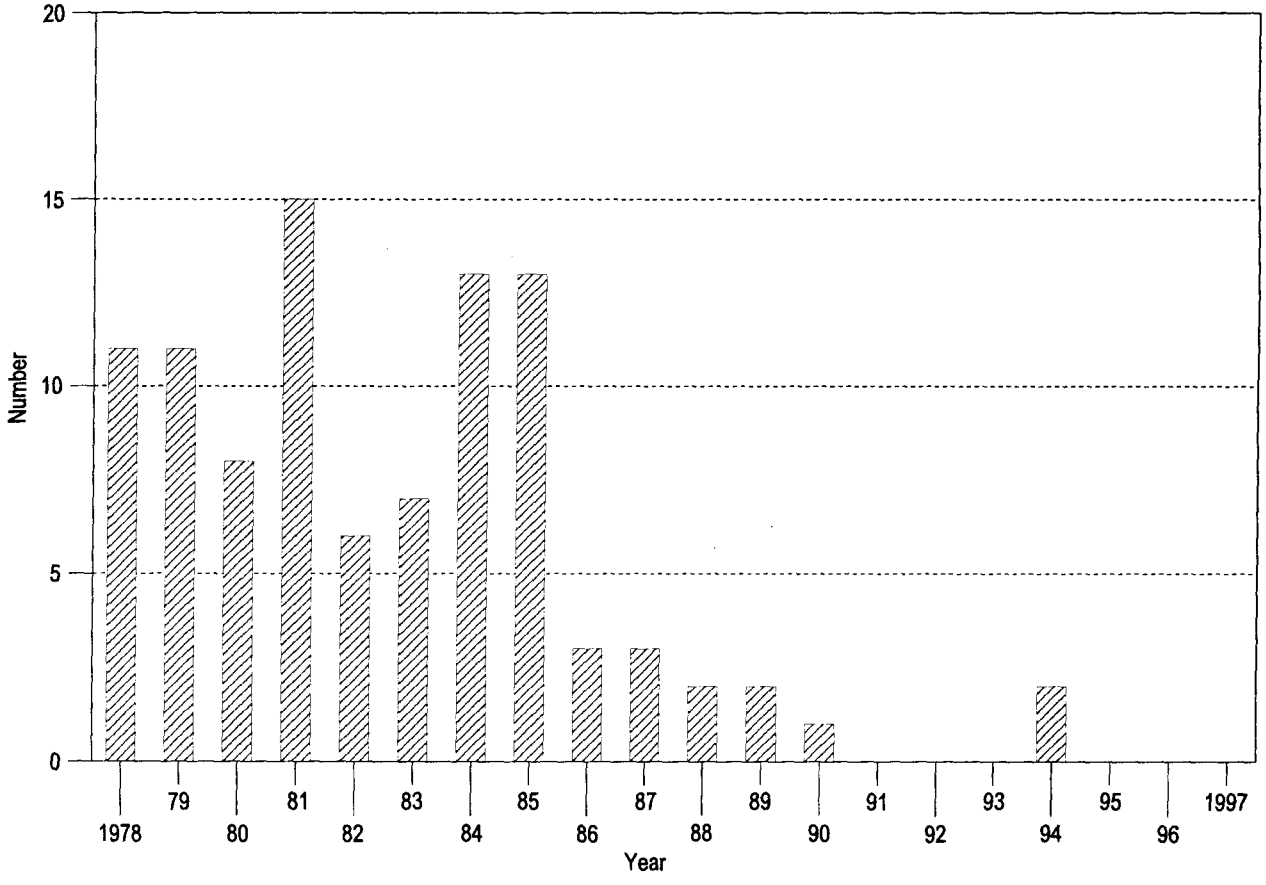


Figure 4-5. Incidents of sabotage

4.23 A number of other improvements are proposed under the draft Convention, to the benefit of both the travelling public and air carriers, for example, the possibility to adopt modern ticketing procedures in an increasingly electronic environment.

4.24 The remaining outstanding questions related to the draft Convention were due to be reviewed in the Spring of 1998 by a special group established by the Council comprised of members from 22 States.

Insurance

4.25 An Airclaims estimate put 1997 hull losses at $886 million (compared with $812 million for 1996), including about $600 million for Western-built jet airliners (the rest covers losses of turboprops, helicopters, business aircraft and former USSR-built jet aircraft) with related passenger-liability claims of over $500 million — an improvement over $1.6 billion in hull and liability losses for 1996 but, nevertheless, making 1997 the fourth worst year on record. Behind these numbers, there were losses of 22 Western-built jetliners and 36 Western-built turboprops compared with 24 and 31 in 1996, respectively.

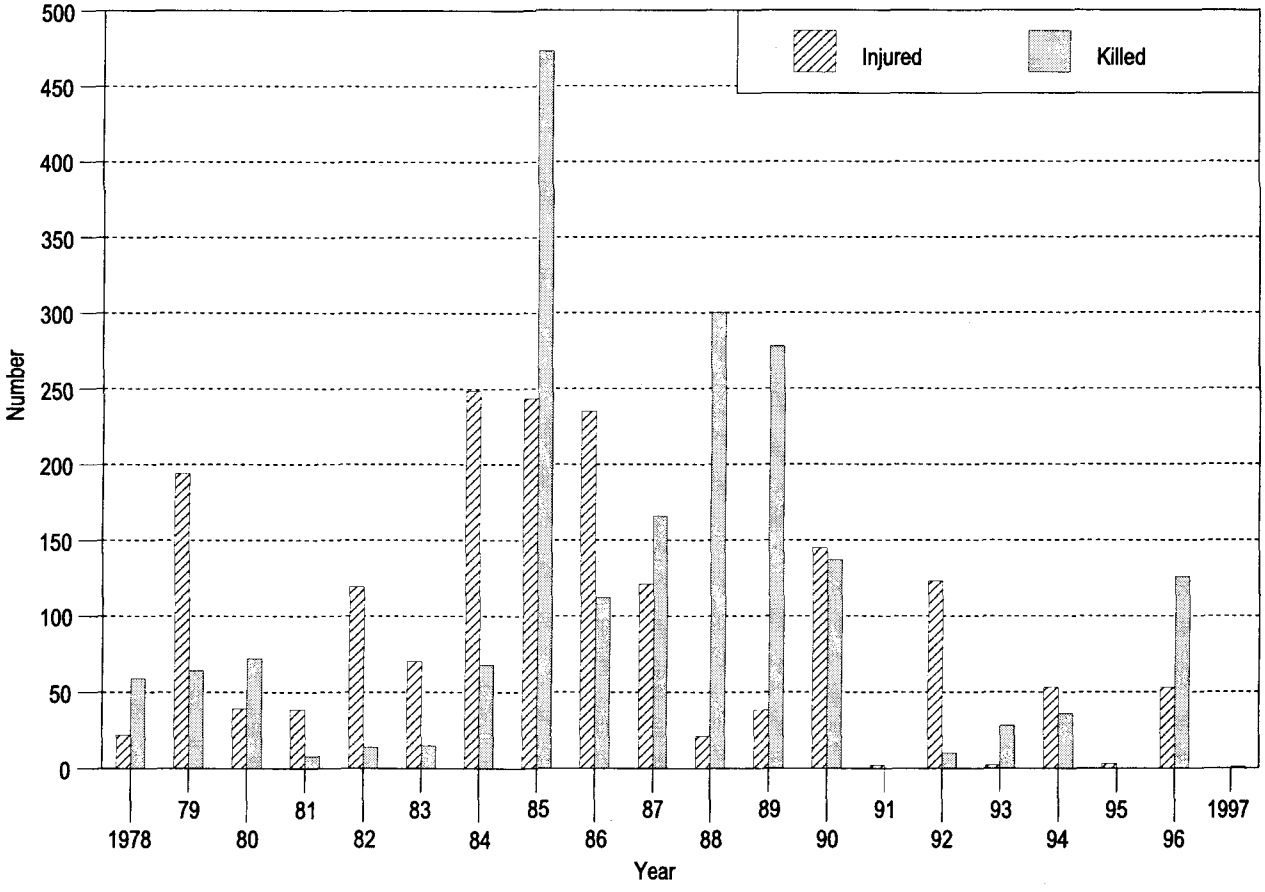


Figure 4-6. Number of persons killed or injured in acts of unlawful interference

4.26 Insurance rates continued to drop from the high levels reached at the end of 1994, reaching slightly higher levels in 1997 than the all-point low achieved at the end of 1990. By the fourth quarter, the rates for renewal of hull insurance had dropped on average by 25 to 30 per cent while liability rates had decreased by about 18 to 25 per cent. The hull war risk insurance market saw even larger reductions with rates dropping by 50 per cent or more from the previous year.

FACILITATION

4.27 The use of computer-based technology to facilitate the inspection of passengers at airports has rapidly progressed in recent years in order to cope with proliferating traffic volumes. In the 1970s, States began to replace their "black books" with computer accessible databases at airports, for immigration and customs purposes. These databases list persons who are of interest to them from an enforcement point of view and are normally accessed by manually typing in a passenger's name, date of birth, etc. while the passenger stands at the inspection point. The proliferation of machine readable travel documents and the introduction of mechanical reading devices dramatically improved this process.

4.28 In the early 1990s, in order to further accelerate the clearance of passengers, customs and immigration services of certain States, in partnership with airlines, "advance passenger information (API)" systems were introduced. Here, passport data are transmitted electronically by the airline to the computer system of the control authority in advance of the arrival of the flight. This saves the time previously taken by the manual keying (or machine reading) and system response at the point of inspection, and results in a faster clearance process for the passengers. The weak point of API as an automated process is at the time of arrival of the flight. Since there is no way to positively identify the passengers whose data have been processed through the system, all passengers must continue to appear before an inspector in order to have their passports checked visually and verified against the computerized list of API passengers and the results of the database checks.

4.29 In the interest of closing this gap in the automation loop, control authorities and industry have looked at the feasibility of introducing a biometric identification device in the travel document. This would allow passengers to be positively identified, by machine, as the owners of the documents, which were used for the advance inspection process and matched with the determination of their entry status. However, the process of encoding a biometric in every passport at the time of issuance would take many years; therefore, States testing systems for automated inspection have introduced a separate card to complement the passport.

4.30 The concept of "PASS" (passenger accelerated service system) was developed as an experiment in fully automated border inspection. This is based on an "enrolment" or one-time inspection by a State's immigration authorities, which enables the passenger to bypass the queue at the immigration booth upon returning to that State. Using a special card that contains encoded identification data, including a biometric measurement, passengers approach a machine that verifies through the biometric that they are the owners of the cards,

which reflects their pre-inspected status, and which admits them on that basis. Participation in these projects is on a strictly voluntary basis. Passengers desiring to participate must register with the programme, divulge certain personal information, and waive all claims in relation to the use of their personal data for law enforcement purposes. In addition, because these systems are elective and designed to serve the frequent traveller, a fee may be charged for participation.

4.31 ICAO has become directly involved in the development of this technology in the context of its work on specifications for machine readable official travel documents. By February 1998, the TAG/MRTD had substantially completed new specifications for multi-functional machine readable cards. The foundation of this development is in the specifications for the wallet-size identification card as described in Doc 9303, Part 3 (*Size 1 and Size 2 Machine Readable Official Travel Documents)*, and the new specifications will provide for the optional deployment of one or more machine readable technologies (magnetic strip, optical memory, integrated circuit chip, bar codes, etc.) in addition to the mandatory optical character recognition (OCR) type font. Finalization of the new specifications will provide international standardization, which will enable promotion of the PASS concept worldwide.

ENVIRONMENTAL PROTECTION

4.32 In 1997, the aviation community continued to address the environmental problems associated with aircraft noise and the impact of aircraft engine emissions.

4.33 Concerning noise, the phasing out of operations of Chapter 2 aircraft (subsonic jet aircraft that meet the noise certification levels in Annex 16, Volume I, Chapter 2, but not those in Chapter 3) at noise-sensitive airports continued in a number of developed countries, in accordance with the policy framework established by the ICAO Assembly in 1990. States and airports are now considering what needs to be done in the longer term, once the phasing out of operations of Chapter 2 aircraft has been implemented. For example, in Europe, proposals are under consideration that could limit the use of former Chapter 2 aircraft, which have been modified to meet Chapter 3 requirements, on the grounds that these aircraft are noisier than new Chapter 3 aircraft designs.

4.34 In relation to aircraft engine emissions, the Intergovernmental Panel on Climate Change (IPCC) in its Second Assessment Report (1995) had underlined the continuing uncertainties regarding the impact of oxides of nitrogen (NO_x), water vapour and sulphur and the consequent need for further scientific research. In August 1997, the Conference on the World Climate Research Programme included, amongst its future research priorities, the investigation of the potential effects of emissions from the growing fleet of civilian aircraft. Meanwhile, the IPCC is working on a special report on *Aviation and the Global Atmosphere* in cooperation with the Ozone Scientific Assessment Panel under the Montreal Protocol and with ICAO involvement. The report is scheduled to be completed in March 1999, and should give States, ICAO and other UN policy-making bodies an authoritative common base of information for addressing the impact of aircraft engine emissions.

4.35 Policy-making regarding aircraft engine emissions is currently hampered by continuing uncertainties regarding their impact and insufficient understanding of the trade-off between different types of emissions, for example, carbon dioxide against NO_x. In ICAO, discussions continued on a recommendation that the NO_x emission Standards for new engines in Annex 16, Volume II, should be made more stringent and on a study on whether charges could be an effective means of reducing adverse environmental consequences of emissions. In December, in Kyoto, Japan, the Conference of the Parties to the United Nations Framework Convention on Climate Change adopted a protocol to the Convention, which includes binding national targets for greenhouse gas emissions that developed countries have agreed to meet. While these national targets cover emissions from almost all sectors in the countries concerned, including domestic aviation, they exclude emissions from international aviation because of the difficulties that have been encountered in attempting to allocate them to individual countries. The Kyoto Protocol includes a provision that developed countries shall pursue limitation or reduction of greenhouse gas emissions from international aviation, working through ICAO.

SMOKING RESTRICTIONS

4.36 The implementation of a complete ban on smoking on all international flights in accordance with ICAO Assembly Resolution A29-15, which had called for the 1 July 1996 deadline, was still not achieved by the end of 1997 but considerable advance towards this goal had been made, both by legislation and by airline policies, and further progress was to be expected. As a measure of success of these efforts on certain markets, the United States DOT has reported that by mid-1997 about 97 per cent of non-stop scheduled United States airline flights between that country and foreign points were smoke-free compared with around 80 per cent one year earlier. In Europe, for example, such major airlines as British Airways and KLM had by year-end, respectively, 90 and 85 per cent of their international services non-smoking with plans to prohibit smoking worldwide in 1998 (with the exception of KLM's Japan destinations).

4.37 According to information sent during 1997 to ICAO by 59 States, nine had by law prohibited smoking on international passenger flights while 16 had legislation banning smoking on domestic flights. A further 15 States were in the process of legislating against smoking on passenger services. As to airlines' initiatives, total smoking bans on domestic flights were being applied in 18 States and on international services in 11 States while smoking restrictions depending on the duration of flight and/or on its destination were applied in 37 States. Only two of the 59 respondents reported no smoking restrictions at all. In general, however, the replies received indicated that States were reluctant to introduce legislative smoking restrictions on all international passenger flights.

4.38 A multilateral Agreement to Ban Smoking on International Passenger Flights implemented in 1995 by Australia, Canada and the United States was joined by New Zealand, which had intended to sign the treaty with the other countries earlier but had first to pass related legislation. However, Air New Zealand had already banned smoking on domestic flights since 1988 and had been reducing smoking on international flights since 1992 to become completely smoke-free in November 1997.

4.39 With regard to the possibility of developing separate smoking cabins with independent ventilation systems, one major aircraft manufacturer has concluded that while it was feasible, it was not practical due to the related cost and design problems. Both Boeing and Airbus have developed smoke extraction systems for enclosed areas separated by curtains from the rest of the cabin. However, it was not clear to what extent such a system improves the air quality in the non-smoking sections of the cabin. Air France was known to be one of the airlines to install such a system on its aircraft, marketing stand-up smokers' bars as a differentiating factor on its transatlantic services.

4.40 In 1997, smoking on board aircraft was also a subject for the courts. In Germany, a Frankfurt court considered the demand for compensation of a non-smoker for having been seated in the smoking section of a Lufthansa flight. The court ruled that German airlines were not required to provide non-smoking seats on their flights. In the United States, a class-action lawsuit first filed six years ago on behalf of 60 000 non-smoking flight attendants suffering the effects of second-hand smoke exposure continued. Also in the United States a new class-action suit was initiated by a flight attendant against Northwest Airlines on the basis that that airline's policy of allowing smoking on transpacific services endangered the health of its flight attendants.

SUBSTANCE ABUSE

4.41 As support for the guidance material contained in the *Manual on Prevention of Problematic Use of Substances in the Aviation Workplace* (Doc 9654), distributed to States in language versions in March 1996, States and international organizations were consulted in 1997 on a proposal to amend Annex 1 by adding a new provision relating to the use of psychoactive substances. Based on the 63 responses received, the Air Navigation Commission reviewed the proposal in 1997 and recommended amendments of both Annex 1 and Annex 2. The Council will review the proposal in 1998.

PART II

WORLD OUTLOOK TO 2000

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Chapter 5
Global Trends and Forecasts

5.1 This chapter reviews developments in the world economy over the period since 1986 and anticipated developments through to 2000; examines trends in airline traffic, productivity, prices and finances; and presents airline scheduled passenger traffic forecasts and, to the extent possible, airline financial forecasts, through to 2000.

ECONOMIC TRENDS

5.2 The demand for air passenger travel is primarily determined by income levels and demographics, and the cost of air travel. World energy demand, supply and prices are critically important both to economic progress and to the cost of travel. Hence, the airline industry is highly vulnerable to economic cycles and fluctuations in fuel prices.

5.3 Between 1986 and 1996, the aggregate world economy measured in terms of Gross Domestic Product (GDP) grew at an average annual rate of 2.5 per cent in real terms. Growth rates varied across regions, from a high of 5.1 per cent for Asia/Pacific to a low of 0.1 per cent for Europe, including the CIS and eastern Europe (see Chapter 6 for further details). World population growth between 1986 and 1996 increased at an average annual rate of 1.7 per cent. Hence, growth of the world's GDP per capita between 1986 and 1996 increased at an average annual rate of 0.9 per cent, significantly lower than the growth of GDP itself, as indicated in Figure 5-1.

5.4 The years 1983 to 1989 saw the world economy experience its longest period of sustained progress since World War II, achieving an average annual growth rate of 3.7 per cent. This extended period of growth in the world economy came to a halt during 1990. The economies of the United States, the United Kingdom and Canada entered into a recession, followed later by slowdowns in Germany and Japan. In addition, the former centrally-planned economies of eastern Europe and the CIS (designated "countries-in-transition" to developed market economies by the International Monetary Fund) went into serious decline. As a result, 1991 was the most difficult year for the global economy since 1982. Recovery commenced in North America in 1992, but it was not until 1994 that it took hold in most of western Europe and the Japanese economy remained weak until 1996 and declined further in 1997.

5.5 Developing countries as a group (excluding the "countries-in-transition") have generally maintained an annual GDP growth of 4 to 6 per cent since the mid-1980s, despite the recent recession in the developed economies. Structural reform and the sustained implementation of prudent macro economic policies together with large capital inflows have

supported consistently strong growth in East and South East Asia. The economies of Latin America, Africa and the Middle East have all had significant periods of difficulty and low growth during the past decade. However, economies of Latin America displayed solid growth in 1997 with GDP rising 5.2 per cent. Mexico, after a severe economic slump two years ago, continued its second straight year of growth in excess of 5 per cent.

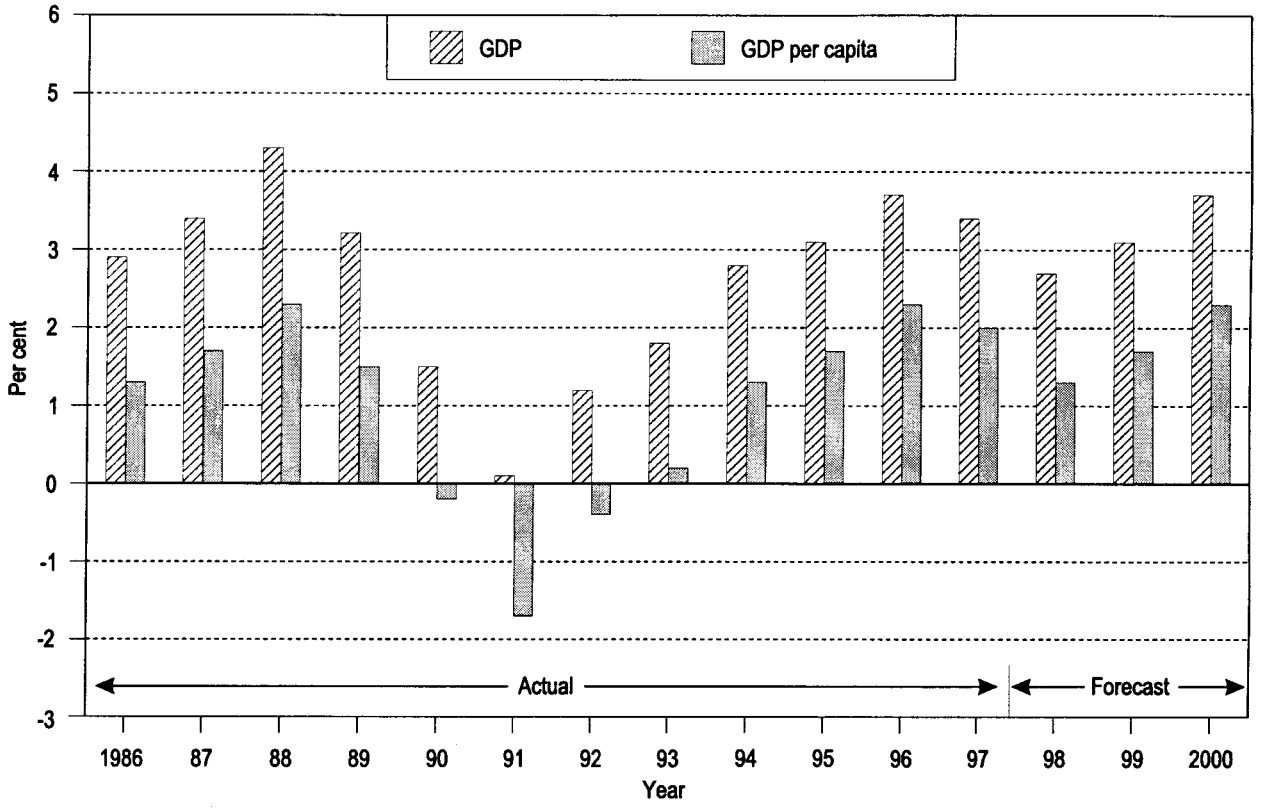
5.6 On several occasions in the last quarter century, sharp movements in crude oil prices have impacted powerfully on the world economy. In particular, the recessions of the mid-1970s and early 1980s were linked to the oil price increases of 1973 and 1979/80. Oil market conditions are therefore of great interest when assessing global economic performance. However, the capability of the economies of the industrialized countries to cope with the oil price increases has improved because of reduced energy dependency and the effects of structural reforms in the 1980s. Furthermore, world oil prices have settled into lower levels in recent years as markets have adjusted to shifts in supply and demand. In 1996, a significant and sustained increase in oil prices did occur, which resulted in increased costs to air transport, but by early 1997 oil prices had returned to pre-1996 levels.

5.7 Oil price rises and accommodating monetary policies contributed to double digit inflation in the industrial countries in the 1970s and early 1980s. Since 1983, average inflation in these countries has moderated to the 3 to 5 per cent range. Inflation rates have been high and variable in many developing countries and tended to increase over the 1980s. Inflation has been particularly serious in Latin America since 1987, and in the "countries-in-transition" in eastern Europe and the CIS since 1992, but have shown significant improvement since 1995.

5.8 There appears to be consensus among economic forecasters that the global economy will continue to expand over the medium term in spite of recent events in several countries in the Asia/Pacific region. The assumptions for global and regional economic growth that have been used as a basis for air traffic forecasts over the period to 2000 are presented in Table 5-1. These assessments of the economic outlook take into account the most recent International Monetary Fund (IMF) and WEFA Group (formerly known as Wharton Econometrics Forecasting Associates) forecasts, as well as the views of other organizations, both government and private sector.

5.9 The United States economy continued to expand at an above average rate during 1997 with moderate inflation. This expansion, now in its seventh year, is expected to continue well into the year 2000, and the inflation rate is expected to remain in the moderate range.

5.10 Countries in the Asia/Pacific region are expected to experience a considerable slowdown, with Japan's economy, which accounts for almost half of the region's output, expected to remain around zero growth in 1998. Economic activity in Latin America is expected to increase at a somewhat slowing rate over the next few years, due primarily to economic difficulties in Brazil and Argentina. The developing economies of the Middle East and Africa are expected to experience moderate economic growth. Although most of the world's economies are expected to expand at moderate rates, the financial situation in the Asia/Pacific region could present some risks.



Source: IMF, WEFA Group.

Figure 5-1. Annual change in real GDP and GDP per capita — World

Table 5-1. Economic growth (GDP) by region
(real average annual growth rates, per cent)

Region	Actual 1996	Estimated 1997	Forecast 1998	Forecast 1999	Forecast 2000
Africa	5.0	3.4	3.9	5.1	5.2
Asia/Pacific	5.4	3.2	2.0	3.3	4.6
Europe	1.5	2.5	2.8	2.9	2.9
Middle East	5.2	3.2	2.0	3.1	4.0
North America	2.6	3.8	2.9	2.4	2.4
Latin America and the Caribbean	3.5	5.2	3.4	4.2	4.5
World	3.6	3.3	2.6	3.2	3.7

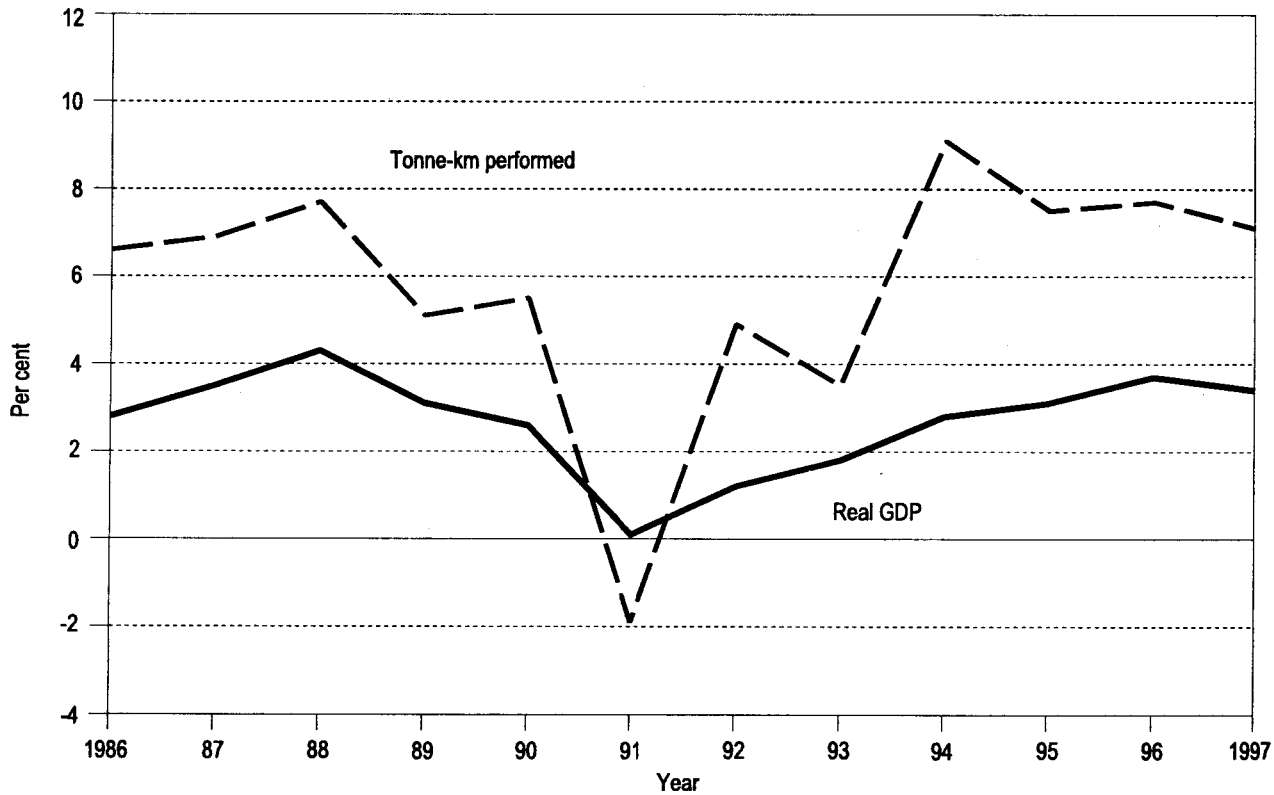
Source: ICAO estimates based on World Bank, International Monetary Fund (IMF), Wharton Econometrics Services and other economic sources.

AIRLINE TRAFFIC TRENDS

5.11 Total scheduled airline traffic, measured in terms of total tonne-kilometres performed, grew at an average annual rate of 6.0 per cent between 1986 and 1997. Passenger-kilometres grew at an average rate of 5.3 per cent per annum and freight tonne-kilometres at nearly 7.9 per cent per annum.

5.12 Global traffic data for each year of the decade 1986-1997 are given in Tables 5-2 (total traffic) and 5-3 (international traffic).

5.13 In broad terms, the pattern of traffic growth over the 1986-1997 period was a reflection of economic conditions experienced over this period. As depicted in Figure 5-2, the relatively buoyant economic and air traffic performance during most of the 1980s came to an end in the middle of 1990. The economic recession in 1991 had a serious effect on air traffic. The recovery in traffic in 1992, which occurred despite continuing poor economic performance, was achieved at a cost of significantly reduced revenue yield. Although real yields declined further in 1993 and 1994, the stimulating effect on traffic demand was less dramatic than had been the case in 1992. On the other hand, economic growth began to provide a more solid foundation for traffic growth. These trends continued in 1997, resulting in an estimated growth for total scheduled passenger traffic of 5.9 per cent for the year.



Source: IMF, ICAO Air Transport Reporting Form A-1.

Figure 5-2. World GDP and scheduled traffic growth

Table 5-2. World total international and domestic revenue traffic
(scheduled services of airlines of ICAO Contracting States, 1986-1997)

Year	Passengers carried		Passenger-km		Freight tonnes carried		Freight tonne-km performed		Mail tonne-km performed		Total tonne-km performed	
	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)
1986	960	6.8	1 452 060	6.2	14.7	7.3	43 190	8.4	4 550	3.4	178 800	6.6
1987	1 028	7.1	1 589 470	9.5	16.1	9.5	48 320	11.9	4 700	3.3	196 470	9.9
1988	1 082	5.3	1 705 430	7.3	17.2	6.8	53 270	10.2	4 830	2.8	212 110	8.0
1989	1 109	2.5	1 773 700	4.0	18.1	5.2	57 150	7.3	5 060	4.8	223 000	5.1
1990	1 165	5.0	1 894 250	6.8	18.4	1.7	58 800	2.9	5 330	5.3	235 220	5.5
1991	1 135	-2.6	1 845 420	-2.6	17.5	-4.9	58 560	-0.4	5 070	-4.9	230 720	-1.9
1992	1 146	1.0	1 928 920	4.5	17.6	0.6	62 640	7.0	5 130	1.2	242 140	4.9
1993	1 142	-0.3	1 949 420	1.1	18.1	2.8	68 450	9.3	5 230	1.9	250 630	3.5
1994	1 233	8.0	2 099 940	7.7	20.5	13.3	77 220	12.8	5 410	3.4	273 420	9.1
1995	1 304	5.8	2 248 240	7.1	22.2	8.3	83 130	7.7	5 630	4.1	293 940	7.5
1996	1 390	6.6	2 426 260	7.9	23.3	5.0	89 190	7.3	5 800	3.0	316 660	7.7
1997	1 448	4.2	2 570 500	5.9	26.1	12.0	99 830	11.9	5 990	3.3	341 140	7.7

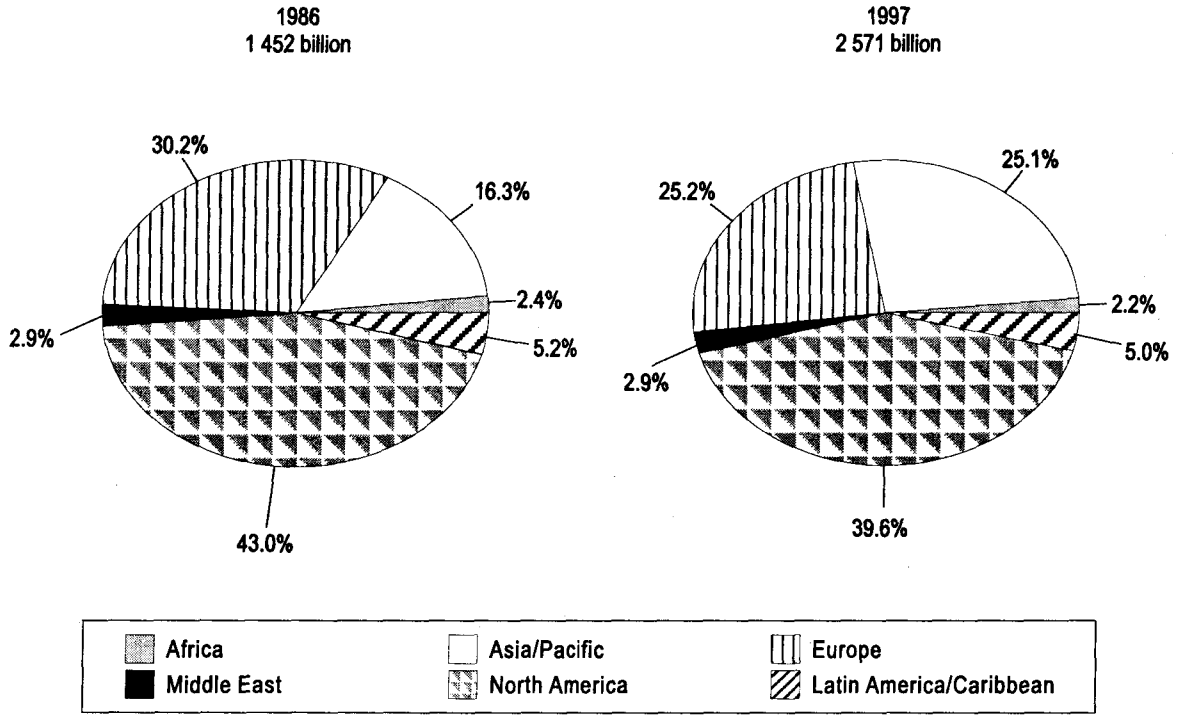
Source: ICAO Air Transport Reporting Form A-1.

Table 5-3. World international revenue traffic
(scheduled services of airlines of ICAO Contracting States, 1986-1997)

Year	Passengers carried		Passenger-km		Freight tonnes carried		Freight tonne-km performed		Mail tonne-km performed		Total tonne-km performed	
	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)	Millions	Annual increase (%)
1986	198	2.1	603 140	2.2	6.4	8.5	32 230	9.7	1 890	1.6	89 710	4.8
1987	222	12.1	687 580	14.0	7.2	12.5	36 690	13.8	1 950	3.2	101 980	13.7
1988	243	9.5	760 990	10.7	7.8	8.3	41 020	11.8	1 990	2.1	113 180	11.0
1989	262	7.8	823 760	8.2	8.6	10.3	44 930	9.5	2 080	4.5	123 020	8.7
1990	280	6.9	893 500	8.5	8.6	0.0	46 320	3.1	2 190	5.3	130 730	6.3
1991	266	-5.0	861 530	-3.6	8.5	-1.2	46 410	0.2	2 190	0.0	128 280	-1.9
1992	299	12.4	982 490	14.0	9.3	9.4	50 750	9.4	2 190	0.0	143 600	11.9
1993	319	6.7	1 047 380	6.6	10.3	10.8	56 050	10.4	2 200	0.5	155 480	8.3
1994	347	8.8	1 143 190	9.1	11.8	14.6	64 700	15.4	2 240	1.8	173 090	11.3
1995	375	8.1	1 249 180	9.3	13.0	10.2	70 340	8.7	2 400	7.1	189 420	9.4
1996	411	9.6	1 377 020	10.2	13.6	4.6	75 500	7.3	2 450	2.1	206 530	9.0
1997	439	6.8	1 477 540	7.3	15.6	14.7	85 040	12.6	2 510	2.4	225 850	9.4

Source: ICAO Air Transport Reporting Form A-1.

5.14 The regional distribution of scheduled passenger traffic for the years 1986 and 1997 is illustrated in Figure 5-3. The airlines of the North American and European regions dominate, contributing 73.2 per cent of the total traffic in 1986 and 64.8 per cent in 1997. Passenger traffic performed by airlines registered in the Asia/Pacific region increased from 16.3 per cent of the total world traffic in 1985 to about 25.1 per cent in 1997. Other regions contributed 10.5 per cent of the traffic in 1985 and 10.1 per cent in 1997.

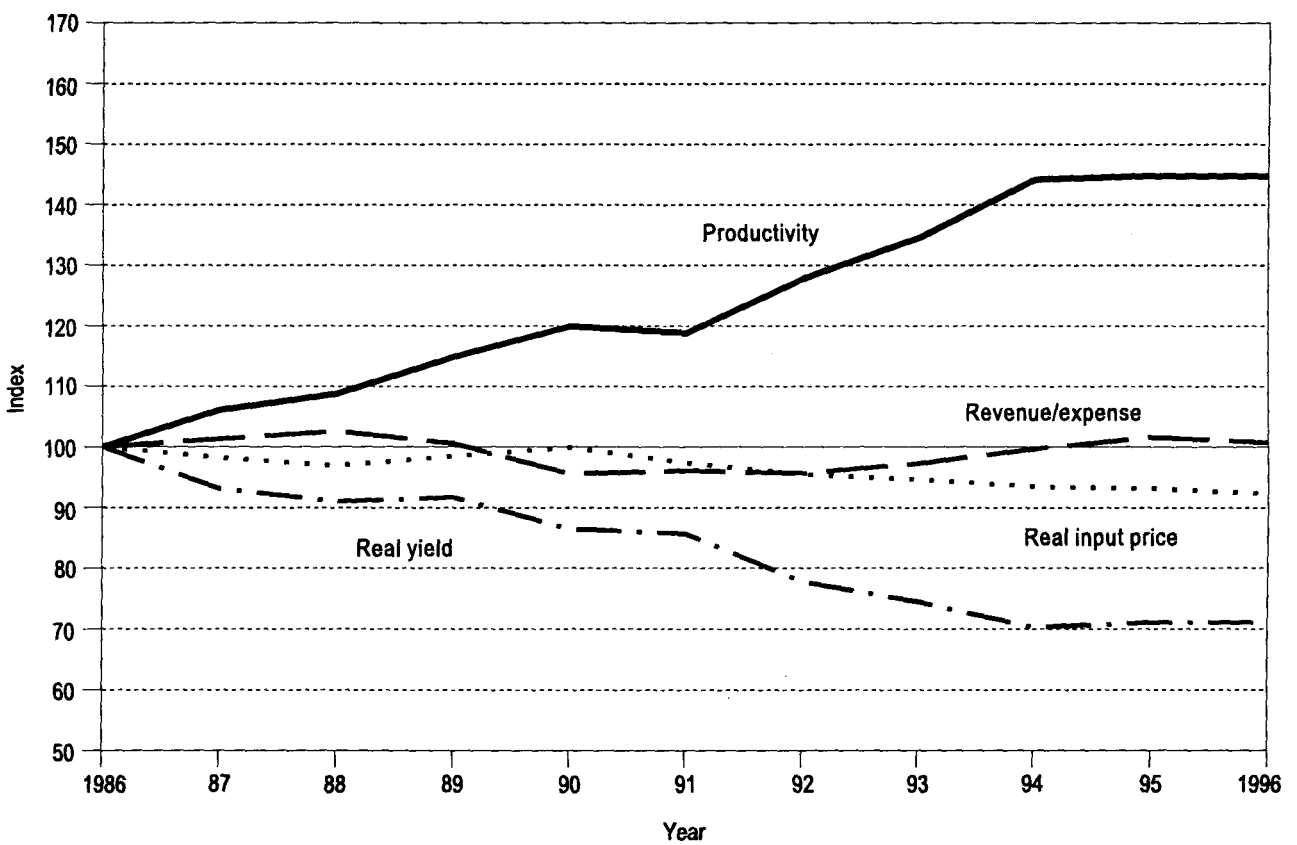


Source: ICAO Air Transport Reporting Form A-1.

Figure 5-3. Regional distribution of scheduled passenger traffic — percentage of passenger-kilometres performed

AIRLINE PRODUCTIVITY, PRICES AND FINANCIAL PERFORMANCE

5.15 The scheduled airline industry has a long history of improving productivity. As a result, the growth in the output of the industry (traffic volumes, conveniently measured by tonne-kilometres performed or TKP) has been greater than the growth in the various inputs used by the industry (mainly labour, fuel and aircraft). For the purposes of the present forecasts, separate partial productivity measures for labour (TKP per employee), fuel (TKP per tonne of fuel consumed) and aircraft (TKP per tonne of fleet payload) have been developed. The trend in total productivity, which is a combination of the partial productivities, is shown in Figure 5-4. The average annual growth in productivity since 1986 has been about 4 per cent. The progressive absorption of new technology aircraft into airline fleets has been a major reason for the improvement in productivity. In particular, the new aircraft are more fuel- and labour-efficient. Improved aircraft utilization and load factors have also made important contributions.



Source: IMF, ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 5-4. Trends in performance — scheduled airline industry

5.16 Improvements in productivity can, in principle, be used either to reduce the real fares and rates paid by passengers and shippers, to pay for increases in real input prices (e.g. wage rates, fuel prices), or to provide airlines with improved financial results. The trends in airline yields (revenue per tonne-kilometre performed) and input prices, deflated by the Consumer Price Index of industrial countries, are presented in Figure 5-4, together with the trend in the revenue/expense (R/E) ratio representing the financial performance of the scheduled airline industry. Expenses are defined here as operating expenses, excluding taxes and interest on debt. It is clear that, over the past decade, airline customers have benefited from lower real yields made possible by the combined impact of productivity growth and declines in the index of real input prices (primarily resulting from falls in fuel prices).

5.17 Although there has been neither an improvement nor a decline in the long-term trend in the financial performance of scheduled airlines as a whole, there have been relatively large changes in the operating results over the medium term. Table 5-4 shows the annual development since 1986 in operating revenues and expenses, the operating result (earnings before interest, other non-operating items and taxes) and the net result (after interest, other non-operating items and taxes). The growth in revenues and expenses over the period reflects an expansion in activity levels and general inflationary pressures, offset by improvements in the efficiency of the industry. However, the impact of these factors has varied considerably over the business cycle. During the buoyant years of the 1980s, rapid growth in demand resulted in a more intensive use of airline resources and strong productivity growth. Airlines were able to improve their operating results and also offer relatively low fares and rates to their customers. In the early 1990s, market conditions changed as demand weakened and the utilization of airline resources tended to decline. The emergence of excess capacity and consequent competitive pressures put downward pressure on yields. These factors combined to produce negative operating results in three consecutive years (1990-1992). In 1993, the airline industry started to move towards a more appropriate balance of supply and demand and achieved a small operating surplus. A much better operating result was obtained in 1994 and by 1995 the industry delivered an operating surplus of $13.5 billion and obtained a positive net result of about $4.5 billion. In 1996, a reduced operating surplus of about $12.3 billion was achieved. The smaller operating profit in 1996 reflects cost pressures, notably from higher aviation fuel prices, a higher value of the U.S. dollar in relation to other world currencies and a levelling out in the average load factor despite the strong traffic growth. According to preliminary estimates for 1997, an operating surplus of $16.5 billion was achieved, and a net result better than that of 1996 is anticipated.

5.18 The change in the structure of operating revenues and expenses over the past decade is illustrated in Table 5-5. The share of incidental revenues (which include sales of services and maintenance, and the leasing of aircraft to other airlines) has increased from 6.9 per cent to 8.4 per cent, while there has been a comparable decline in the share of revenues from scheduled services. The counterpart of some of these changes on the expense side was an increase in the share of "Flight operations — Other", which includes rental of aircraft from other companies. This suggests some restructuring within the airline industry. However, of more significance is the increase in the share of indirect expenses, and especially general, administrative and other operating expenses, and the corresponding decline in the share of direct aircraft expenses, which benefited from productivity improvements and reductions in fuel prices.

Table 5-4. Operating and net results[1]
(scheduled airlines of ICAO Contracting States)[2]

Year	Operating revenues U.S.$ (millions)	Operating expenses U.S.$ (millions)	Operating result Amount U.S.$ (millions)	Operating result Percentage of operating revenues	Net result[3] Amount U.S.$ (millions)	Net result[3] Percentage of operating revenues	Direct subsidies U.S.$ (millions)	Income taxes U.S.$ (millions)
1986	124 600	120 000	4 600	3.7	1 500	1.2	230	-1 150
1987	147 000	139 800	7 200	4.9	2 500	1.7	290	-1 670
1988	166 200	156 000	10 200	6.1	5 000	3.0	320	-3 340
1989	177 800	170 200	7 600	4.3	3 500	2.0	170	-2 950
1990	199 500	201 000	-1 500	-0.8	-4 500	-2.3	230	-300
1991	205 500	206 000	-500	-0.2	-3 500	-1.7	100	550
1992	217 800	219 600	-1 800	-0.8	-7 900	-3.6	140	1 040
1993	226 000	223 700	2 300	1.0	-4 400	-1.9	150	-270
1994	244 700	237 000	7 700	3.1	-200	-0.1	70	-1 300
1995	267 000	253 500	13 500	5.1	4 500	1.7	100	-2 170
1996	282 500	270 200	12 300	4.4	5 300	1.9	30	-2 500
1997[4]	291 000	274 500	16 500	5.7				

1. Revenues and expenses are estimated for non-reporting airlines.
2. Excluding operations within the Commonwealth of Independent States.
3. The net result is derived from the operating result by adding (with plus or minus sign as appropriate) non-operating items (such as interest and direct subsidies) and income tax. The operating and net results quoted, particularly the net results, are the small differences between the estimates of large figures (revenues and expenses) and are therefore susceptible to substantial uncertainties.
4. Preliminary data — net results are not yet available.

Source: ICAO Air Transport Reporting Form EF-1.

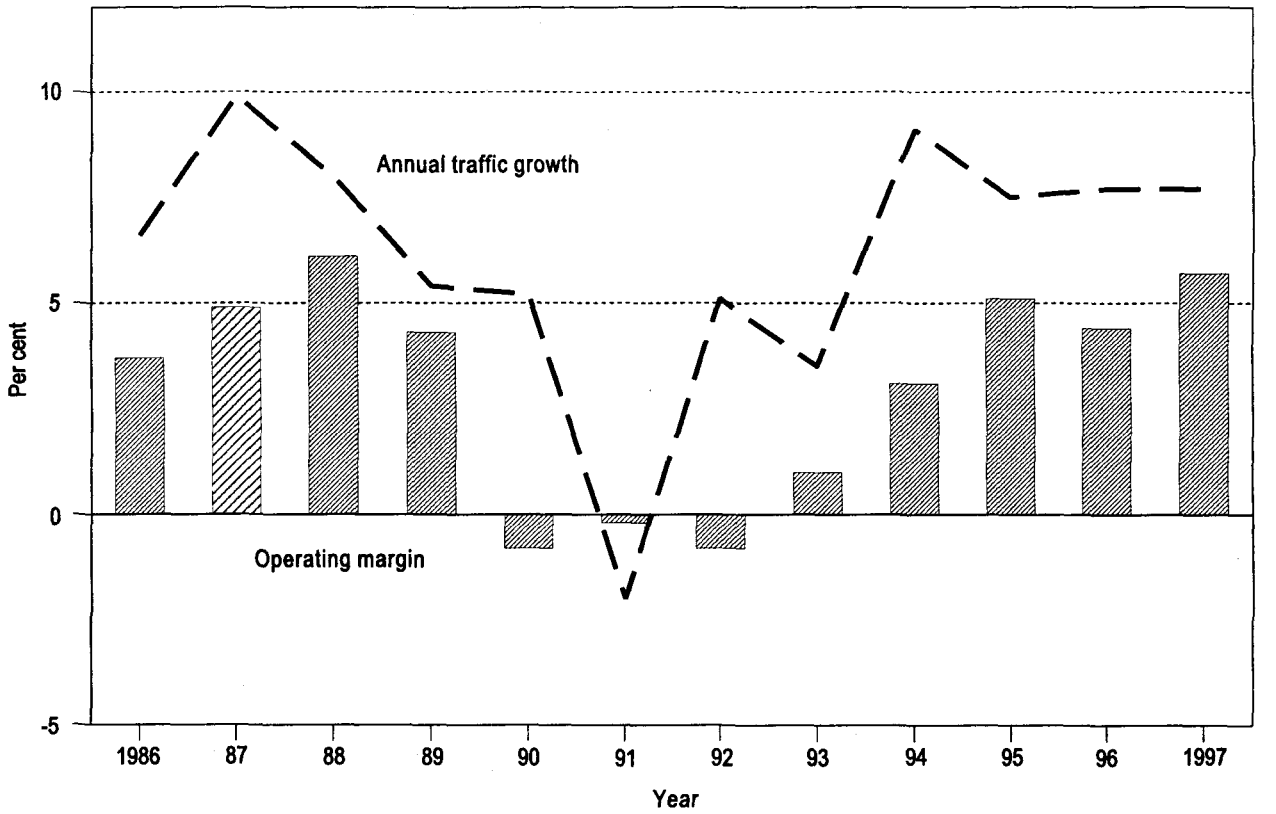
5.19 The variations in the annual operating result, measured as a percentage of airline revenue, are illustrated graphically for the period 1986-1997 in Figure 5-5, which also shows the fluctuations in traffic growth over the same period. There is a positive correlation between this measure of financial return and the growth in traffic. However, close examination of the recent annual changes reveals that the recession in financial results began in 1990 when traffic growth was 5 per cent. Furthermore, traffic rebounded in 1992 after a decline in 1991, while the operating result remained in deficit. Part of the explanation of the financial outcome in 1990 lies in a substantial increase in fuel prices (and hence operating expenses), without compensating increases in yields. In 1992, yields declined significantly in nominal terms, helping to boost traffic but having a depressing effect on financial return. In 1993 and 1994, yields became somewhat more stable and cost efficiency increased progressively, resulting in successive improvements in financial performance. Financial performance continued to improve in 1995 but was hampered slightly in 1996 by the increase in fuel prices. Financial performance improved in 1997 due to declining airline yields and improvements in average passenger load factors.

Table 5-5. Distribution of operating revenues and expenses in 1986 and 1996
(scheduled airlines of ICAO Contracting States[1], total domestic and international services)

Description	Distribution by item (per cent) 1986	1996	Change in per cent share of item 1986 to 1996
OPERATING REVENUES			
Scheduled services (total)	89.6	87.7	-1.9
Passenger	76.0	77.1	-1.1
Freight	12.2	9.6	-2.6
Mail	1.4	1.0	-0.4
Non-scheduled operations	3.6	3.9	0.3
Incidental	6.9	8.4	1.5
TOTAL	100.0	100.0	—
OPERATING EXPENSES			
Direct aircraft			
Flight operations (total)	27.2	27.7	0.5
Flight crew	6.9	7.8	0.9
Fuel and oil	15.9	12.8	-3.1
Other	4.4	7.1	2.7
Maintenance and overhaul	11.5	10.5	-1.0
Depreciation and amortization	7.9	7.1	-0.8
Sub-total	46.6	45.3	-1.3
Indirect			
User charges and station expenses (total)	17.7	17.7	0.0
Landing and associated airport charges	3.6	4.3	0.7
En-route facility charges	1.5	2.6	1.1
Station expenses	12.6	10.8	-1.8
Passenger services	10.1	10.8	0.7
Ticketing, sales, promotion	17.8	15.3	-2.5
General, administrative and other operating expenses	7.8	10.9	3.1
Sub-total	53.2	54.7	1.5
TOTAL	100.0	100.0	—

1. Excludes operations within the Commonwealth of Independent States.

Source: ICAO Air Transport Reporting Form EF-1.



Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 5-5. Financial return and traffic growth — scheduled airline industry

5.20 The pattern of investment in aircraft is related to the cycle of financial performance. Annual aircraft orders and deliveries are shown in Figure 5-6, together with the annual financial return of the carriers. The high levels of aircraft deliveries in the early 1990s were accompanied by introductory costs and higher depreciation expenses, and hence increased expense per unit of output. Furthermore, the arrival of large amounts of new capacity, combined with softening demand during the recessionary period, encouraged competitive reductions in fares and hence reduced revenue per unit of output.

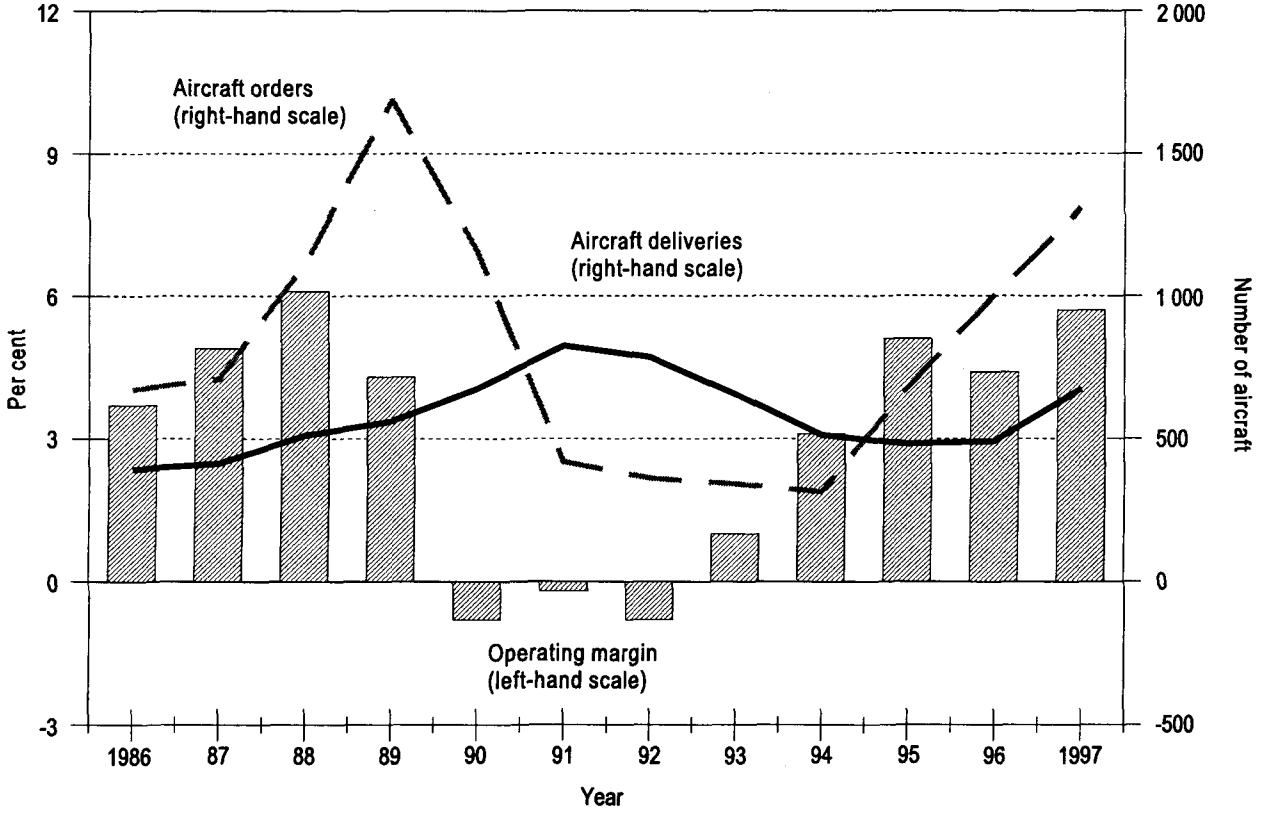
5.21 The high rates of aircraft deliveries in the early 1990s resulted from very high volumes of aircraft orders in earlier years, which were generated by strong traffic growth and a ready availability of finance. Because of the lag between orders and deliveries, the buoyant market conditions which existed at the time of peak order levels had changed by the time the peak deliveries were made, which exacerbated the mismatch between supply and demand in the industry. With aircraft orders at low levels after 1990, aircraft deliveries returned to moderate levels in 1994 and 1995. Together with improved demand, this helped to reduce excess capacity in the industry. In 1995 and 1996, aircraft orders started to increase again, surpassing aircraft deliveries for the first time since 1990.

AIRLINE PASSENGER TRAFFIC FORECAST

5.22 As a basis for the traffic forecasts for this study, econometric analyses were carried out to determine the historical relationship between airline passenger traffic, economic cycles and airline yield levels. These analyses were used to translate the expectations of future global economic development and yield levels into annual projections of traffic demand for the years 1998, 1999 and 2000 according to the methodology described in Appendix 2. These forecasts were then reviewed in the light of prospective changes in other relevant factors which could not be incorporated into the econometric models.

5.23 While at a global level these models appear to provide reasonably robust results, they have been less adequate at a micro or regional level because of the influence of unique factors and uncertainties in the air transport industry in recent years.

5.24 The economic forecasts, which were introduced at the beginning of this chapter, are based on assumptions about broad business cycle conditions and developments, fiscal and



Source: ICAO Air Transport Reporting Form EF-1 and aircraft manufacturers.

Figure 5-6. Financial return and aircraft supply

monetary policy settings and the international trade and financial environment. Assumptions related to population growth and productivity improvement that affect aggregate economic output over the longer term are also taken into consideration. These factors are largely external to the aviation sector. The reasonably positive economic outlook presented in Figure 5-1 and Table 5-1 augurs well for global traffic demand over the forecast period.

5.25 The prospects for airline yields are closely related to cost developments and market conditions in the airline industry. Productivity improvement in the airline industry should continue to produce cost savings, thereby providing some potential for real reductions in air fares. Changes in fuel prices have had important effects on costs, and hence on both financial returns and airline yields, at certain times in the past. However, in recent years with the exception of 1996, fuel price volatility has been short term, with limited impact on year-average price levels and airline yields. Salaries and wages represent the largest airline expense item. Labour cost pressures could build up gradually over the next few years with consequences for airline yields. These various cost pressures will provide a benchmark for airline yields, with revenues needing to be sufficient to cover costs over the long term. However, in the short term, movements in yields will be influenced by competitive conditions in airline markets.

5.26 The global and regional scheduled passenger traffic forecasts for 1998, 1999 and 2000, developed from the economic and yield assumptions and other considerations, are presented in Table 5-6. General economic expansion is expected to provide the main support for traffic demand. Global passenger traffic is expected to grow by 5.0 per cent in 1998, which is below the actual 1997 growth rate of 5.9 per cent. Continued economic growth should boost traffic by around 5.3 per cent in 1999 and 5.7 per cent in 2000. The forecast growth rates for total world traffic are illustrated in Figure 5-7, together with the annual growth pattern over the past 10 years.

5.27 Traffic growth will vary by geographic region because of the impact of specific local or regional factors. The developing regions of the Middle East and Africa are expected to experience relatively high rates of passenger traffic growth over the forecast period, reflecting the expectations of rapid economic growth. The airlines of the Latin America and the Caribbean region are expected to show traffic growth at the highest rate during the forecast period, surpassing the growth of the Asia/Pacific region. Asia/Pacific traffic is expected to grow at somewhat lower rates than the world average in 1998 and rebound to higher rates during 1999 and 2000. European aviation markets are forecast to be reasonably buoyant, with some further benefits of liberalization and recovery in eastern Europe and the CIS. More moderate growth is expected in the mature North American markets despite the strong performance in 1997. Further details of the trends and forecasts on a region-by-region basis may be found in Chapter 6.

AIRLINE FINANCIAL FORECAST

5.28 Financial trends in the airline industry are difficult to forecast because airlines are able to adjust capacity over time and manage yields through fare adjustments at relatively

Table 5-6. ICAO scheduled passenger traffic forecast for 1998-2000
(passenger-kilometres performed)

Region of airline registration	ACTUAL 1986 (billions)	ACTUAL 1996 (billions)	Average annual growth (%)	ESTIMATED 1997 (billions)	Growth (%)	FORECAST 1998 (billions)	Growth (%)	1999 (billions)	Growth (%)	2000 (billions)	Growth (%)
Africa	34.6	53.0	4.4	56.8	7.2	59.6	5.0	62.9	5.5	66.4	5.5
Asia/Pacific	237.0	614.1	10.0	644.9	5.0	672.6	4.3	709.0	5.4	755.7	6.6
Europe	438.8	604.0	3.2	646.9	7.1	686.4	6.1	730.3	6.4	777.8	6.5
Middle East	42.9	72.2	5.3	74.9	3.7	78.0	4.2	82.3	5.5	87.0	5.7
North America	623.8	968.5	4.5	1 019.1	4.3	1 065.0	4.5	1 109.7	4.2	1 158.5	4.4
Latin America and the Caribbean	75.0	114.5	4.3	127.8	11.6	136.1	6.5	146.3	7.5	158.0	8.0
World	1 452.1	2 426.3	5.3	2 570.4	5.9	2 697.7	5.0	2 840.5	5.3	3 003.4	5.7

Figure 5-7. World scheduled passenger traffic growth — passenger-kilometres performed

short notice to respond to (or to create) changes in demand. In addition, fluctuations in the value of the U.S. dollar complicate the interpretation and forecasting of global financial results which are presented in U.S. dollar terms. Also, ICAO receives airline financial data on an annual basis only, the period between transaction and reporting is much greater than for traffic data, and there are significant gaps in reporting. Because of these considerations, the forecasts are restricted to indicative global trends in financial results (excluding operations within the CIS, for which no historic data are available).

5.29 The forecast for total revenues for scheduled airlines is based on assumptions for passenger yields and on the passenger forecasts presented above, together with further assumptions for the trend in the share of airline revenue from sources other than scheduled passengers (i.e. freight, mail, non-scheduled operations and incidental). This produces a growth in total revenues in current U.S. dollars of about 5.7 per cent in 1998, 6.4 per cent in 1999 and 6.8 per cent in 2000. These compare with an average rate of 7.1 per cent per annum over the past ten years.

5.30 The forecast for airline expenses is based on assumptions for the expected trends in quantity of inputs (labour, fuel and aircraft capacity) and the prices of those inputs, the latter being primarily determined by the outlook for general inflation. Airlines are taking steps to trim employment levels and generally improve productivity in order to contain costs. However, wage pressures could increase as labour markets tighten in some regions over the next few years. As a result of these considerations, airline expenses in current U.S. dollars are expected to grow at rates of about 5.3 per cent in 1998, 5.0 per cent in 1999 and 6.0 per cent in 2000 (compared to an average rate of 7.0 per cent per annum over the past ten years).

5.31 The operating result for the world's scheduled airlines is the difference between operating revenues and expenses, the forecasts of which have here been made independently and which are both subject to significant margins of error. It is therefore not possible to forecast the operating result with any reasonable degree of certainty. Nevertheless, the above forecasts of operating revenues and expenses imply that the operating result as a percentage of operating revenues will remain fairly consistent at just over 4 per cent in each of the forecast years. These estimates suggest a stable outlook for the global airline industry in line with expectations for traffic growth and general economic development.

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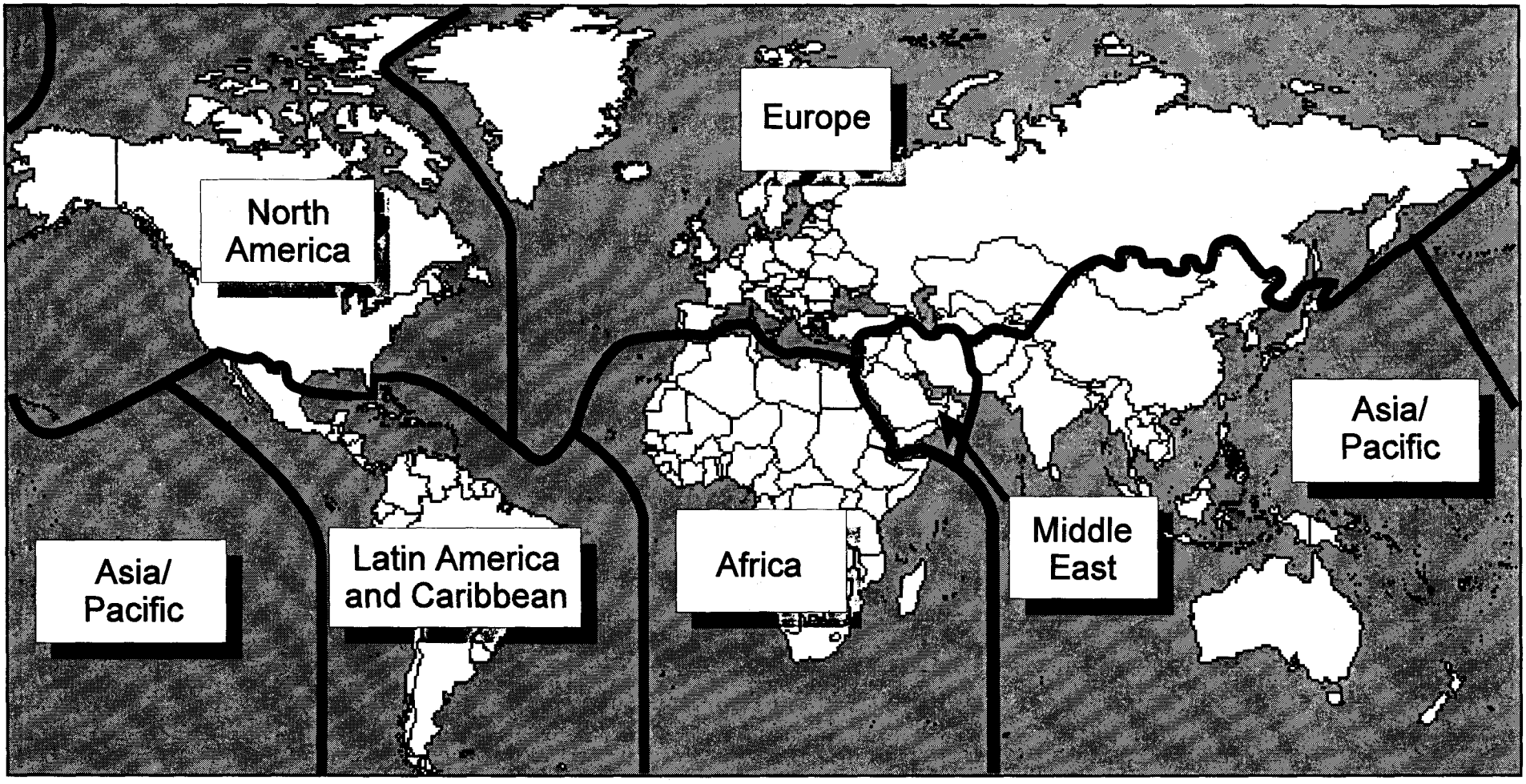
PART III

REGIONAL PERSPECTIVES, 1997 TO 2000

ICAO STATISTICAL REGIONS



International boundaries shown on this map do not imply official endorsement or acceptance by ICAO.

Chapter 6
Regional Highlights, Trends and Forecasts

6.1 This chapter reviews, on a region-by-region basis, some key developments affecting air transport in 1997, the economic environment over the period since 1986 and anticipated through to 2000, and airline finances and passenger traffic trends over the period since 1986, and presents scheduled passenger traffic forecasts for the airlines of each region through to 2000. The regional basis is that of the ICAO Statistical Regions (see map), presented as follows: Africa; Asia/Pacific; Europe; Middle East; North America; Latin America and the Caribbean.

AFRICA

The Region in 1997

Table 6-1. Scheduled traffic — airlines of Africa

	INTERNATIONAL			TOTAL		
	1997	Increase over 1996 (%)	Share of world traffic (%)	1997	Increase over 1996 (%)	Share of world traffic (%)
Passengers carried (thousands)	15 670	10.0	3.6	29 640	4.7	2.0
Passenger-kilometres performed (millions)	47 370	8.8	3.2	56 780	7.1	2.2
Freight and mail tonne-kms performed (millions)	1 680	12.5	1.9	1 770	11.7	1.7

Source: ICAO Air Transport Reporting Form A-1.

6.2 The economic diversities around the world in 1997 were reflected in wide variations in the development of air traffic and the performance of commercial air carriers at the regional and national level. However, the link between the economic development in a given

region and the traffic of airlines registered in that region is becoming more complex, as the regulatory conditions tend to become increasingly liberalized and the airline environment increasingly competitive and globally structured. Policy measures and corporate strategies concerning market access and shares of major carriers through their alliances are leading to more frequent and more profound changes in the international airline environment than experienced in the 1980s.

6.3 With the exception of a few carriers, most of the airlines in Africa are still hampered by institutional, managerial and financial instabilities and both internal and external challenges. Unlike the huge air transport markets in North America and Europe, fragmentation of the African market and correspondingly the route network for passenger and cargo air services persists. Airlines struggle with constant operational deficits, overwhelming debt burden and consequently insufficient investment funds for upgrading of their fleet and ground-based technology as well as introducing other modernization measures. Financing of fleet re-equipment and other expansion programmes, low profitability, lack of funding by African governments, and the negative perception by the capital markets of African airlines are cited by the African Airlines Association (AFRAA) as factors compounding the problems of the road to recovery through privatization and reorganization.

6.4 The gradual process of turning State-owned carriers into modern, commercial enterprises commenced back in 1992. Kenya Airways was the first African airline to be privatized, Uganda Airlines followed in 1998 and plans are in hand for Air Tanzania to follow suit. Among the measures taken by those airlines charged with privatization and modernization programmes, are the restructuring of debt burden, strategic planning, human resources management and development. While Air Afrique remains the only multinational airline, several carriers entered inter-airline cooperation, both internationally and subregionally, in response to fierce competition on the Europe-Africa routes and to effect the necessary economies of scale. The measures of gradual liberalization of the air transport regulatory policies and inter-airline cooperation continued to be debated both in regional groupings such as the African Civil Aviation Commission (AFCAC) and in subregional groupings such as in the Southern African Development Community (SADC) and the East African Cooperation.

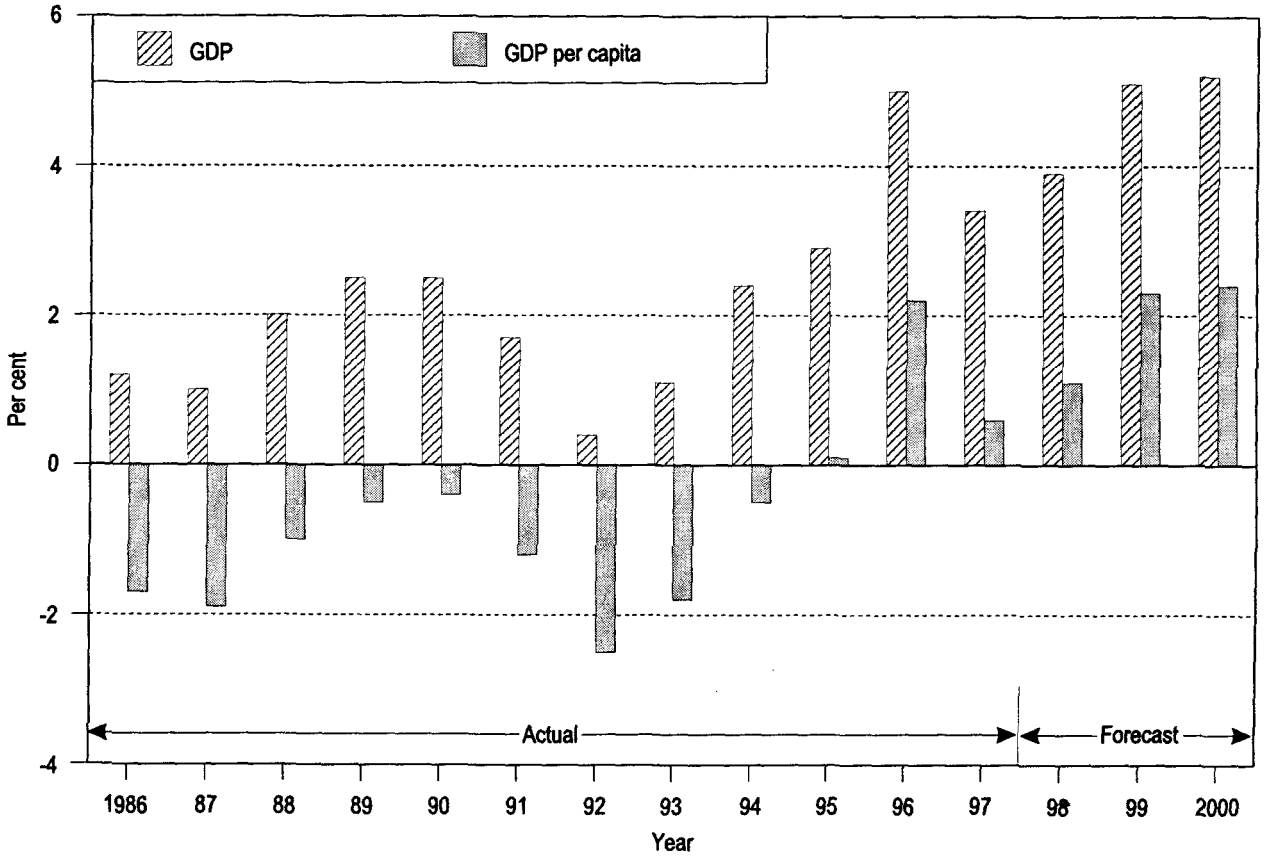
Economic trends

6.5 Over the 1986-1996 period, the aggregate African economy grew at an average annual rate of 2.1 per cent (GDP in real terms), although GDP per capita declined at a rate of 0.8 per cent over that decade. Figure 6-1 illustrates the year-to-year changes in the region's GDP and GDP per capita.

6.6 In 1997, GDP in real terms grew by 3.4 per cent in Africa. The modest slowdown in overall economic development from 1996 (see Table 5-1) was largely due to meagre agricultural crops in drought-stricken African countries, declining commodity prices and economic disruptions ensuing from societal conflicts in some countries. Growth weakened in large economies like South Africa where both domestic and external demand dropped. Recovery of industrial activities has been affected by power and fuel shortages elsewhere. The

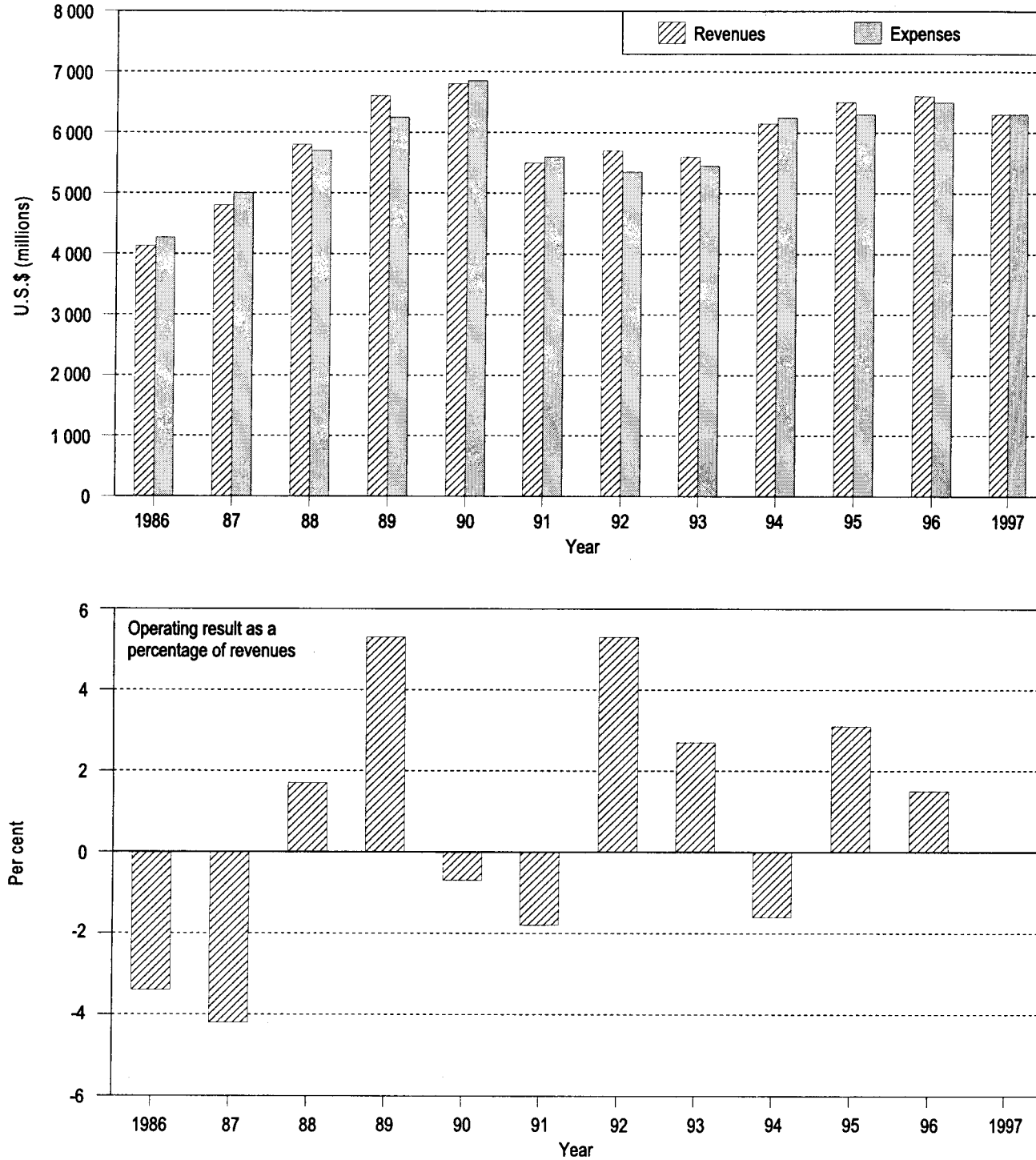
International Finance Corporation (IFC) has indicated in its annual report for 1997 that most countries in the region have implemented market reforms that freed up the energies of the private sector. Nevertheless, it was vital that countries sustain reform programmes and address key constraints, which are mainly in the form of structural bottlenecks in infrastructure, skill shortages, and weak institutions.

6.7 Economic growth is expected to recover in the short term, although more foreign investment is needed to sustain the trend. The economy of the African region is projected to increase at a rate of 3.9, 5.1 and 5.2 per cent for the years 1998, 1999 and 2000, respectively. Prospects depend on a strengthening policy environment, developments in commodity prices (e.g. coffee, oil, various minerals), the pressure on financial markets, improvements of the investment climate and the performance of those countries where economic conditions remain difficult.



Source: IMF, WEFA Group.

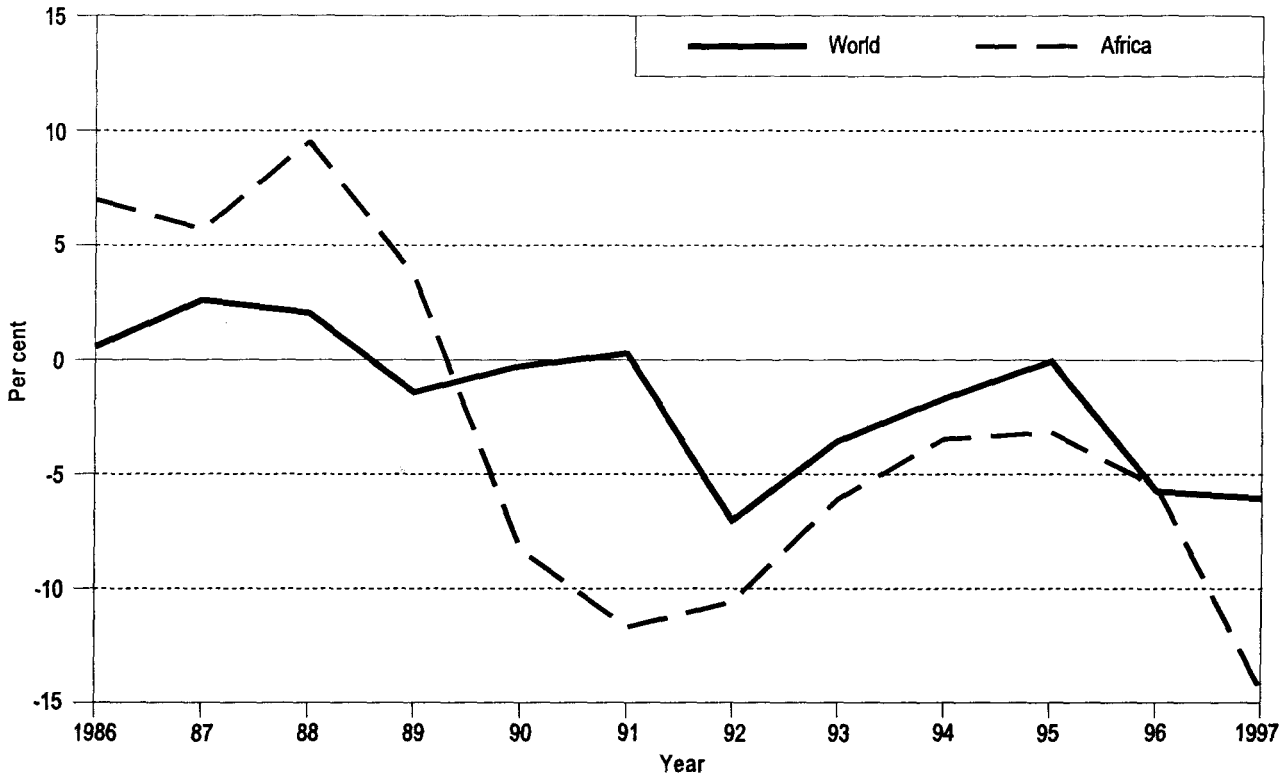
Figure 6-1. Annual change in real GDP and GDP per capita — Africa



Note.— 1997 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-2. Scheduled airline operating revenues and expenses — Africa



Notes.— 1997 figures are from estimated data.
— Real yield for scheduled airlines measured in U.S. cents per PKP deflated by U.S. Consumer Price Index.

Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 6-3. Annual change in real scheduled passenger yield — Africa and World

Airline financial trends

6.8 Over the 1986-1996 period, operating revenues (in dollars) of the scheduled airlines of the African region increased at an average annual rate of 4.8 per cent (compared to the world annual average of 8.5 per cent). Operating expenses for the same period increased by 4.3 per cent per annum. These rates reflect the relatively low traffic growth experienced over most of the period, but also the efforts by the African industry to improve efficiency and financial performance. Since 1992, positive operating results have been achieved, with the exception of 1994, as illustrated in Figure 6-2.

6.9 For the 1986-1996 period, average scheduled passenger yields for airlines of the region, measured in terms of cents per PKPs, declined at an average annual rate of 3.2 per cent in real terms (compared to a 1.5 per cent decline for the world). The year-to-year comparisons of the changes in real passenger yield of African and world airlines are illustrated in Figure 6-3. Throughout the period concerned, the region's airlines average yield level was lower than the world average.

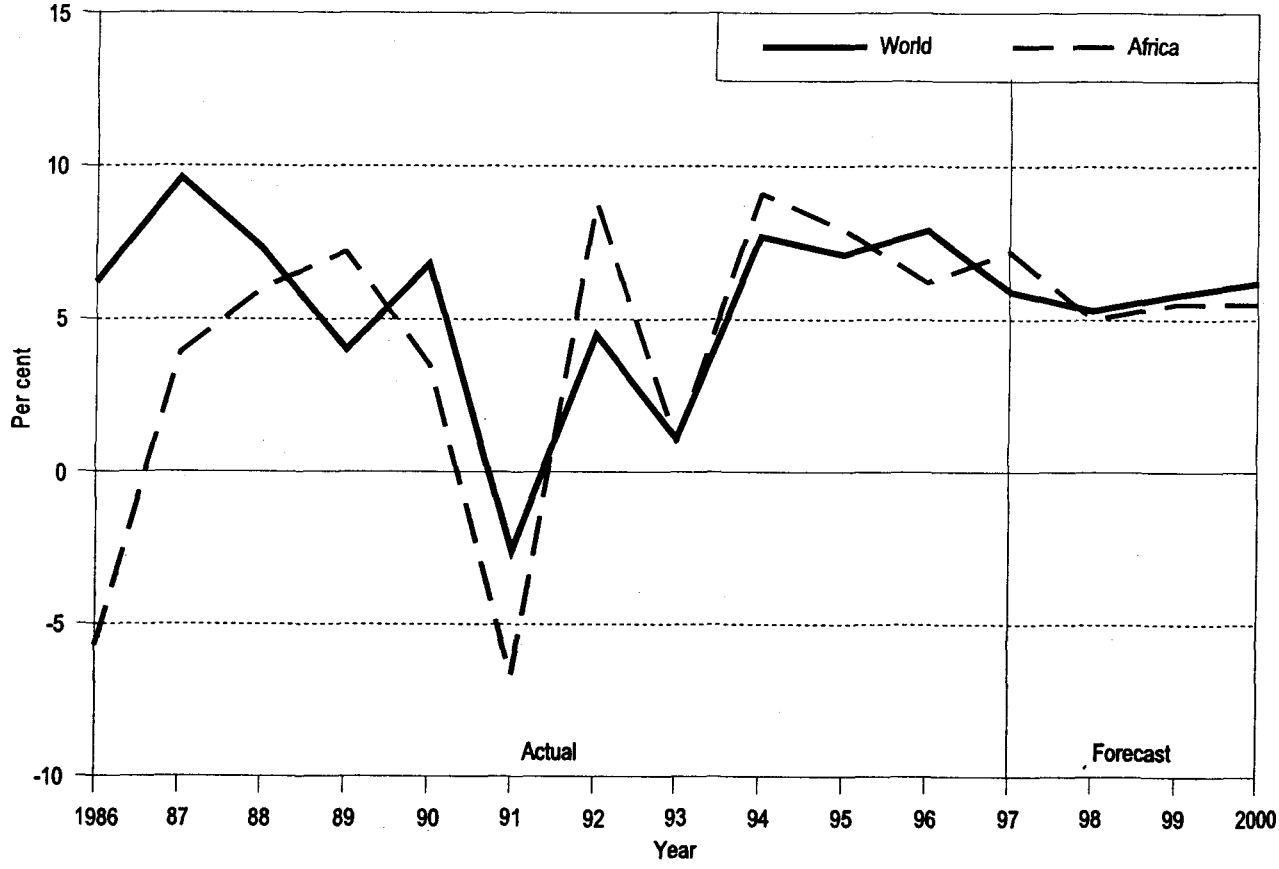


Figure 6-4. Scheduled passenger traffic growth (PKPs) — Africa and World

Airline passenger traffic trends and forecast

6.10 Over the 1986-1996 period, scheduled passenger traffic (in PKPs) of airlines of the African region increased at an average annual rate of 4.4 per cent (compared to the world annual average of 5.3 per cent). Traffic growth in recent years markedly exceeded this decade average; 6.2 per cent growth was recorded in 1996 followed by an estimated 7.2 per cent growth in 1997. Strong traffic growth in parts of the region, especially on routes from Europe to South Africa, are highly dependent on tourism. The year-to-year traffic growth comparison between world and African airlines is shown in Figure 6-4.

6.11 As shown in Table 5-6 and illustrated in Figure 6-4, scheduled passenger traffic of the airlines of the African region is expected to grow by 5.0, 5.5 and 5.5 per cent for the years 1998, 1999 and 2000, respectively, well in line with expected levels of passenger traffic growth worldwide.

ASIA/PACIFIC

The Region in 1997

Table 6-2. Scheduled traffic — airlines of Asia/Pacific

	INTERNATIONAL			TOTAL		
	1997	Increase over 1996 (%)	Share of world traffic (%)	1997	Increase over 1996 (%)	Share of world traffic (%)
Passengers carried (thousands)	101 010	0.3	23.0	333 870	1.0	23.1
Passenger-kilometres performed (millions)	443 780	5.1	30.0	644 920	5.0	25.1
Freight and mail tonne-kms performed (millions)	33 540	13.8	38.3	36 430	13.3	34.4

Source: ICAO Air Transport Reporting Form A-1.

6.12 In June 1997, a meeting of the Asia-Pacific Economic Co-operation (APEC) Transport Ministers directed the Transportation Working Group to reconvene the Air Services Group tasked with prioritizing an earlier developed scheme of eight options *inter alia*: more flexible airline ownership and control arrangements; general easing of tariff regulations; adequacy of existing air cargo service; facilitation of cooperative arrangements (such as codesharing, joint operations and interlining); and a more open market access. For consideration by the Transport Ministers by mid-1998, the Transportation Working Group will submit a comprehensive final report, including recommendations — developed on a consensus basis — on options to be implemented by each member-economy.

6.13 A number of countries reviewed their policies on bilateral air services and adopted a more liberal approach, leading, in some cases, to open-sky agreements. The Australian government pursued its policy of liberalization in its bilateral air services agreements, particularly with regard to charter flights and freighter operations. Malaysia also pursued its policy of economic liberalization and commenced negotiating open-skies agreements on a bilateral basis to promote trade and tourism. New Zealand also pursued its process of economic and structural reforms leading to commercialization of all aspects of civil aviation including open-sky agreements. During 1997, a number of open-sky agreements were bilaterally concluded between both States within the region, States in the region and the United States: Singapore with Brunei Darussalam and New Zealand, respectively; Brunei Darussalam, Malaysia, New Zealand and Singapore respectively with the United States.

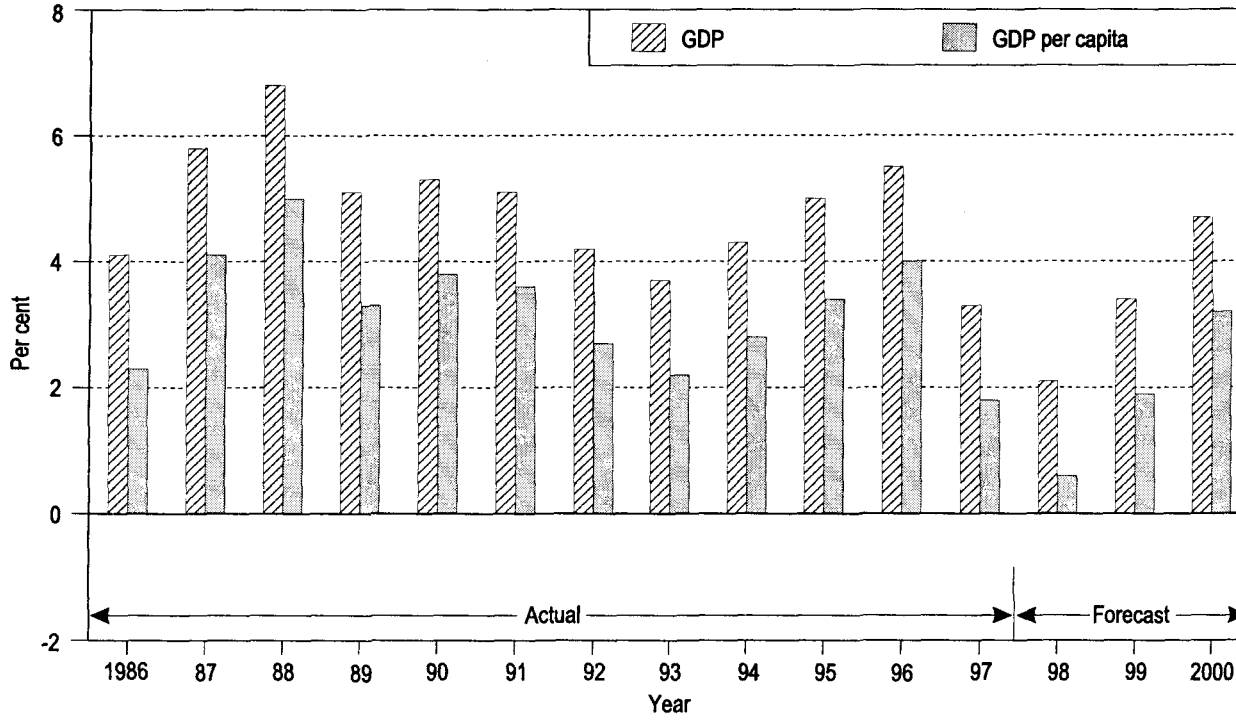
6.14 States in the region also continued with the privatization of airlines and airports. With regard to its policy of privatization of airports, the Australian Government successfully concluded agreements on the leasehold sale of Brisbane, Melbourne and Perth airports to major private airport operators during the year. It is proceeding with plans to lease an additional 15 airports before 30 June 1998. China has allowed foreign investment in the civil

aviation field, for both airlines and airports, in the course of its economic reform policies. The region is investing heavily in the construction of new airports or redevelopment of existing ones. Major airport works were progressing in China, SAR Hong Kong (China), Japan, Malaysia, the Philippines, Republic of Korea and Thailand (see also Chapter 3).

Economic trends

6.15 Over the 1986-1996 period, the aggregate Asia/Pacific economy (GDP) grew at an average annual rate of 5.1 per cent in real terms, and GDP per capita increased at 3.5 per cent, the highest growth rates of all ICAO regions. For more than 10 years Asia/Pacific has been the fastest growing region, but the trend reversed when GDP growth dropped from 5.4 per cent in 1996 to 3.2 per cent in 1997, below the world average. The year-to-year changes in the region's GDP and GDP per capita are illustrated in Figure 6-5.

6.16 The economic situation in Asia/Pacific weakened in 1997 when demand contracted in some of the region's driving economies, that is Japan and those South-East Asia countries affected by the recent financial market declines. Following temporary recovery at 3.9 per cent in 1996, the Japanese economy saw a low 0.9 per cent GDP growth in 1997. In comparison, Australia's output grew at 2.7 per cent in 1997, just moderately lower than the previous year,



Source: IMF, WEFA Group.

Figure 6-5. Annual change in real GDP and GDP per capita — Asia/Pacific

while New Zealand maintained a GDP growth path at 2.8 per cent. In several South-East Asian economies, withdrawal of private foreign financing, together with the drastic currency depreciations and declines in asset prices, led to a sharp and sudden decline in GDP growth. Thailand experienced a recession. Other countries such as Malaysia and the Philippines were exposed to a lesser extent. In contrast, China and India, the largest developing economies experienced just a slight slowdown (8.8 and 5.8 per cent growth respectively in 1997, over 9.7 and 7.5 per cent in 1996).

6.17 Continuing fiscal tightening and weak private consumption despite a recent tax reform, declining export volumes to Asia, high inventory-to-sales ratios and cautious business spending of investors could lead Japan into a recession in 1998. Suffering from sharp contraction in domestic demand and imports, Thailand, Indonesia and Republic of Korea are projected to experience declines in overall output. These exporting economies are likely to compensate to the extent possible by an increase in net exports of highly competitive products on the world market. For the entire Asia/Pacific region, real growth in GDP is expected to slow down further to 2.0 per cent in 1998, recover at 3.3 per cent in 1999 and then gain momentum again at 4.6 per cent in 2000.

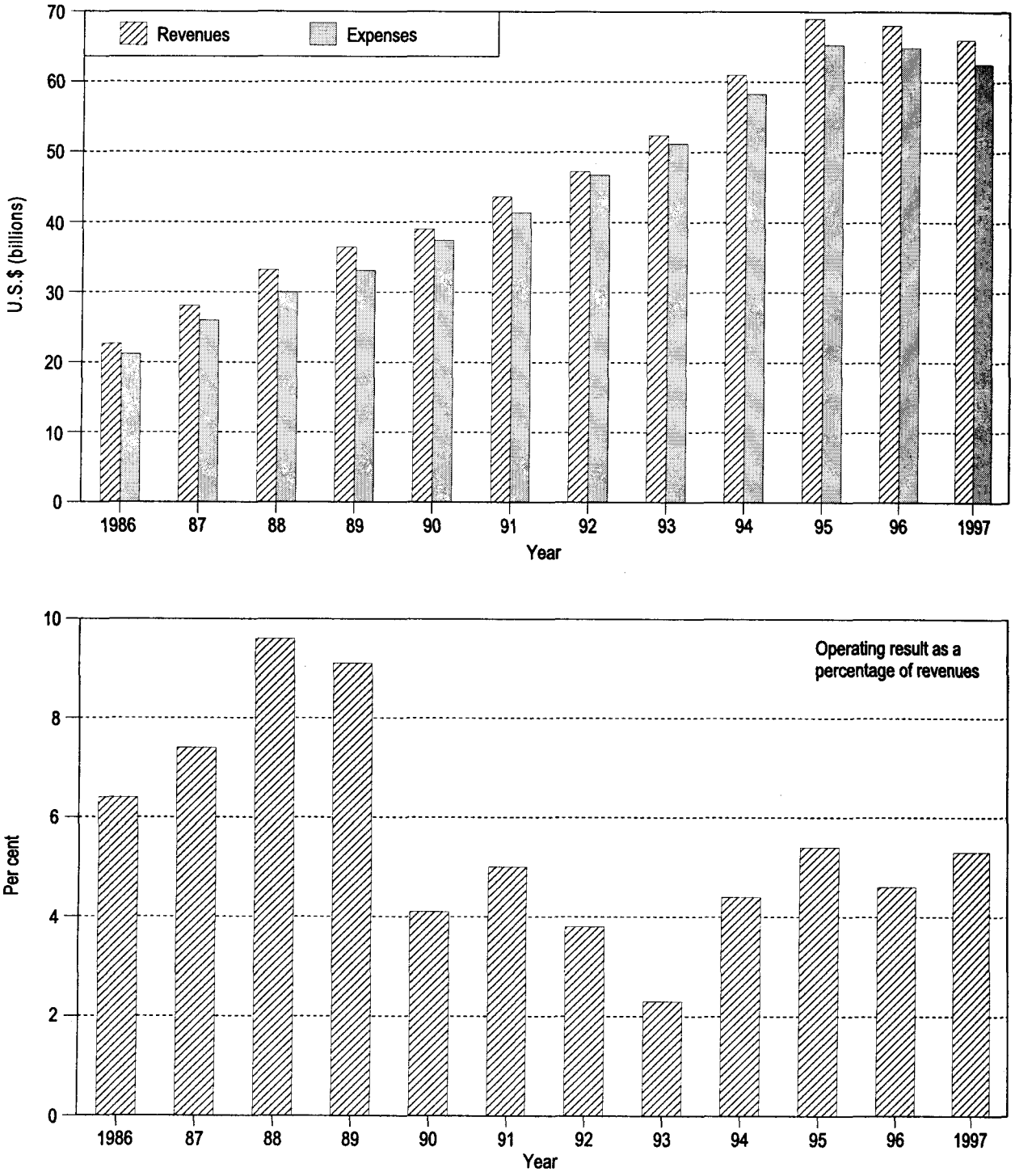
Airline financial trends

6.18 Over the 1986-1996 period, operating revenues of the scheduled airlines of the Asia/Pacific region increased at an average annual rate of 11.6 per cent (compared to the world average annual growth rate of 8.5 per cent). Operating expenses for the same period also increased by 11.8 per cent per annum. Airlines in the region enjoyed positive operating results throughout the last decade as illustrated in Figure 6-6. Although the estimated operating results for 1997 improved over 1996, the aggregated net result is estimated to be around 1 per cent. Starting mid-1997, the combination of weakening traffic demand, softened load factors and devaluation of currencies brought declining profits for most Asian airlines while some carriers incurred losses.

6.19 Average scheduled passenger yields for airlines of the region, measured in terms of cents per PKP, have fluctuated significantly since 1986 and resulted in an annualized decline of 2 per cent during the 1986-1996 period. Figure 6-7 compares the annual changes in real yield for the Asia/Pacific scheduled airlines with those for the total world's airlines. The sharp fluctuations in airline yield reflects, in part, the depreciation of the yen and other Asian currencies against the U.S. dollar.

Airline passenger traffic trends and forecast

6.20 Over the 1986-1996 period, scheduled passenger traffic (in PKP) of airlines of the Asia/Pacific region increased at an average annual rate of 10 per cent, almost double the world's annual average of 5.3 per cent. Having exhibited the highest growth rates among all ICAO regions for almost a decade, in 1997 airlines in the region experienced a slowdown in traffic to almost 5 per cent, below the world average of 5.9 per cent. The year-to-year traffic growth comparison between world and Asia/Pacific airlines is shown in Figure 6-8.

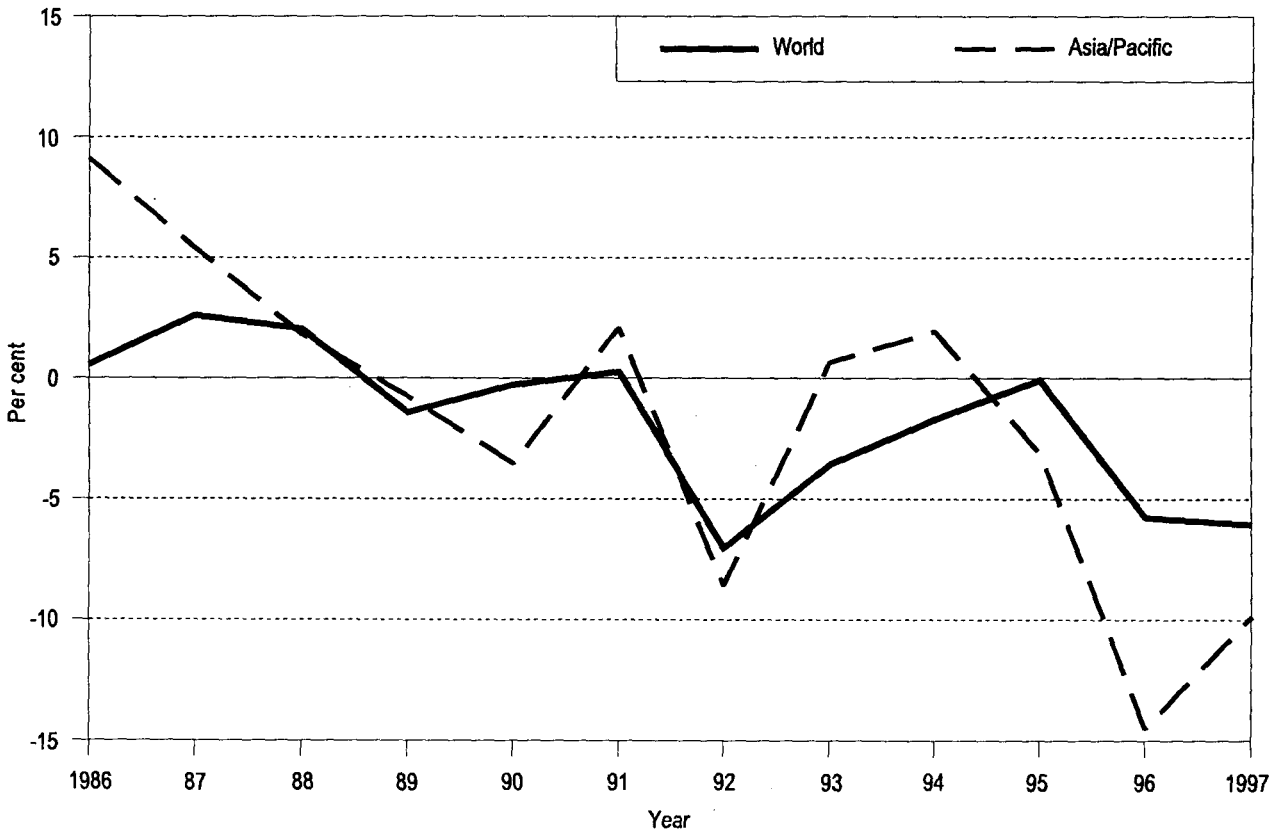


Note.— 1997 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-6. Scheduled airline operating revenues and expenses — Asia/Pacific

6.21 As shown in Table 5-6 and illustrated in Figure 6-8, scheduled passenger traffic of the airlines of the Asia/Pacific region is expected to grow by 4.3, 5.4 and 6.6 per cent for the years 1998, 1999 and 2000, respectively, compared to world airline growth of 5.0, 5.3 and 5.7 per cent. In 1998, intra-regional traffic, outbound traffic from Japan and other countries affected by the economic crisis, are expected to weaken further. However, a gradual recovery of traffic growth is projected for the year 2000 depending, in part, on the effectiveness of financial crisis management, domestic economic performance and international trade.



Notes.— 1997 figures are from estimated data.
— Real yield for scheduled airlines measured in U.S. cents per PKP deflated by U.S. Consumer Price Index.

Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 6-7. Annual change in real scheduled passenger yield — Asia/Pacific and World

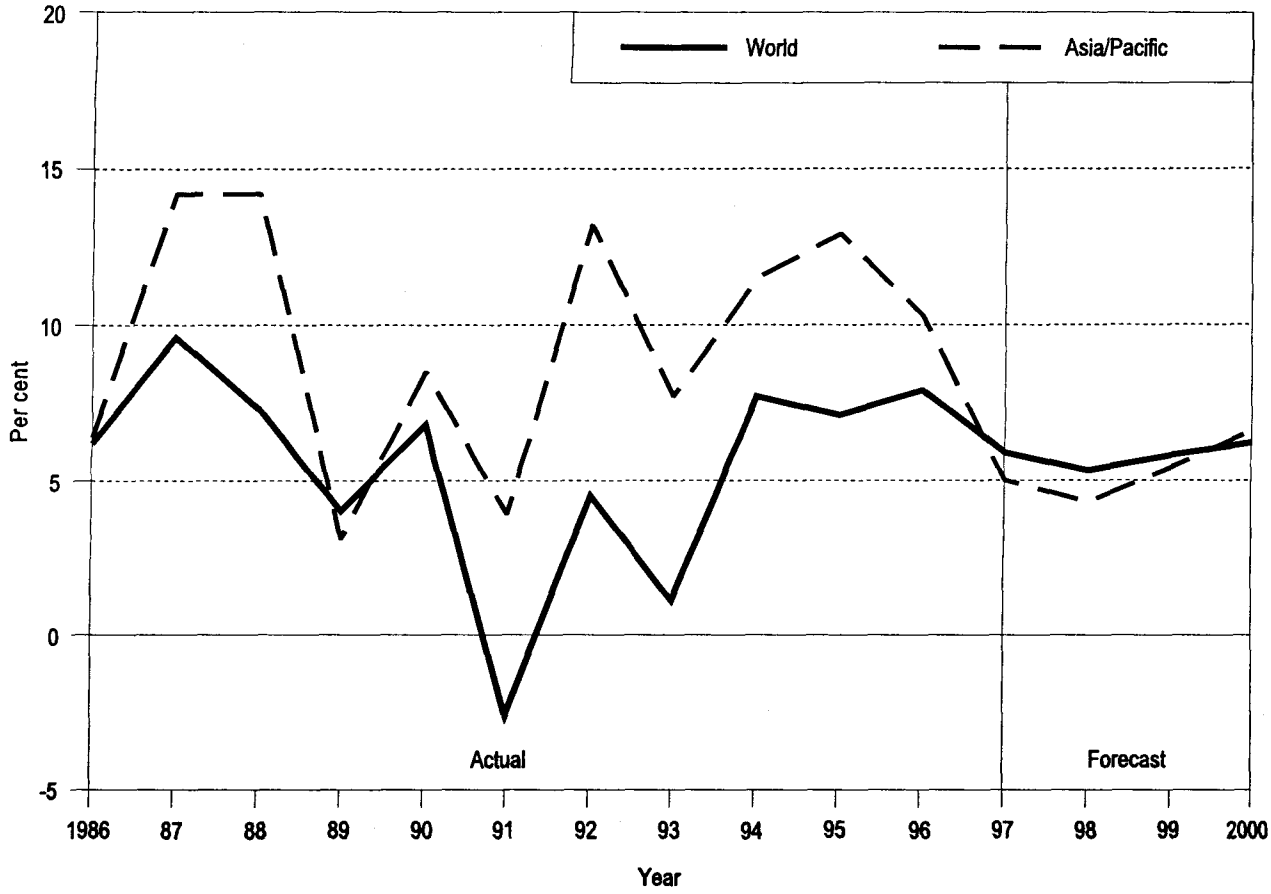


Figure 6-8. Scheduled passenger traffic growth (PKPs) — Asia/Pacific and World

EUROPE

The Region in 1997

Table 6-3. Scheduled traffic — airlines of Europe

	INTERNATIONAL			TOTAL		
	1997	Increase over 1996 (%)	Share of world traffic (%)	1997	Increase over 1996 (%)	Share of world traffic (%)
Passengers carried (thousands)	201 870	10.5	46.0	347 530	7.4	24.0
Passenger-kilometres performed (millions)	535 280	9.4	36.2	646 900	7.1	25.2
Freight and mail tonne-kms performed (millions)	27 540	6.8	31.5	28 440	6.4	26.9

Source: ICAO Air Transport Reporting Form A-1.

6.22 The Ministers of Transport from Member States of the European Civil Aviation Conference (ECAC) adopted, on 14 February 1997, a new institutional strategy for Air Traffic Management (ATM) in Europe, bringing to a successful conclusion more than two years of intensive work in this field. Ministers also agreed on an action programme for its immediate implementation.

6.23 European ATM policy and planning will now be decided in a single, new, Europe-wide structure established under a EUROCONTROL General Assembly at the ministerial level. The legal basis for the new structure was provided by the revised EUROCONTROL Convention signed on 27 June 1997. As a consequence, the Boards of the APATSI (Airport/Air Traffic System Interface) Programme and EATCHIP (European Air Traffic Control Harmonization and Integration Programme) have been disbanded, with the responsibilities absorbed into a restructured EUROCONTROL Organization.

6.24 In the economic field, a recommendation on leasing of aircraft was adopted by ECAC in an effort to harmonize policies in this area. The recommendation states that "for the purpose of ensuring safety and liability standards and compliance with any applicable conditions, all leasing arrangements entered into by air carriers should receive prior approval from the appropriate authorities" and, *inter alia*, urges Member States to cooperate in the provision of information concerning leases, in connection with the ECAC Safety Action Programme (SAFA) and for other purposes (see Chapter 4). Work was also initiated on the revision of the Code of Conduct for Computer Reservation Systems (CRS) as a result of proposals published by the European Commission in July 1997 (see Chapter 2).

6.25 ECAC's Safety Action Programme became fully operational, including the Safety Information Database, which was created by the Joint Aviation Authorities (JAA). The close links with ICAO's Safety Oversight Programme were manifested on the occasion of the ICAO Directors General of Civil Aviation Conference on the Safety Oversight Programme in November 1997 through the signing of a Memorandum of Understanding between ICAO and ECAC regarding the coordination on safety oversight issues. A Model Standard Bilateral Clause on Safety was adopted by the Triennial Session of ECAC, for possible inclusion in bilateral air transport agreements between States.

6.26 The continued objective in regional activities in the field of civil aviation security in 1997 was the implementation, in a harmonized fashion and on a Europe-wide basis, of the provisions in ECAC's Doc 30, which are closely aligned to ICAO's Annex 17. To this end, work was developed on technical specifications for hand-held and walk-through metal detectors, in the area of certification and testing at a European level, and on the potential for applying trace detection to screening. In addition, preparatory work on the drafting of a protocol for testing and auditing by an ECAC team in the context of one-stop security was done, and a great deal of attention was paid to operational problems in the field of human factors.

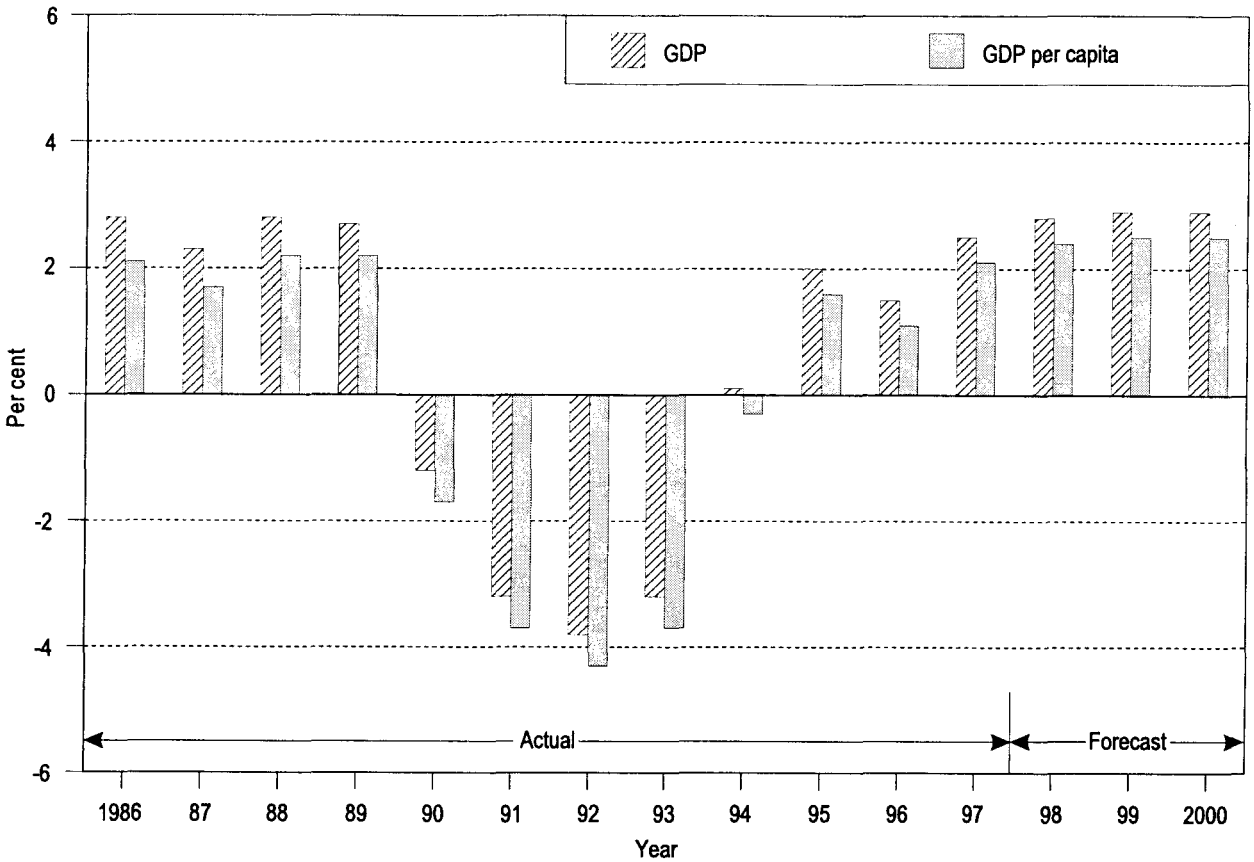
6.27 In 1997, the former Yugoslav Republic of Macedonia became the 36th Member State of ECAC. A number of ECAC workshops, designed partly to assist in the integration of ECAC's newer Member States, were held, including one in Zürich on ECAC's new cargo regime and a second in the new European Regional AVSEC Training Institute in Brussels, on 100 per cent screening of checked baggage. In December 1997, ECAC's Directors General decided to establish the year 2002 as the target date for the implementation on an ECAC-wide basis of 100 per cent screening of checked baggage. They set in place a programme to ensure that momentum towards achieving this objective is not lost.

6.28 In the facilitation field, work progressed with continued emphasis on priority items such as the development of a facilitation information system on illegal immigrants, the harmonization of facilitation conditions of air transport, and the transport of persons with reduced mobility.

6.29 Work in the environmental area continued, including a second edition of the publication on Standard Method of Computing Noise Contours around Civil Airports. Questions relating to the introduction of more stringent requirements in the fields of aircraft noise and emissions were also pursued.

Economic trends

6.30 The aggregate European economy (GDP) grew steadily between 1986 and 1989 after which it went into decline. By 1994, total output was back to where it had been in 1985, the primary reason being the serious decline in the economies of eastern Europe and the CIS beginning in 1990. The impact of this is illustrated in Figure 6-9, which shows the annual European GDP growth. Western Europe achieved a positive average annual growth in GDP of 2.4 per cent per annum over the past decade.



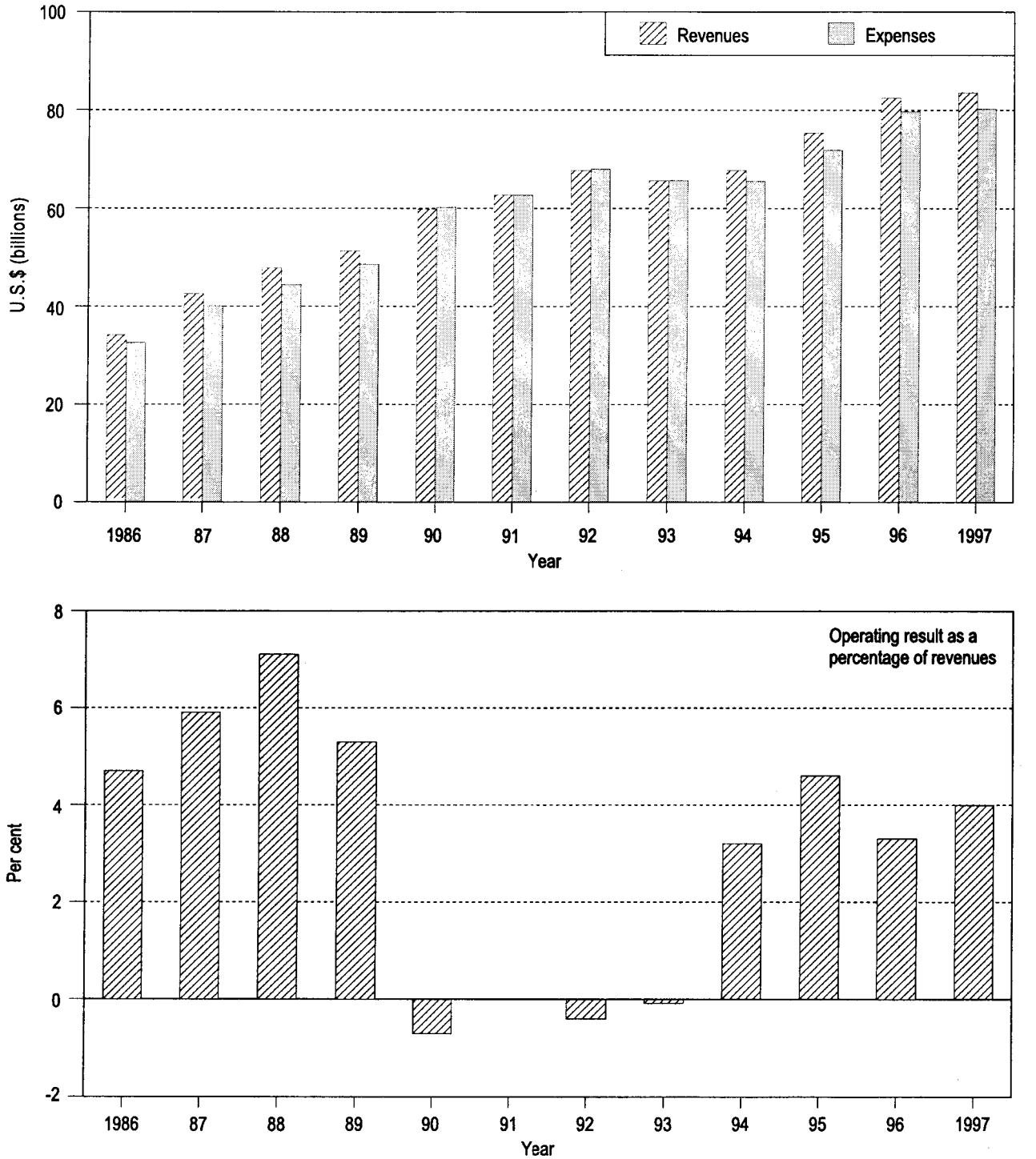
Source: IMF, WEFA Group.

Figure 6-9. Annual change in real GDP and GDP per capita — Europe

6.31 Europe has a relatively low population growth rate. The European population grew at 0.5 per cent per annum between 1986 and 1996, which means that aggregate GDP per capita for the whole region (including the CIS) declined by about 0.5 per cent between these years. A number of economies of transition in eastern Europe and the CIS show some signs of stabilization such as increased output and reduced inflation; but fiscal problems, government budget deficits and turbulent financial markets are expected to prevail. The outlook for western Europe is for moderate growth. GDP growth rates for the whole of Europe are forecast to be 2.8 per cent, 2.9 per cent and 2.9 per cent for 1998, 1999 and 2000, respectively. However, because of the structural changes that are occurring, there is an unusually large element of uncertainty associated with the economic outlook for the region.

Airline financial trends

6.32 Over the 1986-1996 period, operating revenues of the scheduled airlines of the European region (excluding operations of CIS) increased at an average annual rate of 9.2 per



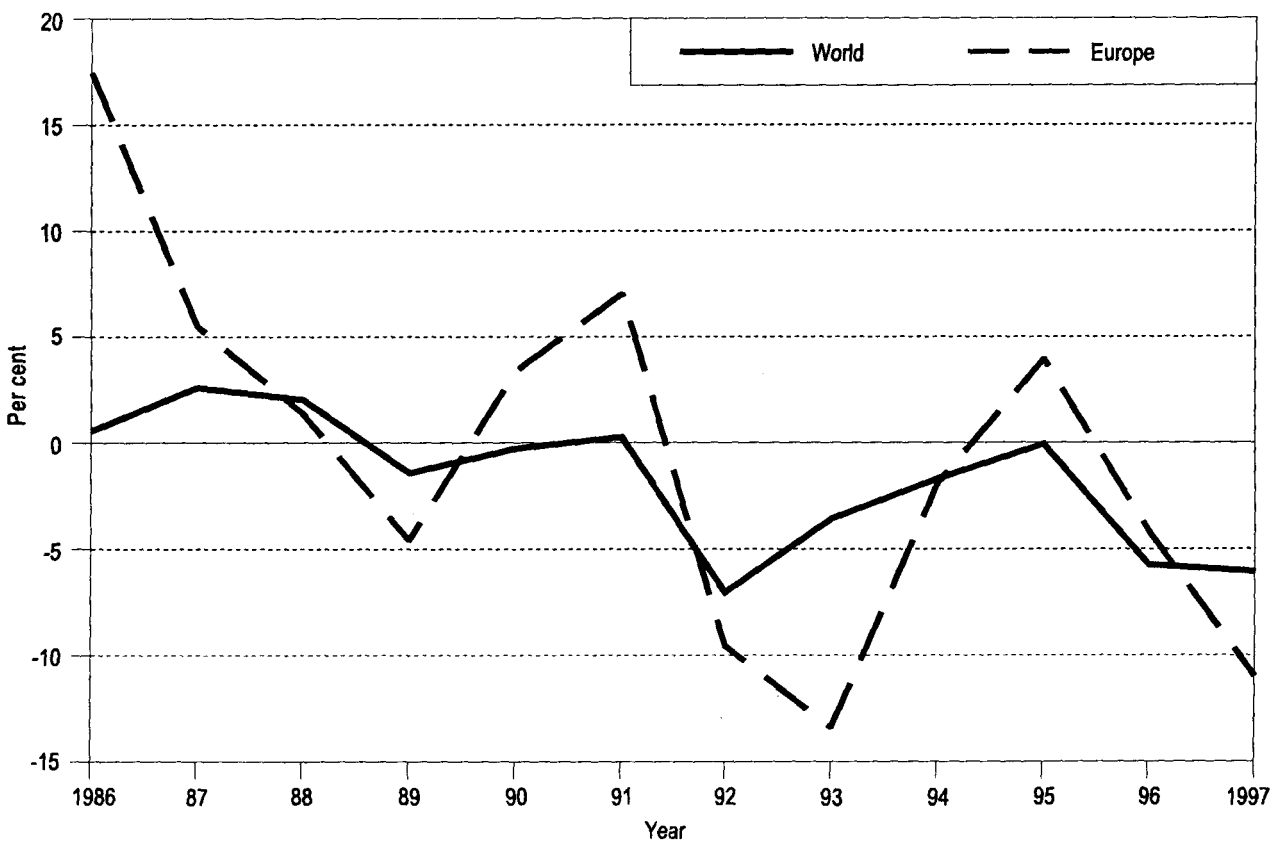
Note.— 1997 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-10. Scheduled airline operating revenues and expenses — Europe

cent (compared to the world annual average of 8.5 per cent). Operating expenses for the same period increased by 9.4 per cent per annum. As illustrated in Figure 6-10, positive operating results were achieved in 1985 to 1989, negative results incurred in 1990, 1992 and 1993, followed by a return to operating profits for the remainder of the period. For the first time since 1989, net profits were earned in 1995. Since then, profitability in the European airline industry has improved progressively with net profits estimated at 3.5 per cent for 1997 (compared to 0.9 per cent in 1996).

6.33 Annual changes in average scheduled passenger yields for airlines of the region (excluding operations of CIS) reveal marked fluctuations over the last decade, as shown in Figure 6-11. However, for the period 1986-1996, yields resulted in a 1.4 per cent decline as the annualized 10-year average, which comes very close to the world result of 1.5 per cent decline. By 1995, real yields had recovered from the sharp declines in 1992 and 1993 when the presence of excess capacity had heightened competitive pressures in airline markets. Stimulated by liberalization, competition is still on the rise and yield came under pressure



Notes.— 1997 figures are from estimated data.
— Real yield for scheduled airlines measured in U.S. cents per PKP deflated by U.S. Consumer Price Index.

Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 6-11. Annual change in real scheduled passenger yield — Europe and World

again in 1996 and 1997; the recent decline in yield is also in part due to the appreciation of the U.S. dollar against most of the European currencies (with the exception of the U.K. pound as described in Chapter 1).

Airline passenger traffic trends and forecast

6.34 Over the 1986-1996 period, scheduled passenger traffic (PKP) of the airlines of the European region increased at an average annual rate of 3.2 per cent (compared to the world annual average of 5.3 per cent) despite a generally impressive performance in western Europe (except in 1991). If airlines of the CIS are excluded, European traffic grew at 8.2 per cent per annum over the period. Reported CIS traffic volumes dropped dramatically, on average by 10.2 per cent each year over the last decade with PKPs in 1996 at only about one-third of those in 1986. A less severe decline of CIS traffic volume continued in 1996 and 1997, whereas European traffic excluding CIS grew at an estimated 8.8 per cent in 1997. The year-to-year comparison of passenger traffic growth of airlines in Europe, including and excluding the CIS, and the world is shown in Figure 6-12.

6.35 As shown in Table 5-6 and illustrated in Figure 6-12, scheduled passenger traffic for the region as a whole, is expected to grow annually at rates of 6.1 per cent, 6.4 per cent and 6.5 per cent for the years 1998, 1999 and 2000, respectively (compared to world airline growth of 5, 5.3 and 5.7 per cent). The airlines of western Europe are expected to continue steady growth over the forecast period as also illustrated in Figure 6-12, while levelling of traffic volumes for the CIS is expected by 1999.

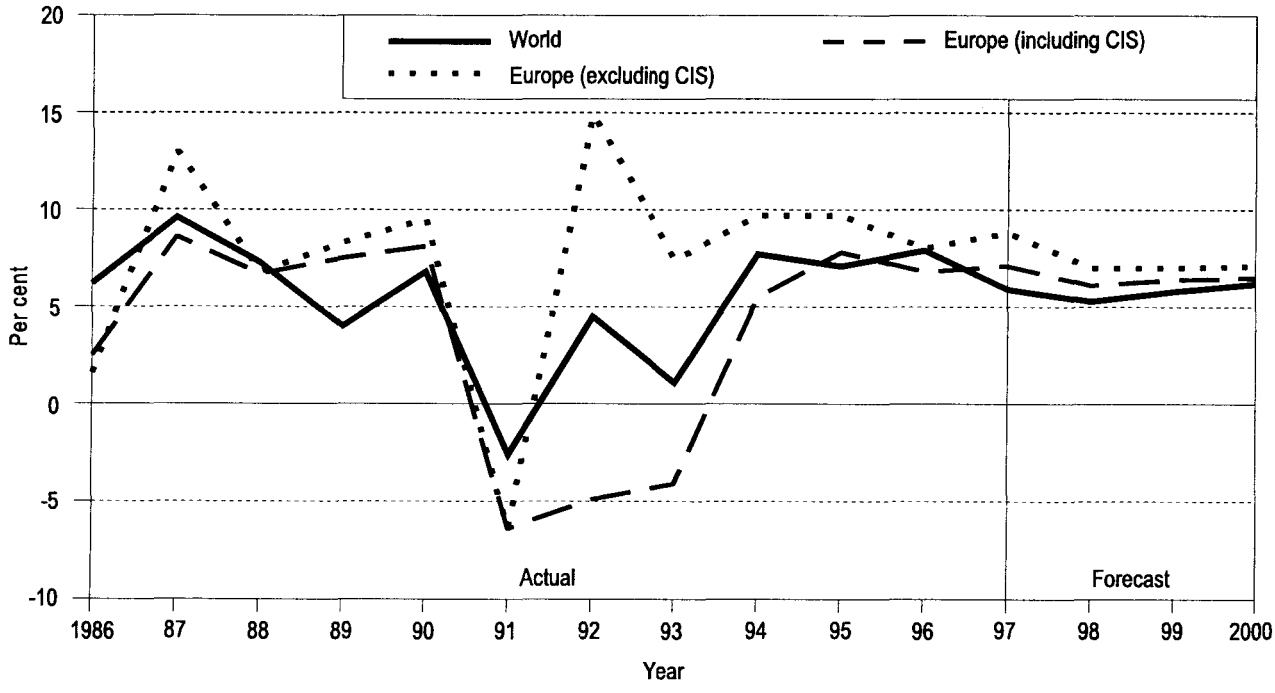


Figure 6-12. Scheduled passenger traffic growth (PKPs) — Europe and World

MIDDLE EAST

The Region in 1997

Table 6-4. Scheduled traffic — airlines of the Middle East

	INTERNATIONAL			TOTAL		
	1997	Increase over 1996 (%)	Share of world traffic (%)	1997	Increase over 1996 (%)	Share of world traffic (%)
Passengers carried (thousands)	21 220	3.0	4.8	37 600	3.0	2.6
Passenger-kilometres performed (millions)	63 160	3.3	4.3	74 950	3.9	2.9
Freight and mail tonne-kms performed (millions)	3 990	6.0	4.6	4 090	6.0	3.9

Source: ICAO Air Transport Reporting Form A-1.

Economic trends

6.36 The Middle East economy has been characterized by several pronounced cycles over the past decade, as illustrated in Figure 6-13 which presents the year-to-year changes in the region's GDP and GDP per capita. The oil-producing countries in the region suffered from declines in crude oil prices during the 1980s and from the effects of the Gulf War in 1990-1991. With a return to political and economic stability in the region, GDP growth recovered quite strongly in 1992. Continuous growth, though varying in strength, was sustained in the following four years. Over the 1986-1996 period, the aggregate GDP for the Middle East grew at an average annual rate of 2.9 per cent in real terms, while GDP per capita levelled off at 0.1 per cent per annum.

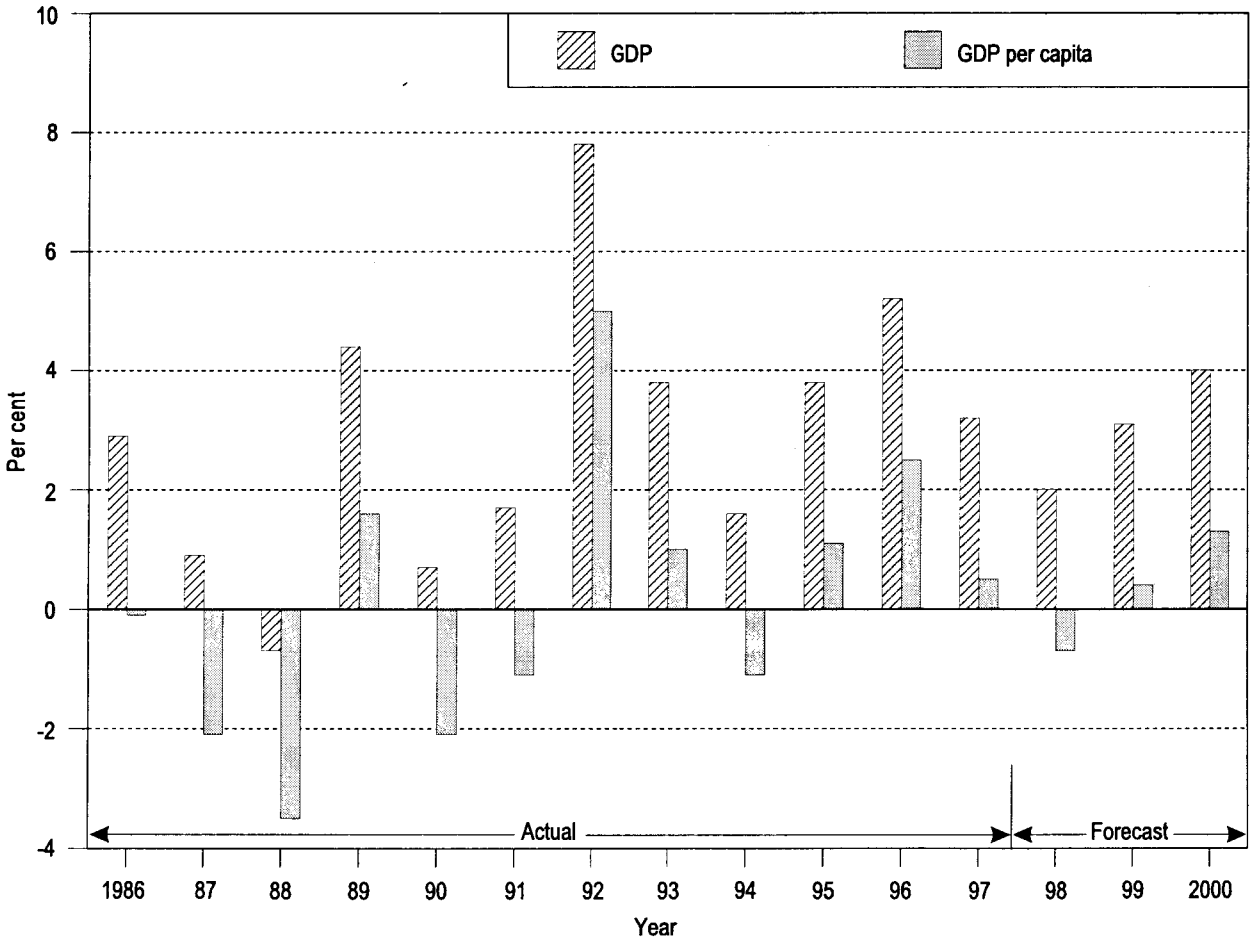
6.37 Prospects for this region are particularly dependent on oil market developments and fiscal consolidation policies. The recent weakening of commodity prices including oil has contributed to an estimated lower GDP growth at 3.2 per cent in 1997 compared to 5.2 per cent in 1996. An improvement in the economic outlook is expected towards the end of the century, with forecast GDP growth rate of 2 per cent, 3.1 per cent and 4 per cent for 1998, 1999 and 2000, respectively.

Airline financial trends

6.38 Over the 1986-1996 period, operating revenues of the scheduled airlines of the Middle East region increased at an average annual rate of 4.3 per cent (compared to the world annual average of 8.5 per cent). Operating expenses for the same period increased by 4.5 per

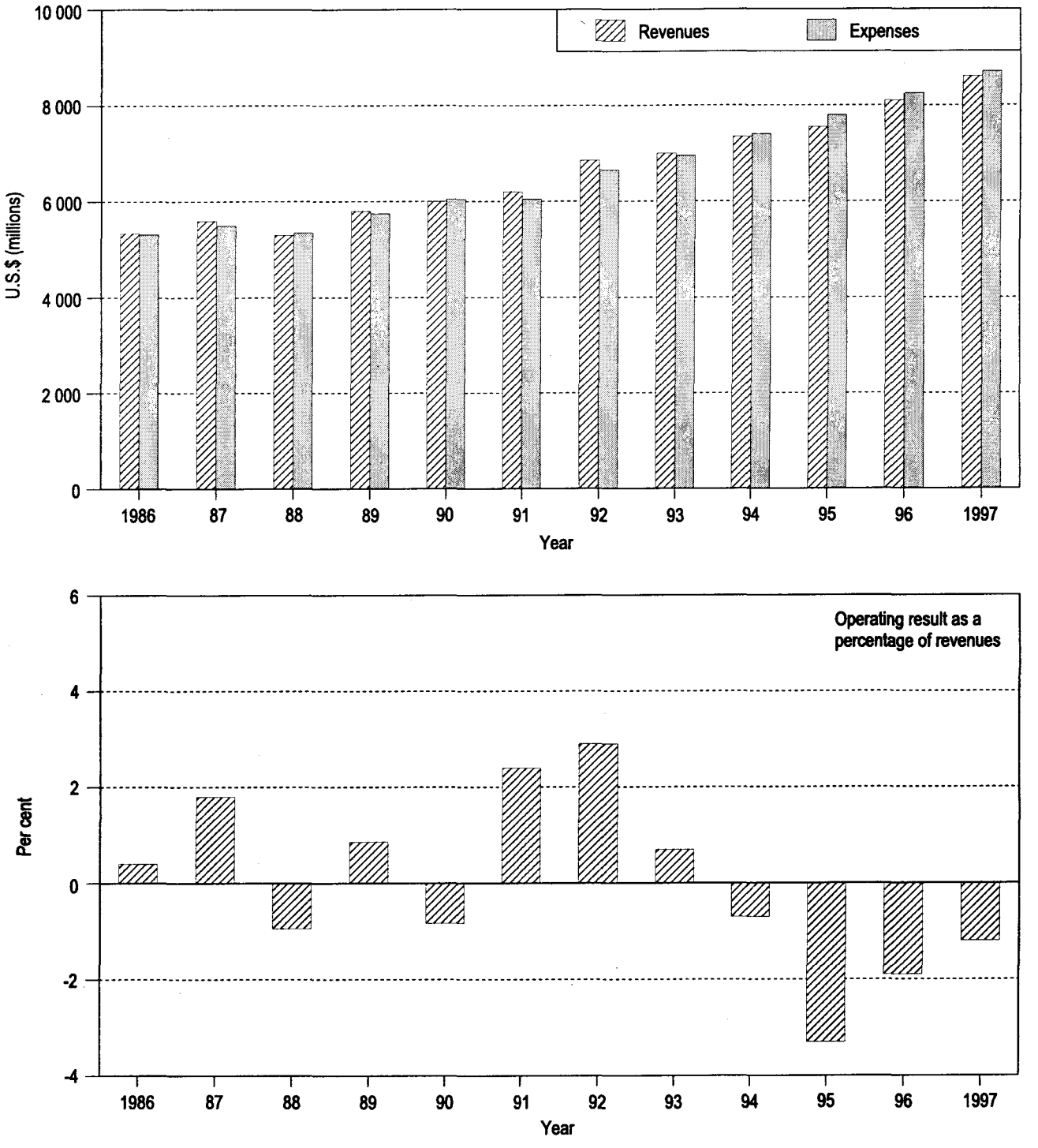
cent per annum. As shown in Figure 6-14, since 1995 the airlines in the region have experienced a string of operating losses. Traffic has grown continuously but capacity expansion has been even greater and unit costs remain comparatively high. Efforts to cut operational costs include inter-airline cooperation, for example, on the common handling of a number of airlines from the Middle East and North Africa at airports in Europe.

6.39 For the 1986-1996 period, average scheduled passenger yields for airlines of the region, measured in terms of U.S. cents per PKP, declined at an average annual rate of 4.2 per cent in real terms (compared to a 1.5 per cent decline for the world), with an exceptional increase in 1991. Real yield rose in 1997 but this time accompanied by increasing traffic volume and revenues. The year-to-year comparisons of the changes in real passenger yields of Middle East and world airlines are illustrated in Figure 6-15.



Source: IMF, WEFA Group.

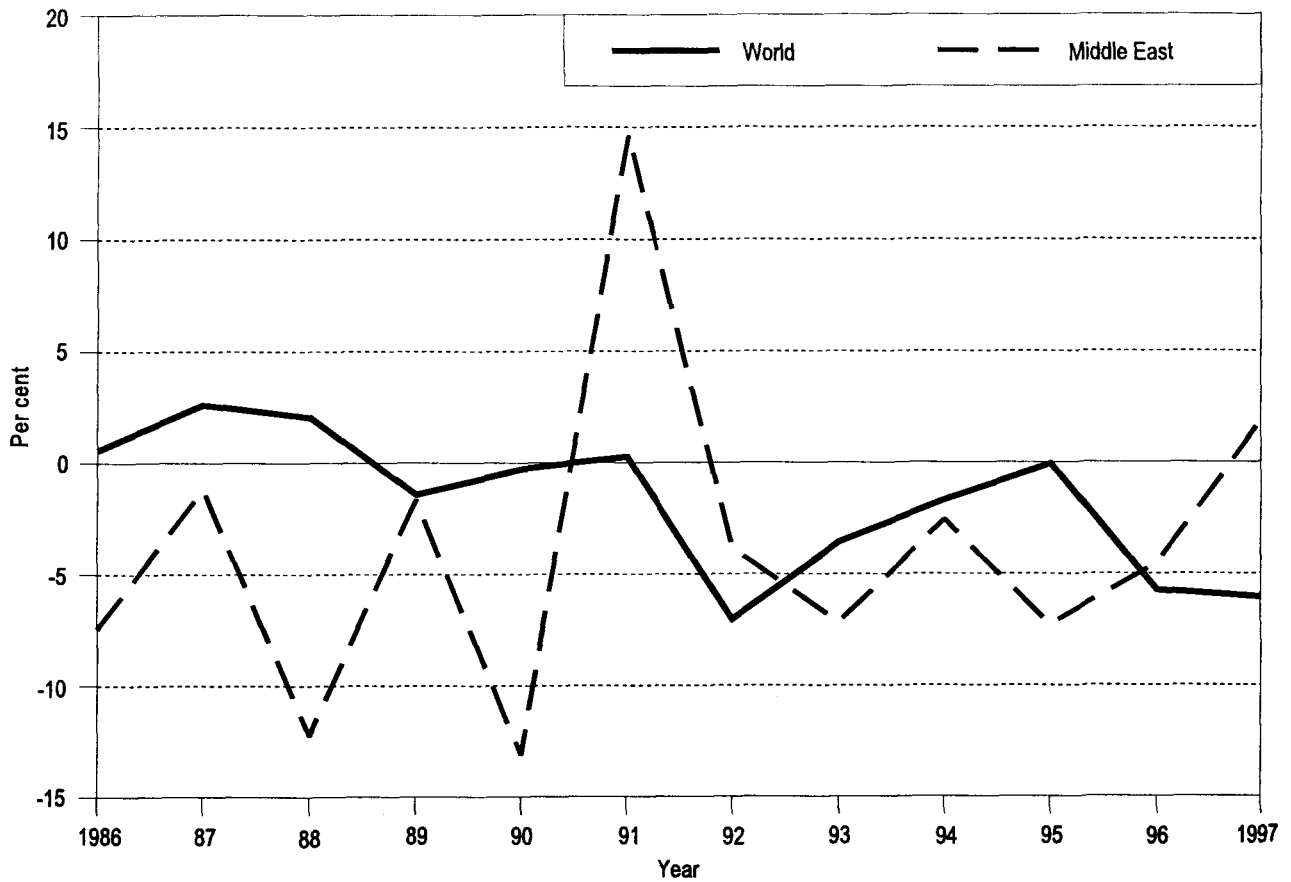
Figure 6-13. Annual change in real GDP and GDP per capita — Middle East



Note.— 1997 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-14. Scheduled airline operating revenues and expenses — Middle East



Notes.— 1997 figures are from estimated data.
— Real yield for scheduled airlines measured in U.S. cents per PKP deflated by U.S. Consumer Price Index.

Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 6-15. Annual change in real scheduled passenger yield — Middle East and World

Airline passenger traffic trends and forecast

6.40 Over the 1986-1996 period, scheduled passenger traffic (PKP) of the airlines of the Middle East region increased at an average annual rate of 5.3 per cent, similar to the world average. Traffic growth has been reasonably buoyant since the declines in 1990 and 1991 associated primarily with the Gulf War. The year-to-year traffic growth comparison between world and Middle East airlines is shown in Figure 6-16.

6.41 As shown in Table 5-6 and illustrated in Figure 6-16, scheduled passenger traffic for the airlines of the Middle East region is expected to grow by 4.2 per cent per annum in 1998, 5.5 per cent in 1999 and 5.7 per cent in 2000. This rate reflects an expected good economic performance in the region.

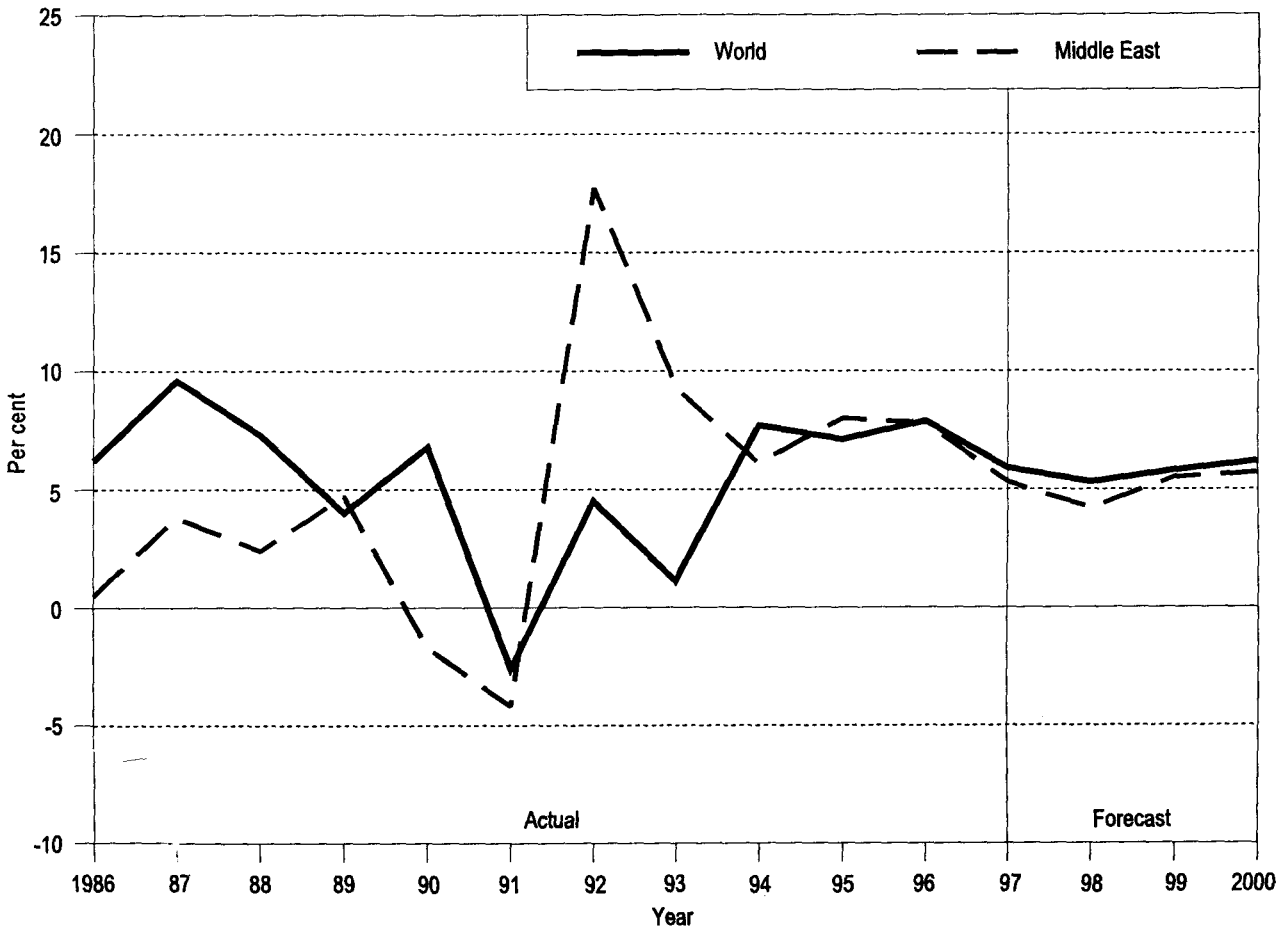


Figure 6-16. Scheduled passenger traffic growth (PKPs) — Middle East and World

NORTH AMERICA

The Region in 1997

Table 6-5. Scheduled traffic — airlines of North America

	INTERNATIONAL			TOTAL		
	1997	Increase over 1996 (%)	Share of world traffic (%)	1997	Increase over 1996 (%)	Share of world traffic (%)
Passengers carried (thousands)	69 520	4.0	15.8	611 860	3.5	42.3
Passenger kilometre Performed (millions)	302 660	5.6	20.5	1 019 140	5.2	39.6
Freight and mail tonne-km Performed (millions)	17 440	21.1	19.9	31 020	15.1	29.3

Source: ICAO Air Transport Reporting Form A-1.

6.42 In 1997, the United States DOT produced a study of the Canada/United States open transborder air services agreement showing that total passenger traffic between the two countries grew by 37.2 per cent in the three years since the agreement had been in effect, in comparison to a growth rate of 4 per cent in the three years prior to the agreement. In terms of non-stop markets with annual traffic of over 50 000 passengers, there was an increase of 42.6 per cent in 1997 (77) over the number in 1994 (54). The phase-in provisions that limited transborder air service to/from certain Canadian cities ended for Vancouver and Montreal in 1997 and will end for Toronto in 1998.

6.43 En-route air navigation fees for aircraft overflying but not landing in the United States, established by the U.S. Federal Aviation Administration in 1997, were struck down by a U.S. Court because the methodology used to calculate them did not conform to the statutory requirement, which states that the fees be based on the direct total cost of providing the service. Fees collected were refunded to the airlines concerned.

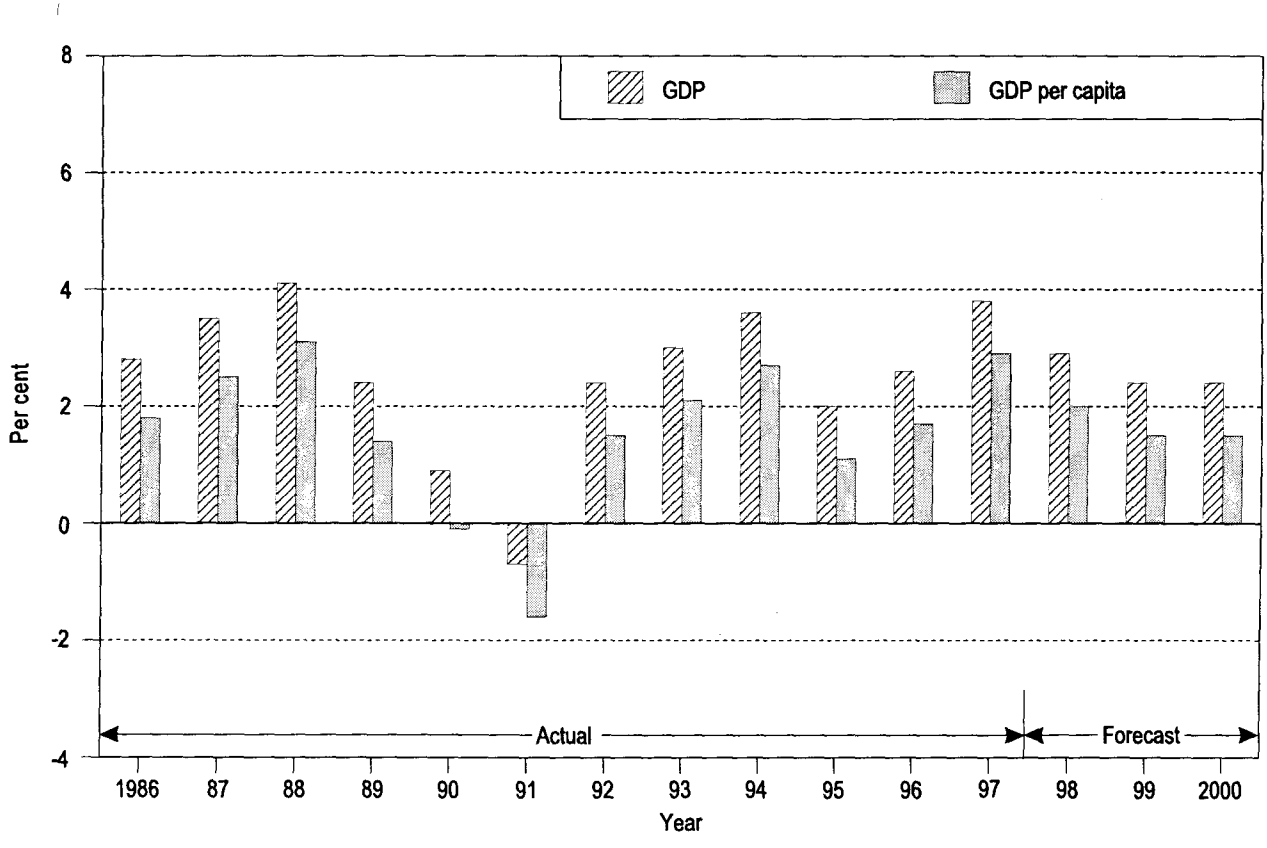
Economic trends

6.44 Over the 1986-1996 period, the aggregate North American economy (GDP) grew at an average annual rate of 2.4 per cent in real terms, and GDP per capita increased at 1.4 per cent per annum. The North American economy continued to expand at an above average pace during 1997, reaching a real growth of 3.8 per cent. The year-to-year changes in the region's GDP and GDP per capita are illustrated in Figure 6-17.

6.45 The current expansion in the United States economy, now well into its seventh year, is one of the longest in post-war history. Growth prospects in the region are solid but some indications point to a mild slowdown; while private consumption is expected to remain strong, business investment shows some degree of saturation. The export position of the United States is expected to weaken due to the current strength of the U.S. dollar and reduced import potential in both Asia/Pacific and Latin America and the Caribbean. GDP is expected to grow at 2.9 per cent, 2.4 per cent and 2.4 per cent in 1998, 1999 and 2000, respectively.

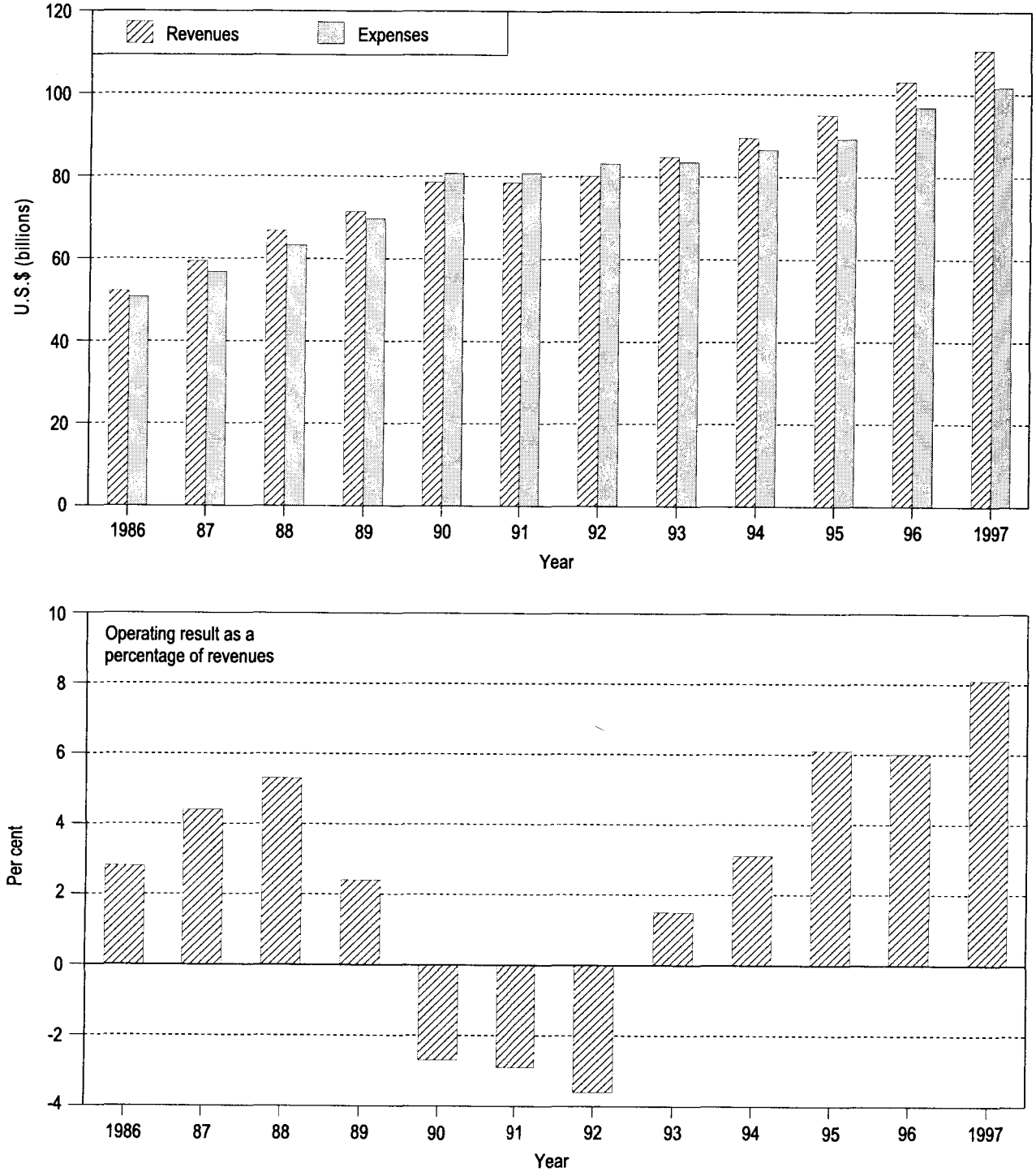
Airline financial trends

6.46 Over the 1986-1996 period, operating revenues of the scheduled airlines of the North American region increased at an average annual rate of 7.1 per cent (compared to the world annual average of 8.5 per cent). Operating expenses for the same period increased by 6.7 per cent per annum. The string of operating surpluses in the 1986 to 1989 period gave way to a 3-year period of serious deficits. Starting in1993, operating surpluses have increasingly



Source: IMF, WEFA Group.

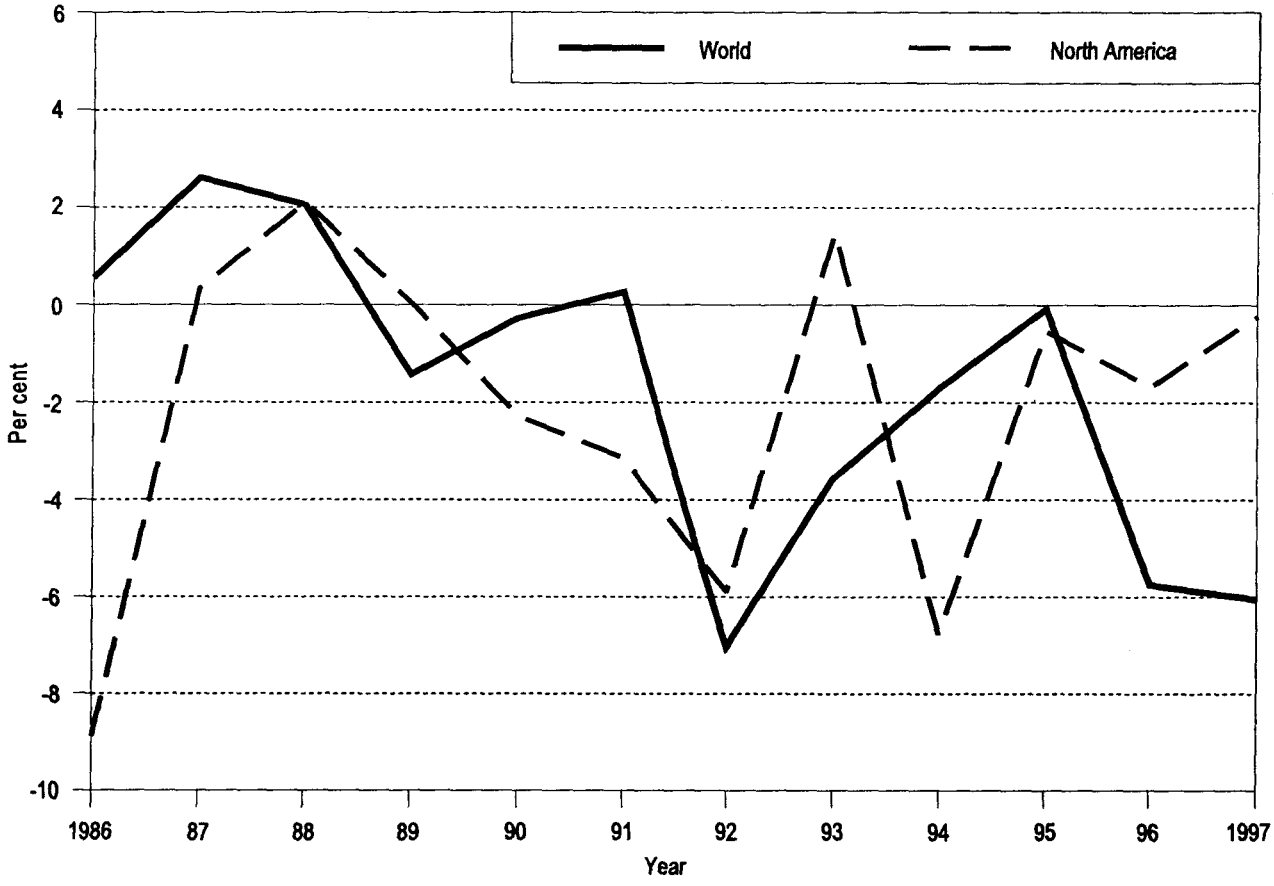
Figure 6-17. Annual change in real GDP and GDP per capita — North America



Note.— 1997 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-18. Scheduled airline operating revenues and expenses — North America



Notes.— 1997 figures are from estimated data.
— Real yield for scheduled airlines measured in U.S. cents per PKP deflated by U.S. Consumer Price Index.

Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 6-19. Annual change in real scheduled passenger yield — North America and World

recovered and widened for five consecutive years as illustrated in Figure 6-18. In 1997, a combination of favourable external factors and successful airline management resulted in an estimated average net result for total scheduled traffic around 5 per cent.

6.47 For the 1986-1996 period, average scheduled passenger yields for airlines of the region, measured in terms of U.S. cents per PKP, declined at an average annual rate of 1.7 per cent in real terms (compared to a 1.5 per cent decline for the world). It is estimated that in 1997, industry-wide real yield improved over the previous year and also compared to the world situation. The revenue environment was strengthened from profitable international traffic and strong underlying domestic demand despite higher basic fares and taxation, as well as tightly controlled unit costs helped by low fuel prices and cautious capacity increases. The year-to-year comparisons of the changes in the real passenger yields of North American and world airlines are illustrated in Figure 6-19.

Airline passenger traffic trends and forecast

6.48 Over the 1986-1996 period, scheduled passenger traffic (PKP) of the airlines of the North American region increased at an average annual rate of 4.5 per cent (compared to the world average of 5.3 per cent). After experiencing a high traffic growth of 7.5 per cent in 1996, growth is estimated to have slowed down to 4.3 per cent in 1997. The year-to-year traffic growth comparison between world and North American airlines is shown in Figure 6-20.

6.49 As shown in Table 5-6 and illustrated in Figure 6-20, scheduled passenger traffic for the airlines of the North American region is expected to grow by 4.5 per cent in 1998, 4.2 per cent in 1999, and 4.4 per cent in 2000. Although these forecast rates are below the expected growth pattern for the world as a whole (5.0, 5.3 and 5.7 per cent for the same three years), they represent an impressive growth potential considering the traffic volume of the region.

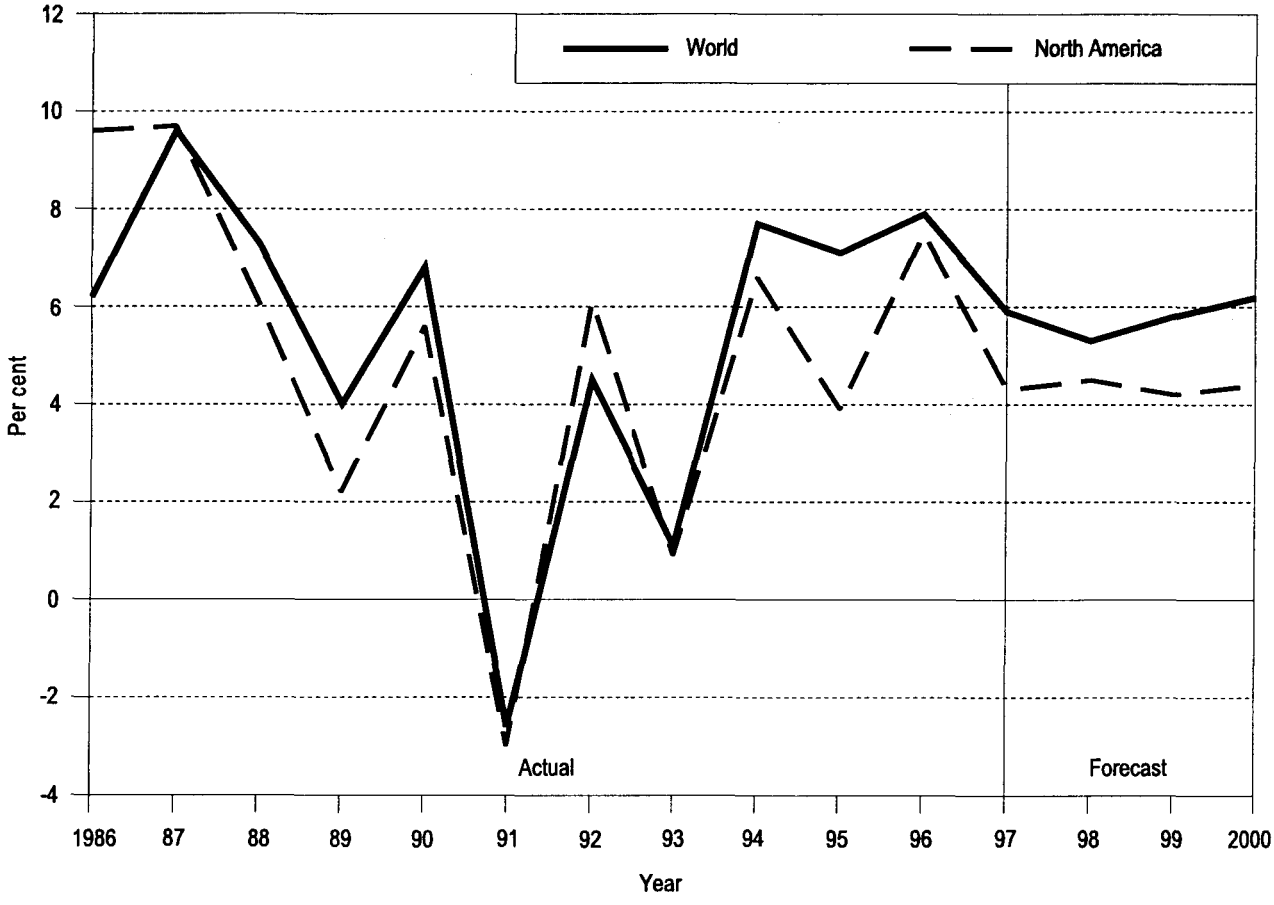


Figure 6-20. Scheduled passenger traffic growth (PKPs) — North America and World

LATIN AMERICA AND THE CARIBBEAN

The Region in 1997

Table 6-6. Scheduled traffic — airlines of Latin America and the Caribbean

	INTERNATIONAL			TOTAL		
	1997	Increase over 1996 (%)	Share of world traffic (%)	1997	Increase over 1996 (%)	Share of world traffic (%)
Passengers carried (thousands)	30 020	14.3	6.8	87 520	10.1	6.0
Passenger-kilometres performed (millions)	85 300	15.2	5.8	127 820	11.6	5.0
Freight and mail tonne-kms performed (millions)	3 370	11.4	3.8	4 080	9.0	3.9

Source: ICAO Air Transport Reporting Form A-1.

Economic trends

6.50 Over the 1986-1996 period, the aggregate Latin American and the Caribbean economy (GDP) grew at an average annual rate of 2.2 per cent in real terms, whereas GDP per capita grew at 0.3 per cent. The economy in this region was severely affected by recession in the late 1980s but a robust recovery started in 1991. The year-to-year changes in the region's GDP and GDP per capita are illustrated in Figure 6-21.

6.51 In 1997, the region experienced a record year when GDP growth was estimated to have averaged 5.2 per cent. Real GDP growth was especially strong in Argentina (8.4 per cent), Peru (7.5 per cent), Mexico (7 per cent), and in Chile (6.6 per cent). Prudent fiscal policies and declining inflation spurred the rise of investment including unprecedented foreign capital inflows to the region. However, the current account deficit of the region has widened considerably.

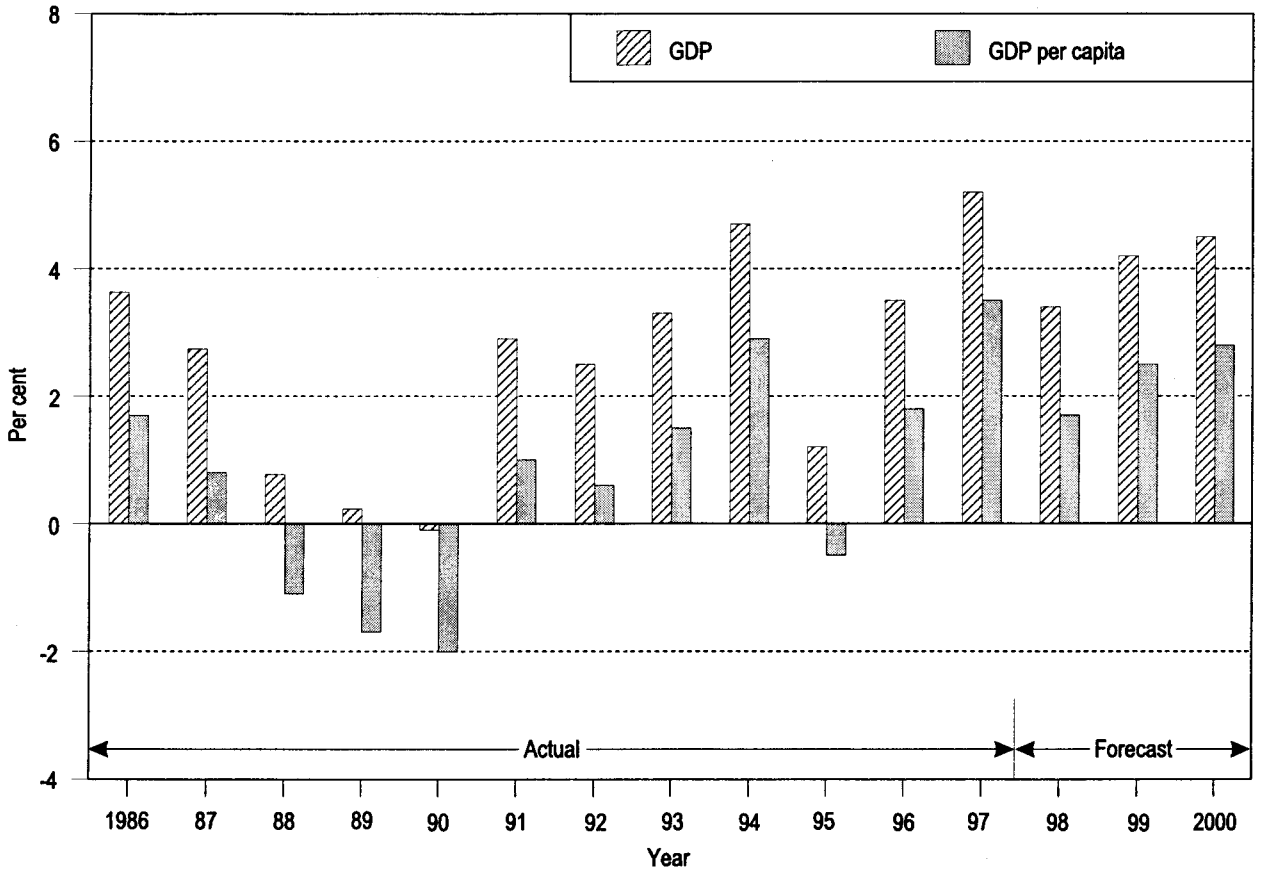
6.52 The economic outlook is encouraging, though a marked deceleration of growth is anticipated in the faster growing economies. GDP for the region is forecast to grow at 3.4 per cent, 4.2 per cent and 4.5 per cent in 1998, 1999 and 2000, respectively.

Airline financial trends

6.53 Over the 1986-1996 period, operating revenues of the scheduled airlines of the Latin American and the Caribbean region increased at an average annual rate of 8.8 per cent

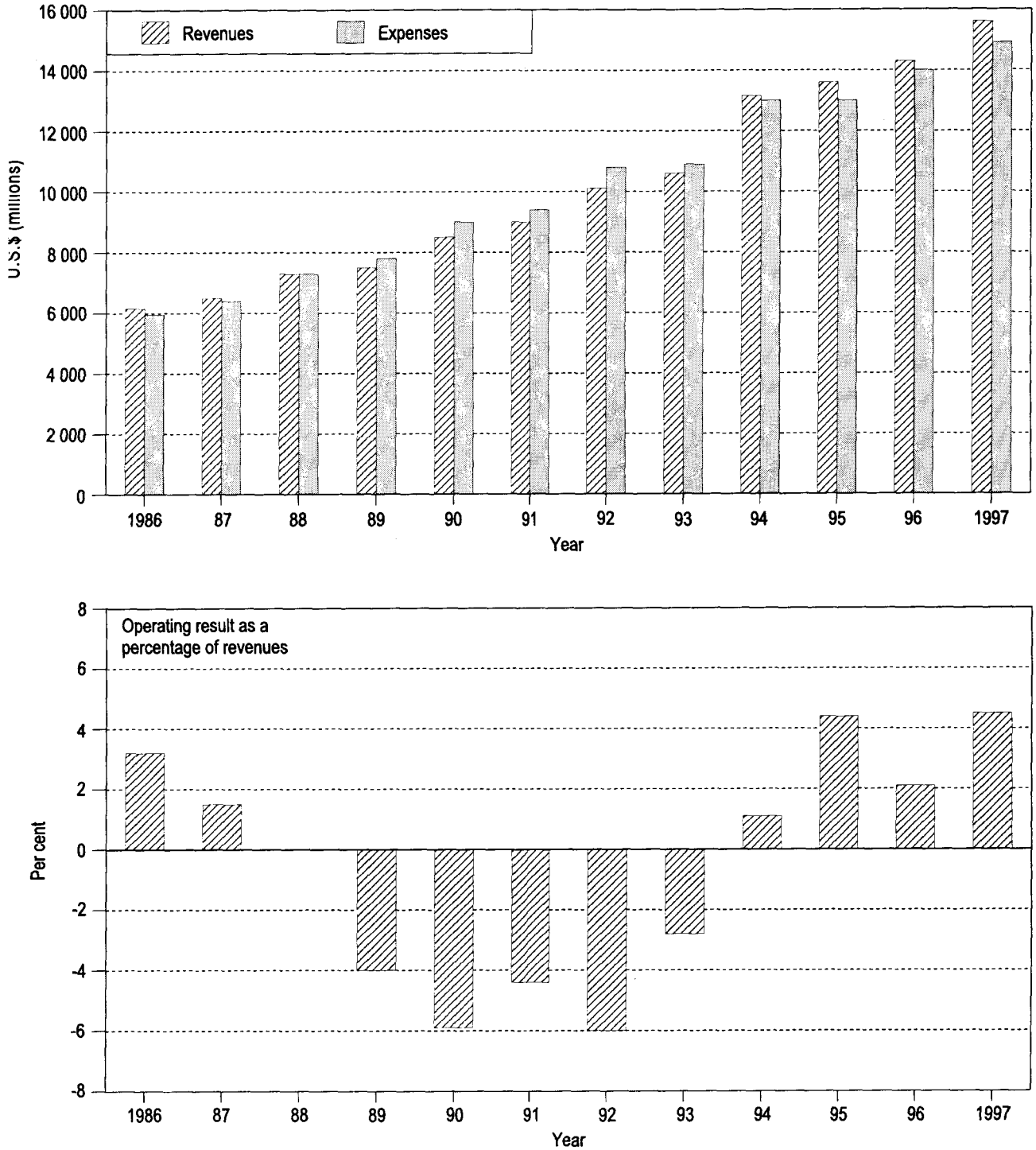
(compared to the world annual average of 8.5 per cent). Operating expenses for the same period increased by 8.9 per cent per annum. The overall financial performance of the airlines of the region has been poor over the whole period with five consecutive years (1989 to 1993) of serious operating losses, as illustrated in Figure 6-22. A concerted effort of drastic cost-cutting, airline industry restructuring and demand recovery led to a significant turnaround and brought positive operating results for four consecutive years. Many airlines had returned to profitability by 1995 and were reporting healthy net results in 1996 and 1997.

6.54 Average scheduled passenger yields for airlines of the region, measured in terms of U.S. cents per PKP and expressed in constant price terms, fluctuated substantially between 1986 and 1996. No significant trend, either up or down, occurred over the whole period. The year-to-year comparisons of the changes in real passenger yield of Latin American and the Caribbean and world airlines are illustrated in Figure 6-23.



Source: IMF, WEFA Group.

Figure 6-21. Annual change in real GDP and GDP per capita — Latin America and the Caribbean



Note.— 1997 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-22. Scheduled airline operating revenues and expenses — Latin America and the Caribbean

Notes.— 1997 figures are from estimated data.
— Real yield for scheduled airlines measured in U.S. cents per PKP deflated by U.S. Consumer Price Index.

Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 6-23. Annual change in real scheduled passenger yield — Latin America and the Caribbean and World

Airline passenger traffic trends and forecast

6.55 Over the 1986-1996 period, the scheduled passenger traffic (passenger-kilometres performed) of airlines of the Latin American and the Caribbean region increased at an average annual rate of 4.3 per cent (compared to the world average growth rate of 5.3 per cent). In recent years, flag carrier privatization, intra-regional mergers and alliances along with extensive fleet and route rationalization were among the measures that enabled airlines of the region to capture a larger share of the United States-Latin America and the Caribbean traffic, one of the world's fastest growing aviation markets. Strong intra-regional demand also contributed to the region's passenger traffic growth of 11.6 per cent in 1997 (estimated), the fastest expansion worldwide. The year-to-year traffic growth comparison between world and Latin American and the Caribbean airlines is shown in Figure 6-24.

6.56 In response to further liberalization of trade and air services and expectations regarding economic performance, traffic growth is expected to remain strong. As shown in Table 5-6 and illustrated in Figure 6-24 scheduled passenger traffic of the airlines of the Latin America and the Caribbean region is expected to grow by 6.5 per cent, 7.5 per cent and 8 per cent in 1998, 1999 and 2000, respectively, which is exceeding the expected growth trend for the world (5.0, 5.3 and 5.7 per cent).

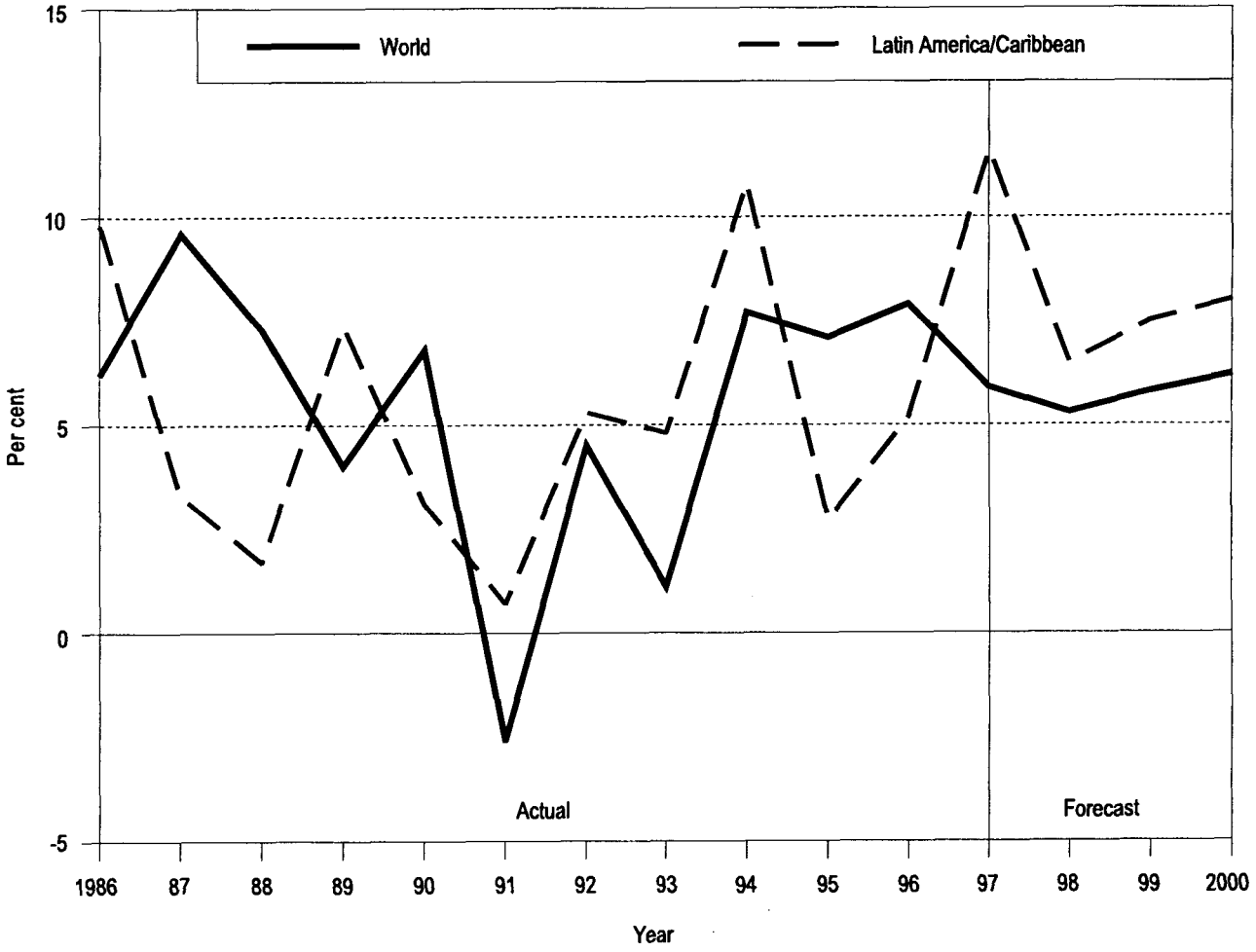


Figure 6-24. Scheduled passenger traffic growth (PKPs) — Latin America and the Caribbean and World

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APPENDICES

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Appendix 1
Statistical Tables

Table A1-1. Regional distribution of scheduled traffic — 1997

By ICAO statistical region of airline registration	Aircraft kilometres (millions)	Aircraft departures (thousands)	Passengers carried (thousands)	Passenger-kilometres performed (millions)	Passenger load factor (%)	Tonne-kilometres performed		Tonne-kilometres available (millions)	Weight load factor (%)
						Freight (millions)	Total (millions)		
Total (international and domestic) services of airlines of ICAO Contracting States									
Europe	5 390	5 176	347 525	646 899	70	27 432	90 301	136 059	66
Percentage of world traffic	25.1	27.1	24.0	25.2		27.5	26.5	24.5	
Africa	506	464	29 640	56 782	62	1 744	6 801	13 790	49
Percentage of world traffic	2.4	2.4	2.0	2.2		1.7	2.0	2.5	
Middle East	495	381	37 600	74 945	68	4 024	10 969	18 136	60
Percentage of world traffic	2.3	2.0	2.6	2.9		4.0	3.2	3.3	
Asia and Pacific	4 205	3 181	333 872	644 919	69	35 417	93 910	148 544	63
Percentage of world traffic	19.5	16.6	23.1	25.1		35.5	27.5	26.8	
North America	9 444	8 223	611 862	1 019 137	71	27 266	123 489	209 619	59
Percentage of world traffic	43.9	43.0	42.3	39.6		27.3	36.2	37.8	
Latin America and the Caribbean	1 474	1 684	87 522	127 818	61	3 947	15 669	28 725	55
Percentage of world traffic	6.9	8.8	6.0	5.0		4.0	4.6	5.2	
Total	21 514	19 109	1 448 021	2 570 500	69	99 830	341 139	554 873	61
International services of airlines of ICAO Contracting States									
Europe	4 043	2 771	201 871	535 280	72	26 700	79 181	116 736	68
Percentage of world traffic	40.6	55.6	46.0	36.2		31.4	35.1	33.2	
Africa	399	203	15 668	47 369	62	1 658	5 876	11 987	49
Percentage of world traffic	4.0	4.1	3.6	3.2		1.9	2.6	3.4	
Middle East	392	201	21 223	63 156	67	3 927	9 811	16 237	60
Percentage of world traffic	3.9	4.0	4.8	4.3		4.6	4.3	4.6	
Asia and Pacific	2 362	651	101 010	443 775	69	32 837	74 740	112 222	67
Percentage of world traffic	23.7	13.1	23.0	30.0		38.6	33.1	31.9	
North America	1 951	672	69 521	302 660	74	16 608	44 899	73 586	61
Percentage of world traffic	19.6	13.5	15.8	20.5		19.5	19.9	20.9	
Latin America and the Caribbean	806	485	30 022	85 300	64	3 310	11 343	20 872	54
Percentage of world traffic	8.1	9.7	6.8	5.8		3.9	5.0	5.9	
Total	9 953	4 983	439 315	1 477 540	70	85 040	225 850	351 640	64

Source: ICAO Air Transport Reporting Form A-1.

Table A1-2. Number of turbo-jet and turboprop aircraft delivered, ordered and remaining to be delivered up to 31 December 1997[1]

(excludes military and government-operated aircraft)

Type of aircraft	Before 1997	Delivered during 1997	Total as of 31/12/97	Ordered during 1997[2]	Remaining to be delivered as of 31/12/97[3]
TURBO-JETS					
Airbus Industrie A-300	459	6	465	3	20
Airbus Industrie A-310	249	2	251	0	7
Airbus Industrie A-319	18	47	65	232	305
Airbus Industrie A-320	553	58	611	94	296
Airbus Industrie A-321	54	22	76	21	140
Airbus Industrie A-330	50	14	64	63	162
Airbus Industrie A-340	90	32	122	23	76
Boeing 717					50
Boeing 737	2 806	134	2 940	318	907
Boeing 747	1 082	39	1 121	37	159
Boeing 757	735	45	780	45	129
Boeing 767	638	42	680	98	141
Boeing 777	45	59	104	50	259
British Aerospace - 146/RJ 85/100	288	22	310	31	41
Canadair Regional Jet	143	61	204	156	146
Embraer EMB -145	2	32	34	121	132
Fokker 70	40	5	45	0	0
McDonnell-Douglas MD-80/90	1 178	42	1 220	6	78
McDonnell-Douglas MD-11	160	12	172	11	14
Total of aircraft in production	8 590	674	9 264	1 309	3 062
Total of aircraft not in production[4]	6 241		6 241		
Total turbo-jets	12 204	674	12 204	1 309	3 062
TURBOPROPS					
Aerospatiale/Aeritalia ATR-42/72	486	36	522	54	39
British Aerospace ATP	55	2	57	2	
British Aerospace Jet Stream 41	92	5	97	3	2
DeHavilland Canada DHC-8	447	34	481	22	65
Dornier DO-328	72	5	77	11	27
Embraer EMB-120 Brasilia	317	12	329	5	
Fokker 50	203	3	206		
SAAB SF-340	399	22	421	21	26
SAAB 2000	36	10	46	10	12
Total of aircraft in production	2 107	129	2 236	128	171
Total of aircraft not in production[4]	2 560		2 560		
Total turboprops	4 667	129	4 796	128	171

1. The numbers given are estimated on the basis of information supplied by aircraft manufacturers. In many instances, numbers for the past years have been revised; owing to lack of information, the aircraft manufactured in the CIS are not included in this table.
2. The numbers do not include options by commercial operators for transport aircraft.
3. The numbers in this column take into account cancellations during the year.
4. These figures are the cumulative totals of deliveries for aircraft types no longer in production after 1996.

Table A1-3. Aircraft accidents involving passenger fatalities on scheduled air services, 1978-1997

Year	Aircraft accidents	Passengers killed	Passenger fatalities per 100 million passenger-km	Passenger fatalities per 100 million passenger-miles	Fatal accidents per 100 million km flown	Fatal accidents per 100 million miles flown	Fatal accidents per 100 000 aircraft hours	Fatal accidents per 100 000 aircraft landings
Excluding the USSR up to 1992 and the Commonwealth of Independent States thereafter.								
1978	25	754	0.09	0.15	0.29	0.47	0.18	0.24
1979	31	877	0.10	0.16	0.34	0.55	0.21	0.29
1980	22	814	0.09	0.14	0.24	0.38	0.15	0.21
1981	21	362	0.04	0.06	0.23	0.37	0.14	0.20
1982	26	764	0.08	0.13	0.28	0.46	0.18	0.25
1983	20 [1]	809	0.08	0.13	0.21	0.34	0.13	0.18
1984	16	223	0.02	0.03	0.16	0.26	0.10	0.14
1985	22	1 066	0.09	0.15	0.21	0.34	0.13	0.19
1986	17	331	0.03	0.04	0.15	0.24	0.09	0.14
1987	24	890	0.06	0.10	0.20	0.32	0.12	0.18
1988	25	699	0.05	0.08	0.19	0.31	0.12	0.18
1989	27	817	0.05	0.08	0.20	0.32	0.12	0.19
1990	22	440	0.03	0.04	0.15	0.25	0.09	0.15
1991	25 [2]	510	0.03	0.05	0.18	0.28	0.11	0.18
1992	25	990	0.06	0.09	0.16	0.26	0.10	0.17
1993	31	801	0.04	0.07	0.19	0.31	0.12	0.21
1994	24	732	0.04	0.06	0.14	0.22	0.09	0.15
1995	22	557	0.03	0.04	0.12	0.19	0.08	0.13
1996	22	1132	0.05	0.08	0.11	0.18	0.07	0.12
1997	25	854	0.03	0.05	0.12	0.19	0.07	0.13
Including the USSR up to 1992 and the Commonwealth of Independent States thereafter.								
1986	22	546	0.04	0.06	na	na	na	na
1987	26	901	0.06	0.09	na	na	na	na
1988	28	729	0.04	0.07	na	na	na	na
1989	27	817	0.05	0.07	na	na	na	na
1990	25	495	0.03	0.04	na	na	na	na
1991	30	653	0.04	0.06	na	na	na	na
1992	29	1097	0.06	0.09	na	na	na	na
1993	34	936	0.05	0.08	0.20	0.32	0.12	0.22
1994	28	941	0.04	0.07	0.15	0.25	0.10	0.16
1995	26	710	0.03	0.05	0.13	0.21	0.08	0.15
1996	23	1135	0.05	0.08	0.11	0.18	0.07	0.13
1997	26	916	0.04	0.06	0.12	0.19	0.07	0.14

1. Includes one collision on the ground shown here as one accident.
2. Includes one collision on the ground shown here as two accidents.

na not available

Source: ICAO Air Transport Reporting Form G and other reports.

Table A1-4. Aviation security

Year	Number of acts of unlawful interference	Number of acts of unlawful seizure		Number of acts of sabotage	Other acts *	Number of persons injured or killed during acts of unlawful interference	
		Attempted seizures	Actual seizures			Injured	Killed
1978	37	13	13	11	—	22	59
1979	37	10	16	11	—	194	64
1980	54	17	29	8	—	39	72
1981	53	14	24	15	—	39	8
1982	36	11	19	6	—	119	14
1983	45	17	21	7	—	70	15
1984	41	7	21	13	—	249	68
1985	40	7	20	13	—	243	473
1986	14	6	5	3	—	235	112
1987	13	6	4	3	—	121	166
1988	12	3	7	2	—	21	300
1989	14	4	8	2	—	38	278
1990	36	12	20	1	3	145	137
1991	15	5	7	0	3	2	0
1992	10	2	6	0	2	123	10
1993	30	4	21	0	5	2	28
1994	37	5	20	2	10	53	36
1995	14	2	9	0	3	3	0
1996	14	2	10	0	2	53	126
1997	5	0	4	0	1	0	1

*Includes missile and facility attacks.

Appendix 2
Methodology for Traffic Forecasts

1. Short- or medium-term air transport forecasting methods depend heavily on careful analysis of recent trends in the aviation industry and of the operating environment as well as economic and demographic factors affecting air travel and the cost of air travel itself.

2. As a basis for the development of traffic forecasts, econometric analyses were carried out, which established a relationship between passenger traffic demand, GDP, GDP/capita and airline yields. Several econometric models were developed at global and regional levels. While at a global level these models appear to provide reasonably robust results, they have been less adequate at the regional level.

3. Based on forecasts of economic developments and expectations of yield, traffic forecasts for the years 1998, 1999 and 2000 were estimated using the econometric models. The forecast traffic growth rates were then reviewed in the light of recent trends in the airline operating environment and prospective changes in other factors which could not be accommodated in the econometric analyses.

4. The basic model form used for the global analysis is described below:

where:

$$y = a \cdot x_1^{b_1} \cdot x_2^{b_2}$$

y = passenger-kilometres performed (PKP)

x_1 = gross domestic product in real terms (GDP)

x_2 = passenger revenue per passenger-kilometre in real terms (PYIELD)

5. The a, b_1 and b_2 are constant coefficients whose values were obtained by statistical estimation procedures using econometric analysis; b_1 and b_2 are equal to the elasticities of demand with respect to corresponding x_1 (GDP) and x_2 (PYIELD), i.e. elasticities of income and price.

6. Using logarithmics, the above relationship was transformed into the equivalent linear relationship $ln\ y = a + b_1 lnx_1 + b_2 lnx_2$. Annual data covering a period of 38 years were used in the subsequent econometric (least squares regression) analysis, with the following results at the global level.

$$ln\ \text{PKP} = 0.69 + 2.15\ ln\ \text{GDP} - 0.57\ ln\ \text{PYIELD} \qquad R^2 = 0.999$$
$$(32.9) \qquad (-7.7) \qquad \text{S.E.} = .024$$

R = coefficient of correlation
S.E. = standard error of the estimate
( ) = "t" values of the corresponding coefficient estimates

— END —

ICAO PUBLICATIONS
IN THE AIR TRANSPORT FIELD

The following summary gives the status and also describes in general terms the contents of the various series of publications in the air transport field issued by the International Civil Aviation Organization:

International Standards and Recommended Practices on Facilitation *(designated as Annex 9 to the Convention)* which are adopted by the Council in accordance with Articles 37, 54 and 90 of the Convention on International Civil Aviation. The uniform observance of the specifications contained in the International Standards on Facilitation is recognized as practicable and as necessary to facilitate and improve some aspect of international air navigation, while the observance of any specification contained in the Recommended Practices is recognized as generally practicable and as highly desirable to facilitate and improve some aspect of international air navigation. Any differences between the national regulations and practices of a State and those established by an International Standard must be notified to the Council in accordance with Article 38 of the Convention. The Council has also invited Contracting States to notify differences from the provisions of the Recommended Practices;

Council Statements on policy relating to air transport questions, such as charges for airports and air navigation services, taxation and aims in the field of facilitation;

Digests of Statistics which are issued on a regular basis, presenting the statistical information received from Contracting States on their civil aviation activities;

Circulars providing specialized information of interest to Contracting States. They include studies on trends in the air transport industry at a global and regional level and specialized studies of a worldwide nature;

Manuals providing information or guidance to Contracting States on such questions as airport and air navigation facility tariffs, air traffic forecasting techniques and air transport statistics.

Also of interest to Contracting States are reports of meetings in the air transport field, such as sessions of the Facilitation Division and the Statistics Division and conferences on the economics of airports and air navigation facilities. Supplements to these reports are issued, indicating the action taken by the Council on the meeting recommendations, many of which are addressed to Contracting States.

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