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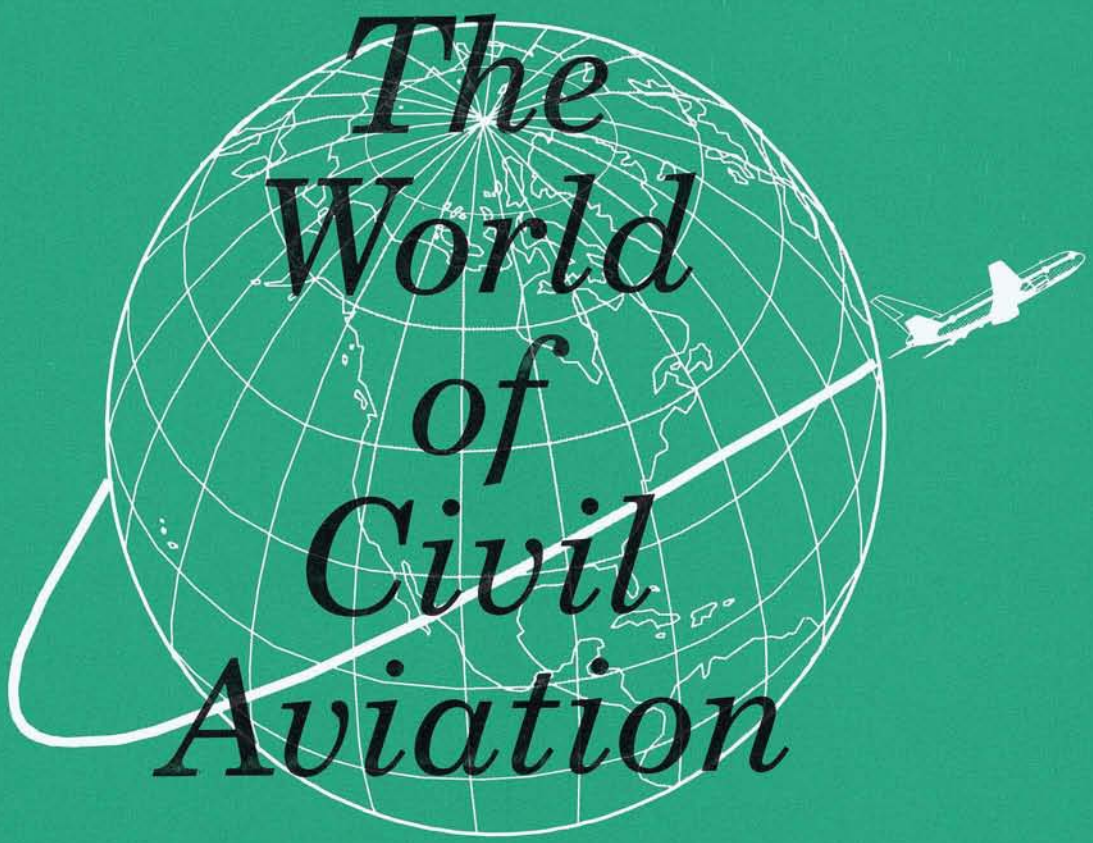

The World of Civil Aviation

1998-2001

Approved by the Secretary General and published under his authority

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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HIGHLIGHTS

DURING 1998 ...

Growth in the world economy slowed...

The world's Gross Domestic Product (GDP) grew by an estimated 1.8 per cent in real terms. On a regional basis the change in GDP ranged from an estimated increase of some 3.6 per cent for Africa to about 0.8 per cent for Asia/Pacific (Chapter 1).

...as did airline traffic...

Overall scheduled passenger/freight/mail tonne-kilometres performed were up by just over 1 per cent and international tonne-kilometres by almost 2 per cent. There were significant differences in the traffic growth between regions, ranging from increases in total traffic of over 7 per cent for carriers based in Latin America and the Caribbean to a decline of almost 4 per cent for those in Africa in terms of passenger-kilometres performed (Chapter 2).

but airline operating profits held up...

Preliminary estimates indicate that the world's scheduled airlines as a whole experienced an operating profit — 5.5 per cent of operating revenues compared with 5.6 per cent in 1997 — for the sixth year in succession (Chapter 2).

...and aircraft orders rose...

The number of turbo-jet aircraft ordered was 1 463 compared to 1 309 in 1997. The financial commitment for orders placed for these aircraft is estimated to be about U.S.$84 billion, compared with U.S.$78 billion estimated for 1997 (Chapter 2).

Liberalization was fostered through bilateral agreements...

While the number of bilateral agreements and memoranda of understanding concluded between States was markedly down (76 compared with 98 in 1997), a significant number of them contained liberalization measures (Chapter 2).

Regional differences in traffic growth will continue...

The passenger traffic of airlines registered in the Asia/Pacific region is expected to show the highest annual average growth rate, while the passenger traffic of airlines in Europe and Latin America and the Caribbean is also expected to grow at a rate above the world average. Traffic of airlines in Africa and the Middle East is forecast to grow at moderate rates, close to the expected world growth rates, 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).

Foreword

Introduction

1. This circular, *The World of Civil Aviation — 1998-2001,* is the seventh in an annual series of publications covering recent and future developments in civil aviation; the developments for the previous period 1997-2000 were published in Circular 273. In the present circular, Part I reviews the main events in or affecting international civil aviation in 1998; Part II analyses trends in the world economy and the air transport industry and presents global forecasts of airline scheduled passenger traffic through to 2001; and Part III reviews, on a region-by-region basis, the year 1998 and gives prospects through to 2001.

2. Extensive aviation statistics for 1997 and 1998 may be found in the forthcoming ICAO statistical yearbooks, *Civil Aviation Statistics of the World — 1997* (Doc 9180/23) and 1998 (Doc 9180/24), compendia 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 forecasts published biennially or triennially. The long-term forecasts for 1998-2008 will be published in the *Outlook for Air Transport to the Year 2008.*

3. A *Catalogue of ICAO Publications and Audio-visual Training Aids* is available on request from:

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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; Airclaims Ltd.; the Airports Council International (ACI); the Association of European Airlines (AEA); Avmark Inc; the European Civil Aviation Conference (ECAC); the International Air Transport Association (IATA); the International Monetary Fund (IMF); the Organisation for Economic Co-operation

and Development (OECD); the United Nations Conference on Trade and Development (UNCTAD); the United States Department of Transportation (DOT); the World Bank; the World Tourism Organization (OMT-WTO); the World Trade Organization (WTO); and the WEFA Group (formerly known as Wharton Econometrics Forecasting Associates).

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 1998 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 1998);

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

c) traffic statistics are for scheduled services of commercial air carriers;

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

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. dollar".

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PART I

THE WORLD IN 1998

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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 The world economy grew at a slower pace in 1998 compared to the previous year: North America as well as Western and Central Europe continued a robust economic performance, contrasted with weakening performances in the regions of Asia/Pacific and Latin America and the Caribbean. Overall economic growth remained basically stable for Africa and for the Middle East (see also Table 5-1). Crude oil prices played a key role not only in the health of the world economy but also in air carrier costs. Inflation, interest rates and currency markets were among other important factors which affected the world economy in general and international aviation in particular.

1.3 As background to the analysis of the world of civil aviation in 1998, which follows in Chapters 2 to 4, this chapter reviews global developments in 1998 concerning: economic output, trade and international tourism; inflation, interest rates and currency markets; and 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 is discussed in Part II, World Outlook to 2001 (Chapter 5) and Part III, Regional Perspectives 1998 to 2001 (Chapter 6), respectively.

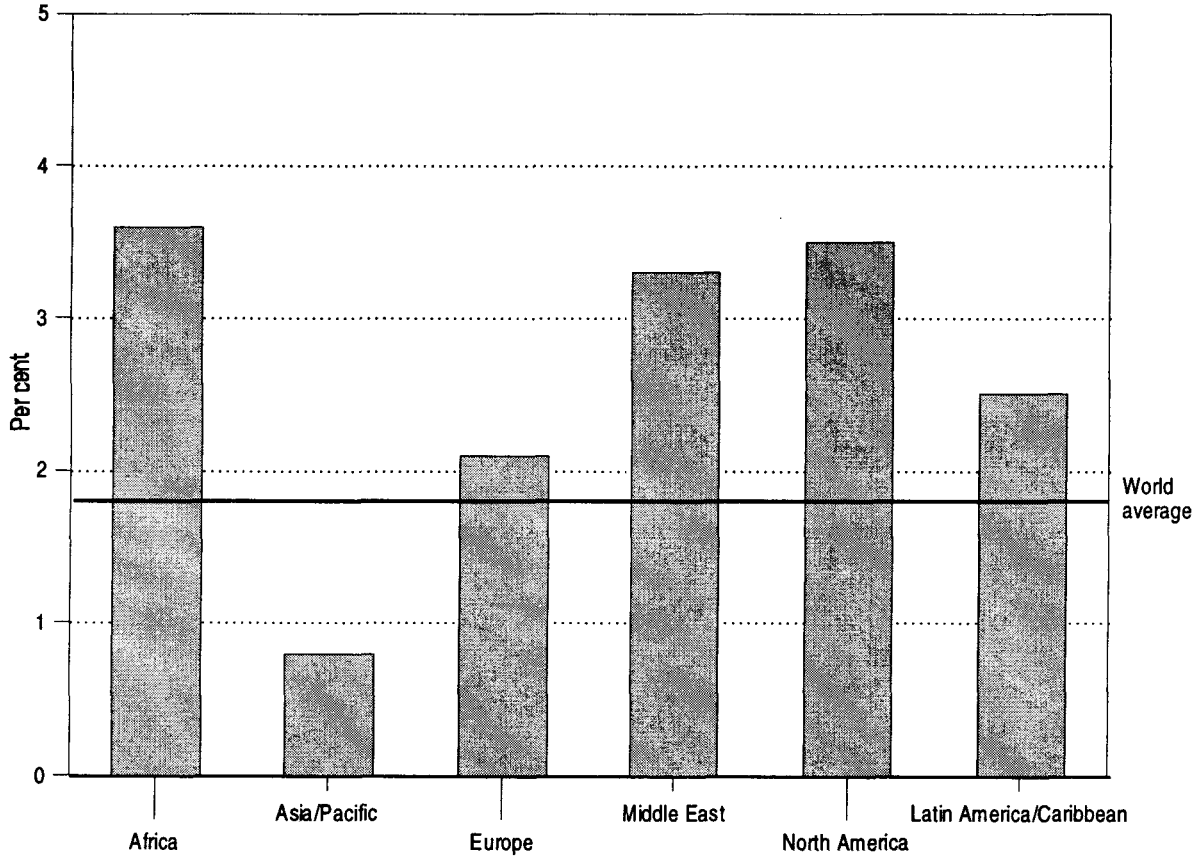
GROSS DOMESTIC PRODUCT

1.4 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 1.8 per cent (in real terms) in 1998, compared to 3.7 per cent in 1997. This global result masks a large spread between the economic performance of industrial and developing countries and amongst regions. Figure 1-1 illustrates the economic growth rates for the world and the ICAO statistical regions in 1998.

1.5 The economies of industrial countries expanded at an estimated 2.3 per cent GDP growth in 1998. Producing more than half of global output, their growth had an overall

stabilizing effect on the world economy. Robust economic growth in North America (3.5 per cent) and a steady growth path for the European Union (2.8 per cent) were backed by strong domestic demand.

1.6 Europe as a whole achieved an average GDP growth of 2.1 per cent. The transition towards market-based economies continued in countries of Central Europe as well as in the Commonwealth of Independent States (CIS) in 1998 with mixed results. Although there was growth in the European Union and recovery in countries of Central Europe (2.5 per cent growth), a decline in growth in the CIS (0.8 per cent), and, notably, recession in the Russian Federation (–5.7 per cent), had a weakening impact.



Source: ICAO estimates based on data from the World Bank, the International Monetary Fund (IMF), WEFA Group, Organisation for Economic Co-operation and Development (OECD) and other economic sources.

Figure 1-1. Annual change in real GDP by region (1998/1997)

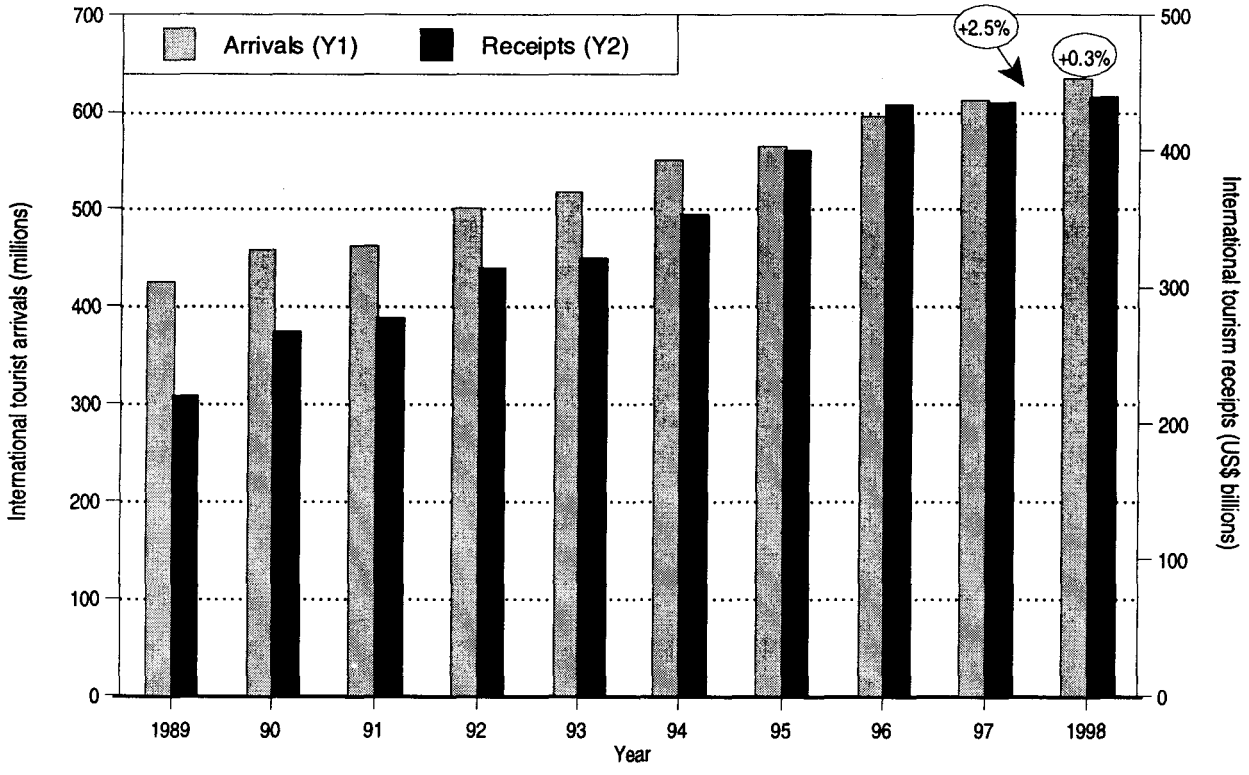
1.7 The region with the largest share in the world economy, Asia/Pacific, experienced a continued slowdown of its GDP growth, which was below 1.0 per cent. The developing economies in Asia/Pacific, accounting for almost two-thirds of the region's output, made a significant contribution as their average GDP grew at 2.6 per cent, but this masked vast differences between countries. While China's GDP growth led again at 7.4 per cent, several South-East Asian economies suffered from mild or sharp recessions. Japan went from slow growth in recent years into a recession, seeing its GDP decline by 2.8 per cent, and Asia's four newly industrialized economies also faced a recession (2.6 per cent GDP decline on average) after a long period of prosperity. In contrast, Australia's economy maintained steady growth at around 4.5 per cent.

1.8 The economic performances of Africa and the Middle East remained basically stable with a GDP increase of 3.6 per cent and 3.3 per cent respectively for 1998 over 1997. Latin America and the Caribbean exhibited a GDP growth at around 2.5 per cent – a slowdown from the trend in recent years.

TRADE DEVELOPMENTS

1.9 In 1998, worldwide trade in goods and services slowed sharply — its volume grew at around 4 per cent compared to strong growth rates of almost 10 per cent in recent years (7.5 per cent in 1997). Trading of manufactured goods expanded at a 5 per cent rate, a downward trend from a buoyant double-digit performance the previous year. Internationally marketed services benefited from globalization of economic activities and gained importance. In broad terms, the major seven economies traded half of the value of both exported and imported goods, all industrialized economies together accounted for almost three-quarters, while trade of developing countries and Asia's newly industrialized economies accounted for the rest. Financial instabilities and erosion of economic conditions mostly in emerging markets in Asia, South America and the Russian Federation had a negative impact on trade. Exports from industrial economies to developing and transitional economies dropped sharply below the 1997 volume. For individual countries, the contraction of export growth was most apparent for the United States, Japan and the United Kingdom. Import/export flows among industrial countries slowed but had an overall stabilizing effect on the world trade performance.

1.10 Impacted by negative trade balances, current account positions generally deteriorated during 1998 leading to a deficit on a worldwide basis and to widening imbalances among major trading blocks and nations. The current account deficit of the United States (–2.7 per cent of GDP) continued to rise in 1998, while the European Union's surplus remained steady (1.4 per cent) and the Japanese surplus rose again markedly (3.2 per cent). Among developing countries, only China and Asia's newly industrialized economies grouped together with Indonesia, Malaysia, Thailand and the Philippines had positive balances, while losses were reported for the regional/subregional groups of the rest of Asia, as well as for Latin America, Africa/Middle East and Central/Eastern Europe.



Source: OMT - WTO.

Figure 1-2. International tourist arrivals and receipts (1989 to 1998)

TOURISM

1.11 The demand for international air travel is fuelled by the expansion of international tourism. At the global level, international tourism continued to prosper, but there was great volatility among the regions. The World Tourism Organization (OMT-WTO) estimated a world total of 635 million international tourist arrivals and 439 billion dollars tourist receipts in 1998, representing an annual growth rate of 2.5 per cent and 0.3 per cent, respectively. Figure 1-2 provides global results in tourist arrivals and receipts from 1989 through to 1998.

1.12 Europe's steady 1998 performance (3 per cent increase in arrivals) had a stabilizing effect, given its 60 per cent share in world international arrivals. Asia/Pacific, the second largest regional market with 14 per cent of world arrivals, suffered from the dampening impact of the Asian financial situation. Travel declined in East Asia and the Pacific (–1.6 per cent in arrivals). Travel to North America showed a slight improvement (1.1 percentage growth in arrivals). Although foreign tourist arrivals in Latin America and the Caribbean

were up by 1.8 per cent, this represented a substantial slowdown. The remaining, smallest, markets of Africa and the Middle East showed a relatively stronger performance with arrivals growing at 6.4 per cent and 4.1 per cent, respectively.

INFLATION, INTEREST RATES AND CURRENCY MARKETS

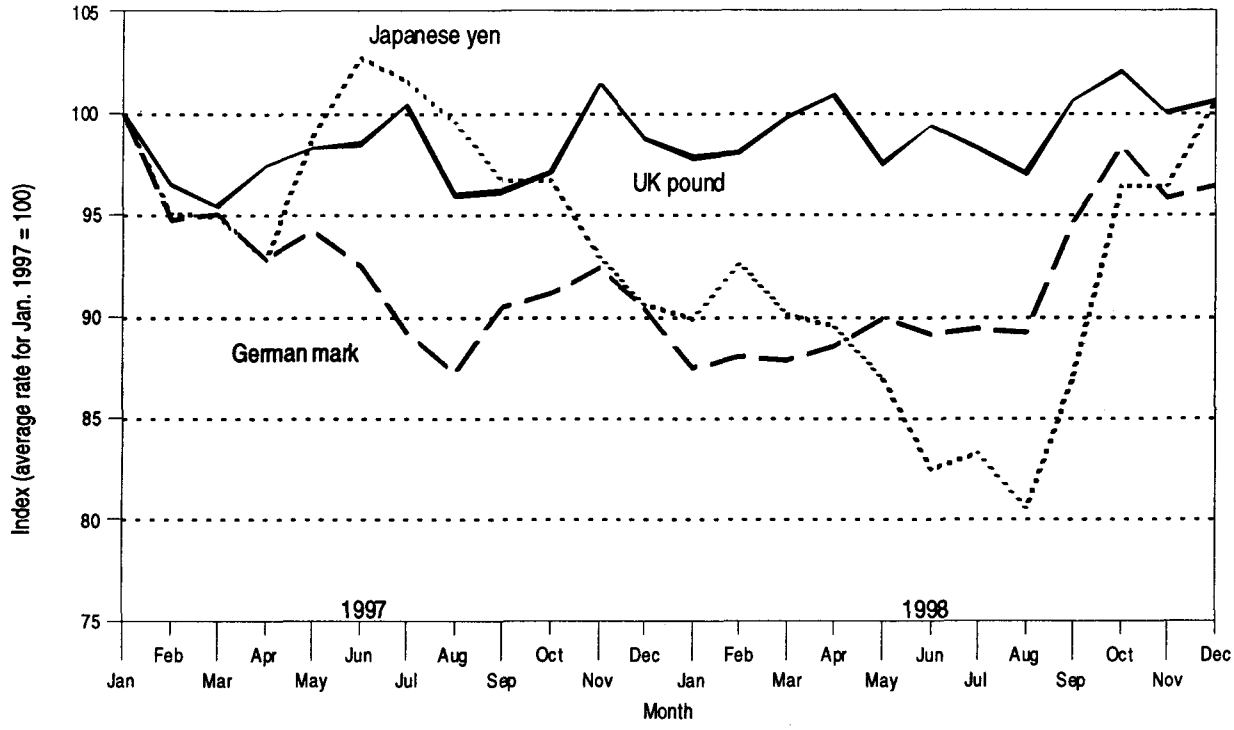
1.13 Since the early 1980s, consumer prices in industrial countries have increased at steadily declining levels despite sharp fluctuations in commodity prices, including oil. During 1998, in most industrial countries inflation rates continued to either fall or stabilize at low levels, leading to an aggregate rate of 1.5 per cent. Developing countries as a group saw a trend of declining inflation rates for consumer prices from much higher levels in the recent past. They achieved in 1998 a rate of around 10 per cent for the second consecutive year.

1.14 Developments in consumer prices in developing countries varied immensely from region to region. Developing countries in Asia showed the best profile, with inflation rates remaining below 10 per cent. In Africa, the regional inflation rate continued to decline from the double-digit rates prevailing since the early nineties and reached its lowest level in 1998 at 8.5 per cent. For South America and the Caribbean, the 10 per cent mark in 1998 was a long-awaited success after triple-digit inflation rates into the mid-nineties. For the "countries-in-transition", an IMF designation for the transition from centrally planned to market economies in Central and Eastern Europe and the CIS, the aggregate inflation rate remained at a high level, exceeding 20 per cent.

1.15 In industrial countries, nominal long-term interest rates continued the downward trend predominant in the nineties; the average rate dropped from 5.3 per cent in 1997 to 4.5 per cent in 1998. Exceptionally low interest rates prevailed in Japan, where long-term rates declined to 1.2 per cent in 1998. In this environment of relative price stability and low cost of financing in 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. Among the currencies of major industrial countries, the Japanese yen continued to fall drastically against the United States (U.S.) dollar during 1998 but recovered in the last quarter. Large depreciations of a number of other Asian currencies contributed to a general strengthening of the U.S. dollar. At the same time, the German mark started to appreciate slowly and the U.K. pound sustained the high rate gained in 1997 against the U.S. currency (Figure 1-3).

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, several developing countries in South-East Asia experienced a drastic devaluation of their national currencies against the U.S. dollar. As a result, prices fell for air tickets of their national carriers and other travel-related expenses for foreign tourists exchanging from currencies which appreciated in the process. Leisure travel activities are likely to react to such price advantages and an increase in demand for in-bound air travel can be expected to some extent.



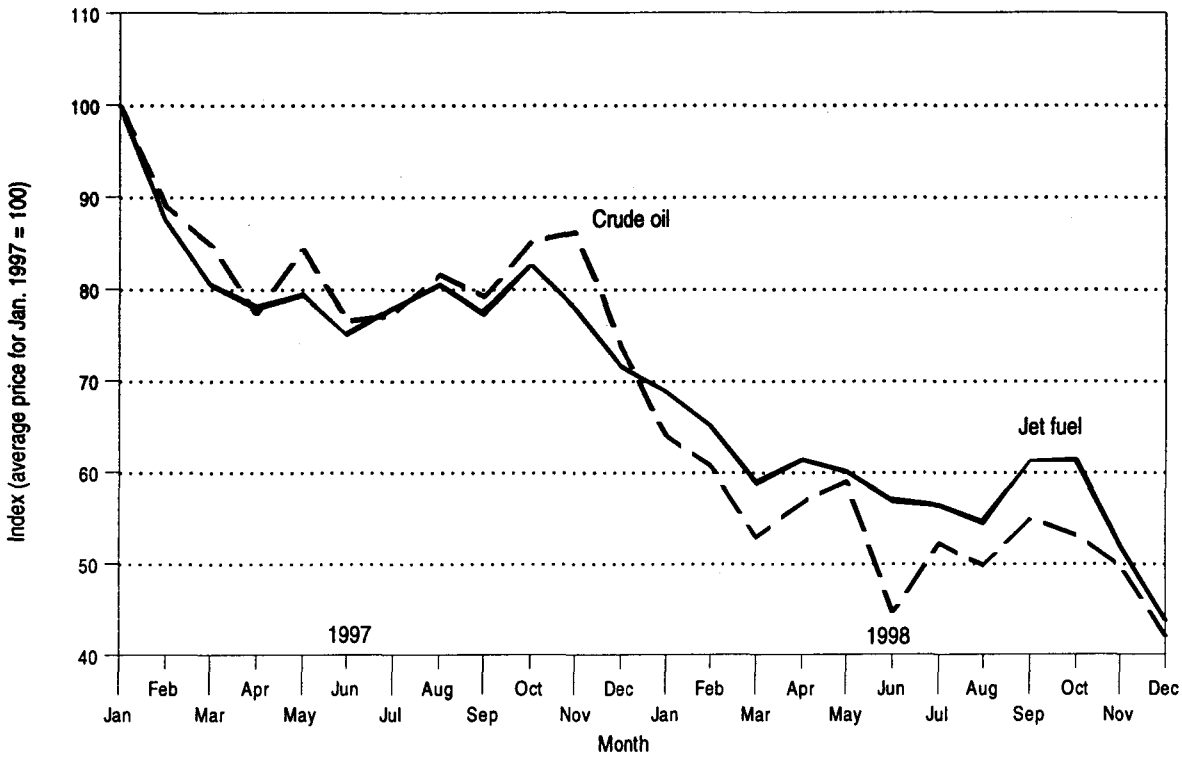
Source: IATA five-day rate.

Figure 1-3. Currency variations with respect to the U.S. dollar (January 1997 to December 1998)

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

CRUDE OIL AND JET FUEL

1.19 In 1998, world prices of crude oil continued to fall. This trend reflected that this commodity was supplied by competing oil-exporting countries much in excess of demand. The world trade price of oil in U.S.dollars in 1998 was down by 31 per cent. Consequently, jet fuel prices softened, resulting in cost reductions for airlines worldwide. Fuel costs have ranged between 12 and 25 per cent of scheduled airline operating costs over the past decade. In 1998, the average annual price of jet fuel in U.S. dollars dropped sharply from 56 cents per gallon in 1997 to 41 cents per gallon (Figure 1-4).



Source: Petroleum Economist and the Journal of Commerce.

Figure 1-4. Trends in crude oil and jet fuel prices (January 1997 to December 1998)

Chapter 2
Air Carriers and their Fleets

2.1 This chapter reviews developments in 1998 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 1998 is also included.

ECONOMIC REGULATION

Air transport agreements and negotiations

2.2 While there was a downward movement in the annual number of reported bilateral agreements and amendments for a third straight year, the strong trend towards liberalization through bilateral arrangements continued. Based on publicly available sources, States concluded 76 bilateral agreements, memoranda of understanding (MOUs) and amendments in 1998, a decrease of 22 from the number concluded the previous year. In regional terms, there was a marked increase in the proportion of agreements, amendments and MOUs between States from differing regions (61) as opposed to those between States in the same region (25), possibly reflecting a greater reliance on regional air service agreements and arrangements by States for intra-regional air services.

2.3 Some information was available on the contents of 38 agreements, two MOUs and 13 amendments concluded in 1998. Of the agreements and amendments on which information is available, eight of the agreements could be classified as traditional (named routes, pre-determination of capacity, double approval tariff regimes); and five of the amendments provided for specific capacity increases (e.g. an increase from 14 to 28 flights per week). The remaining 30 agreements and both MOUs contained one or more liberalization measures, such as multiple designation, open routes, and unrestricted cargo services and seven of these could be termed "open skies" agreements because of their unrestricted traffic rights, capacity and tariff flexibility. Of the remaining eight amendments, three provided for increases in traffic points and capacity, two provided for "open skies" to be phased in over several years, two provided for route expansion, and one provided for multi-year capacity increases, additional route rights and unrestricted code sharing.

2.4 In terms of specific provisions, 29 agreements or amendments provided for multiple designation of airlines, two limited such designations to two airlines per party, one increased

the permitted designations by two, and five limited designations to one per party. Pre-determination of capacity was provided for in 12 agreements and amendments, a "Bermuda" clause in five; free determination in seven and some form of progressive liberalization, such as multi-year capacity increases, in six. With respect to tariff regimes, 12 relied on double approval, two on country of origin, nine on double disapproval, and one did not require tariffs to be filed. Of the 23 agreements and amendments with tariff approval regimes, five did not require the filing or approval of cargo tariffs. The traditional criteria of substantial ownership and effective control by the designating State or its nationals for the use of market access were applied in 17 agreements and three of these expanded the concept to apply to cooperative arrangements between a designated airline and another airline. "Incorporation and principal place of business" was used in nine agreements as an alternative to the traditional ownership and control criteria, one agreement provided for ownership and control by States with a multi-national airline, and one contained no ownership and control criteria for designated airlines.

2.5 In the area of commercial matters, 17 agreements and amendments had provisions on currency conversion and remittance, 16 had provisions for employment of non-national personnel and airline sales activities, nine had clauses dealing with code sharing, three permitted airlines to perform their own ground handling, one allowed airlines a choice of suppliers of this service and one assigned responsibility for this service to the airport.

2.6 In 1998, three of four longstanding bilateral negotiations between major aviation States resulted in agreements. France, Italy and Japan each reached agreements with the United States after protracted negotiations. These agreements provided for widened bilateral opportunities between the respective parties. The other longstanding negotiation, that between the United Kingdom and the United States, was complicated by the issue of proposed conditions to be applied to the approval of an alliance between American Airlines and British Airways. The European Commission (EC) proposed the surrender of airport slots at Heathrow; the U. S. Department of Transportation, which had not ruled on the alliance, suspended its proceeding on it after bilateral negotiations with the United Kingdom failed to produce an "open skies" agreement.

2.7 In negotiations at the regional level, the European Union (EU) and Switzerland reached agreement in principle on a package of measures, including one on air transport, which will provide for market access between Switzerland and the single European market. The seven agreements involved are subject to national ratification procedures as well as the assent of the European Parliament and are expected to enter into force at the beginning of 2001. Based on the progress in negotiations on air transport with ten Central and Eastern European States to include these States in the EU's European Common Aviation Area, the EC expects to complete these negotiations in 1999 and produce a draft agreement for the Council of Ministers. After two unsuccessful efforts by the Council to reach agreement on broadening the EC's negotiating mandate for the United States to include market access and traffic rights, it was reported that the related issue of recent bilateral air service agreements between certain EU Members and the United States, most of which are "open skies" agreements, would be taken to the European Court of Justice.

Global regulatory developments

2.8 There was increased interest in 1998 in the subject of global arrangements for air transport, spurred primarily by the upcoming five-year review of the Annex on Air Transport Services of the General Agreement on Trade in Services (GATS) as well as the start of a new round of trade negotiations in 2000 under the auspices of the World Trade Organization (WTO). The United Nations Conference on Trade and Development held a tourism experts meeting in June which recommended, in the context of preparing developing countries for the next round of trade negotiations, that inclusion of air transport in the GATS be studied and analyzed by a meeting of air transport experts the following year. The International Chamber of Commerce suggested that air cargo should be a candidate for inclusion in the GATS. The WTO itself held an information exchange meeting in November which produced a proposal for a more systematic and detailed examination of air transport activities which might be included in the GATS.

Regional regulatory developments

2.9 In regional developments, a draft proposal was produced as a result of the discussions by Transport Ministers of South America on a common air transport policy. The Caribbean Community Air Service Agreement entered into force, having received the necessary eighth ratification. At its 15th Plenary Session, the African Civil Aviation Commission adopted a resolution on code sharing which, *inter alia,* calls on African States to reaffirm their stand for a gradual and controlled market liberalization and to resist any approach to the advancement of "open skies" policies through code sharing. It also recommends that African States consider Africa as a single aviation market for the purpose of code sharing among African carriers. The Arab Civil Aviation Commission discussed a proposal for a programme to phase in liberalization of traffic rights among its member States, modify national ownership and control criteria and encourage alliances and other cooperative measures by Arab air carriers. The Common Market for Eastern and Southern Africa (COMESA) began preparatory work on the phased liberalization of air transport with the first phase in 1999 to be marked by the authorization of elimination of capacity restrictions, multiple designation and intra-COMESA scheduled passenger services that do not exceed two daily flights. Four States in the South-East Asia subregion (Cambodia, Lao People's Democratic Republic, Myanmar and Viet Nam) agreed to a programme of Subregional Air Transport Cooperation for the gradual liberalization of air services in this area.

2.10 In the EU, the European Parliament approved, with amendments, a proposal to apply Union competition rules externally so that the same competition regime (including exemptions for certain airline cooperative activities) applicable to air transport within the European Community would apply to air transport on Community/third country routes. As a result, the EC was preparing a modified version for the approval of the Council of Ministers. In other actions, the Council adopted a common position in December 1998 on a regulation prohibiting the operation of certain hush-kitted aircraft to and within the European Community after 1 April 2002; the EC continued its study of proposals on consultation and charging principles for airport user charges, levies on aviation fuel for environmental purposes and the application of the value added tax to intra-Community air transport. At

year's end, proposals for increasing and improving compensation for passengers denied boarding and for authorizing the sale of airport slots (times specified for an aircraft to land or take-off) remained pending.

Fair competition

2.11 What constitutes fair competition in air transport was a principal issue in 1998.

2.12 At the international level, attention in the U.S. and Europe was focused on the effects on market access and competition of alliances involving airlines from Europe and the United States. The EC asked for comments on an Air France, Delta and Continental alliance and continued its investigation of the alliance of Austrian Airlines, Delta, Sabena and SwissAir and that of KLM and Northwest. In July, the EC issued conditional proposals for approval of the American Airlines and British Airways alliance as well as the alliance involving Lufthansa, SAS and United Airlines. The conditions included giving up specific numbers of airport slots and restrictions on joint marketing arrangements. However, because of the complaints filed against the ruling by certain involved airlines and its implications on some existing regulatory decisions on the alliances, as well as on bilateral agreements, consultations to address these issues between the concerned parties were still continuing at the end of the year.

2.13 Domestically, the United States provided an example of the vigorous debate engendered by the issue of fair and unfair competition in air transport. The U.S. Department of Transportation proposed an enforcement policy designed to address unfair competitive practices against new airlines which attracted over 1 800 comments. Supporters cited the need for actions to prevent alleged abuses of dominant positions by major airlines which prevented effective competition by new airlines; opponents questioned the facts, analysis and conclusions underlying the proposal and characterized it as an effort to re-regulate a deregulated industry. The U.S. Congress passed legislation requiring, *inter alia,* a report and prior notification to Congress before the issuance of final guidelines for the U.S. Department of Transportation's proposed enforcement policy.

State aid

2.14 In 1998, several regulatory and legal actions were taken in respect of state aid affecting EU airlines. In January, the EC ordered Belgium's Flemish Regional Government to cancel payments intended to compensate Belgian regional airline Air Belgium for reducing air fares for passengers using Ostend Airport instead of Brussels National Airport and for additional costs involved in operation of air services from Ostend Airport. In June, the EC cleared the payment of $285 million in aid to Alitalia by the Italian Government. This was the second tranche of a total state-aid package of $1.6 billion authorized in July1997, with the last tranche scheduled for May 1999. The release came only after the EC was satisfied that conditions imposed on Alitalia as part of the state-aid approval had been implemented. In a separate action, the EC also authorized the Greek Government to resume state-aid payments to Olympic Airways, blocked since April 1996 because of concerns that the Greek authorities

had not fulfilled certain conditions linked to the approval of state aid. In unblocking the payment, the EC also extended to 2002 the application of conditions (including restrictions on fare cutting and on capacity growth) imposed on the airline in its initial approval.

2.15 Following the EC's 1994 approval of $3.3 billion in state aid for Air France, some EU airlines and governments brought court actions against the EC's decision. In June, the European Union Court of First Instance annulled the EC's initial approval of state aid to Air France, ruling that the EC had not provided sufficient justification for two important aspects of its decision (one related to the authorization for purchase of new aircraft and the other to the competitive effect of such aid to Air France on routes outside Europe). In response to the court ruling, the EC accordingly revised its decision with more detailed reasoning and later upheld its initial approval. In another ruling in September, the Court rejected Irish carrier Ryanair's challenge to the EC's 1995 approval of a second tranche of state aid to Aer Lingus, dismissing the claim that Aer Lingus had not achieved cost reductions provided for in its restructuring plan linked to the approval of aid.

2.16 Elsewhere, the Government of Jamaica provided $80 million in aid to Air Jamaica (25 per cent owned by the Government) to help it restructure following losses of $100 million over the previous two years. The Government of Papua New Guinea decided to inject $18 million into its national airline Air Niugini, which would allow the airline to reduce its debt as part of a wider restructuring effort.

Airport access

2.17 Congested airports in Europe resulting in increasing delays in flights stimulated calls for improved air traffic control while a lack of airport slots (the time assigned for an aircraft to take off or land) continued to be an issue in bilateral relations as well as government approval of airline alliances. The EC extended the bloc exemption from competition provisions for slot allocation until June 1999. In the United States, a prohibition on withdrawal of airport slots from certain air carriers at Chicago's O'Hare airport under the High Density Rule was enacted by Congress, but more far-reaching Congressional proposals for increasing slot allocations at certain airports as well as for using new methods such as auctions in certain circumstances were not adopted. The issue of slot allocation is scheduled to be examined at an ICAO Conference on the Economics of Airports and Air Navigation Services in June 2000.

MARKET ENTRY AND EXIT

New and discontinued carriers

2.18 Excluding the Russian Federation, during 1998 nearly 90 air carriers with at least one aircraft with a maximum take-off mass not less than 9 tonnes (20 000 lbs) were reported to have started operations; more than 80 other carriers were constituted but, by the end of the year, had yet to commence operations. About 70 air carriers went out of business during the year.

2.19 As in previous years, the majority of new entrants were either small regional or domestic operators. In some cases, especially in Europe, new carriers were established as low-cost subsidiaries of existing airlines. Air carriers based in Europe accounted for more than 40 per cent of the new entrants that started operations in 1998.

2.20 Nearly 45 per cent of new entrants commenced international passenger services with two-thirds of these operating scheduled flights. About a quarter of new carriers started domestic passenger services. A further quarter initiated freighter-only operations with two-thirds of these commencing international cargo charters.

2.21 Most of the carriers that ceased operations in 1998 had been established relatively recently: nearly half of them were formed within the previous three years and only about one-tenth of them had existed for more than ten years. In 1998, nearly half of the newly-defunct air carriers were located in Europe with international non-scheduled and domestic scheduled operators each accounting for about one-third of the region's demises. Other airlines that ceased trading were spread across other regions, except for the Middle East where no air carrier demise was reported.

2.22 On the basis of schedules published in multilateral airline schedule guides, it is estimated that at the end of 1998 there were some 715 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 1997, this represents a net overall increase of about ten air carriers.

OWNERSHIP, ALLIANCES AND COOPERATION

Privatization

2.23 The trend towards partial or full privatization of government-owned airlines continued in 1998. Two airlines successfully achieved their privatization aims: the Government of Sri Lanka sold 40 per cent of its stake in its national carrier Air Lanka to Emirates Airlines (UAE); and the Government of Aruba sold 70 per cent of its stake in Air Aruba to Venezuelan carrier ASERCA. Preparations for privatization continued for some 25 government-owned carriers which had been targeted in previous years, while privatization objectives were made known for another eight airlines (see Table 2-1). During the year, however, the privatization plans of some ten airlines (including Air France, Austrian Airlines, EL AL of Israel, Air Tanzania and South African Airways) had to be deferred or postponed due to the impact of an unfavourable financial and economic situation, the state of the airlines concerned or because of local circumstances.

2.24 Among reported developments in Africa were the following: the Government of Madagascar planned to privatize its national carrier Air Madagascar in mid-1999. The governments of the eleven African States that jointly own Air Afrique agreed to reduce their shareholding in the flag carrier from 70 to 51 per cent. In preparing the privatization of its national carrier Uganda Airlines, the Government of Uganda invited bids from investors

Table 2-1. Government-owned airlines targeted for partial or full privatization (1998)

Targeted during 1998	Targeted before 1998 and progress reported	Aim achieved during 1998
Air Gabon	Air Afrique	Air Aruba
Air Ivoire	Air France	Air Lanka
Air Madagascar	Air India	
Air Ukraine	Air Kazakhstan	
Austrian Airlines	Air Tanzania	
Georgian Airways	Air Zimbabwe	
Tuninter (Tunisia)	Alitalia	
Ukraine International Airlines	Balkan-Bulgarian Airlines	
	Bangladesh Biman Airlines	
	El Al (Israel)	
	Finnair	
	Iberia (Spain)	
	Indian Airlines	
	KLM-Royal Dutch Airlines	
	Kuwait Airways	
	Lithuanian Airlines	
	LOT-Polish airlines	
	MALEV-Hungarian Airlines	
	Olympic Airways (Greece)	
	Royal Jordanian	
	Saudi Arabian Airlines	
	South African Airways	
	TAP — Air Portugal	
	Thai Airways International	
	THY — Turkish Airlines	
	Uganda Airlines	

interested in buying a significant portion of the airline; this invitation attracted six foreign airline bidders.

2.25 In Europe, the Polish government decided to revive its plan to privatize LOT-Polish Airlines and proposed to change its state ownership law with a view to raising the maximum permitted foreign ownership level in its national carrier to more than 49 per cent. The Government of Georgia announced its plan to sell a 49 per cent stake in its state-owned carrier Georgian Airways, and the Greek Government also planned to sell 15 to 20 per cent of its stake in the national carrier Olympic Airways. As part of its privatization plan, the Italian national carrier Alitalia reduced its state shareholding from 85 to 53 per cent through the public sale of its shares by its state holding company IRI to domestic and foreign investors.

2.26 Elsewhere, the Government of Bangladesh reaffirmed its privatization plan for the national carrier Biman Bangladesh Airlines in which it intended to sell 49 per cent of its stake (40 per cent to the public and 9 per cent to the airline's employees). The Government of Thailand also took steps to reduce its stake in Thai Airways International from 93 to 72 per cent.

2.27 Since the early 1990s, over 80 air carriers have been targeted for partial or full privatization (29 in the last three years). By the end of 1998, 25 of the targeted airlines had achieved their privatization aims while nearly 30 were at different stages of preparation. In addition to the airlines listed in Table 2-1 for which privatization information was available and progress reported, some other airlines may also be at different stages of preparation for privatization.

2.28 Currently, all airlines in North America are privately owned. In Latin America and the Caribbean nearly all major carriers are now majority owned by private interests. In Europe, over half of the major Western European airlines are privately owned while most national carriers of the Eastern European States are majority state-owned (although 15 have been targeted for privatization). In the Asia/Pacific region, partial or full privatization objectives have been made known for some 15 government-owned airlines, while carriers in Japan, Republic of Korea, Brunei Darussalam, Malaysia, the Philippines, Australia and New Zealand as well as those based in the Hong Kong Special Administrative Region and Taiwan Province of China are now privately owned. In the Middle East and Africa, almost all national carriers remain government-owned although some 25 carriers from these two regions have been targeted for privatization.

National consolidation

2.29 In 1998, among the reported major developments in airline consolidation at the national level, of particular note were the alliances forged between the top six U.S. carriers. Northwest Airlines and Continental Airlines formed a wide-ranging commercial alliance which also involved the former taking a 14 per cent stake (or 51 per cent of the voting power) of the latter. The agreement also covered code sharing and marketing on domestic and international routes, as well as cooperation with Northwest's European partner KLM. United Airlines entered into an alliance agreement with Delta Air Lines, which included linking frequent flyer programmes and code sharing on nearly all domestic and international routes except for the North Atlantic. American Airlines and USAir also reached a broad marketing alliance agreement which included cooperation in frequent flyer programmes, access to airport lounges and joint purchasing, but stopped short of code sharing. Furthermore, American Airlines acquired regional carrier Reno Air while its four separate subsidiary carriers Flagship, Simmons, Executive and Wings West were merged into a single entity under the American Eagle Airlines name. These alliances and mergers have attracted regulatory attention and action because of their possible adverse impact on competition and consumers.

2.30 The year also saw major airlines in some other States continue to consolidate through mergers or takeovers of mostly smaller regional airlines. In Chile, the national carrier LanChile, having acquired another major carrier Ladeco in the previous year, decided to merge the latter with its subsidiary carrier Fast Air in order to lower its cost structure. Another Chilean carrier Avant Airlines acquired 100 per cent of domestic carrier National Airlines, increasing its market share to nearly one-third of domestic traffic. In China, Guangzhou-based major carrier China Southern Airlines purchased 60 per cent of local carrier Guangzhou Airlines, while China Airlines, based in Taiwan Province of China, decided

to merge its two subsidiary carriers Mandarin Airlines and Formosa Airlines which would focus on domestic services under the Mandarin name.

2.31 In Europe, British Airways bought its franchisee airline CityFlyer Express while the French carrier Air Liberté (70 per cent owned by British Airways) absorbed TAT to become the second largest domestic airline in France. Austrian Airlines gained full control of regional carrier Tyrolean Airways by purchasing the remaining 14.3 per cent stake held by a local investment firm, while KLM acquired the remaining 50 per cent stake of Martinair, making it a fully owned subsidiary. The Spanish national carrier Iberia took full control of regional carrier Aviaco, of which it already owned 33 per cent, by buying the remaining 67 per cent stake.

2.32 Other reported mergers and takeovers involved charter airlines or regional air carriers. Two charter airlines in the United Kingdom, Flying Colours and Airworld, agreed to merge under the former's brand. U.S. regional carrier Air 2000 merged with Leisure International while another regional carrier Mesa Air took over CCAir based at Charlotte, North Carolina.

Transnational ownership

2.33 During 1998 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 Bangladesh decided to allow unlimited foreign ownership in its cargo airlines and in joint ventures to operate domestic air carriers. The Government of the Republic of Korea increased the permitted foreign ownership level in national carriers from 20 to 49 per cent, while the Government of Thailand decided to raise such a limit from 30 to 49 per cent. In the meantime, many airlines continued to make equity investment in foreign carriers, often as part of a strategy to forge or strengthen alliances and expand market access.

2.34 Emirates Airlines based in Dubai completed its acquisition of a 40 per cent equity stake in Air Lanka and took management control of the latter. In other parts of Asia and the Pacific, Qantas Airways of Australia increased its shareholding in Fiji's Air Pacific from 17.5 to 46 per cent. U Land Airlines based in Taiwan Province of China made equity investments in two domestic carriers in the Philippines, buying a 40 per cent stake in Astro Air International and a 30 per cent stake in Air Philippines. Singapore Airlines signed a memorandum of understanding to form an alliance with China Airlines and to take a 10 per cent stake of the latter. Korean carrier Asiana Airlines received government permission to increase its foreign ownership from 20 to 50 per cent.

2.35 In Europe, SAirGroup, the parent company of Swissair, was the most active in investing in other European carriers. To expand its "European leisure travel grouping", it purchased 49 per cent of Italian regional carrier Air One and took an equity stake in two other charter carriers: 34 per cent in Volare and 45 per cent in Air Europe. It also acquired a 44 per cent stake in French regional carrier Air Littoral and took a 49 per cent stake in LTU, a major German charter operator. SAS bought a 26 per cent stake in Danish regional carrier Cimber Air

and took full control of Finnish domestic carrier Air Botnia by acquiring its 100 per cent stake. British Airways, together with American Airlines, jointly purchased a 10 per cent stake in Iberia, while another UK-based airline EasyJet took a 44 per cent stake in Swiss charter carrier TEA. Norwegian carrier Braathens ASA (30 per cent owned by KLM) also acquired a 25 per cent stake in Swedish regional airline Malmo Aviation.

2.36 Elsewhere, American Airlines took a 40 per cent stake in Colombian carrier ACES, and an 8.5 per cent stake in Aerolineas Argentinas. Delta Air Lines acquired a 35 per cent stake of Aeroperu while Continental Airlines took a 49 per cent stake in Panamanian carrier COPA. TACA International Airlines of El Salvador purchased a 20 per cent stake of Honduras' Islena Airlines, while Venezuelan carrier ASERCA bought a 70 per cent stake in Air Aruba.

Transnational alliances

2.37 During 1998 airlines throughout the world continued to form alliances through various cooperative arrangements (such as code sharing, blocked space, cooperation in frequent flyer programmes, joint marketing and purchasing, and franchising) for a variety of reasons but in large part in order to increase traffic feed and to adapt to an increasingly competitive environment. Major carriers in the Americas and Europe continued to be the most active in securing alliance agreements (accounting for about 57 per cent of over 80 new agreements signed), while there was a considerable increase in arrangements signed by major airlines in the Asia/Pacific region (about 25 per cent of the 80 new agreements signed). Africa and the Middle East were two regions where only a few alliance agreements were signed. Continuing a trend, most agreements had code sharing as a collaborative element.

2.38 While airlines continued to sign agreements targeted on specific routes or fields of cooperation, there was an increase in wide-ranging strategic alliance arrangements. The year saw several competing "global alliance" groupings taking shape, each composed of some major airline members based in different continents and most of which already had fairly extensive networks but, through the alliances, now have a combined route network extending to most parts of the world. Many other carriers built or expanded bilateral partnership relations with leading members of these alliances, with the prospect for some of them of becoming part of the larger grouping at a later stage. Overall, airline alliances are widespread but still evolving, with partnership relations becoming more intertwined and complex, and regulatory implications yet to be seen.

2.39 The "Star Alliance" group, which was founded in 1997 by Air Canada, United Airlines, Lufthansa, Scandinavian Airlines System (SAS), Thai Airways International and subsequently joined by Varig of Brazil, continued to attract new members. Ansett Australia and Air New Zealand, which already had close ties with the alliance members, signed agreements to join the alliance in 1999. All Nippon Airways also announced its intention to become a member in the coming year after signing comprehensive marketing and code sharing tie-up agreements with Lufthansa, United Airlines and SAS, respectively. Singapore Airlines concluded a wide-ranging commercial partnership agreement with Lufthansa and SAS, bringing it closer to the Star Alliance grouping. Other partnership relations forged by members of the group include: a connection marketing agreement signed by United with

Chinese carrier China Southern Airlines, a strategic alliance agreement signed by SAS with Lithuanian Airlines, and a cooperation pact between SAS and Maersk Air of Denmark. To advance the alliance work, the group also developed a five-year business plan and established a management structure comprising a six-member Alliance Management Board to oversee all alliance actions and the implementation of the business plan.

2.40 In September, British Airways and American Airlines, which already had a proposed wide-ranging alliance partnership pending regulatory approval, joined with three other major airlines — Canadian Airlines International, Cathay Pacific Airways and Qantas Airways — in forming a new global alliance grouping called "oneworld". Finnair joined the group in December as its sixth full member. Iberia, which already had close ties with current alliance members (10 per cent jointly-owned by British Airways and American Airlines), was also invited to join the group. While members of the group continued to build partnerships with other airlines (e.g. Canadian and Qantas with LanChile, BA with LOT, American Airlines with China Southern Airlines and Aeropostal of Venezuela), some other major airlines also moved to secure ties with the group by concluding alliance arrangements with its members. For example, Japan Airlines, which already had ties with group member Canadian Airlines International, signed new partnership agreements with both American Airlines and Cathay Pacific.

2.41 Another global alliance, led by the long-established and wide-ranging partnership of Northwest Airlines and KLM, was also taking shape. In addition to the inclusion of another major U.S. carrier, Continental Airlines, the alliance continued to expand by adding new partners in major markets of the world. In Europe, KLM strengthened its partnership with Alitalia by signing an agreement to better integrate passenger and cargo operations through the creation of two jointly-owned companies. Eurowings, Germany's regional carrier, moved a step closer to the group by concluding alliance deals with both KLM and Northwest and by forming a code-sharing partnership with Alitalia. Northwest signed an operational and marketing alliance agreement with Air China. Air China also signed code-sharing agreements with Continental Airlines, Alaska Airlines and America West. KLM, which already had an Asian partner in Garuda Indonesia, signed a commercial cooperation agreement with Malaysia Airlines. In the United States, KLM joined Northwest's alliance with Alaska Airlines by concluding a marketing agreement which included code sharing. KLM also signed a new cooperative agreement with Swiss regional carrier Air Engiadina. In Africa, KLM's alliance partner Kenya Airways signed separate code-sharing agreements with Northwest and Alitalia. The group's new ally Continental Airlines concluded separate cooperative agreements with several airlines based in Latin America and the Caribbean (e.g. with COPA of Panama, ASERCA of Venezuela, BWIA of Trinidad and Tobago and Air Aruba).

2.42 Members of the "Atlantic Excellence Alliance" (formed by Delta Air Lines, Swissair, Sabena, Austrian Airlines and subsequently joined by TAP-Air Portugal, THY-Turkish Airlines and AOM of France) continued to strengthen their bonds by expanding their existing cooperation. Meanwhile, members also made new partnerships with airlines in other regions. Delta Air Lines signed a marketing agreement with Korean Air, while Swissair concluded code-sharing agreements with Japan Airlines and Cathay Pacific Airways. Sabena signed a marketing agreement with VASP of Brazil which would include joint operation of flights and code sharing. On a regional level, Swissair, together with many of its existing European

partners including Crossair (68 per cent owned by Swissair), Sabena, TAP, THY, AOM, Lauda Air and Tyrolean Airways, launched a regional alliance group "Qualiflyer". The alliance is to focus on cooperation in Europe, including coordination of member airlines' flight schedules, ground handling, and improved frequent flyer programme benefits.

2.43 Other reported significant developments include: Air France, which already had an extensive range of code-share alliances, signed new partnership agreements with Austrian Airlines, Korean Air and Middle East Airlines, and was considering forming another global alliance grouping building on its existing alliance partnerships. In Asia/Pacific, the agreement between Air New Zealand, Ansett Australia and Singapore Airlines to form a strategic alliance received approval from the Australian Government. Other cooperative arrangements signed by carriers in the region included: All Nippon Airways with China Eastern Airlines, Singapore Airlines with China Airlines and Asiana, EVA of Taiwan Province of China with Air New Zealand, U Land Airlines with Air Philippines, and Vietnam Airlines with Qantas. Airlines in Latin America continued to secure alliance agreements, mainly with major North American and European carriers (such as American Airlines, Delta, Continental Airlines and Lufthansa). Elsewhere, South African Airways signed strategic alliance agreements with Singapore Airlines and Lufthansa, as well as a commercial cooperation agreement with Swissair. Royal Air Maroc also concluded separate code-sharing agreements with Gulf Air, Air France and Iberia; while Russian carrier Transaero Airlines formed an alliance with Uzbekistan Airways.

SERVICE LEVELS

2.44 In 1998, airlines continued to adapt their passenger travel products to diversified demand. Some airlines saw the need to offer a business-class option in certain domestic and international routes traditionally representing tourist markets. At the same time, some airlines reacted to cuts in business travel budgets and the consequent migration of business travellers to economy class by making the latter more acceptable to business clientele. According to one industry estimate, between 1993 and 1998 the share of first-class seats on long-haul services declined from 10 per cent to 4 per cent while the share of business-class seating fell from 20 per cent to 14 per cent. Airlines often maintained the space allocation to premium class cabins but with fewer seats for greater passenger comfort.

2.45 Airlines also continued their efforts to achieve improvements in other services, such as check-in. Examples included Sabena's new "home check-in" in the Brussels' area which enabled passengers to have their luggage picked up 24 hours prior to departure and receive pre-issued boarding cards. Due to increased security requirements, however, several airlines in the United States cancelled issuance of boarding passes in advance of travel. Virgin Atlantic inaugurated a "drive-through check-in" for premium class passengers, initially at London's Heathrow Airport and subsequently at New York's Newark Airport. British Airways opened check-in desks at the Paddington Railway Station in Central London for passengers with hand baggage using the new rail link to London's Heathrow Airport. Air France, Japan Airlines, Korean Air and Lufthansa started to use kerbside check-in in a new terminal in New York's John F. Kennedy International Airport.

2.46 A number of airlines continued to explore a "smart card" as technology for more efficient and economic servicing of passengers at different stages of the travel process. In the United States, American Airlines and Continental Airlines had extensive trials of a new American Express "universal" card which can act as a charge card, ticket and boarding pass, collect loyalty points, get access to the carrier's airport lounges, store preferences for hotel or car hire, or produce expense reports, etc. Singapore Airlines (SIA) installed check-in machines at Changi Airport which can be used also by first- and business-class travellers for recording their frequent flyer mileage and obtaining an invitation to SIA's lounge.

2.47 In 1998, airlines and regulatory authorities reacted to the growing number of in-flight medical emergencies and related legal action resulting from alleged failure to provide lifesaving medical equipment on board. According to the recently enacted Aviation Medical Assistance Act, the Federal Aviation Administration (FAA), United States, is required to reevaluate the contents of medical kits on board commercial aircraft and the need to carry an automatic external defibrillator. Some carriers (Aloha Airlines, Delta Airlines, United Airlines, US Airways and Delta Connection carrier Comair Airlines) followed American Airlines' voluntary initiative to install enhanced medical kits, including defibrillators, on its fleet. Airlines in other regions took similar action. Qantas, one of the first airlines in the world to install defibrillators on board, went on to equip all its Boeing 747 and 767 aircraft flying internationally with new cardiac monitors and upgraded defibrillators. Finnair equipped its MD-11s and 757s with defibrillators, while El Al installed devices to perform an electrocardiogram on all its planes. Another approach to handle medical emergencies used in 1998 by airlines such as Virgin Atlantic and Emirates Airlines was to contract a diagnosis service which enabled doctors on the ground to receive live readings on conditions of a sick passenger from on-board monitoring devices in order to give a diagnosis.

2.48 Several United States airlines implemented stricter carry-on-baggage policies following a growing number of in-flight injuries. One of these air carriers, which has also reconfigured overhead bins in its aircraft, reported that enforcement of its carry-on-bag policy reduced delays caused by cabin-checked baggage by more than 70 per cent.

2.49 After years of considerable effort, interactive in-flight entertainment (IIFE) systems achieved satisfactory reliability on some airlines. Singapore Airlines reported that its system with 21 video channels, 12 stereo audio channels, 10 Nintendo games, a map display, news, information and communication services surpassed a 99-per cent reliability mark in 1998. After Swissair and Lauda Air, SIA became the third airline in the world to offer an electronic gambling option. Swissair, the innovator of onboard gambling, however, deactivated its IIFE system when it was discovered that IIFE-related wiring might have been a contributing factor to an MD-11 aircraft accident in September 1998.

2.50 Frequent Flyer Programmes (FFPs) continued to develop as a marketing tool, notably for regional and domestic markets. A typical case is a new programme launched by AirTran in the United States which gives passengers the option of redeeming awards on 14 competing airlines. AirTran purchases tickets on other carriers in the open market to serve this purpose. United Airlines and Eurostar, the European operator of passenger rail services, agreed to an inter-modal and inter-continental initiative to credit frequent travellers. Schemes linking frequent flyer awards to purchases of consumer goods and services (e.g. use of certain

credit cards, telephone services, car rentals, hotels, restaurants, retail stores) enjoyed continued popularity in Europe and North America as well as early attraction in South America (LatinMiles of LatinPass Programme, from which Lan Chile withdrew during the year). FFPs remained an important instrument in global airline alliances.

FARES AND RATES

Tariff establishment

2.51 In 1998, the IATA multilateral tariff coordination machinery continued to function against a background of uncertainty arising from government regulatory requirements, particularly implications of competition laws, and significant changes in the airline operating environment, including the increasing impact of the widespread use of automation technology.

2.52 The EC, in 1993, granted a bloc exemption from certain aspects of European Community competition law requirements which allowed airlines of the European Community Member States to continue to participate in IATA passenger and cargo tariff coordination on intra-European Community routes, provided that such tariff consultations were aimed at facilitating interlining. The exemption had a five-year validity and was due to expire on 30 June 1998. In 1996, the EC issued a regulation to amend the block exemption which would prohibit European Community carriers from participating in IATA cargo tariff consultation from July 1997. IATA subsequently submitted an application for an individual exemption for such tariff consultations. During 1996, consultation between IATA and the EC continued for a new bloc exemption and the individual exemption for cargo tariff consultations. As an interim measure, the EC extended the current exemption for passenger tariff consultations for another twelve months until 30 June 1999. The cargo tariff consultations, meanwhile, were also allowed to continue until such time as the EC acts upon IATA's application.

2.53 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 upon in certain markets to address local requirements. However, IATA had to delay the implementation of its new fare construction rules adopted in 1996, as the agreement remained under review by the United States Department of Transportation (DOT).

2.54 The introduction of the EURO — the common currency of the European Economic and Monetary Union from 1 January 1999 — will have an impact on many disciplines of airline industry activities such as passenger and cargo tariffs, ticketing, computer reservation systems and revenue accounting. In anticipation of this, IATA adopted standard procedures for the airline industry to handle all currency transactions for the EURO during the transition period from 1 January 1999 to 30 June 2002.

2.55 In separate action, IATA also adopted industry standard rules in fare selection for application by all computer reservation systems (CRSs) in order to overcome growing problems arising from different fare selection criteria used by different CRSs.

2.56 Recognizing the significant changes in technology, as well as in the regulatory and airline operating environment, including challenges to the multilateral tariff coordination machinery and the need for adaptation, IATA developed a plan to introduce significant changes to its tariff conferences structure and functions. The plan would transform the current tariff coordination structure into two types of activities: 1) Tariff Services Conferences, which would discuss and take action on industry standards and procedures for construction of fares and rates, currency conversion, baggage rules and other technical matters related to tariffs, and participation in which would be automatically open to all IATA members with no additional charge; and 2) Tariff Development Conferences, which would discuss and take action on fares/rates and their related conditions/rules (basically the function of the current multilateral fares and rates consultations but with the emphasis changed from setting all fares and rates to the establishment of prices for the "interline" product), and participation in which would be optional for carriers on a "pay as they participate" basis. The plan would be implemented from 1 January 2000 after formal adoption by the IATA General Annual Meeting in June 1999 and would be subject to regulatory approval.

PRODUCT DISTRIBUTION

2.57 In 1998, a modest increase in total bookings and relatively unchanged market shares among the four global computer reservation systems (CRSs) seemed to suggest that this segment of the industry had matured. Regulatory authorities in Europe and the United States continued to review their respective CRS regulations; there was an expectation that the EC's revised Code of Conduct for CRS would be adopted early in 1999. Travel agents, however, continued to face difficult times due to commission cuts and caps and due to the increased popularity with air travellers of booking and ticketing directly via the Internet.

Computer reservation systems

2.58 Based on the number of air segments reportedly booked by the four global CRSs — Amadeus, Galileo, Sabre, and Worldspan — there was no substantial change from 1997 either in the total number of segments booked or in the market share of the respective CRS vendors. All four global vendors increased their travel agency locations on a worldwide basis with individual increases ranging from 3 to 6.5 per cent. Abacus, the only other multinational CRS, active in Asia and the Pacific, showed a substantially higher increase in agency locations of 27 per cent.

2.59 Concerns that the consolidation of global CRSs into four vendors would result in a less competitive environment were mitigated by a tendency of the four CRSs to expand their markets in terms of countries in which their systems were available. For example, while in 1995 there were twice the number of multinational CRSs, there were 55 countries which had no multinational CRS vendor and 49 countries which had only one multinational CRS vendor. By 1998 there were 45 countries without a multinational CRS vendor and 43 countries which had only one multinational CRS vendor. From another perspective, the number of countries which had two or more multinational CRS vendors increased from 81 in 1995 to 97 in 1998.

2.60 At the corporate level, Abacus terminated its joint marketing and service agreement with Worldspan and concluded a joint venture agreement with Sabre. This change in partners ended the 5 per cent cross-ownership between Abacus and Worldspan; created a new company, Abacus International in which Abacus holds 65 per cent and Sabre 35 per cent equity; converted 7 300 Abacus travel agents in 16 countries from Worldspan to a modified version of the Sabre CRS; and resulted in legal action by Worldspan against Sabre in a U.S. court. Amadeus concluded a joint venture with Korean Airlines to operate the TOPAZ CRS system in Korea with the airline holding 68 per cent of the equity and Amadeus the remainder. Amadeus also acquired 100 per cent ownership of System-One Amadeus, its national marketing company in the United States, by purchasing the shares held by Continental Airlines and EDS. It also announced a public offering of its stock in Madrid. The board of directors of Galileo authorized the repurchase of up to $100 million of the CRS's outstanding shares of common stock.

2.61 The five multinational CRSs all announced the development, and in some cases, testing of programmes to ensure that their systems were Y2K compliant. They also either developed or improved programmes to help airline participants in their systems eliminate costly and unnecessary passive bookings (for example, one used to print a passenger's itinerary).

2.62 In the regulatory area, the U.S. Department of Transportation continued its review of rules for airline-owned computer reservation systems, receiving over 40 comments during 1998. The period of effectiveness of the current U.S. CRS rules has been extended pending completion of the review. Among the issues drawing comments were whether or not airline displays on the Internet should be subject to the rules, problems concerning passive bookings and booking fees, and the possible abuse of marketing data provided by vendors. The proposed changes to the EU's Code of Conduct for CRSs were amended in some areas by the European Parliament but at year's end appeared ready for approval by the Council of Ministers. A noteworthy change is the inclusion of rail services in principal displays for those vendors who wish to do so; the other changes, in areas such as fees and billing data, safeguarding personal data, and subscriber responsibilities, are designed to update the Code and are consistent with the changes introduced in the revised ICAO CRS Code of Conduct in 1996.

2.63 At the end of 1998, 29 States either followed the ICAO Code or had CRS regulations which are consistent or compatible with it. These countries represented about 55 per cent of international scheduled service traffic, based on departures in 1996. Two of these States have invoked the developing country exception concerning delaying the entry of foreign vendors into their markets.

Electronic ticketing

2.64 There was steady growth in electronic ticketing internationally as more airlines introduced the practice on selected routes while others expanded the capability for additional countries and major CRS vendors to include this ticketing option in their systems (at year's end, nine airlines included this option in three CRSs, four in two CRSs, and 11 in one CRS). According to the Airline Reporting Corporation (ARC), which manages travel agents'

transactions with air carriers in the United States, there was a surge in electronic ticketing in the U.S. in 1998, where over 32 per cent of all travel agents reported transactions involving electronic tickets. The ARC also noted a substantial shift in agents reporting transactions electronically, where the total transaction volume reported electronically rose from 6 per cent at the beginning of the year to over 31 per cent at year-end. This not only represented an efficiency gain for agents but also contributed to a decrease in stolen paper airline tickets.

2.65 Some airlines introduced higher commissions for electronic ticketing to encourage the practice. However, efforts by a CRS vendor to impose a specific extra charge for electronic tickets were successfully resisted by the major airlines; another vendor charged a one-time initial fee per country when introducing this practice.

Travel agents

2.66 Internationally there did not appear to be a substantial decline in the number of travel agents in the IATA agency programme, although the spread of the reduction in, and caps on, commission rates in a number of countries posed difficulties for many travel agents in 1998. A trade publication survey of fifty airlines (32 international, 18 domestic) indicated that the amount paid out in travel agent commissions dropped 7 per cent in the first few months of 1998 compared to the previous year. In the United States, where the commission reductions and caps came first and where bookings by the individual passenger directly with the airline on the Internet is most prevalent, the number of retail travel agent locations declined by 2 per cent from December 1997 to December 1998. During the same period, reported commissions fell from U.S.$ 6.6 billion to 6.1 billion, a decline of 7 per cent. Between 1997 and 1998, the average commission rate fell from 7.9 to 6.8 per cent for domestic fares and from 15.0 to 14.2 per cent for international fares. Applications for retail home office/independent travel agency as well as for full service branches declined by 26 and 15 per cent respectively.

2.67 Travel agents continued to face difficult times not only from the reduction in commissions but also from competition from alternative service providers as well as airlines themselves via the Internet. Strategies varied in meeting these challenges and included consolidation, concentration on corporate travel or packaged leisure products to the exclusion of discount airline tickets, the use of fees for some services, innovative marketing programmes and diversification into other sectors of the travel market.

Internet

2.68 Although airlines, CRSs, and travel agents are using the Internet for marketing air transportation, it remains difficult to quantify the extent of the practice. Industry sources indicate that although the amount of direct airline sales from the Internet represents, in most cases, a small percentage of an airline's total sales, these types of sales continue to grow. The majority of the sales of all travel products on the Internet are still being sold by on-line agents or global distribution systems (GDSs). Even in the case of U.S. airlines, which are active users

of the Internet for direct sales, only an estimated 40 per cent of their on-line bookings are made directly; most still coming via on-line agencies or GDSs.

2.69 The development of the use of the Internet as a marketing tool for air transport has tended to be uneven. Airlines which initiated the practice as a means of selling directly to the consumer have refined their websites to include a variety of services beyond booking and ticketing, such as accessing frequent flyer accounts and redeeming mileage awards, tracing baggage and special fare and related tourist promotions. Other airlines are using the Internet primarily for reservations and/or ticketing while others have not yet included these facilities in their websites. This unevenness in development also has a geographical aspect; airlines are relying on direct sales via the Internet mostly in countries where Internet and credit card use are high, but less so in other countries.

TRAFFIC

2.70 Indicators are given below of the development of airline scheduled traffic in 1998, 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

2.71 The total scheduled traffic (domestic plus international) carried by the airlines of the 185 Contracting States of ICAO in 1998 is estimated at about 349 billion tonne-kilometres performed, an increase of just over 1 per cent over 1997. The airlines carried a total of about 1 462 million passengers in 1998, compared with 1 457 million passengers in 1997 and, as in 1997, about 26 million tonnes of freight (Table 2-2). The average passenger load factors on total scheduled services (domestic plus international) remained at 69 per cent, while the average overall (weight) load factor decreased by one percentage point to 60 per cent.

2.72 Compared with previous years, in 1998 there was a significant slowdown in the growth of international scheduled traffic with increases of almost 2 per cent in tonne-kilometres performed, 3 per cent in passengers carried, and little change 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.

2.73 Domestic traffic showed little change, about 118 billion tonne-kilometres performed in 1998 against 117 billion tonne-kilometres performed in 1997.

Scheduled: regional breakdown

2.74 From 1997 to 1998, development in total and international scheduled traffic varied considerably among regions of carrier registration with respect to both passengers and freight.

Table 2-2. Scheduled services of airlines of ICAO Contracting States (1998/1997)

	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)								
1997	1 457	2 573 010	69	26.4	102 880	5 990	344 190	61
1998	1 462	2 630 370	69	26.2	102 270	5 740	348 780	60
Percentage change	0.3	2.2	0.0	-0.8	-0.6	-4.2	1.3	-1.0
INTERNATIONAL								
1997	438	1 468 150	70	15.7	87 740	2 490	227 390	64
1998	452	1 510 770	69	15.8	87 180	2 470	231 240	62
Percentage change	3.2	2.9	-1.0	0.6	-0.6	-0.8	1.7	-2.0
DOMESTIC								
1997	1 019	1 104 860	68	10.7	15 140	3 500	116 800	56
1998	1 010	1 119 600	68	10.4	15 090	3 270	117 540	56
Percentage change	-0.9	1.3	0.0	-2.8	-0.3	-6.6	0.6	0.0

Source: ICAO Air Transport Reporting Form A-1.

In terms of total passenger-kilometres performed, the change in traffic ranged from a decrease of almost 2 per cent for the airlines registered in Africa to an increase of 7 per cent for those registered in Latin America and the Caribbean (Table 2-3). International scheduled services also posted different changes in passenger- kilometres performed according to region, ranging from a decrease of about 2 per cent for airlines registered in Asia/Pacific to an increase of 7 per cent for those registered in Europe. In terms of freight tonne-kilometres performed, carriers registered in Africa showed a significant decrease both in total and in international traffic (down 20 and 17 per cent respectively). At the other end of the scale, carriers registered in Latin America and the Caribbean showed increases in total and in international freight tonne-kilometres performed of about 7 per cent each.

2.75 The differences in regional traffic development between 1997 and 1998 caused some changes in the distribution of this traffic. The regional distribution for total and for international scheduled traffic in 1998 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 1998, the airlines of North America carried just over 36 per cent of total world traffic. However, the largest share of international scheduled traffic (about 37 per cent) was carried by the airlines of Europe.

2.76 In 1998, airlines registered in Europe showed the highest average annual weight load factor on international scheduled services (about 66 per cent), while those in Africa showed the lowest average load factor (some 47 per cent). Compared with 1997, 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 Latin America and the Caribbean, a decrease of one percentage point for airlines of Europe and the Middle East and a decrease of about two percentage points for the airlines of Africa, Asia/Pacific and North America, respectively.

Scheduled: carrier rankings

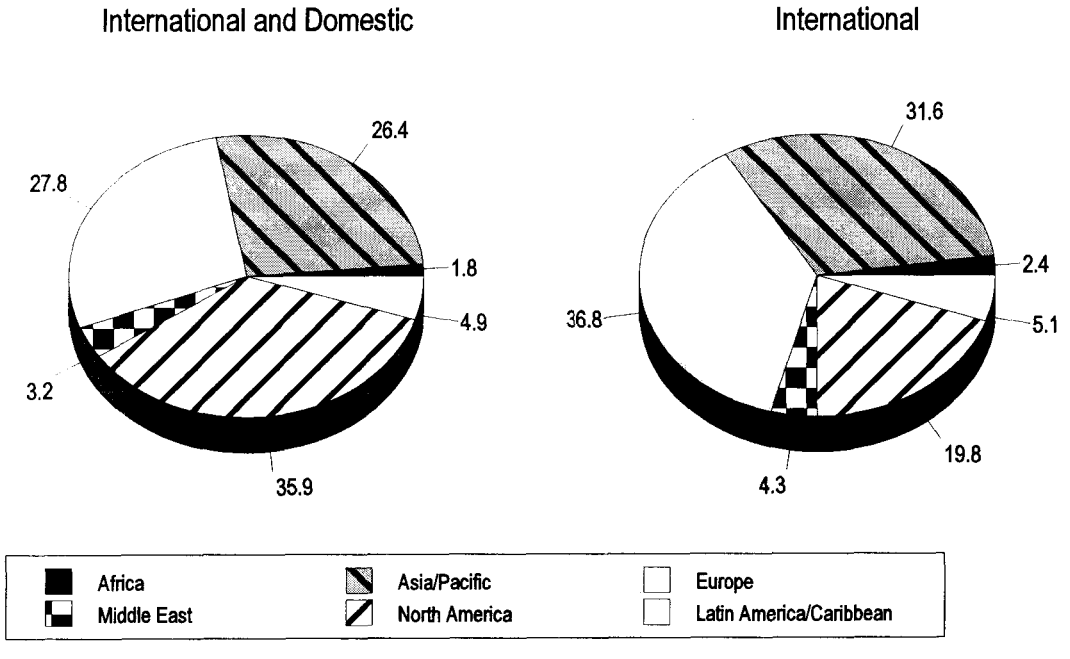
2.77 Table 2-4 shows the top 30 air carriers in the world in 1998 in terms of the overall volume of passenger-kilometres performed, freight and mail tonne-kilometres performed and total (passenger, freight and mail) tonne-kilometres performed, compared with the ranking of the same carriers in 1997 and in 1989. Table 2-5 shows the top 30 air carrier rankings according to the same parameters but in terms of international scheduled traffic.

Table 2-3. Growth of scheduled traffic by region of airline registration: 1998/1997
(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	-2.5	-1.9	-19.7	0.0	-3.8
Asia and Pacific	-1.9	-1.5	-1.2	3.0	-1.8
Europe	2.8	5.5	-0.8	-1.0	3.6
Middle East	-0.4	1.4	-0.7	14.3	1.3
North America	-0.3	2.1	0.4	-7.2	1.5
Latin America and the Caribbean	5.8	7.0	6.9	-7.7	7.3
Total	0.3	2.2	-0.6	-4.2	1.3
INTERNATIONAL					
Africa	0.7	-0.4	-17.3	0.0	-3.1
Asia and Pacific	-0.6	-1.6	-2.3	4.3	-1.9
Europe	6.2	7.0	-0.6	0.0	4.3
Middle East	-1.2	2.2	-0.5	16.7	1.6
North America	2.8	2.5	2.3	-7.2	2.3
Latin America and the Caribbean	2.3	4.1	7.2	0.0	6.8
Total	3.2	2.9	-0.6	-0.8	1.7

Source: ICAO Air Transport Reporting Form A-1.

2.78 These tables show the rise in ranking of a number of Asian carriers associated with the relatively high growth in traffic in that region over the period 1989 -1998 (although there was a slowdown in 1997 and 1998). They also illustrate the restructuring which has taken place in the air transport industry in the United States, the ex-USSR and China. In 1989, Northwest and Pan American (now defunct) 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 1998, United and American were the two major international United States carriers, Aeroflot (Aria) was one of the several international carriers of the Russian Federation operating a relatively small domestic network, and, including the carriers registered in SAR Hong Kong, in 1998 China had over a dozen international carriers.



Source: ICAO Air Transport Reporting Form A-1.

Figure 2-1. Percentage distribution of scheduled traffic according to region of registration of airline — total tonne-kilometres performed (1998)

Scheduled: country rankings

2.79 Rankings for the top 30 countries or groups of countries by volume of scheduled traffic generated by their airlines in 1998, 1997 and 1989 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 1998, 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, Japan and the United Kingdom (about 34, 6 and 6 per cent, respectively). On international services, about 32 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, 8 and 6 per cent, respectively).

Scheduled: city-pair rankings

2.80 The 25 largest city-pair traffic flows in terms of passengers carried on international scheduled services represented a total of about 48 million passengers in 1997 (Table 2-8; owing to incomplete data it has not been possible to include figures for 1998). This represents some 11 per cent of the world total of international scheduled passengers. The table shows that of the 25 major passenger flows 12 involved international routes within eastern Asia, eight routes were within Europe, three routes across the North Atlantic and two routes across North-Mid Pacific. In terms of cities, London (10), Tokyo (7) and Hong Kong (5) appear most frequently. Almost all the city-pairs shown involve over-water sectors.

Non-scheduled

2.81 It is estimated that in 1998 total international non-scheduled passenger-kilometres performed throughout the world decreased by an estimated 4 per cent (Table 2-9) with the share of such traffic in overall international air passenger traffic decreasing to about 13 per cent compared with just over 14 per cent in 1997. 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

2.82 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 for aircraft having a maximum take-off mass of less than 9 000 kg (20 000 lbs) are not included.

Table 2-4. Top 30 scheduled air carriers in 1998 and their ranking in 1997 and 1989 — TOTAL (international and domestic) scheduled traffic carried[1]

PASSENGER-KILOMETRES PERFORMED					FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED					TOTAL TONNE-KILOMETRES PERFORMED				
Carrier	Estimated 1998 (millions)	Ranking 1998	1997	1989	Carrier	Estimated 1998 (millions)	Ranking 1998	1997	1989	Carrier	Estimated 1998 (millions)	Ranking 1998	1997	1989
United	200 385	1	1	3	Federal Express	9 681	1	1	3	United	22 509	1	1	2
American	175 176	2	2	2	Lufthansa	6 351	2	2	1	American	18 803	2	2	3
Delta	166 121	3	3	4	Korean Air	5 699	3	3	8	Delta	17 581	3	3	4
British Airways	111 027	4	5	7	SIA	4 818	4	5	12	British Airways	15 143	4	4	7
Northwest	107 331	5	4	5	Air France	4 723	5	4	4	Lufthansa	13 882	5	6	8
Continental	81 967	6	8	6	United	4 326	6	7	11	Northwest	12 591	6	5	5
JAL	78 813	7	6	9	JAL	4 231	7	6	2	Air France	12 217	7	7	9
Lufthansa	75 238	8	7	13	British Airways	4 049	8	9	9	JAL	11 245	8	8	6
Air France	72 928	9	9	12	KLM	3 914	9	8	10	SIA	10 362	9	9	13
USAir	66 374	10	10	11	Cathay Pacific	3 339	10	10	13	Federal Express	9 681	10	12	17
SIA	58 083	11	13	14	American	2 908	11	12	14	KLM	9 678	11	11	14
KLM	57 575	12	12	17	Northwest	2 852	12	11	6	Korean Air	8 841	12	10	15
Qantas	56 675	13	11	16	Delta	2 507	13	13	17	Continental	8 547	13	13	10
All Nippon Airways	53 713	14	14	15	Cargolux	2 245	14	14	—	Cathay Pacific	7 210	14	15	19
Southwest	46 506	15	15	31	Swissair	2 018	15	16	21	Qantas	7 078	15	14	18
Cathay Pacific	40 654	16	18	19	Nippon Cargo	1 898	16	18	24	USAir	6 511	16	16	16
TWA	39 296	17	17	8	Qantas	1 804	17	17	18	All Nippon Airways	5 817	17	17	21
Air Canada	37 257	18	19	18	Asiana[2]	1 679	18	15	149	Alitalia	5 029	18	18	22
Alitalia	35 561	19	20	24	Thai Airways	1 584	19	20	29	Swissair	4 767	19	21	26
Korean Air	35 417	20	16	26	Alitalia	1 508	20	21	16	Thai Airways	4 682	20	20	27
Thai Airways	34 340	21	21	21	United Parcel	1 458	21	26	—	Air Canada	4 631	21	19	20
Iberia	32 475	22	23	20	All Nippon Airways	1 416	22	23	33	Southwest	4 397	22	22	37
Malaysian Airlines	29 372	23	22	38	Malaysian Airlines	1 378	23	22	38	TWA	3 951	23	23	11
Swissair	28 031	24	26	29	Polar Air Cargo[3]	1 329	24	19	—	Malaysian Airlines	3 777	24	24	39
Canadian	26 544	25	25	25	Varig	1 317	25	24	20	Varig	3 689	25	25	25
America West	26 318	26	24	34	Air Canada	1 216	26	25	23	Iberia	3 688	26	27	23
Varig	26 145	27	27	27	Lan Chile	1 209	27	31	49	Canadian	3 120	27	28	28
Virgin Atlantic	22 130	28	30	74	El Al	1 123	28	27	25	Asiana	2 764	28	26	148
SAS	20 821	29	28	30	Continental	1 109	29	32	22	Virgin Atlantic	2 762	29	33	74
Saudia	18 820	30	32	28	Air China[4]	1 070	30	29	—	Saudia	2 645	30	30	29

1. Most 1998 data are computer-generated estimates, thus the ranking may change when final data become available.
2. Started domestic 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 1998 and their ranking in 1997 and 1989 — INTERNATIONAL scheduled traffic carried[1]

PASSENGER-KILOMETRES PERFORMED					FREIGHT AND MAIL TONNE-KILOMETRES PERFORMED					TOTAL TONNE-KILOMETRES PERFORMED				
Carrier	Estimated 1998 (millions)	Ranking 1998	1997	1989	Carrier	Estimated 1998 (millions)	Ranking 1998	1997	1989	Carrier	Estimated 1998 (millions)	Ranking 1998	1997	1989
British Airways	108 773	1	1	1	Lufthansa	6 298	1	1	1	British Airways	14 940	1	1	1
United	75 153	2	2	9	Korean Air	5 597	2	2	4	Lufthansa	13 301	2	2	3
Lufthansa	69 853	3	3	4	SIA	4 818	3	4	7	SIA	10 362	3	4	5
JAL	62 018	4	4	2	Air France	4 595	4	3	3	Air France	10 306	4	3	4
American	58 273	5	5	13	British Airways	4 047	5	7	5	KLM	9 677	5	7	7
SIA	58 083	6	7	6	JAL	3 915	6	5	2	JAL	9 669	6	5	2
KLM	57 568	7	6	10	KLM	3 914	7	6	6	United	9 580	7	6	12
Air France	55 353	8	8	7	Federal Express	3 749	8	9	10	Korean Air	8 371	8	8	9
Northwest	47 851	9	9	5	Cathay Pacific	3 339	9	8	11	Cathay Pacific	7 210	9	9	11
Qantas	42 731	10	10	8	United	2 761	10	10	22	American	7 182	10	10	16
Cathay Pacific	40 654	11	11	12	Cargolux	2 245	11	11	—	Northwest	6 197	11	11	6
Delta	39 876	12	13	21	Swissair	2 016	12	14	15	Qantas	5 569	12	12	10
Thai Airways	31 049	13	15	14	Nippon Cargo	1 898	13	16	16	Delta	5 050	13	13	28
Korean Air	30 821	14	12	18	American	1 895	14	15	28	Swissair	4 747	14	14	15
Alitalia	28 329	15	14	16	Northwest	1 855	15	12	8	Thai Airways	4 355	15	16	17
Swissair	27 838	16	16	19	Asiana[2]	1 644	16	13	—	Alitalia	4 288	16	15	14
Malaysian Airlines	25 392	17	18	31	Qantas	1 628	17	17	13	Federal Express	3 749	17	17	27
Continental	24 322	18	23	17	Thai Airways	1 553	18	18	21	Malaysian Airlines	3 407	18	18	34
Air Canada	23 881	19	17	22	Alitalia	1 484	19	19	12	Air Canada	3 167	19	19	22
Iberia	23 340	20	19	20	United Parcel[2]	1 458	20	22	—	Continental	2 895	20	30	20
Virgin Atlantic	22 130	21	20	53	Delta	1 431	21	21	40	All Nippon Airways	2 841	21	22	43
All Nippon Airways	19 981	22	21	42	Malaysian Airlines	1 328	22	20	34	Iberia	2 776	22	23	18
Canadian	18 190	23	24	26	Lan Chile	1 178	23	27	48	Virgin Atlantic	2 762	23	25	54
Varig	17 739	24	25	24	El Al	1 123	24	24	17	Varig	2 704	24	21	21
SAS	16 455	25	26	23	Varig	1 034	25	26	18	Asiana	2 558	25	20	—
Air New Zealand	16 352	26	22	29	Polar Air Cargo[3]	1 007	26	23	—	Air New Zealand	2 479	26	24	35
Sabena	15 338	27	34	34	Air Canada	1 000	27	25	24	Cargolux	2 245	27	26	—
Aeroflot (Aria)	13 577	28	31	—	All Nippon Airways	971	28	28	45	Canadian	2 236	28	29	30
Emirates Airlines	12 919	29	35	70	Air China[4]	952	29	31	—	El Al	2 216	29	28	26
Saudia	12 875	30	29	25	Saudia	871	30	29	27	SAS	2 206	30	27	24

1. Most 1998 data are computer-generated estimates, thus the ranking may change when final data become available.
2. Started domestic 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 group of countries in 1998 and their ranking in 1997 and 1989 — 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 1998 (millions)	Ranking 1998	1997	1989	Country or group of countries	Estimated 1998 (millions)	Ranking 1998	1997	1989	Country or group of countries	Estimated 1998 (millions)	Ranking 1998	1997	1989
United States	984 697	1	1	1	United States	29 168	1	1	1	United States	118 515	1	1	1
Japan	154 402	2	3	3	Japan	7 871	2	3	2	Japan	20 896	2	3	3
United Kingdom	152 126	3	2	4	Republic of Korea	7 378	3	2	7	United Kingdom	19 611	3	2	4
Germany	90 424	4	4	8	Germany	6 389	4	5	3	Germany	15 306	4	4	6
France	89 306	5	5	5	France	4 942	5	6	4	France	13 917	5	5	5
China[2]	75 279	6	7	18	United Kingdom	4 841	6	4	5	Republic of Korea	11 605	6	6	11
Hong Kong SAR	43 039	—	—	—	Singapore	4 818	7	7	9	Netherlands	10 915	7	7	10
Australia	73 661	7	6	7	Netherlands	3 993	8	8	8	Singapore	10 362	8	8	9
Netherlands	69 133	8	8	11	China[2]	3 122	9	10	19	Australia	8 931	9	9	8
Canada	63 801	9	9	6	Hong Kong SAR	4 228	—	—	—	China[2]	8 720	10	10	20
Singapore	58 083	10	11	9	Luxembourg	2 246	10	9	114	Hong Kong SAR	8 315	—	—	—
Republic of Korea	47 711	11	10	16	Australia	2 086	11	11	11	Canada	7 751	11	11	7
Brazil	46 162	12	13	10	Switzerland	2 029	12	13	14	Brazil	5 992	12	12	12
Russian Federation	44 456	13	12	—	Canada	1 928	13	12	10	Italy	5 221	13	14	13
Spain	40 042	14	15	12	Brazil	1 803	14	14	12	Russian Federation	4 931	14	13	—
Italy	37 623	15	14	13	Thailand	1 584	15	15	20	Switzerland	4 851	15	15	15
Thailand	34 340	16	16	14	Italy	1 511	16	16	13	Thailand	4 682	16	16	16
Malaysia	29 372	17	17	25	Malaysia	1 378	17	17	25	Spain	4 378	17	17	14
Switzerland	28 847	18	18	21	Chile	1 312	18	20	29	Malaysia	3 777	18	18	26
Scandinavia[3]	25 402	19	19	15	Gulf States[4]	1 240	19	19	31	Gulf States[4]	3 527	19	19	31
Mexico	25 078	20	21	19	Israel	1 123	20	18	15	Scandinavia[3]	3 042	20	20	18
India	24 723	21	20	17	Saudi Arabia	952	21	21	21	India	2 774	21	23	17
Gulf States[4]	24 408	22	23	30	New Zealand	826	22	22	28	New Zealand	2 700	22	21	25
New Zealand	19 014	23	24	23	Colombia	809	23	25	26	Saudi Arabia	2 645	23	24	19
Saudi Arabia	18 820	24	25	20	Spain	801	24	24	16	Mexico	2 473	24	25	23
Indonesia	18 029	25	22	22	Russian Federation	777	25	23	—	Luxembourg	2 287	25	26	111
South Africa	16 996	26	26	27	Scandinavia[3]	750	26	26	22	Israel	2 241	26	27	22
Belgium	15 338	27	32	32	India	561	27	29	17	Chile	2 194	27	30	39
Argentina	14 225	28	28	26	Indonesia	480	28	27	23	Indonesia	2 060	28	22	21
Turkey	13 033	29	29	41	Belgium	473	29	28	18	Belgium	1 853	29	31	27
Philippines	12 909	30	27	24	Pakistan	409	30	31	24	South Africa	1 812	30	29	29

1. Most 1998 data are estimates, thus the ranking and the rate of increase or decrease may change when final data become available.
2. 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) and that of the Taiwan province of China.
3. Three States — Denmark, Norway and Sweden.
4. Four States — Bahrain, Oman, Qatar and United Arab Emirates.

Source: ICAO Air Transport Reporting Form A-1.

Table 2-7. Top 30 countries or group of countries in 1998 and their ranking in 1997 and 1989 — INTERNATIONAL 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 1998 (millions)	Ranking 1998	1997	1989	Country or group of countries	Estimated 1998 (millions)	Ranking 1998	1997	1989	Country or group of countries	Estimated 1998 (millions)	Ranking 1998	1997	1989
United States	273 473	1	1	1	United States	16 340	1	1	1	United States	41 155	1	1	1
United Kingdom	145 173	2	2	2	Republic of Korea	7 241	2	2	6	United Kingdom	19 006	2	2	2
Japan	85 608	3	3	3	Japan	6 946	3	3	2	Japan	14 905	3	3	3
Germany	83 012	4	4	5	Germany	6 312	4	5	3	Germany	14 531	4	4	4
Netherlands	69 058	5	5	8	United Kingdom	4 829	5	4	5	Republic of Korea	10 929	5	5	8
France	58 513	6	7	4	Singapore	4 818	6	7	8	Netherlands	10 908	6	7	7
Singapore	58 083	7	6	6	France	4 654	7	6	4	France	10 654	7	6	5
Australia	46 526	8	9	7	Netherlands	3 992	8	8	7	Singapore	10 362	8	8	6
Canada	42 071	9	10	9	Luxembourg	2 246	9	9	110	Australia	6 117	9	9	9
Republic of Korea	40 982	10	8	14	Switzerland	2 019	10	10	12	Canada	5 402	10	10	10
Thailand	31 049	11	12	10	Australia	1 793	11	11	10	Switzerland	4 816	11	11	12
Italy	28 867	12	11	12	China[4]	1 657	12	17	21	Thailand	4 355	12	13	13
Switzerland	28 579	13	13	13	Hong Kong SAR	4 228	—	—	—	Italy	4 337	13	12	11
Spain	26 027	14	16	15	Canada	1 586	13	12	11	Brazil	3 633	14	14	16
Brazil	25 521	15	14	17	Thailand	1 553	14	13	17	Gulf States[2]	3 478	15	16	27
Malaysia	25 392	16	15	23	Italy	1 484	15	14	9	Malaysia	3 407	16	15	24
Gulf States[2]	23 911	17	17	24	Malaysia	1 328	16	15	24	Spain	3 038	17	17	14
Scandinavia[3]	17 360	18	20	16	Chile	1 266	17	20	27	China[4]	2 891	18	18	28
Russian Federation	17 108	19	19	—	Gulf States[2]	1 234	18	19	31	Hong Kong SAR	8 315	—	—	—
China[4]	16 565	20	21	30	Brazil	1 221	19	16	14	New Zealand	2 479	19	19	25
Hong Kong SAR	43 039	—	—	—	Israel	1 123	20	18	13	Scandinavia[3]	2 289	20	21	17
New Zealand	16 352	21	18	21	Saudi Arabia	871	21	21	19	Luxembourg	2 287	21	20	107
Belgium	15 338	22	28	28	New Zealand	812	22	22	28	Israel	2 217	22	22	19
India	12 957	23	25	19	Colombia	732	23	24	26	Russian Federation	2 179	23	23	—
Saudi Arabia	12 875	24	24	18	Scandinavia[3]	720	24	23	20	Saudi Arabia	2 030	24	24	18
South Africa	12 867	25	26	34	Spain	702	25	26	16	Belgium	1 853	25	27	21
Indonesia	12 536	26	22	22	Russian Federation	486	26	28	—	Chile	1 848	26	29	40
Israel	12 152	27	27	26	Belgium	473	27	25	15	India	1 608	27	28	20
Austria	11 833	28	30	42	Indonesia	423	28	27	25	Indonesia	1 546	28	25	23
Mexico	11 679	29	29	25	India	411	29	30	18	South Africa	1 407	29	30	35
Philippines	10 475	30	23	20	Pakistan	374	30	32	23	Austria	1 405	30	32	46

1. Most 1998 data are estimates, thus the ranking and the rate of increase or decrease may change when final data become available.
2. Four States — Bahrain, Oman, Qatar and United Arab Emirates.
3. Three States — Denmark, Norway and Sweden.
4. 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) and that of the Taiwan province of China.

Source: ICAO Air Transport Reporting Form A-1.

Table 2-8. Scheduled passenger traffic on world's major international city-pairs
(top 25 city-pairs ranked by international passengers, 1997)

Rank	City-pair	Distance (km)	1997 (thousands)	1996 (thousands)	1997/96 %
1	Hong Kong-Taipei[1]	777	3 820	3 950	-3.3
2	London-New York	5 539	3 325	3 037	9.5
3	Dublin-London	456	3 303	2 986	10.6
4	Amsterdam-London	369	2 655	2 353	12.8
5	London-Paris	346	2 577	2 679	-3.8
6	Kuala Lumpur-Singapore	335	2 499	2 478	0.8
7	Honolulu-Tokyo	6 134	2 337	2 425	-3.6
8	Jakarta-Singapore	906	2 185	2 050	6.6
9	Bangkok-Hong Kong	1 743	2 085	2 275	-8.4
10	Seoul-Tokyo	1 227	2 038	1 911	6.6
11	Hong Kong-Tokyo	2 938	1 880	2 324	-19.1
12	Frankfurt-London	654	1 708	1 610	6.1
13	Bangkok-Singapore	1 444	1 670	1 685	-0.9
14	Taipei-Tokyo	2 182	1 660	1 620	2.5
15	Hong Kong-Singapore	2 578	1 536	1 680	-8.6
16	Hong Kong-Manila	1 126	1 430	1 460	-2.1
17	Los Angeles-Tokyo	8 752	1 337	1 282	4.3
18	New York-Paris	5 833	1 280	1 280	0.0
19	Brussels-London	349	1 279	1 128	13.4
20	Bangkok-Tokyo	4 644	1 234	1 173	5.2
21	London-Milan	936	1 221	1 043	17.1
22	London-Zurich	787	1 220	1 110	9.9
23	Singapore-Tokyo	5 356	1 180	1 209	-2.4
24	London-Rome	1 441	1 158	1 077	7.5
25	London-Los Angeles	8 759	1 117	1 032	8.2
	TOTAL		47 734	46 857	1.9

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

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

Orders and deliveries

2.83 In 1998, 1 463 turbo-jet aircraft were ordered compared with 1 309 in 1997. The financial commitment represented by orders placed in 1998 for these aircraft is estimated to be about $84 billion compared with $78 billion estimated for 1997. In 1998, 929 aircraft were delivered, compared with 674 in 1997. The backlog of unfilled orders increased from 3 062 aircraft at the end of 1997 to 3 565 aircraft at the end of 1998. The status of orders and deliveries for the year 1998 is shown in Table A1-2 in Appendix 1, which gives data by manufacturer and model for turbo-jet and turboprop aircraft.

2.84 The turbo-jet types shown in Table 2-10 were most active in 1998 in terms of orders and deliveries, accounting for about 84 per cent of the orders and for about 72 per cent of the deliveries made, and 80 per cent of the backlog of unfilled orders in 1998. The number of turboprop aircraft ordered in 1998 was 78, and 126 aircraft were delivered during the year. The backlog of turboprop aircraft was 171 at the end of the year.

Table 2-9. Estimated international non-scheduled revenue passenger traffic (1997 and 1998)

Category	1997 Pass.-kms performed (millions)	1997 Percentage of total carriers	1997 Percentage of total traffic	1998 Pass.-kms performed (millions)	1998 Percentage of total carriers	1998 Percentage of total traffic	Annual change (%) 1998/97
Scheduled carriers	122 900	51	—	112 200	49	—	-8.7
Non-scheduled carriers	118 000	49	—	118 000	51	—	0.0
TOTAL NON-SCHEDULED TRAFFIC	240 900	100	14.1	230 200	100	13.2	-4.4
TOTAL SCHEDULED TRAFFIC	1 468 200	—	85.9	1 510 770	—	86.8	2.9
TOTAL TRAFFIC	1 709 100	—	100.0	1 740 970	—	100.0	1.9

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

Table 2-10. Main aircraft types ordered and delivered (1998)

Aircraft	Orders	Deliveries	Backlog
Airbus A319/320/321	412	167	986
Boeing 737	354	281	959
Canadair RJ	179	63	262
Embraer EMB-145	86	60	158
Boeing 777	70	74	250
Boeing 717	65	—	115
Airbus A340	60	23	113

Source: Aircraft manufacturers.

Composition

2.85 Between 1989 and 1998, 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 60 per cent, from 11 353 to 18 139, as shown in Table 2-11. During this period, the number of jet aircraft increased from 8 696 to 14 479, rising from about 77 per cent to 80 per cent of the fleet, while turboprop aircraft increased from 2 073 to 3 372, a marginal rise above 18 per cent of the fleet. On the other hand, the number of piston-engined aircraft declined by almost 49 per cent, from 584 to 288, and now constitutes less than 2 per cent of the total world fleet.

2.86 BACK Information Services reported that, as at the end of 1998, there were 499 western-built commercial jets in storage, including nine Caravelles and one Concorde, compared with 548 jets at the end of the previous year. The number of wide-bodies remained virtually the same, 204 against 203 in 1998, with A300s, 747s, D-10s and L1011s accounting for 85 per cent of aircraft in the group. Among narrow-bodies, 727s and 737s contributed nearly half the aircraft in the group. The number of western-built jets available for sale or lease increased for the second year in a row from 344 in December 1997 to 408 in December 1998. The number of wide-bodies available grew to 185 or by 37 per cent while the increase in the narrow-bodies was not significant. The 1996-97 trend to lower market prices for commercial jets was even more pronounced in 1998 affecting nearly all aircraft models with just a few exceptions for some new aircraft.

Leasing developments

2.87 By the end of 1998, airlines leased well over 2 200 jet aircraft from leasing companies. Two leasing companies based in the United States continued to dominate the market: in October 1998, General Electric Capital Aviation Services was managing 777 transport jets with maximum take-off weight more than 9 tonnes and International Lease Finance Corporation was managing 420 aircraft. Considering all types of leases, the share of the western-built jet fleet leased by airlines is approaching 50 per cent.

Table 2-11. Commercial transport fleet[1] at year end (1989, 1997, 1998[2])

	TURBO-JET		TURBOPROP		PISTON ENGINE		
Year	Number	Percent-age	Number	Percent-age	Number	Percent-age	Total aircraft all types
1989	8 696	76.6	2 073	18.3	584	5.1	11 353
1997	13 627	79.1	3 291	19.1	299	1.7	17 217
1998	14 479	79.8	3 372	18.6	288	1.6	18 139

1. Aircraft having a maximum take-off mass of less than 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.

2.88 During 1998, the strong recovery of market operating lease rates continued, confirming a growing popularity of leasing among airlines. Lease rates for most of the wide-body aircraft showed double-digit percentage increases, for many older models exceeding 30 per cent. The leasing rates for Chapter 3 narrow-body aircraft fluctuated depending on the type of aircraft.

AIRCRAFT AND ENGINE MANUFACTURING

Aircraft developments

2.89 In the high-capacity long-range aircraft category, the Boeing Commercial Airplane Group settled during 1998 on a design configuration for the next version of the 747 family, the 747-400X with a maximum take-off weight of 409.5 tonnes and a range of 14 300 kilometres. The aircraft could be in service in less than two years after its launch in late 1998. External dimensions and interior configuration of the new model will be the same as the existing 747-400 model for both versions, passenger (416 seats in three classes) and combi (266 seats and seven main-deck cargo pallets). Boeing intends to terminate the production of the MD-11 tri-jet by February 2000 because of weak demand for this aircraft which was originally built by McDonnell Douglas. Airbus Industrie started deliveries of the wide-body A340-8000, a 260-seat derivative of the A340-200 with increased take-off weight and range extended to 14 800 km. With the fabrication of the first A340-600 commencing in July and an expected type certification early in the year 2002, the Airbus A340-500/600 programme stayed on track (range/three-class seating for A340-500 and A340-600 models will be respectively 15 750 km/313 seats and 13 900 km/380 seats). In the Russian Federation, the 92-tonne-payload Ilyushin Il-96T freighter (range 14 000 km), equipped with Pratt & Whitney engines and Rockwell Collins avionics, obtained the basic type certification in March but some cockpit tests remained to be completed before full approval could be given.

2.90 Airbus Industrie shifted the target date of the entry into service for its Very Large Commercial Transport aircraft, A3XX, from late 2003 to the third quarter of 2004. Applications for type certification were made to the European Joint Aviation Authorities (JAA) in January and to the United States FAA in September. In May, Airbus signed a memorandum of understanding (MoU) with General Electric/Pratt & Whitney Engine Alliance to offer their new engine GP7000 on the A3XX (a similar MoU was signed in October 1996 with Rolls-Royce in respect of the Trent 900 engine). The double-decker-family concept includes a basic A3XX-100 model (555 seats, 14 100 km range), a smaller A3XX-050 model (480 seats), a stretched A3XX-200 model (nearly 1 000 seats in a one-class, high-density layout), two extended-range models, two short-range models, a freighter and a combi.

2.91 The world's longest airliner (73.8 metres) and the heaviest twin jet (299.4 tonnes of take-off weight), the Boeing 777-300, powered by Rolls-Royce Trent 892 engines, was delivered in May to the launch carrier, Cathay Pacific. The economic downturn in Asia was cited as the main reason behind Boeing's revision of its twin-aisle aircraft development strategy. As a result, the entry-into-service date for the 777-200X/300X growth versions slipped from

September 2000 to mid-2002. Two versions of the latest model of the long-haul Airbus Industrie A330-200 twin jet, powered by General Electric CF6-80E1 or by Pratt & Whitney PW4000 engines, entered commercial service. The A330-200 model is a shortened derivative of the A330-300 model with maximum take off weight of 230 tonnes, 253 seats in a three-class accommodation and 12 000 km range. The third version, powered by Rolls-Royce Trent 700 turbofans, took to the air in June and delivery is commencing in 1999. Boeing's production of a comparable aircraft category, the 767-400ER (261 seats in a three-class layout and 11 500 km range) was on schedule, aiming at rollout in August 1999 and first delivery in May 2000.

2.92 The 1998 developments in the mid-size medium-haul aircraft market were related mostly to Boeing aircraft. The longest single-aisle jet to date (54.5 metres), the 757-300, took to the air in August with its certification expected in January 1999. The smallest member of the "Next-Generation" 737 aircraft family (110- to 132-seater 737-600) was certificated by the FAA in August and by the JAA in September; it was delivered to the launch customer the same month. The 128- to 149-seat 737-700 obtained JAA certification in February after changes were made to increase stall warning (the FAA's certification was granted in November 1997). The 737-800 (160 to 189 seats) also earned type certification from both the FAA (March) and the JAA (April) and entered service. Flight-testing and certification schedule for the 737-900 (177 to 189 seats) was being finalized with deliveries envisaged in 2001.

2.93 An international programme, financed and coordinated by an Egyptian company with Lufthansa Technic providing technical support, resulted in the Tupolev Tu-204, the first Russian-built airliner to start its commercial life outside the Commonwealth of Independent States. The Tu-204-120 (up to 210 passengers, 6 300 km range) is equipped with Rolls-Royce RB211-535E4 engines, western avionics, interior, tires and other equipment. It received Russian certification in February and was delivered in November to the launch customer, a new Egyptian carrier, Air Cairo. The JAA certification of both versions, passenger and freighter, was targeted for the end of 1999. Russian Myasishchev design bureau started to offer the GP-60 high altitude (13-15 km) lifting body fuselage aircraft in various sizes with a capacity for up to 500 passengers and a range of 5 000-15 000 km, depending on the payload.

2.94 The re-engined Boeing 717-200, a 106-seat (two class) twin jet with a 2 540 km range (up to 3 350 km for an extended-range version) formerly known as the McDonnell Douglas MD-95, flew for the first time in September, some three months later than originally scheduled due to engine certification problems; its revised entry into service was scheduled for the second half of 1999. Airbus Industrie announced in September a commercial launch of the A318, a 107-seat twin jet, known initially also as A319M5 (A319 reduced by five fuselage frames); it is expected to enter into service by mid-2002.

2.95 With regard to the regional aircraft market, three new models of existing aircraft had their maiden flights in 1998: a) in January, the Bombardier de Havilland Dash 8Q-400, a 70-seat high-speed twin-turboprop Dash 8 derivative (certification expected in the first quarter of 1999); b) also in January, the 32-seat twin jet Fairchild Dornier 328 JET, a

development of the Do-328 turboprop (certification expected in February 1999); and c) in July, Embraer's 37-seat twinjet ERJ-135, a derivative of the 50-seat ERJ-145 (certification expected in May 1999).

2.96 In 1998, the United States-German regional aircraft manufacturer Fairchild Dornier launched: a) in May, the 428JET, a stretched 44-seat version of the 328 JET (certification expected in December 2000); b) also in May, the new 528/728/928 JET family based on a 75-seat 728 JET (certification expected in the first quarter of 2001); c) the 55-seat 528 JET (certification expected in 1999); and d) the 90-seat 928 JET which is expected to evolve into a 105- to 110-seat aircraft. Feasibility studies commenced on at least six other new projects involving the French-Italian group ATR, Bombardier, British Aerospace, a consortium of aircraft manufacturers in China, Embraer, and the Japan Aircraft Development corporation. Furthermore, a plan to relaunch Fokker 70/100 jet production advanced.

2.97 Manufacturers of regional aircraft from the Commonwealth of Independent States (CIS) also launched new products. The first production of a 64-seat twin-turboprop Ilyushin Il-114, manufactured in Uzbekistan, was delivered in August to the national air carrier, Uzbekistan Airways. In the Russian Federation, the Beriev Be-200 multi-purpose twin jet amphibian (64 seats in a passenger layout) had its first flight in September. Sukhoi design bureau started to display a new 26-seat S-80 twin-boom aircraft, powered by two General Electric CT7-98 turboprop engines, to potential customers and has planned delivery for late 1999 or early 2000. In November, Ukranian aircraft manufacturer Antonov signed an agreement with the Iranian Government to assemble up to 80 of its 52-seat An-140 twin turboprop aircraft in Iran. Earlier in the year, two Antonov prototypes began flight trials with full type certification planned for September 1999. By the end of 1998, Tupolev, another CIS aircraft manufacturer, negotiated with Iran a licensed production of the 100-seat Tu-334 twin jet. In the Russian Federation, a consortium of aircraft and engine manufacturers and research institutes headed by the Sukhoi design bureau, started development of the Very Large Commercial Transport aircraft KR-860 which would carry as many as 860 to 1 000 passengers for 14 000 km.

2.98 In July, the European Aero International consortium created in 1995 by Aerospatiale of France, Alenia of Italy and British Aerospace, was dissolved, following the consortium's December 1997 decision to abandon the joint project to build a family of regional jets based on a 70-seater. Aerospatiale and Alenia, former partners in ATR (Avions de Transport Regional), restructured their corporation, not only to market and support its line of ATR turboprops, but also to include engineering, design and manufacturing. A feasibility study to develop a new ATR family of regional jets was renewed. In Asia, two international projects were abandoned: a) the one-year old programme to build a 100-seat AE31X regional airliner of which Aviation Industries of China owned 46 per cent; and b) the four-year old MD-90 Trunkliner programme, initially meant to build 40 aircraft in China, was scaled down in 1996 to just 20 airframes of which only three will be finally assembled.

Engine developments

2.99 The engine industry also continued its quest for technological advances. The most powerful engine in commercial aviation PW4098, the 436kN-thrust version of the Pratt & Whitney 4000 family, made its first test flight in February and was certified by the FAA in

July. However, technical problems during final simulated take-offs forced the manufacturer to recertify the engine. Rolls-Royce started the test runs of the 454kN-thrust Trent 8104, developed for the proposed 777-200X/300X aircraft, and reported test results of a thrust of 490kN. General Electric completed initial tests of an upgraded GE90 compressor as part of its Performance Improvement Program. The Program's goals are to reduce specific fuel consumption (SFC) by 1.7 per cent, to increase thrust to 414kN, to lower exhaust gas temperature by about 20°C and to increase on-wing life of the engine. Key to the improvement was the use of advanced "three dimensional" (3D) aerodynamic design methods on the vanes, blades and variable stators of the 10-stage high-pressure compressor. The target certification date for this engine had been set for December 1999 and expected entry-into-service on the 777-200ER around June 2000. Rolls-Royce also introduced 3D blade design technology on its two new engines under development, the Trent 500, the sole power plant for A340-500/600, and the Trent 8104, claiming the technology provides a SFC reduction of up to 2 per cent. In April, a "hybrid" Rolls-Royce RB211-524HT, the RB211-524G/T version with a Trent 700 core, entered revenue service on a 747-400, showing a 2 per cent improvement in SFC and a 40 per cent reduction in oxides of nitrogen (NO_x) emissions.

2.100 In September, Pratt & Whitney announced the launch of a new engine generation to power aircraft with 90 to 200 seats. This generation's core model, the PW6000 for the 71kN to 107kN thrust range, had been designed specifically for the high-cycle operations of the short-haul market (certification scheduled for March 2001). It was promoted as the initial engine for the proposed A318, an industrial launch of which was expected in early 1999, upon placement of a sufficient number of aircraft orders by airlines. The PW6000 core will be used as a building block for the 111kN- to 156kN-thrust PW8000 geared turbofan (fan blades of which had also been developed with 3D aerodynamic code). It is configured for aircraft with seating capacity from 120 to 200 passengers and might enter into service by 2003.

2.101 The BMW Rolls-Royce 83kN-thrust BR715 turbofan, developed from the BR710 and powering Gulfstream 5 and Bombardier Global Express long-range business jets, received JAA and FAA certification in August and September, respectively. It started to fly on the Boeing 717, the only airframe application to date for this engine which has growth potential up to 102 kN and is intended for 90- to 130-seat regional aircraft. General Electric started to flight test the 61kN-thrust CF34-8C1 engine developed for the Canadair regional jet CRJ-700. In September, another United States manufacturer, AlliedSignal, launched the development of an all new family of engines in the 18-40kN thrust range to power both new and existing regional and business airliners; FAA certification was expected in the first quarter of 2001.

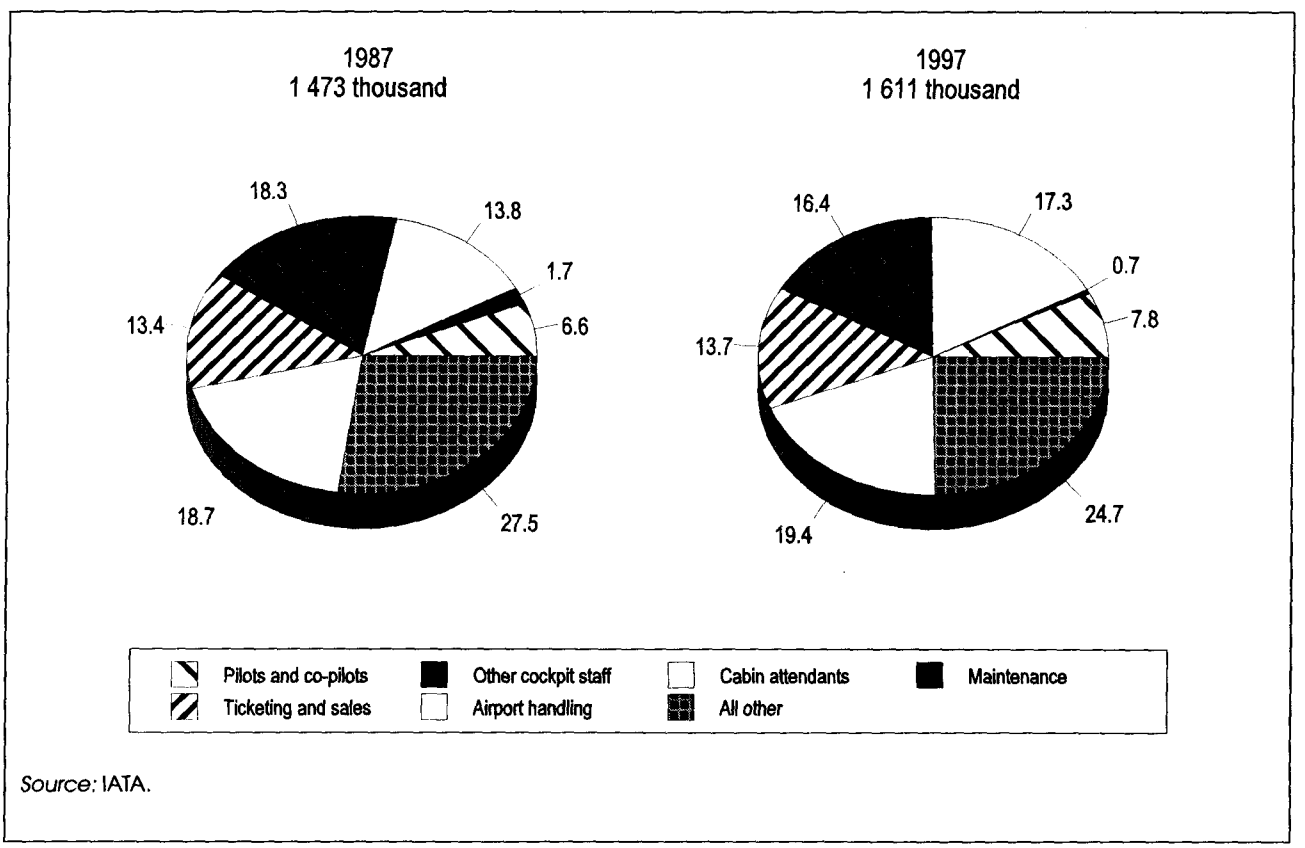
2.102 Engine manufacturers were employing advanced technologies to address noise and emission performance, two factors gaining more and more importance in air carriers' choice of power plants. To reduce noise, the manufacturers were examining a number of fan technologies aimed at increasing unit efficiency and bypass ratios. The major efforts to cut emissions in 1998 were directed at combustor improvements. Rolls-Royce has completed work on a new combustor for the RB211-535E4, a scaled down variant of the Trent engines' combustor, demonstrating a 40 per cent reduction in NO_x emission and expected to be fitted to the power plants of the first Boeing 757-300. The General Electric emission target was to cut NO_x output by 30 per cent without affecting engine durability and operability. The company has been working on a new single-annular combustor which is more efficient than

presently staged, double-annular combustors needed to ensure low emission. A German propulsion long term (up to 2010) research programme, dubbed Engine-3E (3E for environment, economy and efficiency), focused on a geared high-bypass engine, for which goals of emission reduction were set for noise at 10dB (compared with a turbofan engine with a bypass ratio of 6.0) and for NO_x at 85 per cent below the 1995 ICAO standard.

PERSONNEL

2.103 In 1997 an estimated 1.9 million employees worked for 450 commercial air carriers around the world, a 2.4 per cent increase over the previous year (1998 data were not available at the time of writing). Overall labour productivity (TKPs/per employee) rose at an average five per cent annually from 1987 to 1997.

2.104 For 1987 and 1997, Figure 2-2 compares the composition of IATA airline personnel by occupational groups. There was a slightly increased proportion of pilots and airport handling staff. The share of cabin attendants expanded notably and reflects the high growth rates for passenger traffic, particularly on international routes. Despite growing fleets, the



Source: IATA.

Figure 2-2. Airline personnel by occupational groups — World (1987 and 1997)

number of maintenance personnel hardly changed in absolute terms (thus falling in terms of share) largely due to technologically-induced productivity gains through computer-based diagnostic procedures and exchange of pre-manufactured components, but also reflecting sub-contracting of this function to specialized maintenance bases run by independent corporations. The introduction of fly-by-wire avionics and other automated equipment as well as procedures on flight decks of modern aircraft contributed to redundancy affecting "Other cockpit staff".

2.105 Trade unions in all regions are becoming increasingly concerned about the immediate and long-term effects of both domestic and international airline alliances. Job security is becoming an issue related to consolidation of services and joint purchasing (for example, in aircraft parts and catering) as well as outsourcing. A Star Alliance Trade Union meeting was held in 1998 during which various trade unions, including the Association of Star Alliance Pilots, started to explore their cooperation potential in the airline alliance concerned.

FINANCES

Financial results

2.106 Preliminary estimates for 1998 indicate that the world's scheduled airlines as a whole experienced an operating profit of 5.5 per cent of total operating revenues, compared with 5.6 per cent in 1997. This is the sixth successive year of operating profit following three years of operating losses (1990-1992). The operating revenues of scheduled airlines (excluding operations within the CIS) are tentatively estimated at $298.5 billion in 1998, an increase of about 3 per cent compared with the $291.0 billion earned in 1997. Expressed in United States currency, operating revenues per tonne-kilometre performed increased from 80.8 cents in 1997 to an estimated 81.6 cents in 1998, despite a decline in yield in Asia and Latin America. The operating expenses for the same airlines are tentatively estimated at $282.0 billion in 1998, an increase of about 3 per cent over the $274.7 billion incurred in 1997. Operating expenses per tonne-kilometre performed increased by 1 per cent from 76.3 cents in 1997 to 77.1 cents in 1998. Low aviation fuel prices and the continuing efforts by airlines around the world to reduce their costs contributed to keeping in check operating expenses per tonne-kilometre performed.

2.107 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 1998, the estimated operating profit of about $16.5 billion was almost the same as the operating profit of $16.3 billion in 1997. The operating profit in 1998 reflects a generally healthy economy in most regions of the world. At the same time capacity increases for passenger services continued to be kept in check. The average passenger load factor was 69 per cent, similar to that in 1997.

2.108 In 1998, the United States scheduled airlines ("majors" and "nationals") as a group accounted for about 37 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 1998 was a profit of $9.1 billion, a slight increase from the profit of $8.6 billion experienced in 1997. For the airlines of the rest of the world combined (excluding operations within the CIS), the preliminary estimated operating profit in 1998 was $7.4 billion, slightly lower than the operating profit of $7.7 billion shown for 1997.

2.109 The net result is derived from the operating result by taking into account the non-operating items and taxes. Preliminary estimates suggest that in 1998 the net result for the world's scheduled airlines is expected to show an improvement over 1997 due to low interest rates, improved airline balance sheets and reduced long-term debt. Information on both operating and net results over the period 1987-1998 and distribution of operating revenues and expenses by item in 1987 and 1997 may be found in Tables 5-4 and 5-5 in Chapter 5.

2.110 The estimates of the world's scheduled airlines as a whole do not portray the considerable difference in results achieved by individual airlines. In 1997 (complete data were not available for 1998 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, experienced positive or break even aggregated operating results in 1997, with operating profits expressed as a percentage of operating revenues ranging from a high of 8.0 per cent for airlines in North America to break even for those based in Africa and the Middle East. Net results ranged from a surplus of 5.1 per cent of operating revenues for airlines based in North America to a net loss of 4.7 per cent of operating revenues for those in the Middle East (Figure 2-3).

2.111 Available data on non-scheduled carriers are insufficient to produce accurate financial estimates for 1998. In 1997 the operating revenues of the non-scheduled carriers were tentatively estimated at $8.4 billion compared with $8.2 billion earned in 1996. In 1997 these carriers, as a group, had an operating profit estimated at $0.6 billion and a net result, after taking into account the non-operating items and taxes, of some $0.3 billion.

Consolidated balance sheet

2.112 At the end of the fiscal year 1997 (1998 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 $350.9 billion, compared with $341.3 billion at the end of the fiscal year 1996 (Table 2-12). Of these, 26 per cent were represented by current assets, some 58 per cent by fixed assets and the remainder by other assets.

2.113 At the end of 1997, the net value of the aircraft fleet (i.e. after depreciation charges) was $161.7 billion, compared with $159.7 billion at the end of 1996, representing an increase of 1.2 per cent, accounting for about 46 per cent of total assets. Accumulated depreciation charges stood at about $137.7 billion of which $105.6 billion were for the aircraft fleet, representing some 40 per cent of the gross value of the fleet. The remaining accumulated depreciation charges covered ground property and equipment and represented some 53 per cent of their gross value.

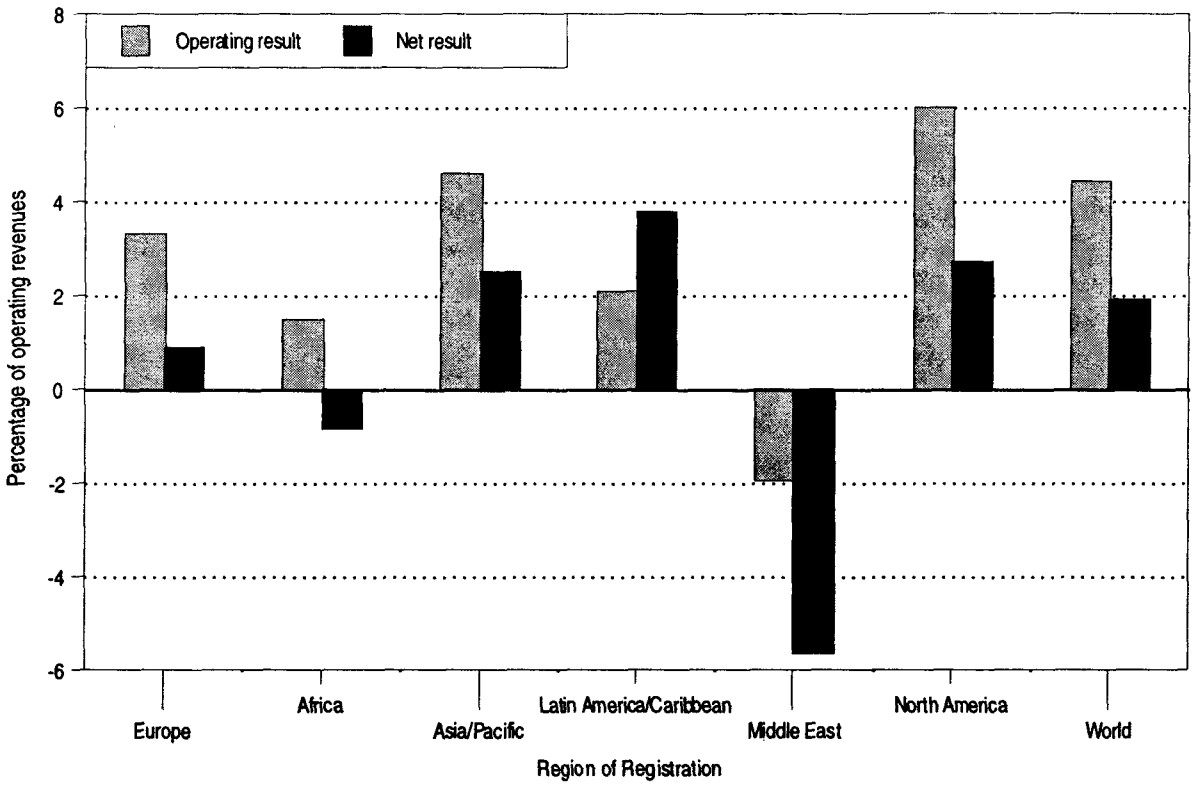


Figure 2-3. Financial results by region — scheduled airlines (1997)

2.114 Between the fiscal years 1996 and 1997, the value of stockholders' equity increased by some 7 per cent (from $70.1 billion to $75.3 billion), and in relative terms, it remained at 21 per cent of total liabilities. During the same period long-term debt increased from $109.8 billion to $112.3 billion and, in relative terms, it accounted for 32 per cent of total liabilities. At the end of the fiscal year 1997 current liabilities, including unearned transportation revenue, stood at $99.8 billion, or some 28 per cent of total liabilities, compared with some 30 per cent in 1996. Unearned transportation revenue represented about 6 per cent of total liabilities and some 7 per cent of total traffic revenue for 1997.

2.115 Long-term trends in the balance sheet elements may be discerned from comparing the figures for 1997 with those for 1989, which are also contained in Table 2-12. At the end of the fiscal year 1997, total assets stood at $350.9 billion compared with $203.4 billion at the end of 1989. Relative to the totals, the most significant difference between 1989 and 1997 is the decrease in the proportion of current assets (from 30 to 26 per cent of the total) and the corresponding increase in other assets. The proportion of fixed assets is virtually the same in both years (57 per cent of total assets in 1989 and 58 per cent in 1997); however there was a slight relative increase in investment in flight equipment (from about 43 per cent of total assets in 1989 to 46 per cent in 1997), and a reduction in the relative amount represented mainly by ground property and equipment (from 10 per cent in 1989 to 8 per cent in 1997).

2.116 As regards liabilities, between 1989 and 1997 there was a slight reduction in the proportion of current liabilities including unearned transportation revenue (from 30 to 28 per cent of total liabilities) and in stockholders' equity (from 22 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 the reserves.

Table 2-12. Consolidated balance sheet — Scheduled airlines of ICAO Contracting States[1] (End of fiscal years 1989, 1996 and 1997)

	1989		1996		1997	
	U.S.$ (millions)	% of total	U.S.$ (millions)	% of total	U.S.$ (millions)	% of total
ASSETS						
Current assets	61 910	30	86 400	25	89 550	26
Fixed assets						
Flight equipment	86 490	43	159 720	47	161 700	46
Ground property and equipment	19 680	10	28 780	8	28 230	8
Land	900	0	3 860	1	3 810	1
Investments in affiliated companies	8 770	4	10 160	3	10 440	3
Other assets	25 640	13	52 420	15	57 140	16
TOTAL ASSETS	203 390	100	341 340	100	350 870	100
LIABILITIES						
Current liabilities						
Current liabilities	48 220	24	83 610	24	79 980	23
Unearned transportation revenues	12 460	6	17 420	5	19 770	6
Long/medium-term liabilities						
Long-term debt	64 110	32	109 750	32	112 300	32
Other medium/long-term liabilities	34 080	17	60 420	18	63 490	18
Stockholders' equity						
Share capital	14 730	7	27 170	8	26 200	7
Other capital	29 790	15	42 970	13	49 130	14
TOTAL LIABILITIES	203 390	100	341 340	100	350 870	100
ACCUMULATED DEPRECIATION						
Flight equipment	58 530	76	104 050	77	105 620	77
Ground property and equipment	18 050	24	31 660	23	32 120	23
TOTAL ACCUMULATED DEPRECIATION	76 580	100	135 710	100	137 740	100

1. Excludes domestic operations within the CIS

Source: ICAO Air Transport Reporting Form EF-1.

Chapter 3
Airports and Air Navigation Services

3.1 This chapter discusses developments in 1998 in the management and organization of airports and air navigation services, in the infrastructure, traffic and finances of airports, and in financial and technical aspects of air navigation services.

MANAGEMENT AND ORGANIZATION

Airports

3.2 The year 1998 saw accelerated activity at the government level towards establishing autonomous entities to operate airports, and growing emphasis being placed on more active private involvement in airport operations, management and financing.

3.3 In Canada, further implementation of government plans added London and Sault-Sainte Marie (Ontario), St. John's (Newfoundland), and La Ronge (Saskatchewan) airports to those previously transferred from the Federal Government to local autonomous operators, while discussions were still under way for the transfer of Halifax (Nova Scotia). In the United States, a 99-year lease contract within the framework of the Federal Aviation Administration's pilot project for private involvement in five airports was awarded for the management of Stewart airport (New York) to a subsidiary of a United Kingdom firm; the possibility was raised of the non-renewal of the lease for J.F. Kennedy, La Guardia and Newark airports held by the Port Authority of New York and New Jersey when it expires in 2015 and the subsequent privatization of these airports. BAA (United Kingdom) increased its involvement in U.S. airport operation with a 10-year contract for Harrisburg airport (Pennsylvania).

3.4 Privatization projects completed in 1998 in Europe include Karlovy-Vary (Czech Republic), where the operation of the airport was awarded under an agreement to a private company; the new cargo airport of Europort Vatry (France), for which a 20-year concession was awarded to an international consortium led by French and Canadian interests; the regional airport of Friedrichshafen (Germany), sold to a local company; Rimini (Italy), in which SEA of Milan bought a 30 per cent share; Eindhoven (Netherlands) where the Amsterdam airport authority acquired a 51 per cent share; Maribor (Slovenia), in which new ownership was shared between the State (51 per cent) and a private company (49 per cent); Stockholm-Skavsta (Sweden), where United Kingdom interests hold a 90 per cent share; and London-Luton, and Glasgow-Prestwick airports (United Kingdom), both held 100 per cent by private United Kingdom interests. Privatization or commercialization plans were under way for a number of other airports, including Brussels (Belgium); Hamburg and Hannover

(Germany); Bologna, Catania, Florence, Milan, Rome, Turin, and Venice (Italy); Gdansk (Poland); seventeen airports in Romania; a number of small airports in Slovakia; four airports in Turkey; Zurich (Switzerland); and Humberside (United Kingdom). Also in Italy a merger was being contemplated between the entities managing the airport systems of the two main cities (Rome and Milan).

3.5 In Latin America, a 50-year concession for operating a group of Mexican airports (nine airports of the South-East group, including Cancun) was sold for U.S.$ 116 million in late 1998 to an international consortium, including Copenhagen airport. In Chile, a 15-year "Build, operate and transfer" (BOT) contract to operate Santiago airport was awarded to Vancouver Airport Services of Canada. Privatization, commercialization and/or creation of autonomous operators were also under way in Colombia (Cali); Costa Rica (San José); Guatemala (two airports); Honduras (four airports); Jamaica (two airports); Mexico (for the three other groups of airports, consisting of a combination of profitable and non profitable airports); Panama (Panama-Tocumen); Peru (five airports, including Lima); and Uruguay (Montevideo).

3.6 In Africa, Algiers airport (Algeria) will be managed by a new local entity, SIGA, under a BOT scheme for a period of 30 years; and in Egypt, El Alamein airport will also be managed under a BOT scheme, while the operation of Terminal Three at Cairo airport under a BOT scheme is being considered. In the United Republic of Tanzania, a joint venture with United Kingdom interests will manage and develop Kilimanjaro airport.

3.7 In Asia/Pacific, plans are still under way for a number of privatization/ corporatization projects in: China (Tianhe, Wuhan); India (for five international and five major domestic airports); Pakistan (for nineteen airports); Thailand (for the five main airports); and Uzbekistan (Tashkent). In New Zealand, the State's 66 per cent stake in Wellington airport was sold to local interests and the float of Auckland airport shares was most successful (with 80 per cent of the shares being held by New Zealand interests), while plans were under way to partially privatize Christchurch airport. In Australia, the privatization process continued: a consortium led by the AGI group was the successful bidder for the concession to operate the airports of Darwin, Alice Springs and Tennant Creek, while the concession to operate Adelaide and Coolangatta (Gold Coast) was purchased by a consortium led by Manchester airport (United Kingdom), and Canberra, Townsville, Launceston and Mount Isa each went to a locally led consortium; each airport was sold under a 50-year lease contract with an option for 49 more years, and foreign ownership was limited to 49 per cent; the government maintains strict regulatory requirements, including controls on landing charges.

3.8 The new trend towards airport cooperative strategies or alliances continued. For example: Amsterdam and Zurich airports were considering acquiring shares in the new entity managing Brussels airport; and the Paris airport authority and Liege airport signed an alliance to develop complementarity in air freight matters and take advantage of high-speed rail links between the two urban areas concerned.

3.9 The increased utilization by low fare air carriers of secondary airports located in the vicinity of large conurbations, as a means of by-passing congested airports, is also a

noteworthy development. Examples of this trend can notably be found in France, with Beauvais and Pontoise airports near Paris, in Sweden, with Skavsta airport near Stockholm, and in Belgium, with Charleroi airport (now called Brussels-South). Most of the time, these airports are served by low-cost airlines which take advantage of the lower airport fees charged by secondary airports.

Air navigation services

3.10 The trend towards providing air navigation services through autonomous entities continued in 1998, as evidenced by the growing number of members (eighteen) of CANSO (Civil Air Navigation Services Organisation). In the United States, plans are for air traffic services to be provided by a self-financing autonomous unit to be created for that purpose. In the United Kingdom, plans to sell the National Air Traffic Services (NATS) Ltd. to a public-private company are under consideration. In Belgium, Belgocontrol, a new air traffic control authority (State-owned) was created in October 1998. In Thailand, the provision of all air traffic control services was handed over to the State-run Aerothai company, removing approach and aerodrome control services from the responsibility of the Department of Aviation. In the South Pacific, the joint management of airspace over a number of sovereign island States and territories and the high seas is currently being studied.

MAJOR AIRPORT PROJECTS

3.11 At the end of 1998 there were 1 178 airports in the world open to international civil aviation. Three regions accounted for almost 80 per cent of all new airport projects completed, under construction or projected in 1998: Asia, Europe and Africa. During the year, three new major airports were completed: Hong Kong-Chek Lap Kok (China); Kuala Lumpur-Sepang (Malaysia); and Oslo-Gardermoen (Norway); while in the Middle East region the airport serving the Gaza strip was inaugurated. Work started or continued (planned completion dates shown in brackets) on major new airport projects at Haikou-Meilan (1999), Shanghai-Pudong (1999), and Guangzhou-Huadu (2005 – all in China); Athens-Spata (2001) (Greece); Cochin (1999) (India); Fukuoka, Kobe (2004) and Nagoya-Chubu (2005) all in Japan; Yangon (formerly Rangoon) and Mandalay (1999) (Myanmar); Doha (1999) (Qatar); Seoul-Inchon (2001) (Republic of Korea); Istanbul-Kurtkoy (2000) (Turkey); and Austin-Bergstrom (1999) (United States).

3.12 Plans were announced or continued to be studied for new international airports to serve the following cities: Buenos Aires (Argentina); Nice (France); Mumbai (formerly Bombay), Goa, Chennai (formerly Madras) and Bangalore (India); Tel-Aviv (Israel); Mexico City (Mexico); Amsterdam (Netherlands); Lahore (Pakistan); Warsaw (Poland); Khartoum (Sudan); Tunis (Tunisia); Kampala (Uganda); Dubai-Jebel Ali (United Arab Emirates). Plans for second airports for Sydney (Australia), Toronto (Canada), and Bangkok (Thailand) were revived. At the regional level, plans were announced for new international airport developments in the following countries: Denmark (Jutland region); Dominica; Greece (Thessaloniki, Meteora, Ierapetra); Ireland (Midland region); Israel (Nevatim); Mauritius (on

the north of the island); Saudi Arabia (Dawadmi); Spain (Ciudad Real); United Republic of Tanzania (Zanzibar); Turkey (Alanya); Vietnam (in the south-east part of the country).

3.13 Major airport expansion projects were also under way in all regions in 1998, with Europe accounting for the largest share of the projects.

3.14 New terminals or terminal expansions were completed during the year, notably at the airports of Rio de Janeiro (Brazil); Copenhagen (Denmark); Paris-Ch. De Gaulle (France); Budapest (Hungary); Tokyo-Narita (Japan); Beirut (Lebanon); Seoul-Kimpo (Republic of Korea); Bucuresti (Romania); New York (United States); and at a number of airports in Germany (Berlin, Bremen, Hannover, Stuttgart) and the United Kingdom (Belfast, Leeds/Bradford, Manchester, Sheffield). New terminals or significant terminal expansion works were under construction at a number of airports around the world, notably: Sydney (Australia); Rio de Janeiro (Brazil); Sofia (Bulgaria); Ottawa and Toronto (Canada); Santiago (Chile); Abidjan (Côte d'Ivoire); Addis Ababa (Ethiopia); Helsinki (Finland); Nice and Paris-Ch. De Gaulle (France); Dusseldorf, Leipzig, Nuremberg, Saarbrucken and Stuttgart (Germany); Accra (Ghana); Tel Aviv (Israel); Rome-Fiumicino (Italy); Nagoya and Osaka-Kansai (Japan); Riga (Latvia); Luxembourg (Luxembourg); Amsterdam (Netherlands); Christchurch (New Zealand); Muscat (Oman); Lahore (Pakistan); Manila (Philippines); Warsaw (Poland); Moscow-Domodedovo (Russian Federation); Durban and Johannesburg (South Africa); Geneva (Switzerland); Basel/Mulhouse (Switzerland/France); Bangkok-Dong Muang (Thailand); Tunis (Tunisia); Istanbul-Ataturk (Turkey); Birmingham and Edinburgh (United Kingdom); Honolulu, New York, Orlando, Philadelphia, Phoenix, San Francisco, San José, San Juan and Stewart (United States); and Tashkent (Uzbekistan).

3.15 Runway capacity was added at Paris-Ch. De Gaulle (France); Beirut (Lebanon); and Madrid (Spain) in 1998, with additions under construction at: Hong Kong-Chek Lap Kok (China); Helsinki (Finland); Paris-Ch. De Gaulle (France); Leipzig (Germany); Denpasar (Indonesia); Osaka-Kansai (Japan); Stockholm-Arlanda (Sweden); Abu Dhabi (United Arab Emirates); and Phoenix (United States). In addition, a number of projects for new runways were announced, notably for: Buenos Aires (Argentina); Brisbane and Melbourne (Australia); Vienna (Austria); Brasilia (Brazil); Havana (Cuba); Cairo (Egypt); Tokyo-Narita (Japan); Astana (Kazakhstan); Beirut (Lebanon); Male (Maldives); Amsterdam and Maastricht (Netherlands); Muscat (Oman); Moscow-Sheremetyevo (Russian Federation); Barcelona, Malaga and Tenerife-Sur (Spain); Antalya (Turkey); Ashkhabad (Turkmenistan); and San Francisco and St. Louis (United States).

AIRPORT TRAFFIC

3.16 The 25 largest airports in the world in terms of passenger throughput, 17 of which are located in the United States, handled a combined total of about 992 million passengers in 1998 (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 109 000 passengers every twenty-four hours. These 25 airports also handled a combined total of about 11 million aircraft movements in 1998, corresponding to an average per airport of one take-off or landing every 71 seconds.

3.17 There are significant differences between the rankings of airports by passengers and by movements. For example, Tokyo-Haneda ranks sixth in terms of passengers handled but 46th in terms of aircraft movements, Frankfurt seventh by passengers but 20th by movements, and Hong Kong 23rd 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 would make a top 25 listing by movements are Pittsburgh (18), Philadelphia (19), Cincinnati (15), Charlotte (23) and Seattle (22), all in the United States.

3.18 Table 3-1 also includes 1989 data to illustrate the longer-term rate of growth of airport traffic. The number of passengers handled at the large airports concerned increased at about 4.5 per cent per annum on average over the 1989-1998 period, while aircraft movements increased at some 3.3 per cent per annum, illustrating a trend towards the use of larger aircraft. There were substantial differences in the rates of growth among individual airports.

3.19 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 about 2 per cent of airports serving international operations, handled about 498 million passengers in 1998, or about 49 per cent of the world total of international scheduled and non-scheduled passengers.

3.20 Over the 1989-1998 period, the number of international passengers handled at these airports increased at about 5.8 per cent per annum and the number of international aircraft movements increased at about 5.4 per cent per annum. Over this period, the highest annual growth rates in terms of individual passengers were recorded for Brussels (11 per cent) and Amsterdam-Schiphol (9 per cent). Taipei, Brussels and Seoul achieved the highest annual growth rate in terms of international aircraft movements (about 10 per cent).

AIRPORT FINANCES

3.21 The financial situation of international airports continued to improve, with a noticeable increase in the number of airports experiencing revenues in excess of their costs. However, a large number of the 1 178 airports open to international civil aviation still do not recover their total costs. The trend towards higher profitability for airports operated as commercial (autonomous entities) was again evident. There was also growth in the number of airports, primarily in Europe and a few major airports in the Asia/Pacific region, where revenues from non-aeronautical sources exceeded 50 per cent of the total revenues. As a rule, airports with high traffic volumes generally show higher shares of non-aeronautical revenues and the share tends to increase as traffic increases.

3.22 Stabilization of the share which landing and associated airport charges represent in total airline operating expenses continued in 1997 (1998 data were not available at the time of writing). That share was 4.2 per cent in 1997, compared to 4.3 per cent in 1996 and 4.5 per cent in 1995 (prior to which there were several years of increase).

Table 3-1. Scheduled and non-scheduled traffic at world's major airports
(top 25 airports ranked by TOTAL passengers, 1998)

Rank No.	Airport (ranking by total commercial aircraft movements given in brackets)	Passengers embarked and disembarked				Aircraft movements			
		1998 (thousands)	1997 (thousands)	Change 1998/97 (%)	Average change per annum 1998/89 (%)	1998 (thousands)	1997 (thousands)	Change 1998/97 (%)	Average change per annum 1998/89 (%)
1	Atlanta (3)	73 474	67 838	8.3	6.0	819.3	768.6	6.6	6.1
2	Chicago (1)	72 370	70 385	2.8	2.3	847.1	834.6	1.5	1.2
3	Los Angeles (4)	61 216	59 177	3.4	3.5	741.7	751.5	-1.3	2.7
4	London-Heathrow (10)	60 660	57 849	4.9	4.9	441.0	430.7	2.4	2.7
5	Dallas/Ft.Worth (2)	60 483	60 148	0.6	2.7	824.0	839.1	-1.8	1.9
6	Tokyo-Haneda (46)	51 241	49 280	4.0	3.8	226.3	209.7	7.9	3.7
7	Frankfurt (20)	42 734	39 613	7.9	5.7	406.0	382.7	6.1	3.5
8	San Francisco (21)	40 060	39 870	0.5	3.3	402.9	407.4	-1.1	-0.7
9	Paris-Charles de Gaulle (16)	38 629	35 103	10.0	7.4	420.6	396.0	6.2	8.4
10	Denver (11)	36 818	34 969	5.3	3.3	437.7	452.2	-3.2	0.4
11	Amsterdam (27)	34 420	31 021	11.0	9.4	373.6	349.5	6.9	8.0
12	Miami (6)	33 935	34 533	-1.7	4.2	464.1	461.3	0.6	5.0
13	New York-Newark (13)	32 445	30 916	4.9	5.0	432.8	443.0	-2.3	2.7
14	Phoenix (9)	31 772	30 659	3.6	4.9	448.2	432.6	3.6	2.5
15	Detroit (8)	31 544	31 542	0.0	4.4	458.7	457.8	0.2	4.0
16	New York-Kennedy (30)	31 295	31 355	-0.2	0.4	329.2	336.3	-2.1	1.8
17	Houston (17)	31 026	28 678	8.2	7.6	408.0	378.8	7.7	4.6
18	Las Vegas (28)	30 218	30 306	-0.3	6.8	349.4	351.2	-0.5	3.2
19	Seoul (47)	29 429	36 521	-19.4	8.7	216.8	228.9	-5.3	9.1
20	London-Gatwick (44)	29 173	26 793	8.9	3.6	241.0	229.7	4.9	2.6
21	St Louis (7)	28 640	27 661	3.5	4.1	462.6	477.9	-3.2	2.2
22	Minneapolis (12)	28 532	30 208	-5.5	4.4	433.3	440.8	-1.7	4.2
23	Hong Kong (57)	27 898	29 007	-3.8	6.2	153.9	164.1	-6.2	5.5
24	Orlando (31)	27 749	27 305	1.6	5.4	327.2	323.6	1.1	6.5
25	Boston (5)	26 416	25 568	3.3	1.9	476.3	452.8	5.2	3.1
	TOTAL	992 177	966 305	2.7	4.5	11 141.7	11 000.8	1.3	3.3

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, 1998)

Rank No.	Airport (ranking by international commercial aircraft movements given in brackets)	International passengers embarked and disembarked				International aircraft movements			
		1998 (thousands)	1997 (thousands)	Change 1998/97 (%)	Average change per annum 1998/89 (%)	1998[2] (thousands)	1997 (thousands)	Change 1998/97 (%)	Average change per annum 1998/89 (%)
1	London-Heathrow (1)	53 146	50 612	5.0	5.6	369.7	361.0	2.4	4.0
2	Paris-Charles de Gaulle (2)	34 362	31 549	8.9	7.3	369.6	348.0	6.2	8.1
3	Frankfurt (4)	34 273	32 333	6.0	6.4	316.6	298.4	6.1	4.7
4	Amsterdam-Schiphol (3)	33 762	30 832	9.5	9.2	359.5	336.3	6.9	7.5
5	Hong Kong (13)	27 204	28 318	-3.9	5.9	154.8	165.0	-6.2	5.7
6	London-Gatwick (8)	26 300	24 385	7.9	3.2	198.5	189.2	4.9	2.2
7	Singapore (11)	22 523	23 799	-5.4	6.3	166.0	172.7	-3.9	7.4
8	Tokyo-Narita (17)	21 670	22 941	-5.5	3.3	118.6	117.0	1.4	1.3
9	Brussels (5)	18 393	15 814	16.3	11.0	275.7	254.6	8.3	9.7
10	New York-Kennedy (22)	17 741	17 378	2.1	-0.2	96.9[1]	99.0[1]	-2.1	-1.3
11	Zurich (6)	17 702	16 747	5.7	5.4	227.8	218.4	4.3	5.2
12	Bangkok (19)	16 956	16 274	4.2	6.2	114.4	115.0	-0.5	5.5
13	Miami (10)	15 486	15 507	-0.1	5.3	172.0[1]	171.0[1]	0.6	5.3
14	Toronto (9)	14 805	14 465	2.4	4.6	182.5[1]	171.0[1]	6.7	4.8
15	Manchester (20)	14 652	13 291	10.2	6.8	112.2	104.7	7.2	4.7
16	Copenhagen (7)	14 308	13 846	3.3	5.2	203.9	206.0	-1.0	3.6
17	Los Angeles (33)	14 187	14 747	-3.8	4.9	78.0[1]	79.0[1]	-1.3	2.0
18	Taipei (21)	13 800	14 185	-2.7	6.6	107.3	106.8	0.5	9.8
19	Palma de Mallorca (32)	13 402	12 291	9.0	5.3	82.1	77.3	6.2	4.6
20	Rome-Fiumicino (15)	13 066	13 301	-1.8	5.5	131.9	125.4	5.2	5.7
21	Seoul (30)	13 007	15 233	-14.6	6.8	88.9	93.9	-5.3	9.7
22	Madrid (16)	12 176	11 014	10.6	7.1	127.4	123.9	2.8	6.8
23	Munich (12)	11 975	11 022	8.6	7.7	158.7	152.7	3.9	7.7
24	Dusseldorf (18)	11 793	11 505	2.5	4.7	117.1	115.4	1.5	3.9
25	Dublin (14)	10 977	9 747	12.6	9.9	134.0	124.0	8.1	7.2
	TOTAL	497 666	481 136	3.4	5.8	4464.1	4325.7	3.2	5.4

1. Estimated values in this column.
2. 1998 data are still preliminary; actual ranking and percentage change may differ when final data become available.

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

AIR NAVIGATION FACILITIES AND SERVICES

3.23 The financial situation of air navigation services also continued to improve, particularly where air navigation services were operated by autonomous entities, reflecting more efficient cost recovery mechanisms and the growing emphasis States are placing on recovering their air navigation service costs. The share which route facility charges represent in total airline operating expenses remained in 1997 at the same level as for 1996, that is at 2.7 per cent (1998 data were not available at the time of writing).

3.24 Major developments during the year in the fields of aeronautical communications, navigation and surveillance, air traffic management, aeronautical meteorology, search and rescue, and accident investigation and prevention are described below.

Communications, navigation and surveillance

3.25 Implementation of communications, navigation, and surveillance/air traffic management (CNS/ATM) systems continued at an ever-increasing pace. Communication via data link was increasingly being used for transmission of ATM-related information, for example, for the delivery of oceanic clearances, pre-departure clearances and weather information. Following successful trials, definite plans were drawn up to introduce controller-pilot data link communications (CPDLC) and other data link applications in Europe and the United States.

3.26 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. In particular, the air traffic services message handling service (ATSMHS) was being actively developed for operational use in parts of Europe, Thailand and between Japan and the United States. Work also continued in the development and assessment of digital technologies to improve VHF communication spectrum utilization.

3.27 Significant progress continued in a number of States and international organizations in global navigation satellite system (GNSS) development and implementation. The ICAO GNSS Panel continued development of Standards and Recommended Practices (SARPs) for GNSS.

3.28 Development of satellite-based augmentation systems (SBAS) continued in Europe (EGNOS), Japan (MSAS) and the United States (WAAS). This form of augmentation has the potential to support the use of GNSS for all phases of flight down to Category I precision approach. Several architectures of ground-based augmentation system (GBAS) which have the potential to support Category II/III precision approach applications also continue to be developed and tested. This type of augmentation will be used by some States as an alternative to SBAS 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 types of airspace.

3.29 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 information relating to air navigation, also known as SADIS, are intended to serve air navigation systems in several ICAO regions.

3.30 Considerable progress continued to be reported during the year in improving surveillance capabilities. This included the deployment of automatic dependent surveillance (ADS) in oceanic areas and implementation of SSR Mode S stations, particularly in Europe, India and the United States.

Air traffic management

3.31 Air traffic control (ATC) systems around the world continued to be updated as part of the evolutionary process leading to a seamless global air traffic management (ATM) system. In most cases, supporting CNS/ATM systems were being implemented as part of systems upgrades, with a view to achieving early benefits as well as meeting long-term requirements. The expansive airspace over Siberia in the Russian Far East was becoming increasingly available for international civil aviation due to the implementation of CNS/ATM functionalities into ATS systems. In particular, controller pilot data link communications (CPDLC) and automatic dependent surveillance (ADS) allowed for more efficient communications and surveillance in the remote airspaces of Siberia. Work was under way to expand the ATS route network across the eastern part of the Russian Federation.

3.32 Several ATM operational concepts aimed at the progressive introduction of CNS technologies in support of seamless ATM systems have been developed. The organizations developing these concepts have been working closely with each other towards a coordinated implementation of emerging ATM systems. To facilitate the goal of a global, seamless ATM system, ICAO established the Air Traffic Management Operational Concept Panel to facilitate the development of a common ATM concept for implementation of CNS/ATM systems.

3.33 Many States were planning for, or had already introduced, required navigation performance (RNP). The European Civil Aviation Conference (ECAC) States introduced RNP 5 on the entire ATS route network in designated flight information regions (FIRs). In the Asia/Pacific region, RNP 10 was implemented in April 1998 on ATS routes in the Pacific.

3.34 Reduced vertical separation minima (RVSM) airspace was expanded in the North Atlantic Region to the airspace between FL 310 and FL 390 inclusive. The increased capacity and flexibility provided a significant bonus to aircraft operations. The Pacific and European Regions were planning for implementation of RVSM in 2000 and 2001 respectively and several other regions were preparing for implementation of RVSM.

Aerodromes

3.35 Future larger aeroplanes with wing spans greater than 65 m (larger than the B747-400) and capable of carrying more than 550 passengers may enter service by the

year 2004 and would have an impact on the airport infrastructure. To assist States in planning to accommodate these aeroplanes, Annex 14, Volume I, specifications on airport design were reviewed and updated for applicability from November 1999.

Aeronautical information services

3.36 The objective of aeronautical information service (AIS) is to ensure the flow of information necessary for the safety, regularity and efficiency of international air navigation. The role and importance of aeronautical information/data changed significantly with the implementation of modern, airborne computer-based navigation systems. Timely and high-quality aeronautical information/data are required to support the use of area navigation in the required navigation performance environment. Corrupt or erroneous aeronautical information/data can potentially affect the safety of air navigation. For this reason, in 1997 new requirements for a quality system were introduced in Annex 15. On that basis, States are invited to implement a properly organized quality system that contains procedures, processes and resources that satisfy all the functional stages required in aeronautical information/data origination and maintenance.

3.37 To support the communications, navigation, and surveillance/air traffic management (CNS/ATM) systems, it is required that the AIS provide quality aeronautical information to all users at all times. It would not be possible to achieve this very important AIS goal without automation. Developments in automation in both ground-based and airborne equipment, as well as the established requirements for quality aeronautical information, are increasing the need for the provision to users of aeronautical information/data in electronic format. For the above reasons, many States had already established, or were in the process of planning in 1998 to establish, aeronautical databases in their AIS to meet the needs for storing, accessing, transferring and archiving aeronautical information/data.

3.38 In the electronic environment, the generation and use of aeronautical information may involve many computer systems. To support and facilitate the use of aeronautical information contained in such systems, the requirement for international civil aviation is to be able to promulgate aeronautical information in a common, computer-interpretable form that will remain complete and consistent even when the information is exchanged between different computer systems. To meet these requirements, ICAO commenced the development of recommendations for a future standardized aeronautical information conceptual model.

Aeronautical meteorology

3.39 Considerable progress was achieved in the computer preparation of global forecasts of significant weather (SIGWX) by the world area forecast centres in London and Washington. As a result, SIGWX charts for Europe, the Middle East, the North Atlantic and Western Asia, prepared by means of an interactive computer workstation, are being issued by WAFC London. Global coverage by three ICAO satellite broadcasts has been achieved, and very small aperture terminals have been installed in approximately 120 States. These broadcasts provide

global world area forecast system products and operational meteorological information, such as METARs, TAFs and SIGMETs, directly to States. The implementation of the satellite broadcasts and the provision of SIGWX forecasts by the WAFCs have permitted the closure of five of the 15 regional area forecast centres (RAFCs), the most recent being RAFC Cairo from 1 April 1998.

3.40 Within the international airways volcano watch, work continued in States responsible for volcanic ash advisory centres to develop and issue graphical volcanic ash advisories for provision to area control centres and meteorological watch offices.

Search and rescue

3.41 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.

3.42 The system also continued to expand its capability. Six satellites were in operation and several replacement satellites incorporating technical enhancements were being built. At year's end, 38 local user terminals (LUTs) and 22 mission control centres (MCCs) were in operation. 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.

3.43 Since it began trial operations in September 1982, the COSPAS-SARSAT system has contributed to the rescue of over 8 900 persons in aeronautical, maritime and terrestrial incidents.

Controlled flight into terrain (CFIT)

3.44 The ICAO Council adopted amendments to Annex 6, Parts I, II and III and to PANS-OPS, Volumes I and II, which implement many of the recommendations of the ICAO and Industry CFIT Task Force. Amendments in response to other recommendations of the task force are still under development. The ICAO Air Navigation Commission authorized the circulation, for comment, of proposals to introduce requirements for a predictive terrain hazard warning function in the carriage of ground proximity warning systems (GPWS) into Annex 6, Parts I and II, and provisions concerning the implementation of minimum safe altitude warning (MSAW) systems into Annex 11. The Obstacle Clearance Panel (OCP) is developing global navigation satellite system (GNSS) criteria for non-precision instrument approach procedures when aircraft are equipped with flight management systems (FMS) and vertical navigation (VNAV), as well as material concerning altitude correction for temperature, pressure and strong wind conditions.

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

3.45 The distribution of the CFIT Education and Training Aid developed by the ICAO and Industry CFIT Task Force commenced, and copies of this aid were distributed in 1998 to the Directors General of Civil Aviation of all States, operators, civil aviation industry organizations and major airframe manufacturers. Extended requirements for GPWS, in Annex 6, Parts I and II, adopted in March 1995, entered into force on 1 January 1999.

Flight safety and Human Factors

3.46 Preparations for the Fourth Global Flight Safety and Human Factors Symposium, to be held in Santiago, Chile, from 12 to 15 April 1999, were completed in September. The focus of the Symposium will be on Human Factors issues in CNS/ATM systems.

3.47 An ICAO workshop on cross-cultural issues in aviation safety was held in Bangkok, Thailand, from 12 to 15 August. The event was the first of its nature industry-wide. The third regional seminar on Human Factors training implementation was held in Beirut, Lebanon, from 7 to 8 December.

3.48 ICAO participated in most Human Factors-related key events, exchanging information on the latest developments in the field of aviation Human Factors, thus maintaining a leadership role in this field.

Chapter 4
User and Public Interest

4.1 This chapter reviews the levels of safety and security in air transport in 1998, efforts during the year to improve compensation for passengers involved in 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 worldwide shows that there were 22 fatal aircraft accidents in 1998 involving 909 passenger fatalities compared to 27 fatal accidents and 930 passenger fatalities in 1997 (Table A1-3 in Appendix 1). Relating passenger fatalities to the volume of traffic, there was no significant change in the number of passenger fatalities which remained at about 0.035 per 100 million passenger-kilometres performed (Figure 4-1). The number of fatal aircraft accidents decreased from 0.13 per 100 million aircraft-kilometres flown in 1997 to 0.10 in 1998 (Figure 4-2), while the number of fatal aircraft accidents per 100 000 landings also decreased, from the previous rate of 0.14 in 1997 to 0.11 in 1998 (Figure 4-3).

4.3 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 seven accidents in 1998 with 719 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 190 passenger fatalities. The fatality rate for turbo-jet aircraft operations was, therefore, far lower than for propeller-driven aircraft.

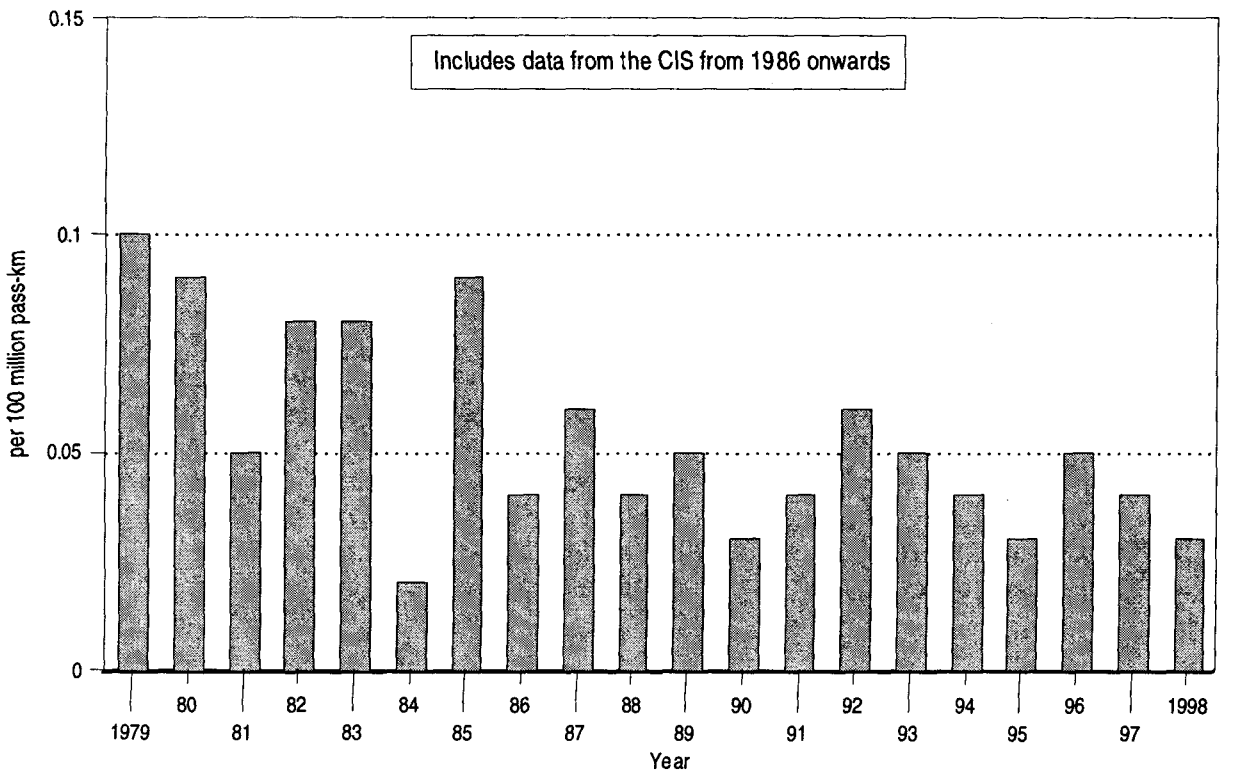
Non-scheduled commercial operations

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 1998 there were 33 fatal accidents resulting in 282 passenger fatalities (including six all-cargo services with passengers on board) compared with 297 passenger fatalities from 31 fatal accidents in 1997.

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 nine fatal accidents (including five all-cargo services with passengers on board) with 185 passenger fatalities in 1998.

Safety oversight

4.6 In 1998, the voluntary ICAO safety programme continued its activities of conducting safety oversight assessments of States, developing guidance material and delivering training programmes. By the end of the year, 88 States had requested a safety oversight assessment by an ICAO team since the beginning of the programme in March 1996, and the number of assessed States stood at 67. The year marked the end of the voluntary programme and the transition towards the ICAO Universal Safety Oversight Audit Programme, which was approved by the Council on 6 May 1998, on the basis of the recommendations made by the Directors General of Civil Aviation Conference on a global strategy for safety oversight, held at ICAO Headquarters in November 1997.



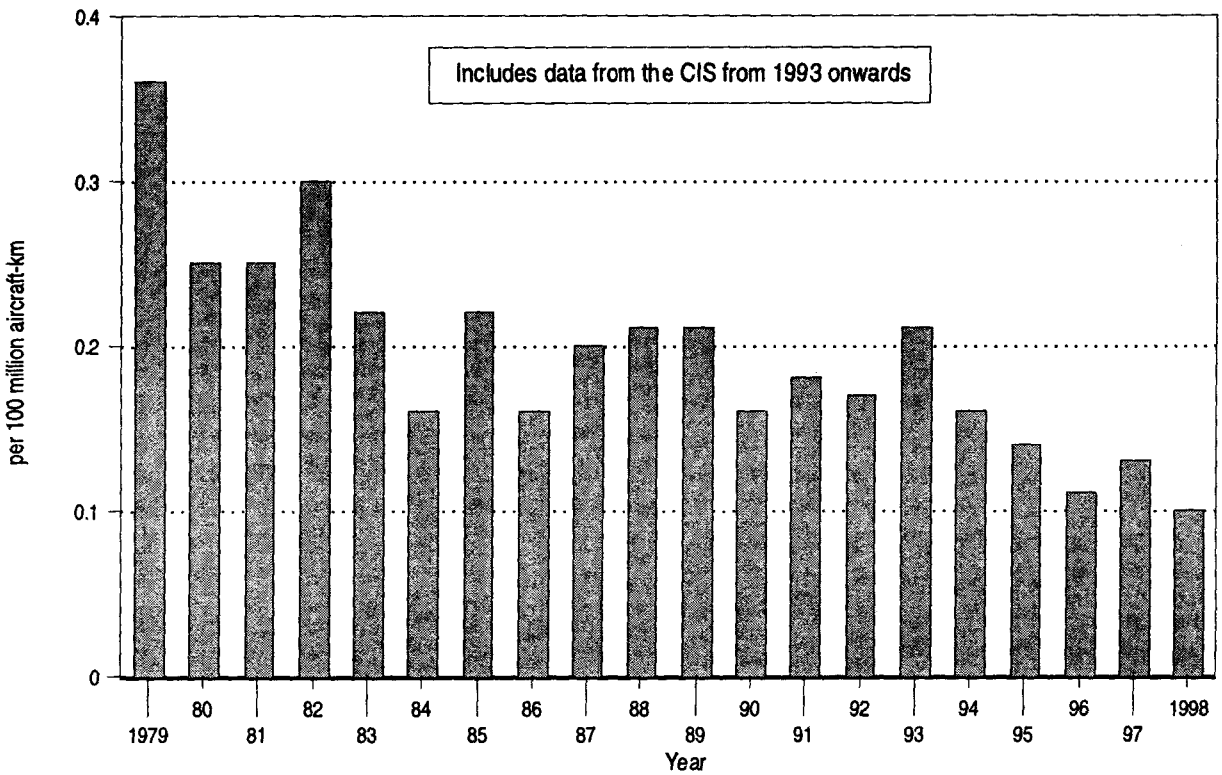
Source: ICAO Air Transport Reporting Form G and other reports.

Figure 4-1. Passenger fatalities per 100 million passenger-kilometres on scheduled services (1979-1998)

4.7 The ICAO Universal Safety Oversight Audit Programme, as approved by the Council, provides for the conduct by ICAO of mandatory and regular safety audits of all Contracting States, while allowing for greater transparency in the disclosure of audit results. The initial mandate calls for the auditing of all Contracting States by the end of the year 2001.

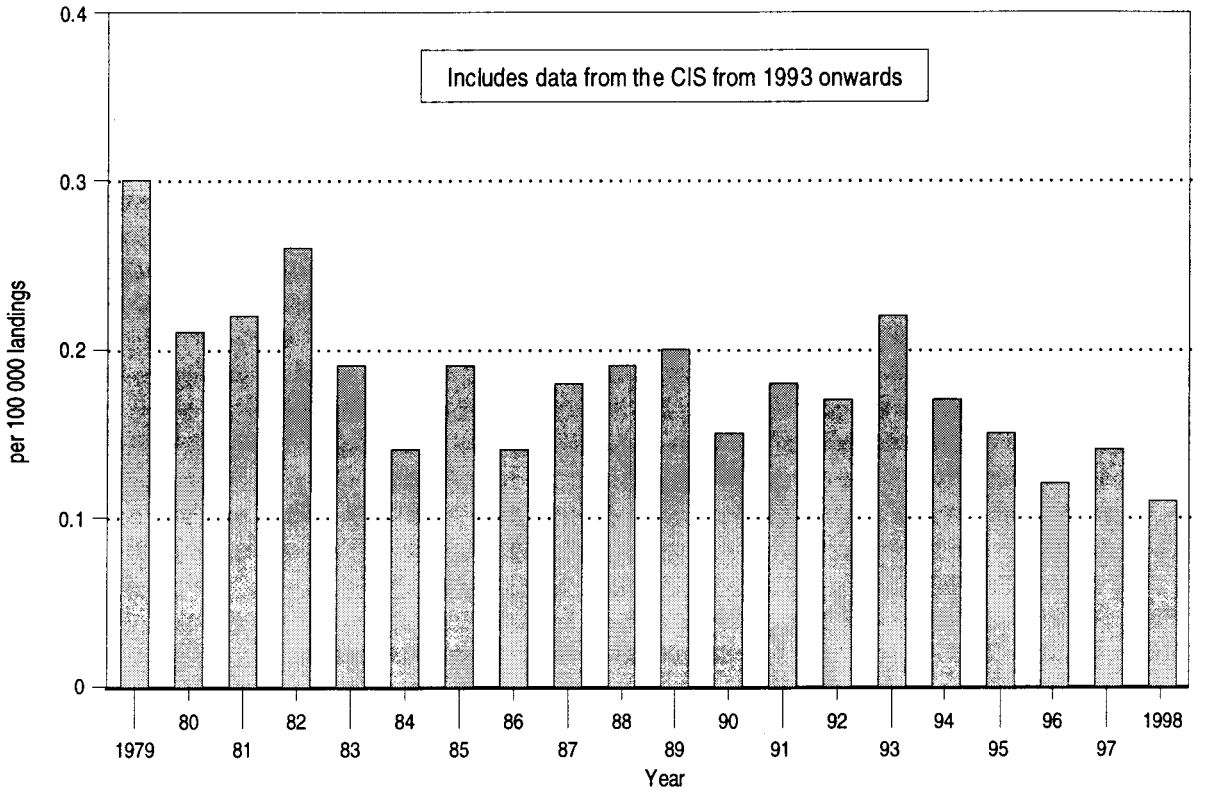
4.8 The 32nd Session of the Assembly adopted Resolution A32-11 endorsing the ICAO Universal Safety Oversight Audit Programme and directing the Council to bring it into effect from 1 January 1999. To this end, a dedicated Safety Oversight Audit Unit was established within the Air Navigation Bureau of ICAO.

4.9 A coordination agreement on safety oversight issues was signed between ICAO and the Latin American Civil Aviation Commission during the 32nd Session of the ICAO Assembly in September 1998.



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

Figure 4-2. Fatal accidents per 100 million aircraft-kilometres flown on scheduled services (1979-1998)



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

Figure 4-3. Fatal accidents per 100 000 landings by aircraft on scheduled services (1979-1998)

SECURITY

4.10 During the reporting period, six acts of unlawful interference were officially reported or confirmed by concerned States. These included four unlawful seizures of domestic aircraft and two incidents involving international flights, namely one attempted seizure, and one unlawful act against the safety of civil aviation. Developments in acts of unlawful interference since 1979 are shown in Figures 4-4 to 4-6 and in Appendix 1, Table A1-4.

4.11 In light of the positive response from donor States, the ICAO Council agreed to the extension of the Mechanism for financial, technical and material assistance to States with regard to aviation security until the end of 2001. The 32nd Session of the ICAO Assembly endorsed the Council's decision in this regard.

4.12 Following the establishment of the Mechanism, it readily became apparent that the effective implementation of training programmes was critical if the enhanced aviation security performance standards required to combat international terrorism were to be achieved. In the initial years of the Mechanism, assistance programme training was done on an *ad hoc* basis within States. It soon became clear that a more permanent and well-structured approach was necessary. Both economies and predetermined measurable outputs dictated a training policy review and subsequent adjustment to implementation strategy. As a consequence, negotiations by ICAO with selected States resulted in the establishment of a global network of regional/sub-regional aviation security training centres. To date, ten such centres have been created in the following locations: Amman, Brussels, Casablanca, Dakar, Kyiv, Moscow, Nairobi, Penang, Port-of-Spain and Quito; and until these have attained self-sufficiency and been linked electronically to give effect to computer-based training (CBT), additional centres are not envisaged. The range of training events staged in each facility is based on identified needs within respective regions. Programmed activities are promulgated to States through the ICAO Regional Offices. Depending on membership within the Mechanism, States may qualify for fellowship support on a limited basis, provided full justification is made. Some training events are staged on a cost recovery basis.

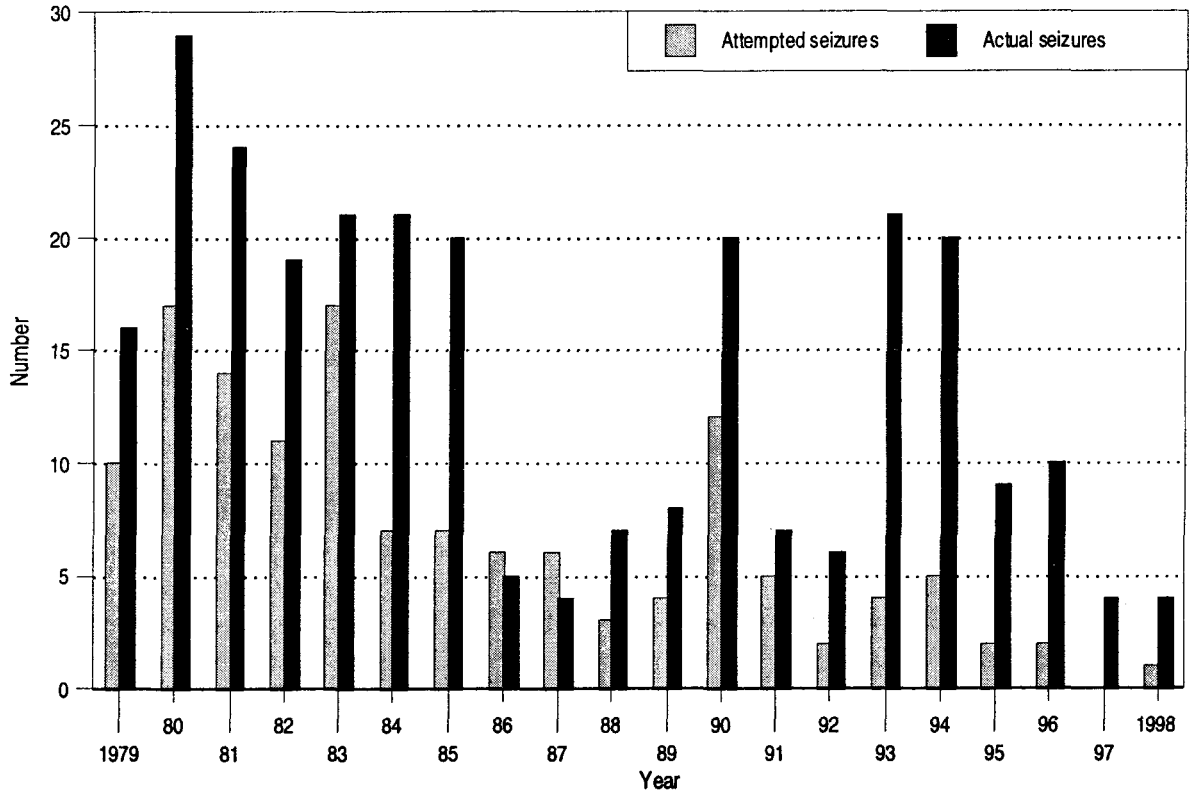


Figure 4-4. Acts of unlawful seizure (1979-1998)

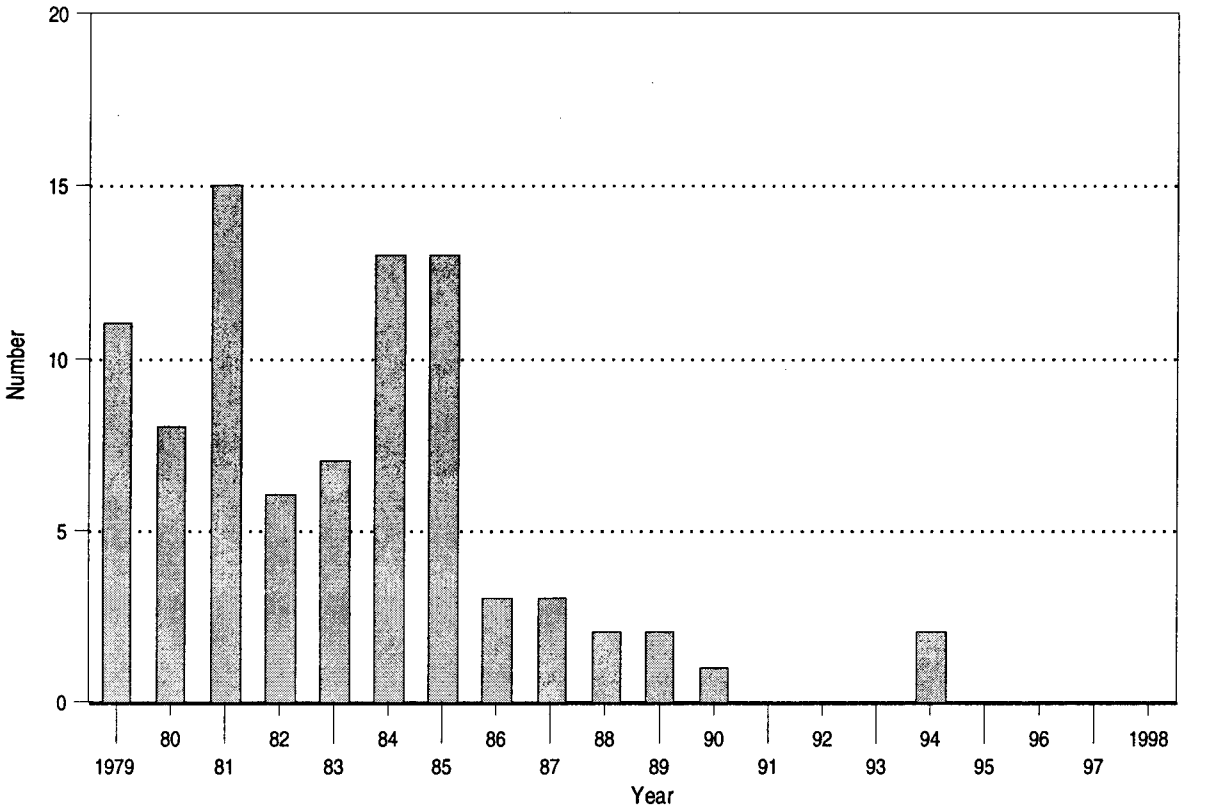


Figure 4-5. Incidents of sabotage (1979-1998)

4.13 In order to provide appropriate tools for use in the centres, work is progressing in the development of the ICAO Training Programme for Aviation Security in the form of Standardized Training Packages (STPs). Thirteen STPs have been proposed and these will address Basic Training for Airport Security Personnel, Management, Instructors, Crisis Management, Airline Security, Supervisors, Systems Testing, Cargo Security, Awareness, Programme Development, Regulating Authority, Security Audit Inspection and Equipment Maintenance.

Convention on the Marking of Plastic Explosives

4.14 The *Convention on the Marking of Plastic Explosives for the Purpose of Detection*, done at Montreal on 1 March 1991, entered into force on 21 June 1998. The Convention, *inter alia,* requires each State Party to prohibit and prevent the manufacture in its territory of unmarked plastic explosives, as well as prohibiting and preventing their movement into or out of its territory. In addition, the Convention establishes an International Explosives Technical Commission which will evaluate technical developments relating to the manufacture, marking and detection of explosives.

Protocol against use of weapons against civil aircraft

4.15 The *Protocol relating to an Amendment to the Convention on International Civil Aviation* [*Article 3* bis], signed at Montreal on 10 May 1984, entered into force on 1 October 1998. Under the Protocol, Contracting States recognize that every State shall refrain from resorting to the use of weapons against civil aircraft in flight and that, in case of interception, the lives of persons on board and the safety of civil aviation must not be endangered.

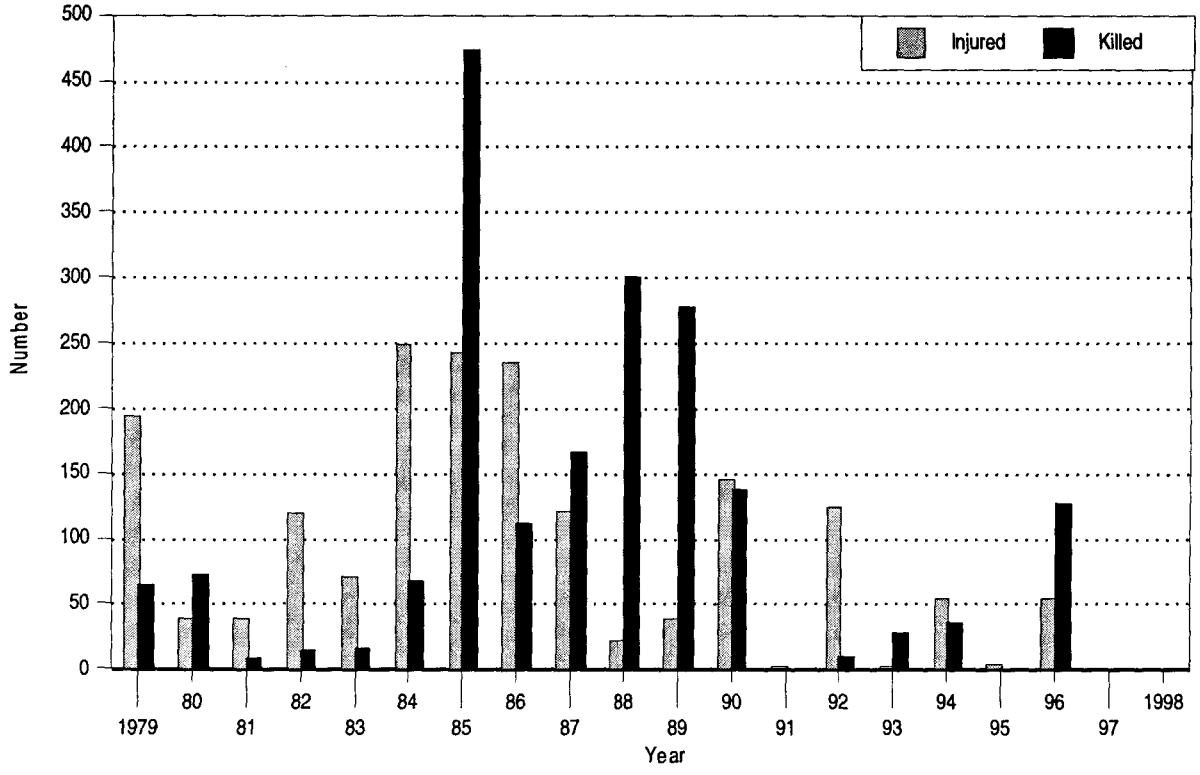


Figure 4-6. Number of persons killed or injured in acts of unlawful interference (1979-1998)

AIR CARRIER LIABILITY

Diplomatic Conference on modernization of air carrier liability

4.16 The ICAO Council decided in June 1998 to convene a Diplomatic Conference to consider the adoption of the draft *Convention for the Unification of Certain Rules for International Carriage by Air*, which is to modernize and consolidate the present complex system of air carrier liability established by the so-called "Warsaw System".

4.17 The decision to convene the Conference from 10 to 28 May 1999 followed a review of the draft text developed by the 30th Session of the Legal Committee by a group of governmental experts (Special Group) which met in Montreal from 14 to 18 April 1998. The group discussed outstanding questions related to the proposed new legal instrument and refined the text for submission to the Diplomatic Conference.

FACILITATION

4.18 The year 1998 marked a turning point in cargo facilitation.

Montreal Protocol No. 4

4.19 *Montreal Protocol No. 4 to Amend the Convention for the Unification of Certain Rules relating to International Carriage by Air signed at Warsaw on 12 October 1929 as Amended by the Protocol done at The Hague on 28 September 1955*, signed at Montreal on 25 September 1975, entered into force on 14 June 1998. In relation to cargo, the Protocol simplifies documentation and introduces strict liability in international carriage by air.

Evolution of cargo facilitation policy

4.20 Cargo facilitation strategy during the first 25 years of ICAO was based on a business environment of manual inspection and clearance procedures in which all information exchanges were dependent on the preparation and movement of paper documents. Customs transactions for importation and transit had to wait for the arrival of the flight. Since aircraft were relatively small, the volume of cargo was much smaller than that of today, and therefore every shipment was given the same treatment. International airlines and airports were largely owned and often administered by governments; hence facilitation of cargo clearance activities was viewed as essentially a government responsibility.

4.21 During the 1970s, with the introduction of wide-body aircraft and the emergence of computers and other new technology as helpful tools, States began to find ways to rationalize

their inspection processes. New concepts of inspection management were introduced, including the use of risk analysis to determine the level of inspection required for a particular customer and the segmentation of customers for multiple-channel processing according to criteria set by the authorities. Such innovations continue to have the effect of facilitating the vast majority of customers, but it is important to note that such customers qualify for a lower level of control, not because they are air transport customers but because they have been assessed as "low-risk".

4.22 Today, issues related to information requirements are more complex than just determining the number and type of paper documents which are exchanged among the parties to an import/export transaction. Indeed, the issue of "number of copies" has also lost significance with the presence of high-speed photocopiers in general use. As computerization capabilities are almost universally available to both governments and industry, it is appropriate to be more positive about advocating the use of information technology by all parties. At the same time, with the rapid development of alternative methods of communication and the ease with which message formats and protocols can be converted for global electronic data interchange, it may now be appropriate for Annex 9 to be less prescriptive regarding standards for electronic communications.

4.23 Finally, changes in the regulatory environment over time have resulted in the need to assign increased responsibility for facilitation to private sector entities in the civil aviation community. Privatization and deregulation have afforded operators access to new technology and a greater degree of control than ever before over business volumes and markets. Sudden increases in cargo volumes at a particular airport bring new challenges to the process of cargo reporting, entry and release, and of necessity, new partnerships must be forged. If the customs and other public authorities are to streamline procedures and process data in advance using information technology, it is logical to assume that operators and clearing agents will modernize their own methods of work in order to match the innovations of governments. In the 21st Century, premium levels of facilitation will be enjoyed by customers and operators who are highly competent in executing their responsibilities in the clearance process.

Separate passports for children

4.24 During 1998 ICAO completed a study which had been requested by the Facilitation (FAL) Division, seeking recommendations concerning the inclusion of identification details of dependants in the passport of their parent or guardian — a practice by which children may travel internationally without a passport of their own. The information acquired from the study, in light of modern social problems and international conventions and resolutions concerning children and passport security, indicates that, rather than facilitating the travel of families, the practice often inconveniences the child and complicates immigration inspection. The ICAO Facilitation Panel subsequently adopted a recommendation that each traveller, regardless of age, be issued his or her own passport in the interests of both facilitation and security.

ENVIRONMENTAL PROTECTION

4.25 In 1998, the aviation community continued to address the environmental problems associated with aircraft noise and the impact of aircraft engine emissions.

4.26 Concerning noise, the phasing out of operations by Chapter 2 aircraft (subsonic jet aircraft that meet the noise certification levels in Annex 16, Volume I, Chapter 2, but exceed 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 by Chapter 2 aircraft has been implemented. During 1998, ICAO decided to take up again the question of certification standards more stringent than those in Chapter 3. In Europe, proposals were under consideration that could limit the use of former Chapter 2 aircraft which have been modified to meet Chapter 3 requirements. Meanwhile, for single-engine light propeller-driven aeroplanes, ICAO has proposed more stringent Standards to States and a decision is expected in 1999.

4.27 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. At ICAO's request, the IPCC is working on a special report on *Aviation and the Global Atmosphere* in cooperation with the Scientific Assessment Panel of the Montreal Protocol and with ICAO involvement. The report is scheduled to be completed in April 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.

4.28 While policy-making regarding aircraft engine emissions continues to be hampered by uncertainties regarding their impact, this subject is being given increased attention by States following the adoption in December 1997 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), which included a provision that developed countries, working through ICAO, shall pursue limitation or reduction of greenhouse gases from aviation bunker fuels.

4.29 ICAO's work on emissions is progressing in three areas. Firstly, a recommendation has been made that the NO_x emission standards for new engines in Annex 16, Volume II, should be made more stringent and a Council decision was expected early in 1999. Work also commenced on the development of a new emissions parameter which would cover climb and cruise emissions, include carbon dioxide as well as NO_x, and take account of aircraft productivity. Secondly, consideration is being given to reducing fuel burn and hence emissions, through improved operational measures. And thirdly, increasing attention is being given to how market-based options might help, such as emission-related levies (charges or taxes) and emissions trading.

SMOKING RESTRICTIONS

4.30 The implementation of a complete ban on smoking on all international flights in accordance with ICAO Assembly Resolution A29-15 which had called for a 1 July 1996 deadline was still not achieved by the end of 1997, but considerable advancement 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 Department of Transportation has reported that by the mid-1997 about 97 per cent of non-stop scheduled U.S. airline flights between that country and foreign points were smoke-free compared with around 80 per cent one year earlier. In 1998 that figure became 100 per cent. In 1997, major European airlines British Airways and KLM had, respectively, 90 and 85 per cent of their international services non-smoking and went on in 1998 to prohibit smoking worldwide (with the exception of the KLM's Japanese destinations).

4.31 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 airline 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 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.

4.32 The Multilateral Agreement to Ban Smoking on International Passenger Flights implemented in 1995 by Australia, Canada and the United States was joined in 1998 by New Zealand which had indicated its intention 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.

4.33 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 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 prevents tobacco smoke from affecting air quality in non-smoking sections of the cabin.

SUBSTANCE ABUSE

4.34 In February 1998, the ICAO Council adopted Amendment 162 to Annex 1 concerning new provisions related to the use of psychoactive substances. The Council also adopted a

similar amendment to Annex 2 with a cross-reference in Annex 6. These new provisions, supported by the *Manual on Prevention of Problematic Use of Substances in the Aviation Workplace* (Doc 9654), are expected to contribute significantly to flight safety worldwide, primarily by promoting a higher degree of awareness and openness surrounding alcoholism, drug abuse and other forms of problematic use of psychoactive substances.

PART II

WORLD OUTLOOK TO 2001

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Chapter 5
Global Trends and Forecasts

5.1 This chapter reviews developments in the world economy over the period since 1987 and anticipated developments through to 2001; 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 2001.

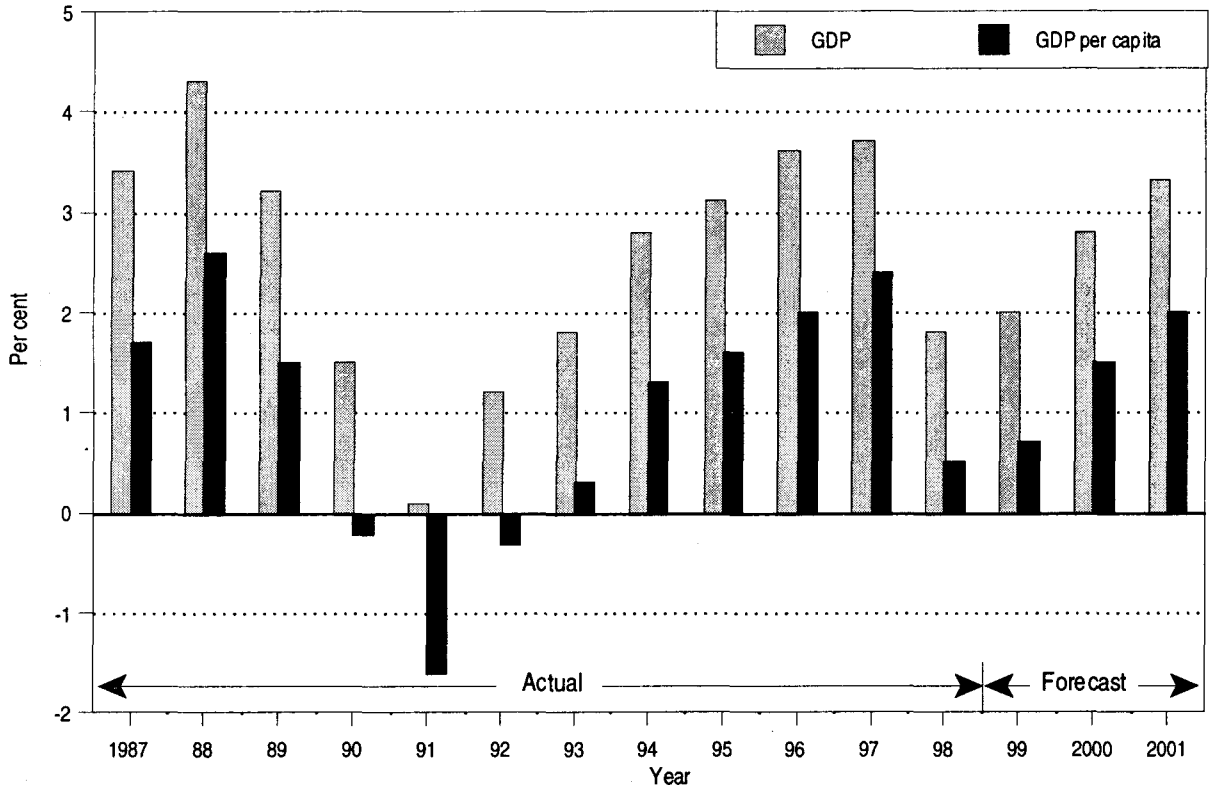
ECONOMIC TRENDS

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 1987 and 1997, 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 4.9 per cent for Asia/Pacific to a low of almost zero for Europe, including the CIS and Eastern Europe (see Chapter 6 for further details). World population growth between 1987 and 1997 increased at an average annual rate of 1.5 per cent. Hence growth of the world's GDP per capita between 1987 and 1997 increased at an average annual rate of 1.0 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 ("countries-in-transition") 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. The Japanese economy remained weak, declining further in 1997 and 1998.

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. However, the economies of Latin America, Africa and the Middle East have all had significant periods of difficulty and low growth during the past decade. Structural reform and the sustained implementation of prudent macro



Source: IMF, WEFA Group.

Figure 5-1. Annual change in real GDP and GDP per capita — World (1987-2001)

economic policies together with large capital inflows supported consistently strong growth in East and South-East Asia through to 1997 when there were substantial financial and economic setbacks in several countries. The growth of the aggregate economy of the developing countries fell by more than half in 1998, to about 3 per cent, compared to 5-6 per cent registered during the 1996-1997 period. The slowdown resulted primarily from contractions in output from several South-East Asian countries which also had an impact, to a lesser extent, on other regions of the world.

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 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 and they declined further in 1998.

Table 5-1. Economic growth (GDP) by region
(real average annual growth rates, per cent — 1997 to 2001)

Region	Actual 1997	Estimated 1998	Forecast 1999	2000	2001
Africa	3.3	3.6	3.0	4.7	4.6
Asia/Pacific	3.9	0.8	1.1	2.8	4.0
Europe	2.7	2.1	1.5	2.7	2.7
Middle East	3.8	3.3	2.0	3.3	4.4
North America	3.9	3.5	3.2	2.2	2.3
Latin America and the Caribbean	5.3	2.5	0.9	3.9	4.2
World	3.7	1.8	2.0	2.8	3.3

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

5.7 Oil price rises and accommodating monetary policies contributed to double digit inflation in 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, but have recently become less serious.

5.8 There appears to be consensus among economic forecasters that the global economy will continue to slow down over the medium term but some improvement is expected toward the end of the period with recovery in the Asia/Pacific and Latin America and the Caribbean regions. The assumptions for global and regional economic growth that have been used as a basis for air traffic forecasts over the period to 2001 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, in both government and the private sector.

5.9 Backed by strong domestic demand, the United States economy continued to expand at an above average rate during 1998. It is expected, however, to decelerate over the medium term towards the latter part of the forecast period concerned.

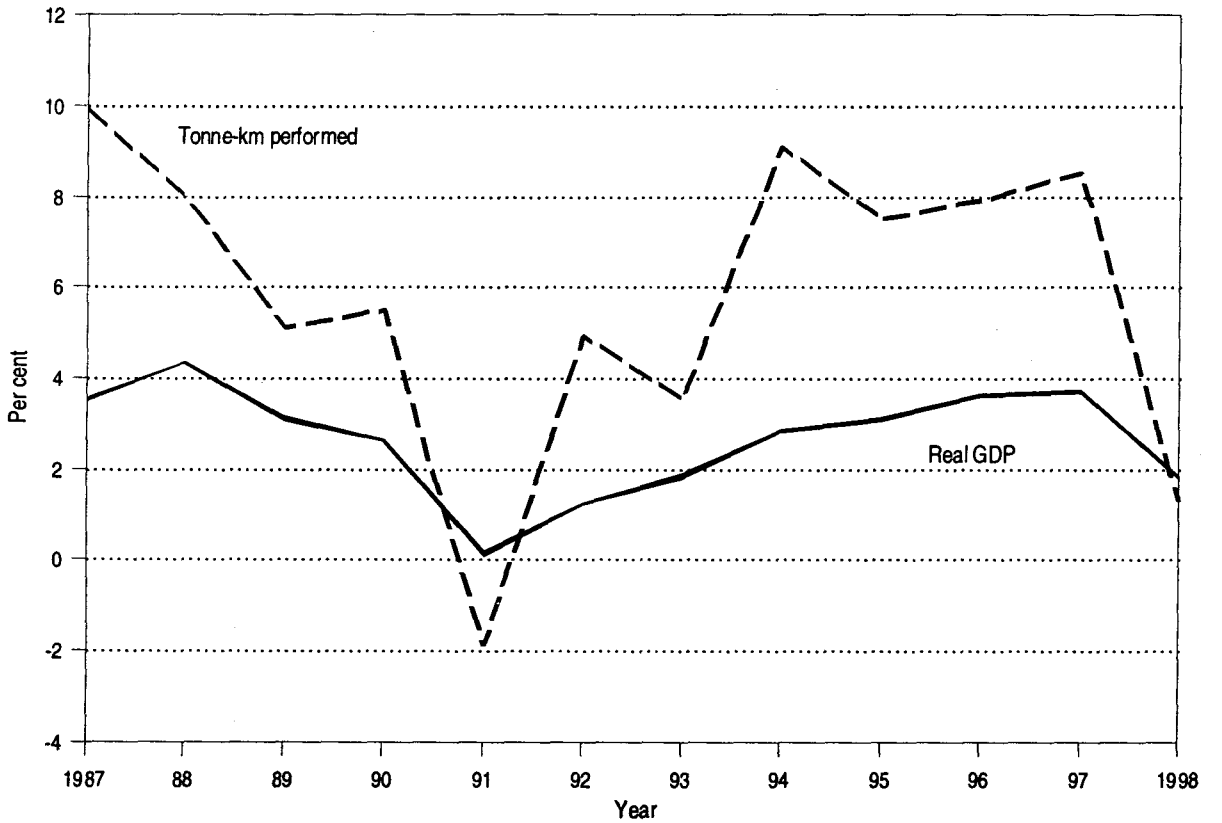
5.10 Countries in the Asia/Pacific region are expected to experience improved economic performance, especially towards the end of the forecast period, with Japan's economy, which accounts for almost half of the region's output, expected to experience slight growth only by 2000. Economic activity in Latin America is expected to increase significantly over the next few years, although difficulties in Brazil, which represents roughly one-third of the economic output of the region, and lowering growth in some other countries will have an impact on the overall performance of the region. The developing economies of the Middle East are expected to experience moderate economic growth while the aggregate economy of the African region is anticipated to grow at higher rates, especially towards the end of the forecast period.

AIRLINE TRAFFIC TRENDS

5.11 Total scheduled airline traffic, measured in terms of total tonne-kilometres performed, grew at an average annual rate of 5.3 per cent between 1987 and 1998. Passenger-kilometres grew at an average rate of 4.7 per cent per annum and freight tonne-kilometres at 7.0 per cent per annum.

5.12 Global traffic data for each year of the decade 1987-1998 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 1987-1998 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

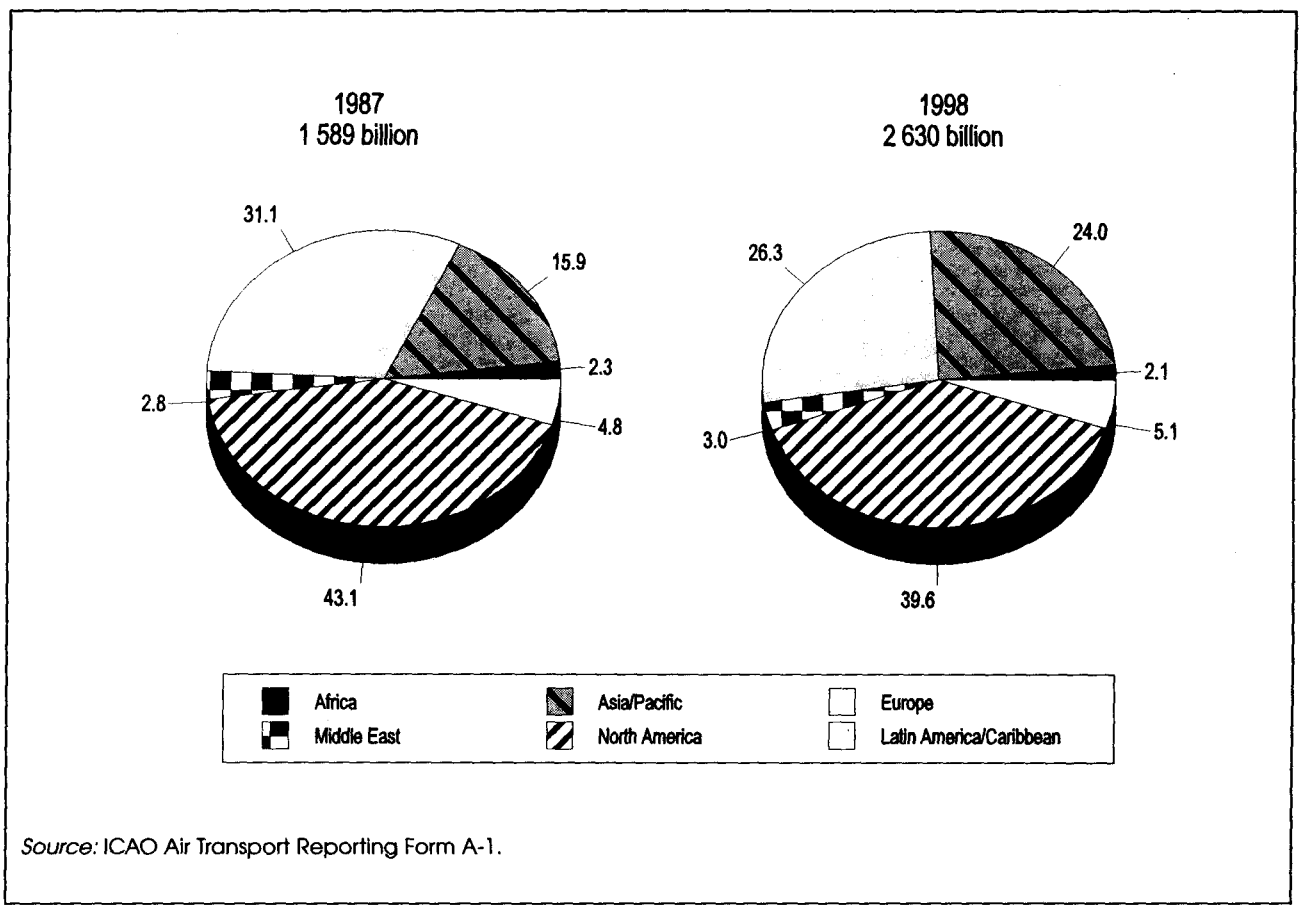


Source: IMF, ICAO Air Transport Reporting Form A-1.

Figure 5-2. GDP and scheduled traffic growth — World (1987-1998)

been the case in 1992. On the other hand, economic growth began to provide a more solid foundation for traffic growth. These trends continued until 1997 but reversed in 1998 when GDP grew only at 1.8 per cent, providing for an estimated growth of the total scheduled passenger traffic only of 2.2 per cent in that year.

5.14 The regional distribution of scheduled passenger traffic for the years 1987 and 1998 is illustrated in Figure 5-3. The airlines of the North American and European regions dominate, contributing 74.2 per cent of the total traffic in 1987 and 65.9 per cent in 1998. Passenger traffic performed by airlines registered in the Asia/Pacific region increased from 15.9 per cent of the total world traffic in 1987 to about 24.0 per cent in 1998. Other regions contributed 9.9 per cent of the traffic in 1987 and 10.2 per cent in 1998.



Source: ICAO Air Transport Reporting Form A-1.

Figure 5-3. Regional distribution of scheduled passenger traffic — percentage of passenger-kilometres performed (1987 and 1998)

Table 5-2. World total international and domestic revenue traffic
(scheduled services of airlines of ICAO Contracting States, 1987-1998)

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 (%)
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	2 248 210	7.1	22.2	8.3	83 130	7.7	5 630	4.1	293 930	7.5
1996	1 391	6.7	2 431 690	8.2	23.2	4.5	89 200	7.3	5 800	3.0	317 150	7.9
1997	1 457	4.7	2 573 010	5.8	26.4	13.8	102 880	15.3	5 990	3.3	344 190	8.5
1998	1 462	0.3	2 630 370	2.2	26.2	−0.8	102 270	−0.6	5 740	−4.2	348 780	1.3

Source: ICAO Air Transport Reporting Form A-1.

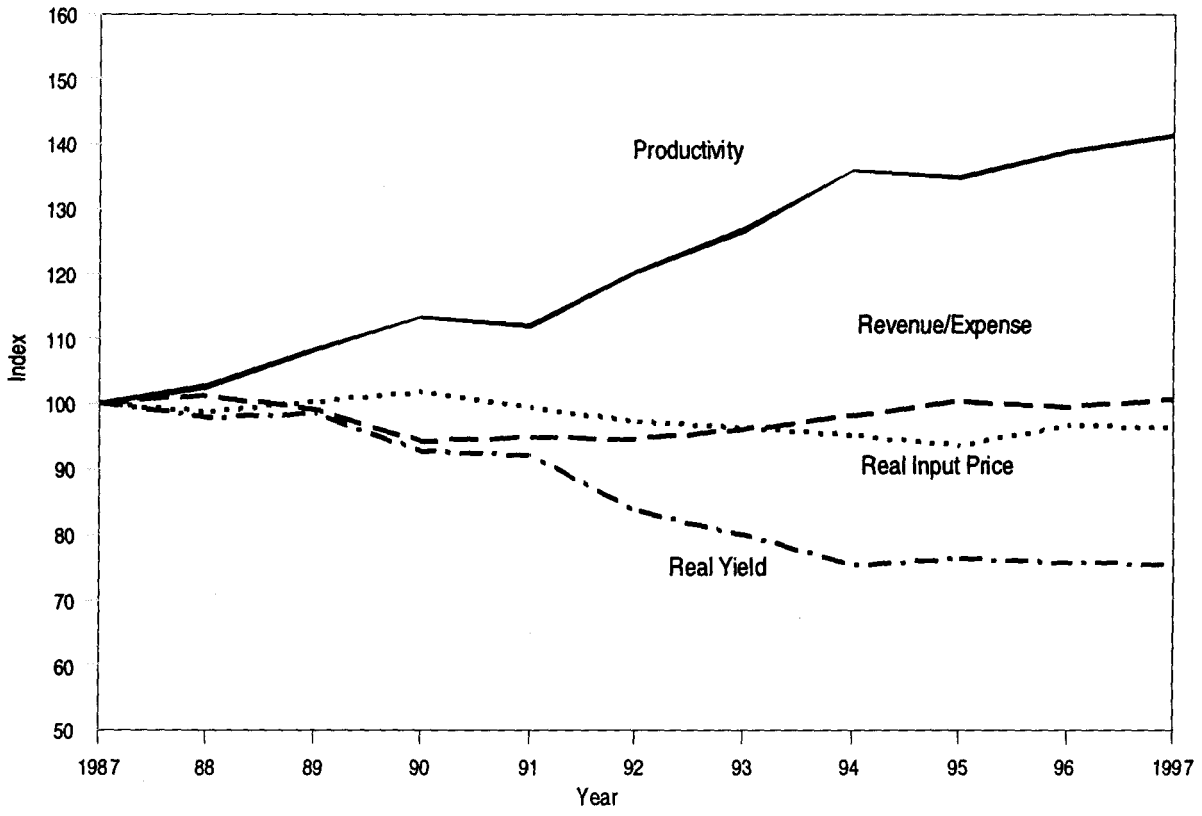
Table 5-3. World international revenue traffic
(scheduled services of airlines of ICAO Contracting States, 1987-1998)

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 (%)
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	155 490	8.3
1994	347	8.8	1 143 180	9.1	11.8	14.6	64 700	15.4	2 240	1.8	173 080	11.3
1995	375	8.1	1 249 160	9.3	13.0	10.2	70 340	8.7	2 400	7.1	189 430	9.4
1996	412	9.9	1 380 680	10.5	13.6	4.6	75 510	7.4	2 450	2.1	206 870	9.2
1997	438	6.3	1 468 150	6.3	15.7	15.4	87 740	16.2	2 490	1.6	227 390	9.9
1998	452	3.2	1 510 770	2.9	15.8	0.6	87 180	−0.6	2 470	−0.8	231 240	1.7

Source: ICAO Air Transport Reporting Form A-1.

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 1987 has been about 3.5 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 of scheduled airline industry — World (1987-1997)

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 reductions 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 1987 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

Table 5-4. Operating and net results[1]
(scheduled airlines of ICAO Contracting States, 1987-1998)[2]

			Operating result		Net result[3]			
Year	Operating revenues U.S.$ (millions)	Operating expenses U.S.$ (millions)	Amount U.S.$ (millions)	Percentage of operating revenues	Amount U.S.$ (millions)	Percentage of operating revenues	Direct subsidies U.S.$ (millions)	Income taxes U.S.$ (millions)
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	*291 000*	*274 700*	*16 300*	*5.6*	*8 550*	*2.9*	*180*	*-4 200*
1998[4]	298 500	282 000	16 500	5.5				

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.

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, with a net result of $5.3 billion, but in 1997, there was an operating surplus of $16.3 billion and a net result of almost $8.6 billion. According to preliminary estimates for 1998, an operating surplus of $16.5 billion is expected.

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 7.1 per cent to 8.8 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. The share of indirect expenses, and especially general, administrative and other operating expenses has increased slightly, corresponding to the decline in the share of direct aircraft expenses, which benefited from productivity improvements and reductions in fuel prices.

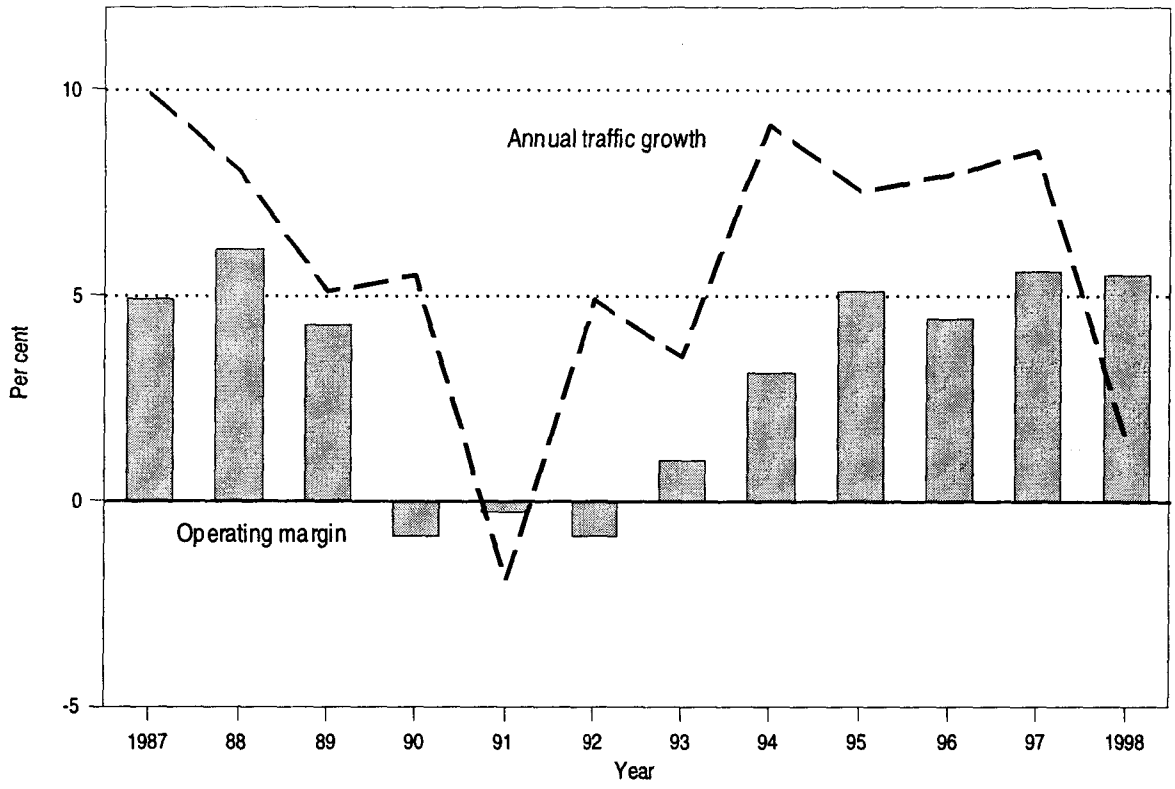
5.19 The variations in the annual operating result, measured as a percentage of airline revenue, are illustrated graphically for the period 1987-1998 in Figure 5-5, which also shows the fluctuations in traffic growth over the same period. There is a positive correlation between this measure of financial return and the growth in traffic. However, close examination of 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 further in 1997 and 1998 due to increases in average passenger load factors in 1997 and declines in fuel prices both in 1997 and 1998.

Table 5-5. Distribution of operating revenues and expenses
(scheduled airlines of ICAO Contracting States[1],
total domestic and international services, 1987 and 1997)

Description	Distribution by item (per cent) 1987	1997	Change in per cent share of item 1987 to 1997
OPERATING REVENUES			
Scheduled services (total)	88.8	87.3	-1.5
Passenger	75.6	76.2	0.6
Freight	11.8	10.2	-1.6
Mail	1.3	0.9	-0.4
Non-scheduled operations	4.1	3.9	-0.2
Incidental	7.1	8.8	1.7
TOTAL	100.0	100.0	—
OPERATING EXPENSES			
Direct aircraft			
Flight operations (total)	26.3	27.8	1.5
Flight crew	6.8	7.8	1.0
Fuel and oil	14.8	12.6	-2.2
Other	4.7	7.4	2.7
Maintenance and overhaul	11.5	11.0	-0.5
Depreciation and amortization	7.8	6.5	-1.3
Sub-total	45.6	45.3	-0.3
Indirect			
User charges and station expenses (total)	17.7	17.4	-0.3
Landing and associated airport charges	3.7	4.1	0.4
En-route facility charges	1.6	2.8	1.2
Station expenses	12.4	10.5	-1.9
Passenger services	10.4	10.7	0.3
Ticketing, sales, promotion	17.4	14.8	-2.6
General, administrative and other operating expenses	8.9	11.8	2.9
Sub-total	54.4	54.7	0.3
TOTAL	100.0	100.0	—

1. Excludes operations within the Commonwealth of Independent States.

Source: ICAO Air Transport Reporting Form EF-1.

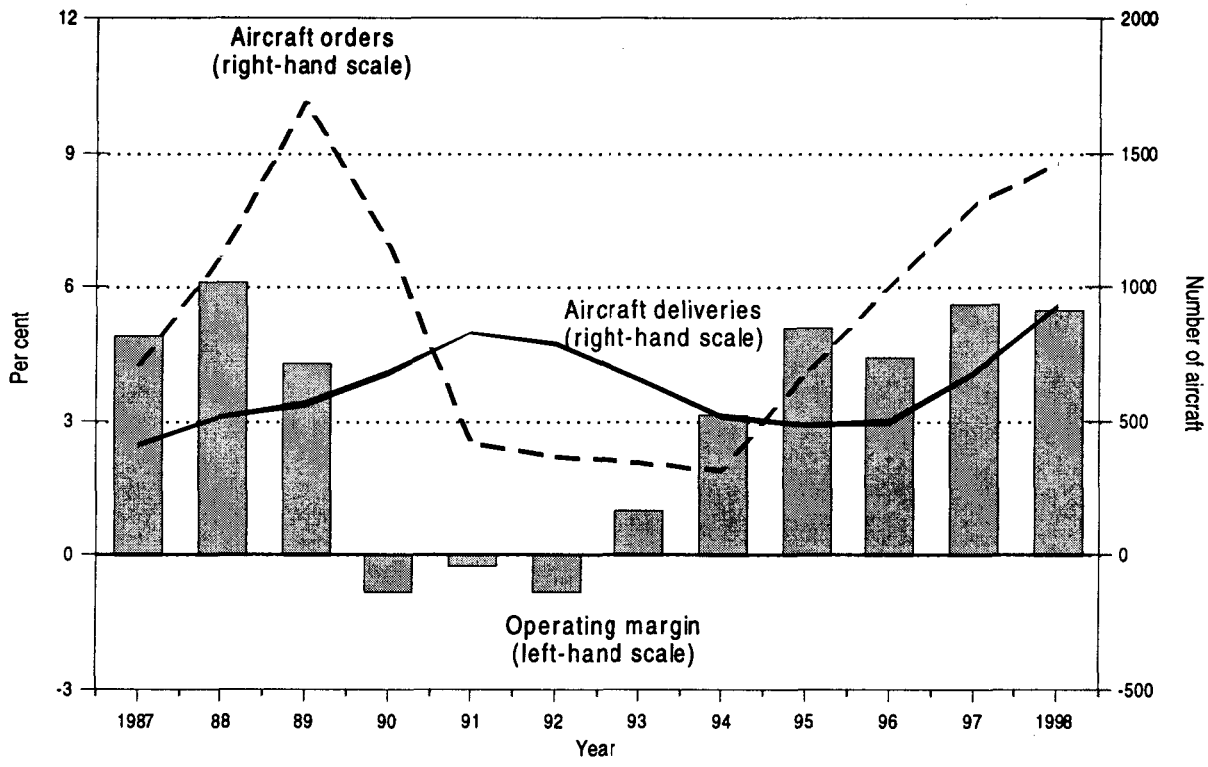


Source: ICAO Air Transport Reporting Forms A-1 and EF-1.

Figure 5-5. Financial return and traffic growth of scheduled airline industry — World (1987-1998)

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 financing. 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. Aircraft orders started to increase again from 1996, surpassing aircraft deliveries for the first time since 1990.



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

Figure 5-6. Financial return and aircraft supply — World (1987-1998)

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 1999, 2000 and 2001 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 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 1999, 2000 and 2001, developed from economic and yield assumptions and other considerations, are presented in Table 5-6. General economic performance is expected to provide the main support for traffic demand. Global passenger traffic is expected to grow by 4.1 per cent in 1999, above the 1998 growth rate of 2.2 per cent. Expected improvement in economic growth should boost traffic by around 5.0 per cent in 2000 and 5.7 per cent in 2001. 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.

Table 5-6. ICAO scheduled passenger traffic forecast
(passenger-kilometres performed, 1999-2001)

Region of airline registration	ACTUAL 1987 (billions)	ACTUAL 1997 (billions)	Average annual growth (%)	ESTIMATED 1998 (billions)	Growth (%)	FORECAST 1999 (billions)	Growth (%)	2000 (billions)	Growth (%)	2001 (billions)	Growth (%)
Africa	35.9	56.2	4.6	55.2	-1.9	57.4	4.0	60.3	5.0	63.5	5.3
Asia/Pacific	253.5	639.5	9.7	630.1	-1.5	657.2	4.3	696.0	5.9	744.0	6.9
Europe	494.2	655.2	2.9	691.5	5.5	721.9	4.4	763.1	5.7	808.9	6.0
Middle East	44.6	76.7	5.6	77.7	1.4	80.5	3.6	84.4	4.8	89.3	5.8
North America	684.6	1 020.4	4.1	1 042.1	2.1	1 082.8	3.9	1 123.8	3.8	1 175.5	4.6
Latin America/ Caribbean	76.7	125.1	5.0	133.8	7.0	139.3	4.1	147.2	5.7	156.8	6.5
World	1 589.5	2 573.1	4.9	2 630.4	2.2	2 739.1	4.1	2 874.8	5.0	3 038.0	5.7

5.27 Traffic growth will vary by geographic region because of the impact of specific local or regional factors. It is anticipated that the traffic of the airlines of the Asia/Pacific region will grow at the highest rate among ICAO regions, although significantly lower than the growth rates experienced by the region in the past decade. Markets for European airlines are also forecast to be reasonably buoyant, surpassing world growth rates, with some further benefits of liberalization and recovery in Eastern Europe and the CIS. Latin America and the Caribbean traffic is expected to match the world average growth rate in 1999, and grow at a faster rate than the world average in both 2000 and 2001. The developing regions of the Middle East and Africa are expected to experience moderate rates of passenger traffic growth over the forecast period, close to the expected world growth rates. More moderate growth is expected in the mature North American markets. 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 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 incomplete historical data are available).

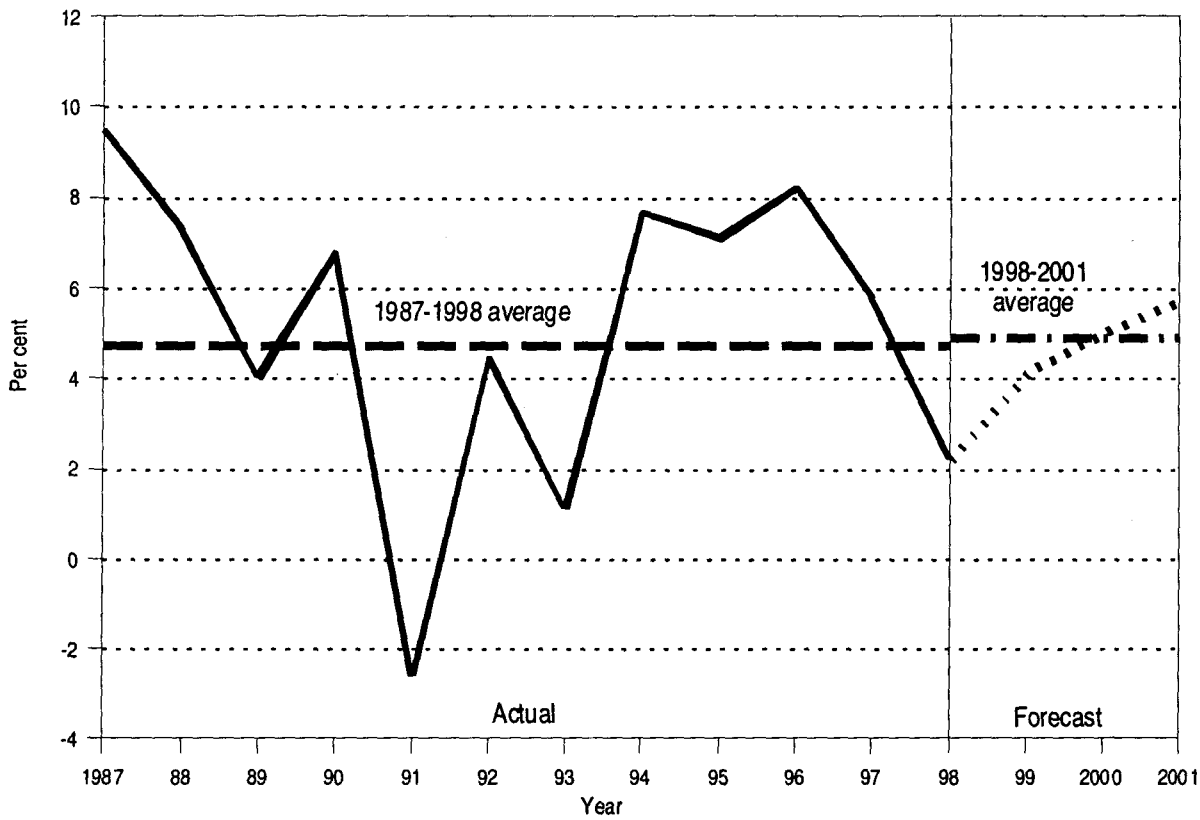


Figure 5-7. World scheduled passenger traffic growth — passenger-kilometres performed (1987-2001)

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 3.7 per cent in 1999, 5.3 per cent in 2000 and 5.9 per cent in 2001. These compare with an average rate of 7.1 per cent per annum over the past ten years.

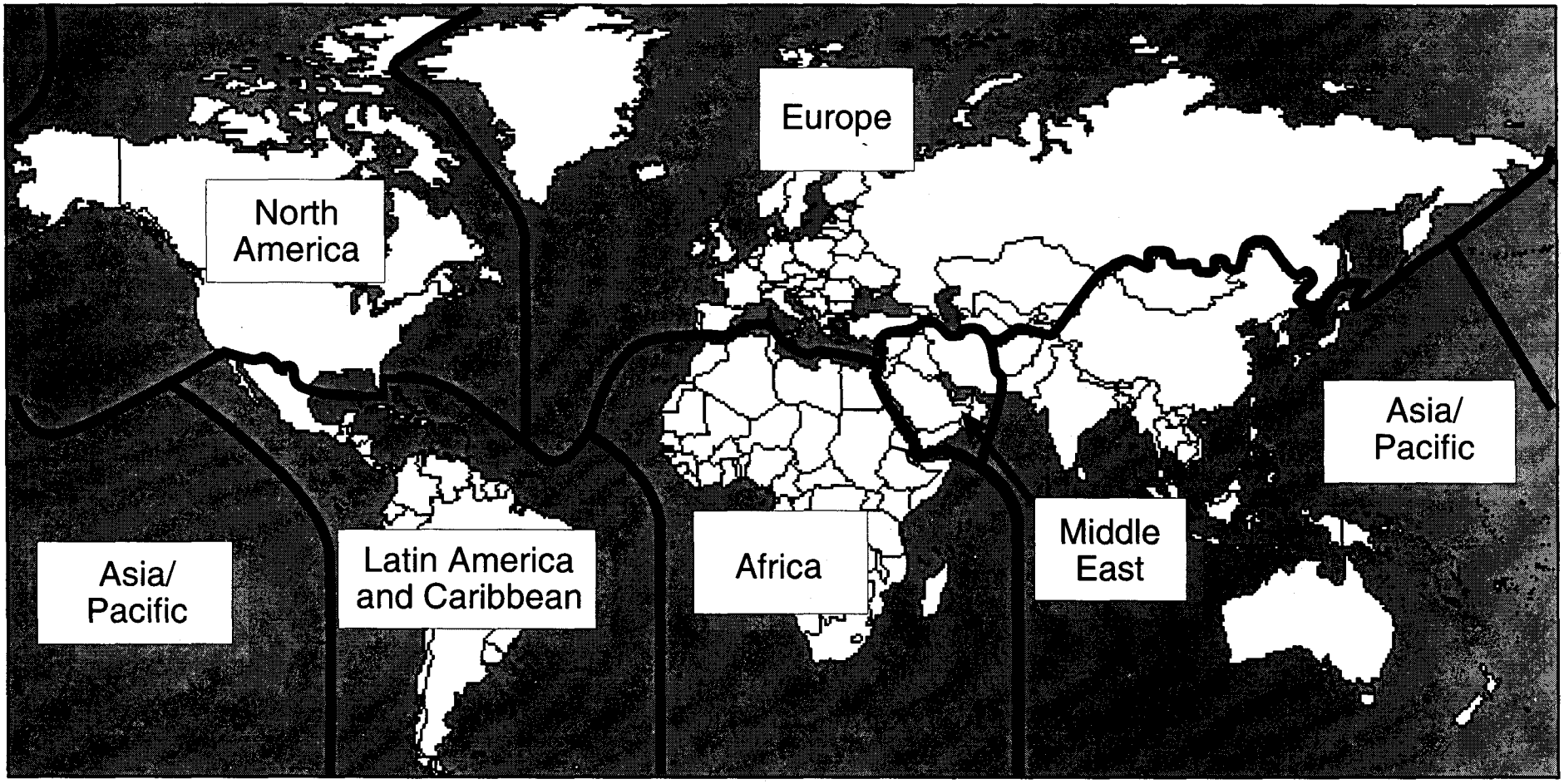
5.30 The forecast for airline expenses is based on assumptions for the expected trends in quantity of inputs (labour, fuel and aircraft capacity) and the prices of those inputs, the latter being primarily determined by the outlook for general inflation. Airlines are taking steps to trim employment levels 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 4.8 per cent in 1999, 5.1 per cent in 2000 and 5.8 per cent in 2001 (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 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.

PART III

REGIONAL PERSPECTIVES, 1998 TO 2001

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 1998, the economic environment over the period since 1987 and anticipated through to 2001, and airline finances and passenger traffic trends over the period since 1987, and presents scheduled passenger traffic forecasts for the airlines of each region through to 2001. 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 1998

Table 6-1. Scheduled airline traffic — Africa (1998/1997)

	INTERNATIONAL			TOTAL		
	1998	Increase over 1997 (%)	Share of world traffic (%)	1998	Increase over 1997 (%)	Share of world traffic (%)
Passengers carried (thousands)	15 640	0.7	3.5	28 990	-2.5	2.0
Passenger-kilometres performed (millions)	46 840	-0.4	3.1	55 180	-1.9	2.1
Freight and mail tonne-kms performed (millions)	1 360	-17.1	1.5	1 410	-19.4	1.3

Source: ICAO Air Transport Reporting Form A-1.

6.2 Based on the need to improve overall efficiency and financial results, restructuring of several civil aviation organizations was initiated in a number of States. Restructuring was carried out in four States during 1998. In some other States, proposals were accepted but implementation was hindered by lack of resources, while in yet others, feasibility studies were conducted.

6.3 Under the auspices of the Economic Commission for Africa, preparations were under way for a meeting of African Ministers responsible for civil aviation, scheduled for 1999, to review the air transport policy for Africa. This will include a review of the Yamoussoukro Declaration.

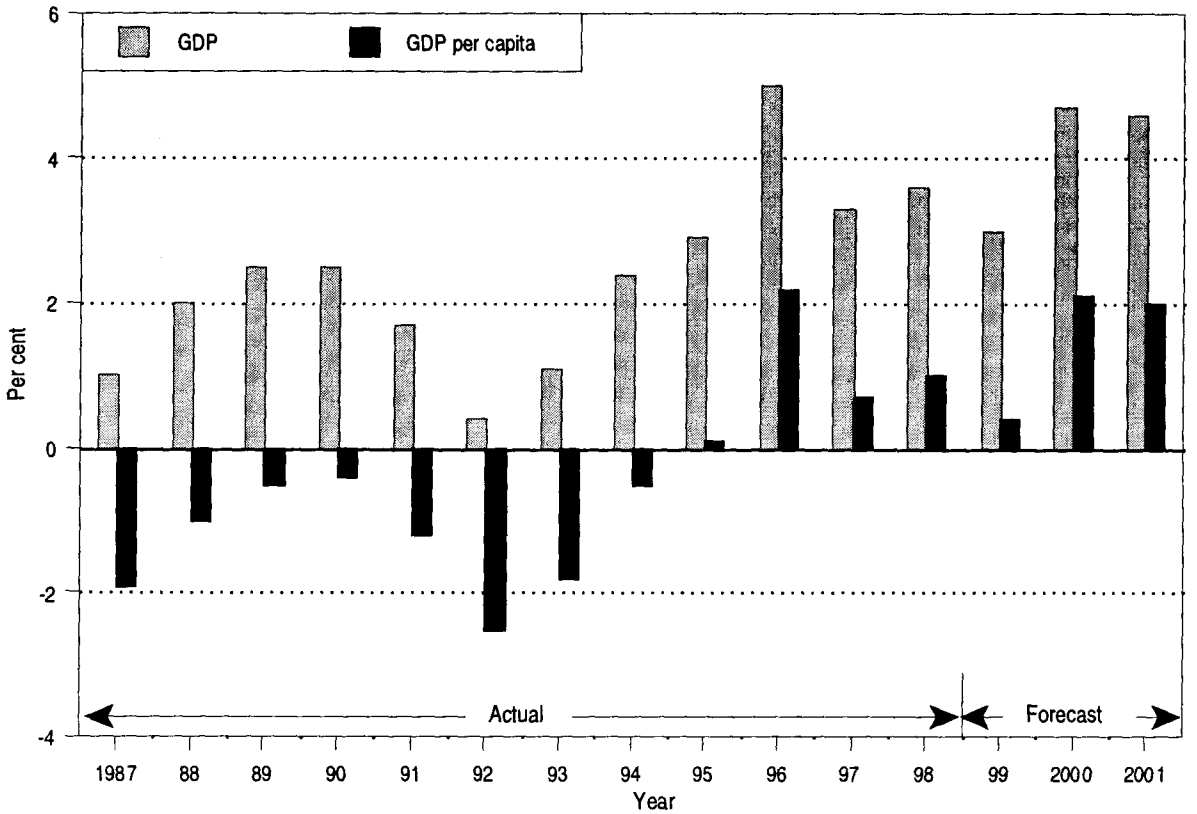
6.4 Sub-regional organizations such as COMESA, SADC and the East African Co-operation addressed air transport policy matters in their meetings. A number of States were engaged in reviewing their air transport policies as well, in pursuance of the guidance arising from ICAO's World-wide Air Transport Conference in 1994.

6.5 Challenges for African airlines were increasingly manifested through global alliances, increased competition and changing culture at the national level. Regional penetration through code sharing, franchising and other innovative commercial agreements intensified. With the exception of Kenya Airways and South African Airways, the majority of sub-Saharan airlines had neither network partners nor code-share arrangements outside the region. Furthermore, several requests were pending from United States airlines to code share with European airlines in order to obtain access to African markets. In response to these developments, the Council of Ministers of Transport of the Yaounde Treaty countries and the 15th AFCAC Plenary Session adopted resolutions not to accept third country code sharing.

Economic trends

6.6 Over the 1987-1997 period, the aggregate African economy grew at an average annual rate of 2.4 per cent (GDP in real terms), although GDP per capita declined at a rate of 0.5 per cent over that decade. Figure 6-1 illustrates the year-to-year changes in the region's GDP and GDP per capita. Domestic factors ranging from a lower incidence of civil strife in some countries to greater macroeconomic stability and modest progress in liberalizing markets and privatizing state enterprises helped the region's improved economic performance significantly during recent years. Favourable external conditions also contributed, most notably the rapid growth in world trade, surging private capital flows and a mini-boom in commodity prices (1994-95). But the region's economy has not been immune from internal and external shocks, especially in 1998, when the financial and economic setbacks in Asia resulted in significant deterioration of terms of trade.

6.7 The economic performance of the African region is expected to remain stable over the medium term. The aggregate GDP is anticipated to grow at 3.0, 4.7 and 4.6 per cent for the years 1999, 2000 and 2001, respectively. Underlying these projections are fiscal reforms, strengthening of the private sector, rising domestic savings, expanding non-oil exports and successful consolidation of domestic and international economic policy reforms.



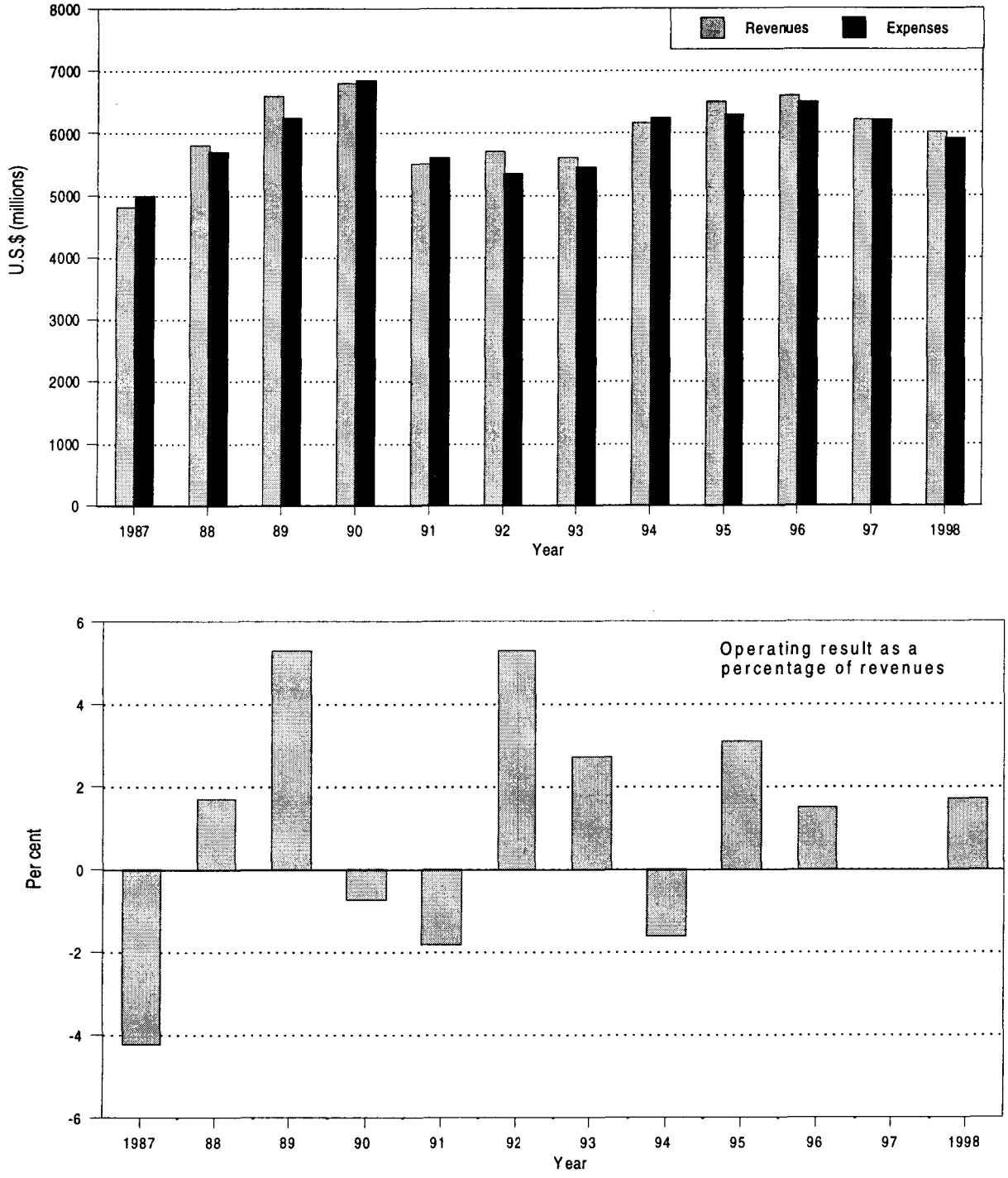
Source: IMF, WEFA Group.

Figure 6-1. Annual change in real GDP and GDP per capita — Africa (1987-2001)

Airline financial trends

6.8 Over the 1987-1997 period, operating revenues (in dollars) of the scheduled airlines of the African region increased at an average annual rate of 2.6 per cent (compared to world annual average of 7.1 per cent). Operating expenses for the same period increased by 2.2 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 and 1997, as illustrated in Figure 6-2.

6.9 For the 1987-1997 period, average scheduled passenger yields for airlines of the region, measured in terms of cents per passenger-kilometres performed (PKPs), declined at an average annual rate of 5.6 per cent in real terms (compared to a 2.5 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.



Note.— 1998 figures are from estimated data.

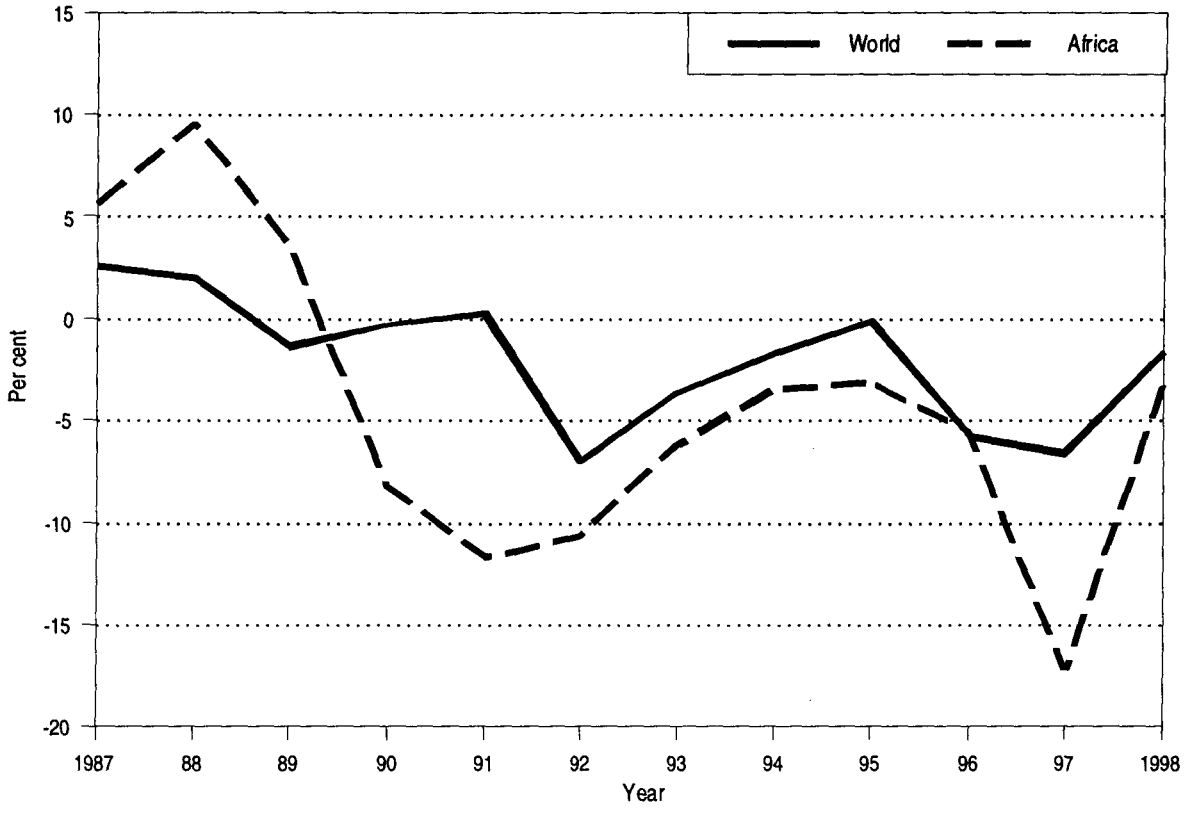
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-2. Scheduled airline operating revenues and expenses — Africa (1987-1998)

Airline passenger traffic trends and forecast

6.10 Over the 1987-1997 period, scheduled passenger traffic (in PKPs) of the airlines of the African region increased at an average annual rate of 4.6 per cent (compared to the world annual average of 4.9 per cent). Traffic growth in recent years markedly exceeded this decade's average; 6.2 per cent growth was recorded in 1996 followed by a 6.0 per cent growth in 1997. This trend reversed in 1998 with traffic declining by 1.9 per cent (compared to world average growth of 2.2 per cent). 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 4.0, 5.0 and 5.3 per cent for the years 1999, 2000 and 2001, respectively, close to the levels of passenger traffic growth worldwide.



Notes.— 1998 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 (1987-1998)

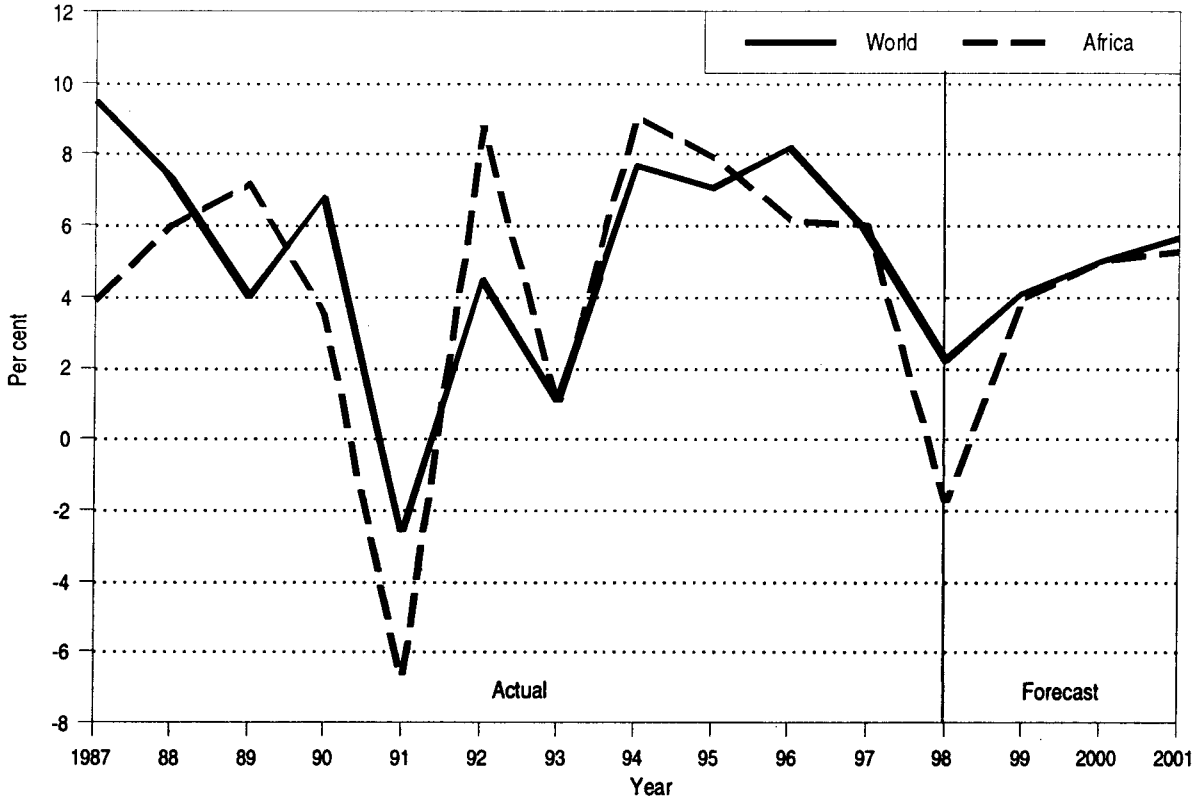


Figure 6-4. Scheduled passenger traffic growth (PKPs) — Africa and World (1987-2001)

ASIA/PACIFIC

The Region in 1998

Table 6-2. Scheduled airline traffic — Asia/Pacific (1998/1997)

	INTERNATIONAL			TOTAL		
	1998	Increase over 1997 (%)	Share of world traffic (%)	1998	Increase over 1997 (%)	Share of world traffic (%)
Passengers carried (thousands)	100 330	-0.6	22.2	326 890	-1.9	22.4
Passenger-kilometres performed (millions)	433 510	-1.6	28.7	630 050	-1.5	24.0
Freight and mail tonne-kms performed (millions)	32 790	-2.1	36.6	36 060	-1.1	33.4

Source: ICAO Air Transport Reporting Form A-1.

6.12 The Air Services Group (ASG) of the Asia/Pacific Economic Cooperation (APEC) completed its work on recommendations on options to be implemented by each member State. Those options included *inter alia*: more flexible airline ownership and control arrangements; general easing of tariff regulation; adequacy of existing air cargo services; facilitation of cooperative arrangements, such as code sharing, joint operations and interlining; and more open market access. The ASG issued a comprehensive report on the options which was subsequently submitted to the APEC Transport Ministers.

6.13 In May 1998, 14 Ministers from South Pacific Forum member States met in Fiji to discuss aviation policy. The Ministers agreed on a number of conclusions aimed at the enhancement of aviation safety and promotion of competitiveness of the region's aviation industry. The Ministers recognized that most island member States of the Forum were not in a position to develop and maintain their own skills base for effective safety inspection and certification. Therefore, it was agreed that safety oversight could be performed through a collaborative mechanism, allowing for sharing of expert resources. The Ministers supported a policy framework to manage the airspace of the Forum region as a unified airspace. Such a unified airspace would allow the benefits of the satellite-based CNS/ATM system to be implemented cooperatively in a cost effective manner and would avoid unnecessary duplication. The Ministers agreed that the Forum Secretariat, in consultation with Forum member States and with ICAO's assistance, would develop proposals for airspace management.

6.14 The Ministers also agreed on aviation policies that would encourage private sector development and enhance competitiveness. As part of the steps towards liberalization, the Ministers committed themselves to using bilateral negotiations to encourage more flexible cooperation between States and between airlines. Areas of such cooperation may include code sharing, ownership and control, pricing, charter services, route rights, fifth freedom rights, dedicated freighter services, multiple designation, etc.

6.15 In consultation with Australian airport operators and the Australian Competition and Consumer Commission (ACCC) a new pricing policy for leased Australian federal airports was developed and is being implemented. A price cap will operate for the first five years to ensure aeronautical charges fall in real terms by limiting increases in these charges to the Consumer Price Index minus a factor determined for each airport. Airport operators are also required to report to the ACCC on the quality of service and financial performance of their operations. Detailed slot management and compliance schemes were tabled in the Australian federal parliament in March 1998 and June 1998, respectively. The slot management scheme came into effect for the scheduling season beginning 29 March 1998. The compliance scheme came into effect on 25 October 1998.

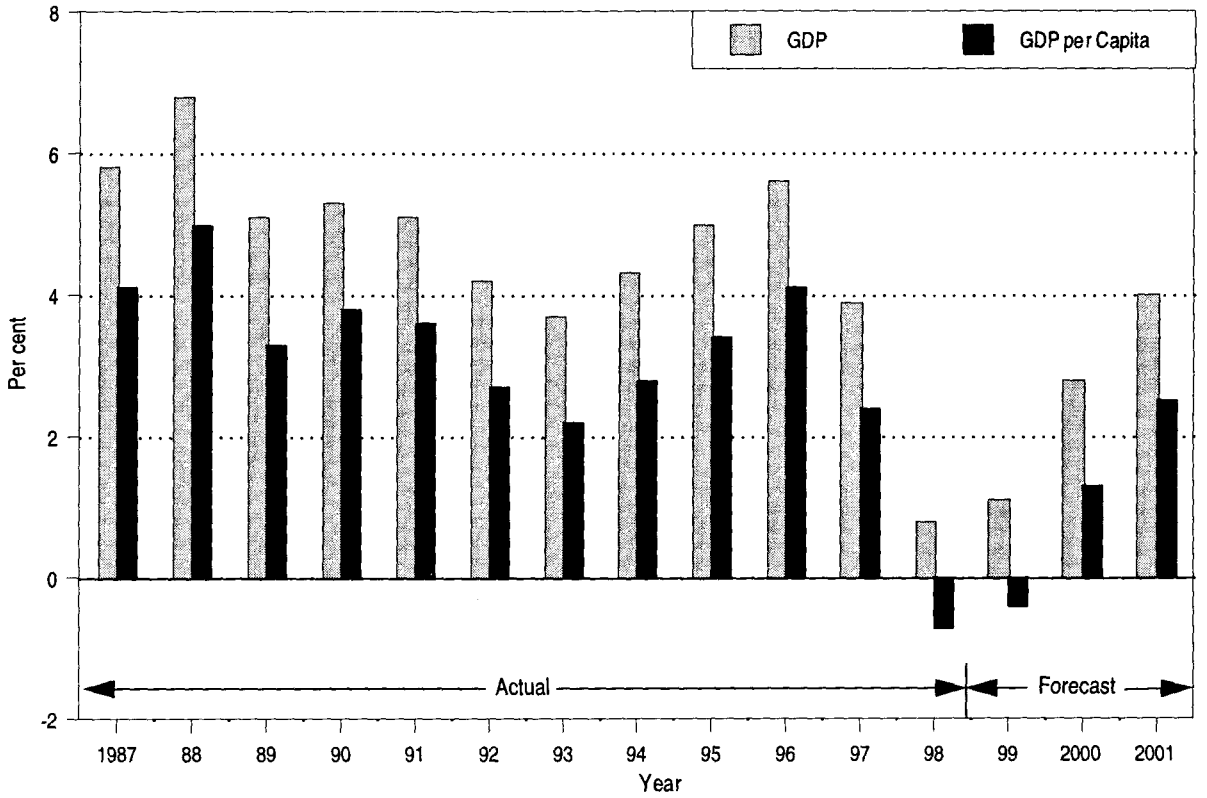
Economic trends

6.16 Over the 1987-1997 period, the aggregate Asia/Pacific economy (GDP) grew at an average annual rate of 4.9 per cent in real terms, and GDP per capita increased at 3.3 per cent, the highest growth rates of all ICAO regions. For more than 10 years Asia/Pacific had been the fastest growing region, but GDP growth dropped from 5.4 per cent in 1996 to 3.9 per cent in 1997 and further to an estimated 0.8 per cent in 1998, well below the world average. The year-to-year changes in the region's GDP and GDP per capita are illustrated in Figure 6-5.

6.17 In 1998 the region's economic performance continued to slow significantly. It was mainly due to the unprecedented depth and severity of the recession in several South-East Asian countries resulting from a collapse in their domestic investment and consumption, and output contraction. The Japanese economy experienced a recession with curbed consumer spending, falling export growth and declining investment spending and confidence.

6.18 The performance of the Asia/Pacific economy is expected to start to recover in 1999 and gain momentum in 2000 and 2001. There are modest recoveries in prospect for almost all countries affected by the recent setbacks. It is anticipated that the restoration of growth will be helped by a return of financial market confidence and further easing of monetary policy; however, to sustain the improving trends, financial sector reforms and corporate sector restructuring will be required in some countries. The revival of the Asia/Pacific economy will depend to a high degree on how Japan in particular will cope with its difficulties.

6.19 For the entire Asia/Pacific region, in real terms the GDP is expected to grow at 1.1 per cent in 1999 and gain momentum in 2000 and 2001, with expected growth rates of 2.8 and 4.0 per cent, respectively.



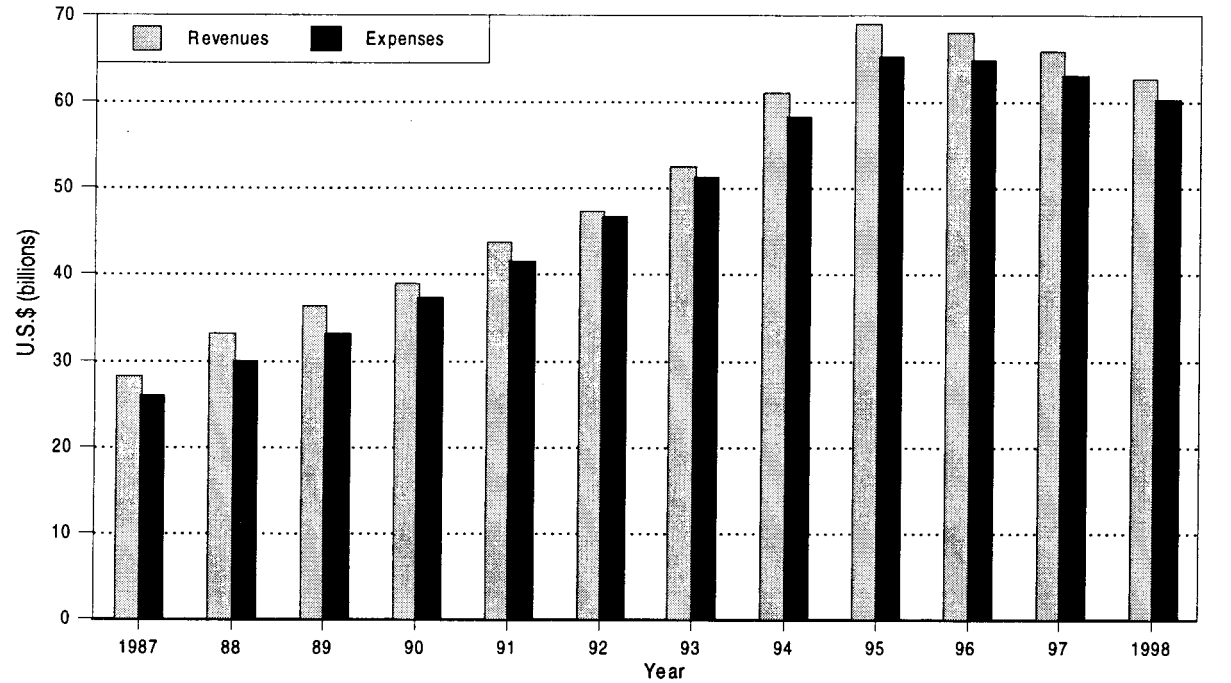
Source: IMF, WEFA Group.

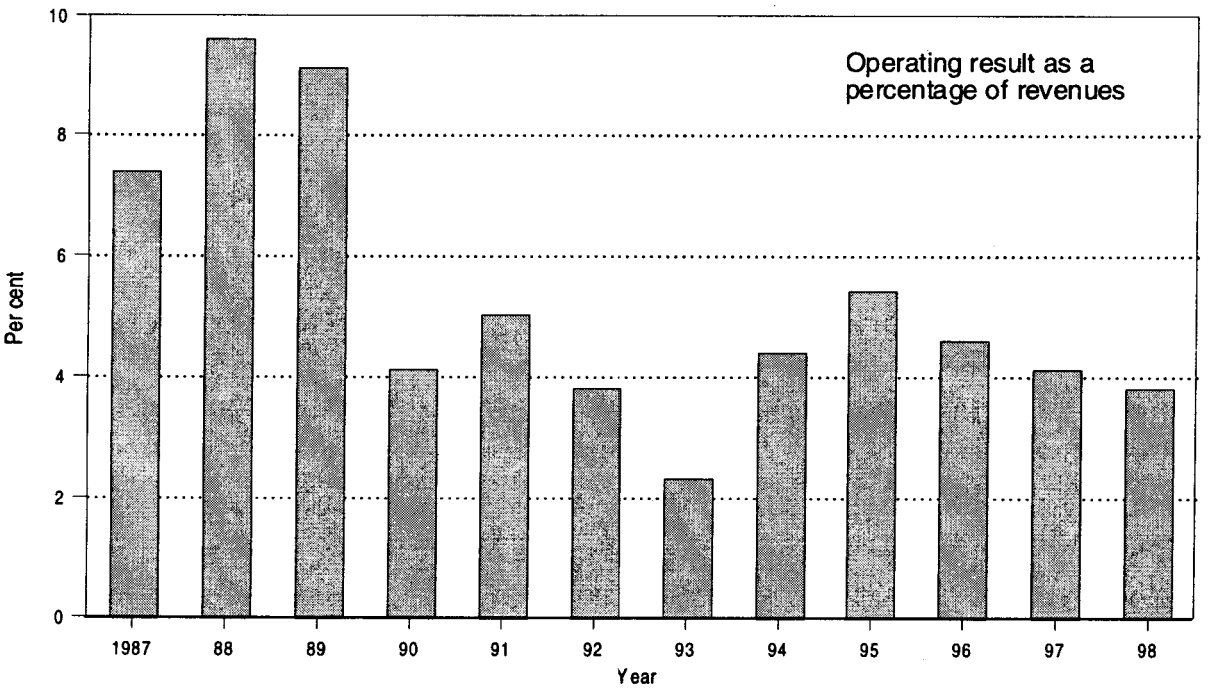
Figure 6-5. Annual change in real GDP and GDP per capita — Asia/Pacific (1987-2001)

Airline financial trends

6.20 Over the 1987-1997 period, operating revenues of the scheduled airlines of the Asia/Pacific region increased at an average annual rate of 8.9 per cent (compared to the world average annual growth rate of 7.1 per cent). Operating expenses for the same period increased by 9.3 per cent per annum. Airlines in the region enjoyed positive operating results throughout the last decade as illustrated in Figure 6-6. However, it is estimated that the aggregate operating profit for 1998 of the Asia/Pacific airlines was around $2 400 million, significantly lower than that of 1997.

6.21 Average scheduled passenger yields for airlines of the region, measured in terms of cents per PKP, have fluctuated significantly since 1987 and resulted in an annualized decline of 3.5 per cent during the 1987-1997 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 reflect, in part, the fluctuation of the yen and other Asian currencies against the U.S. dollar.





Note.— 1998 figures are from estimated data.

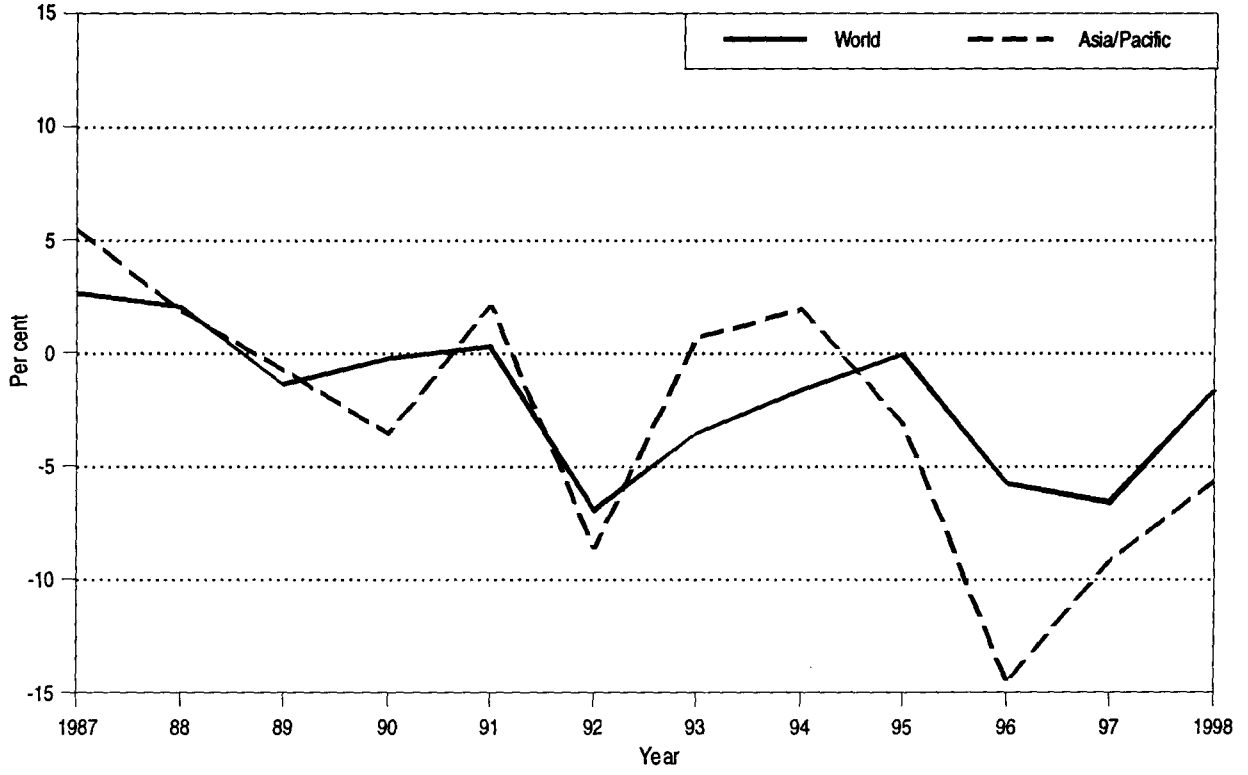
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-6. Scheduled airline operating revenues and expenses — Asia/Pacific (1987-1998)

Airline passenger traffic trends and forecast

6.22 Over the 1987-1997 period, scheduled passenger traffic (in PKPs) of airlines of the Asia/Pacific region increased at the average annual rate of 9.7 per cent, almost double the world's annual average of 4.9 per cent. Having exhibited the highest growth rates among all ICAO regions for almost a decade, in 1997 airlines of the region experienced a slowdown in traffic growth to almost 4 per cent, below the world average of 5.8 per cent. In 1998 the traffic is estimated to have declined by 1.5 per cent. The year-to-year traffic growth comparison between world and Asia/Pacific airlines is shown in Figure 6-8.

6.23 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, 5.9 and 6.9 per cent for the years 1999, 2000 and 2001, respectively, compared to the world airline growth of 4.1, 5.0 and 5.7 per cent.



Notes.— 1998 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 (1987-1998)

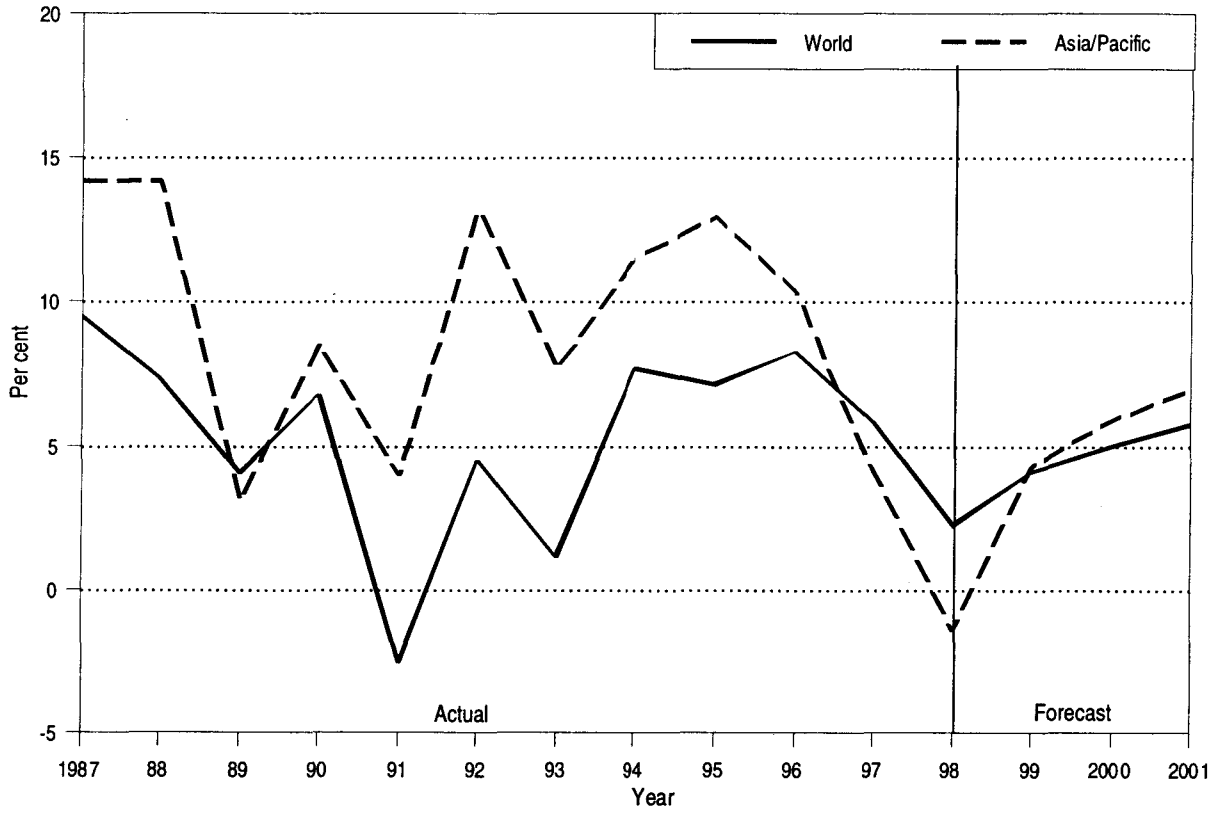


Figure 6-8. Scheduled passenger traffic growth (PKPs) — Asia/Pacific and World (1987-2001)

EUROPE

The Region in 1998

Table 6-3. Scheduled airline traffic — Europe (1998/1997)

	INTERNATIONAL			TOTAL		
	1998	Increase over 1997 (%)	Share of world traffic (%)	1998	Increase over 1997 (%)	Share of world traffic (%)
Passengers carried (thousands)	215 590	6.2	47.6	365 200	2.8	25.0
Passenger-kilometres performed (millions)	572 080	7.0	37.9	691 480	5.5	26.3
Freight and mail tonne-kms performed (millions)	29 650	-0.6	33.1	30 560	-0.8	28.3

Source: ICAO Air Transport Reporting Form A-1.

6.24 The Council of the European Union (EU) adopted a mandate authorizing the EC to negotiate Community membership of the European Organization for the Safety of Air Navigation (EUROCONTROL). This development should assist EUROCONTROL in meeting its objectives and provide for a single, efficient body for ATM policy-making in Europe.

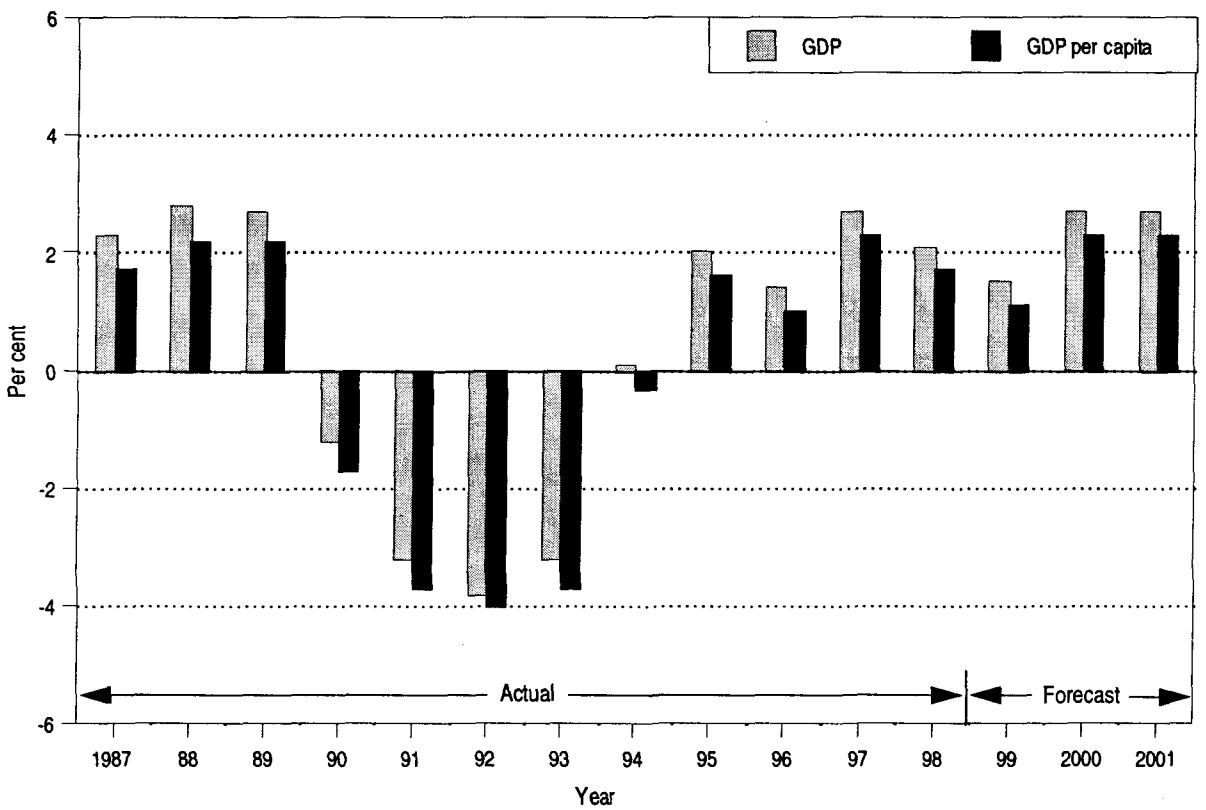
6.25 In the latter part of 1998, an agreement was finalized on air transport services between the EU and Switzerland. Also a first round of negotiations was carried out with ten Central and Eastern European States with the aim of establishing the European Common Aviation Area (ECAA); the intention is for the agreement to be finalized by the end of 1999. Including Switzerland, Iceland and Norway, this would bring the membership of the ECAA to 28 States. Within the European Union, progress was made on updating the code of conduct on computer reservations systems, assisted by work in ECAC, with the aim of facilitating the choice of services for the air traveller.

6.26 In June 1998 a tripartite agreement was signed between the European Union, EUROCONTROL and the European Space Agency formalizing cooperation on a European contribution to a Global Navigation Satellite System (GNSS). Further work will continue on how best Europe's contribution to a GNSS can be envisaged.

Economic trends

6.27 The aggregate European economy (GDP) grew steadily between 1987 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 2.3 per cent per annum over the past decade.

6.28 GDP growth rates for the whole of Europe are forecast to be 1.5, 2.7 and 2.7 per cent for 1999, 2000 and 2001, respectively. However, because of the structural changes that are occurring in Central and Eastern Europe and conflict in the Federal Republic of Yugoslavia, there is an unusually large element of uncertainty associated with the economic outlook for the region.



Source: IMF, WEFA Group.

Figure 6-9. Annual change in real GDP and GDP per capita — Europe (1987-2001)

Airline financial trends

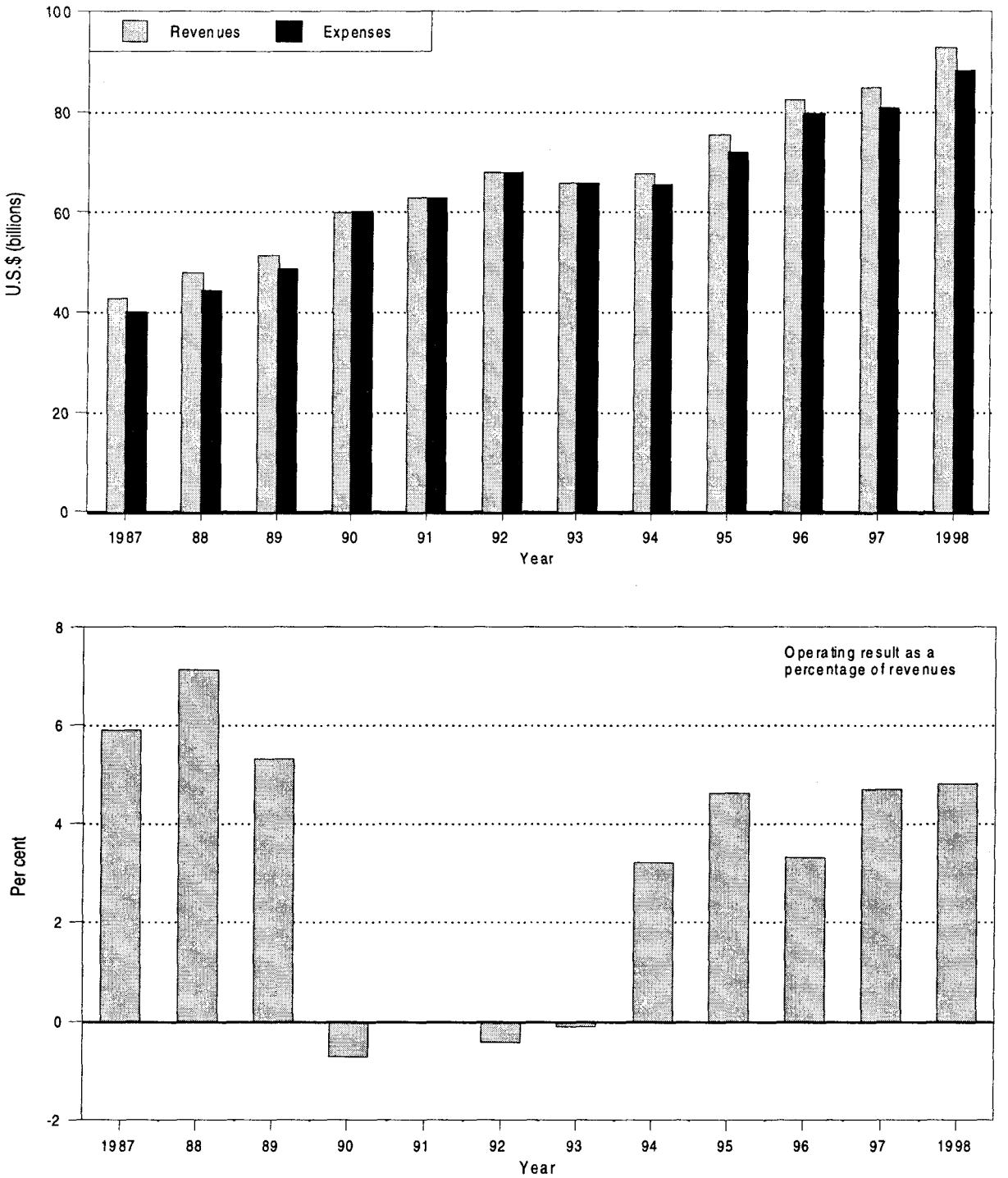
6.29 Over the 1987-1997 period, operating revenues of the scheduled airlines of the European region (excluding operations within the CIS) increased at an average annual rate of 7.1 per cent (comparable to the world annual average rate of 7.1 per cent). Operating expenses for the same period increased by 7.3 per cent per annum. As illustrated in Figure 6-10, positive operating results were achieved in 1987 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 at 4.0 per cent for 1997 and an estimated operating profit at 4.7 per cent for 1998.

6.30 Annual changes in average scheduled passenger yields for airlines of the region (excluding operations within the CIS) reveal marked fluctuations over the last decade, as shown in Figure 6-11. Over the whole period 1987-1997, the annualized ten-year average showed a 3.1 per cent decline in yield, close to the world result of 2.5 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 remained on the rise and yield came under pressure again in 1996 and 1997; that decline in yield was also in part due to the appreciation of the U.S. dollar against most European currencies (with the exception of the U.K. pound). It is estimated that in 1998 the real yield increased slightly, accompanied by a moderate passenger traffic growth in part due to the appreciation of some European currencies against the U.S. dollar (see Chapter 1).

Airline passenger traffic trends and forecast

6.31 Over the 1987-1997 period, scheduled passenger traffic (in PKPs) of the airlines of the European region increased at an average annual rate of 2.9 per cent (compared to the world annual average of 4.9 per cent) despite a generally impressive performance in Western Europe (except in 1991). If airlines of the CIS are excluded, European traffic grew at 7.3 per cent per annum over the period. Reported CIS traffic volumes dropped dramatically, on average by 11.1 per cent each year over the last decade with PKPs in 1997 at only about 31 per cent of those in 1987. A less severe decline of CIS traffic volume continued in 1997 and 1998, whereas European traffic excluding the CIS grew at an estimated rate of 6.7 per cent in 1998. 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.

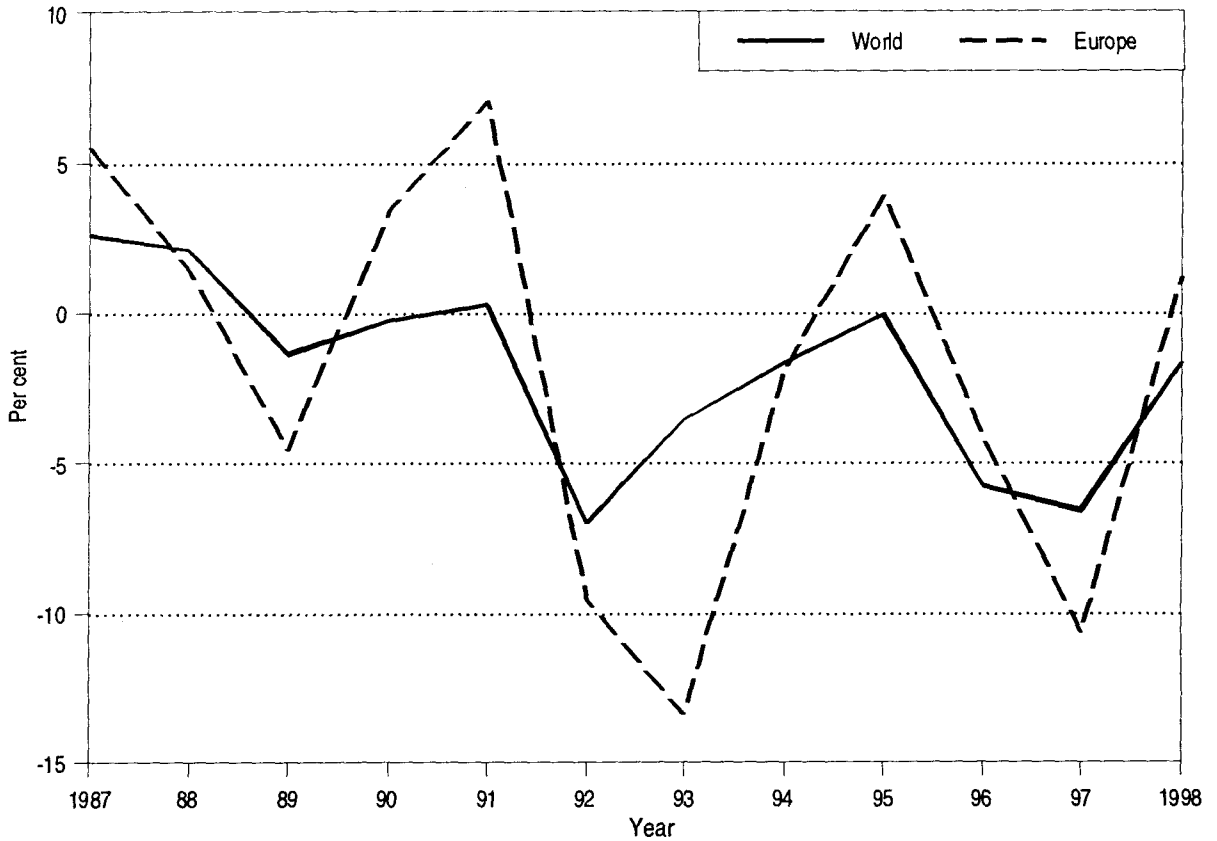
6.32 As shown in Table 5-6 and illustrated in Figure 6-12, scheduled passenger traffic for the region as a whole is expected to grow annually at rates of 4.4, 5.7 and 6.0 per cent for the years 1999, 2000 and 2001, respectively (compared to world airline growth of 4.1, 5.0 and 5.7 per cent). The airlines of Europe excluding the CIS 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 2001.



Note.— 1998 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-10. Scheduled airline operating revenues and expenses — Europe (1987-1998)



Notes.— 1998 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 (1987-1998)

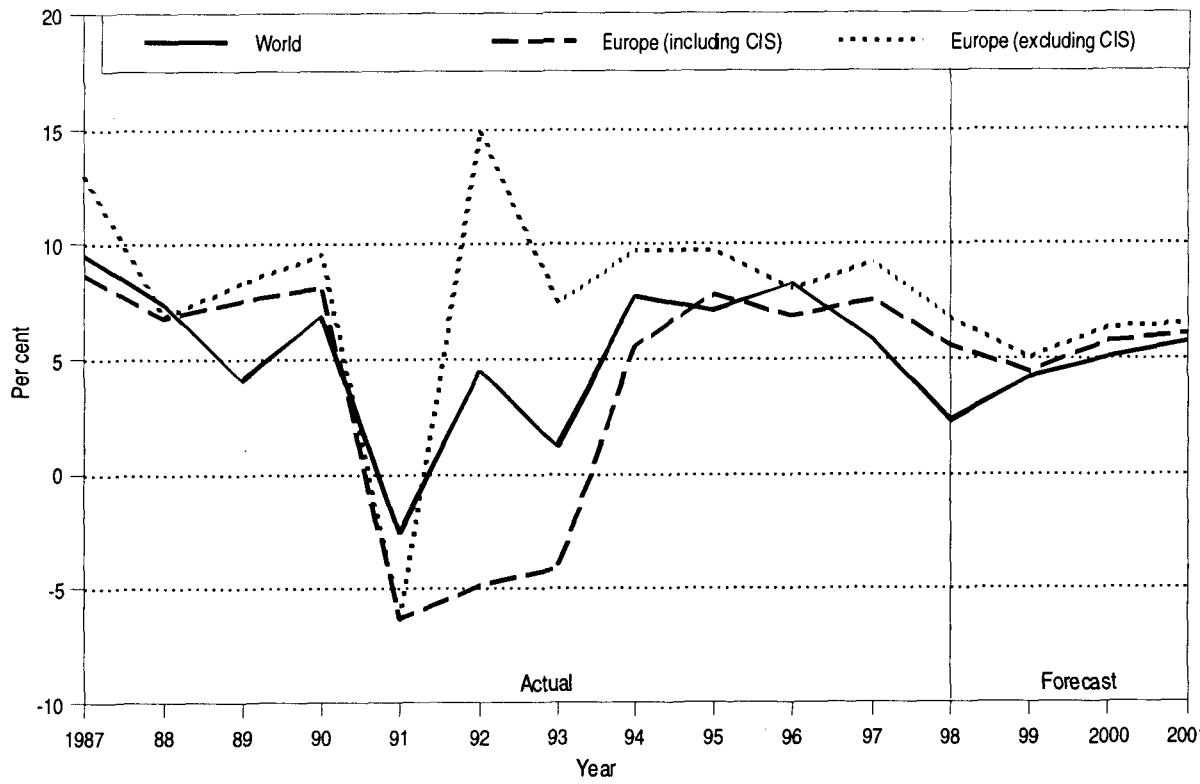


Figure 6-12. Scheduled passenger traffic growth (PKPs) — Europe and World (1987-2001)

MIDDLE EAST

The Region in 1998

Table 6-4. Scheduled airline traffic — Middle East (1998/1997)

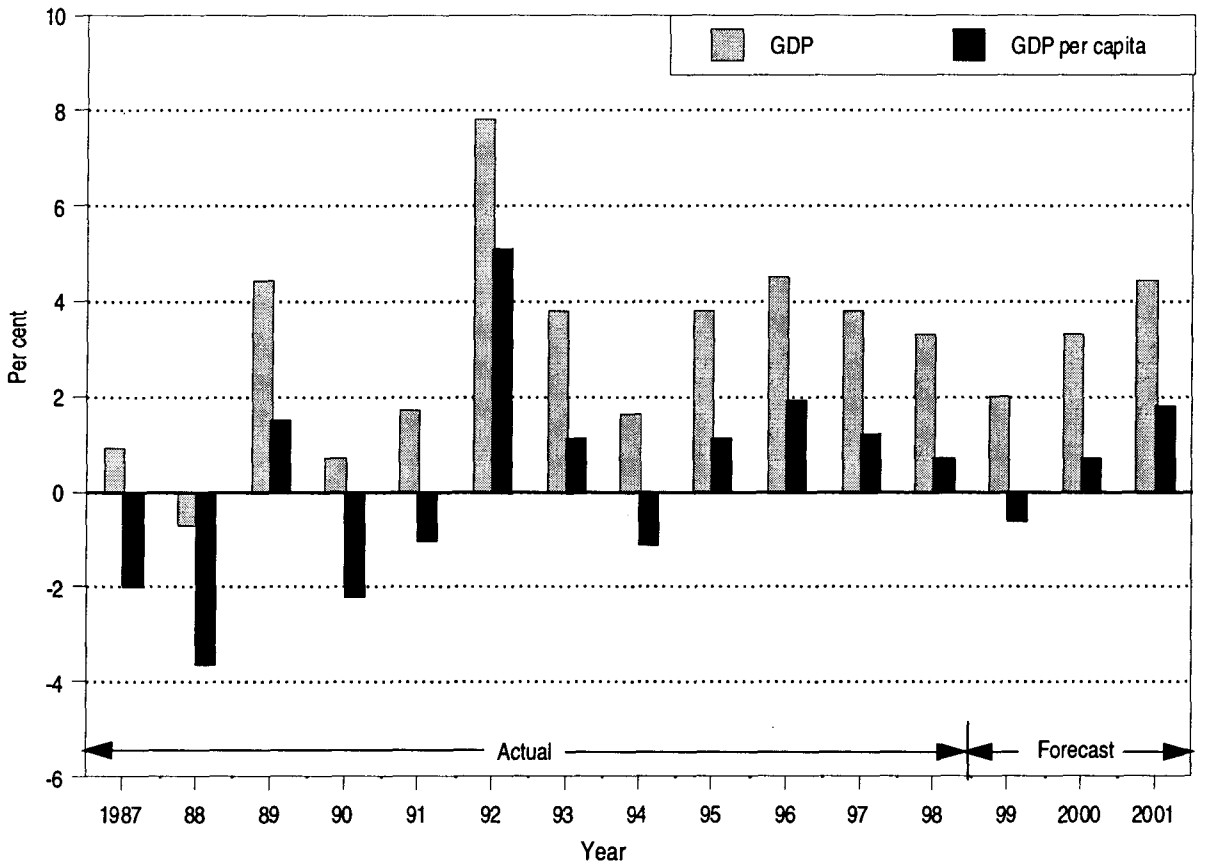
	INTERNATIONAL			TOTAL		
	1998	Increase over 1997 (%)	Share of world traffic (%)	1998	Increase over 1997 (%)	Share of world traffic (%)
Passengers carried (thousands)	21 510	-1.2	4.8	39 470	-0.4	2.7
Passenger-kilometres performed (millions)	65 330	2.2	4.3	77 740	1.4	3.0
Freight and mail tonne-kms performed (millions)	4 010	-0.2	4.5	4 120	-0.5	3.8

Source: ICAO Air Transport Reporting Form A-1.

Economic trends

6.33 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 five years. Over the 1987-1997 period, the aggregate GDP for the Middle East grew at an average annual rate of 3.1 per cent in real terms, while GDP per capita leveled off at 0.4 per cent per annum.

6.34 Prospects for this region are particularly dependent on oil market developments and fiscal consolidation policies. The recent further weakening of commodity prices including oil has contributed to an estimated lower GDP growth of 3.3 per cent in 1998 compared to 3.8 per cent in 1997. An improvement in the economic outlook is expected in 2000 and 2001, with forecast GDP growth rates of 2.0 per cent, 3.3 per cent and 4.4 per cent for 1999, 2000 and 2001, respectively.

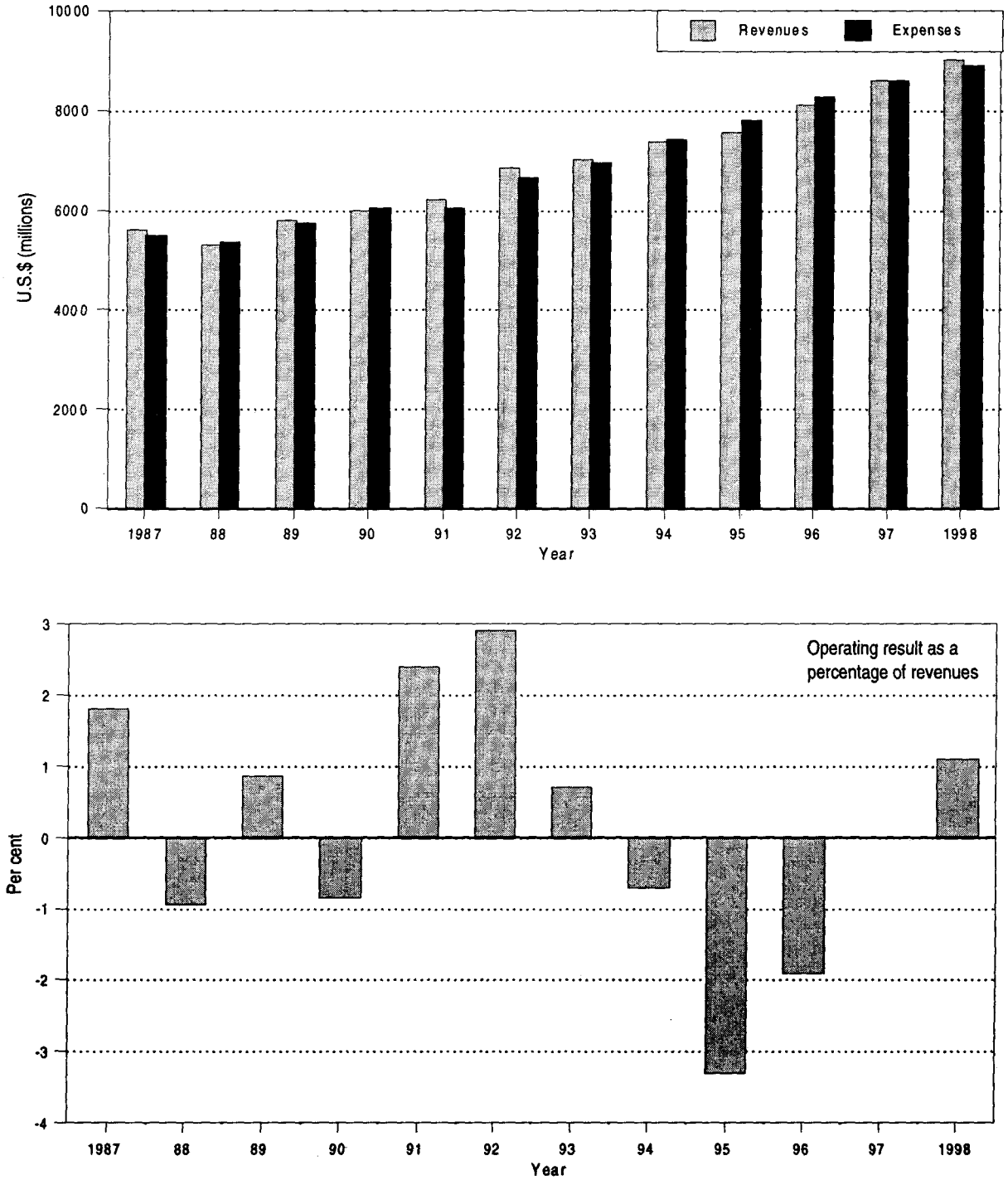


Source: IMF, WEFA Group.

Figure 6-13. Annual change in real GDP and GDP per capita — Middle East (1987-2001)

Airline financial trends

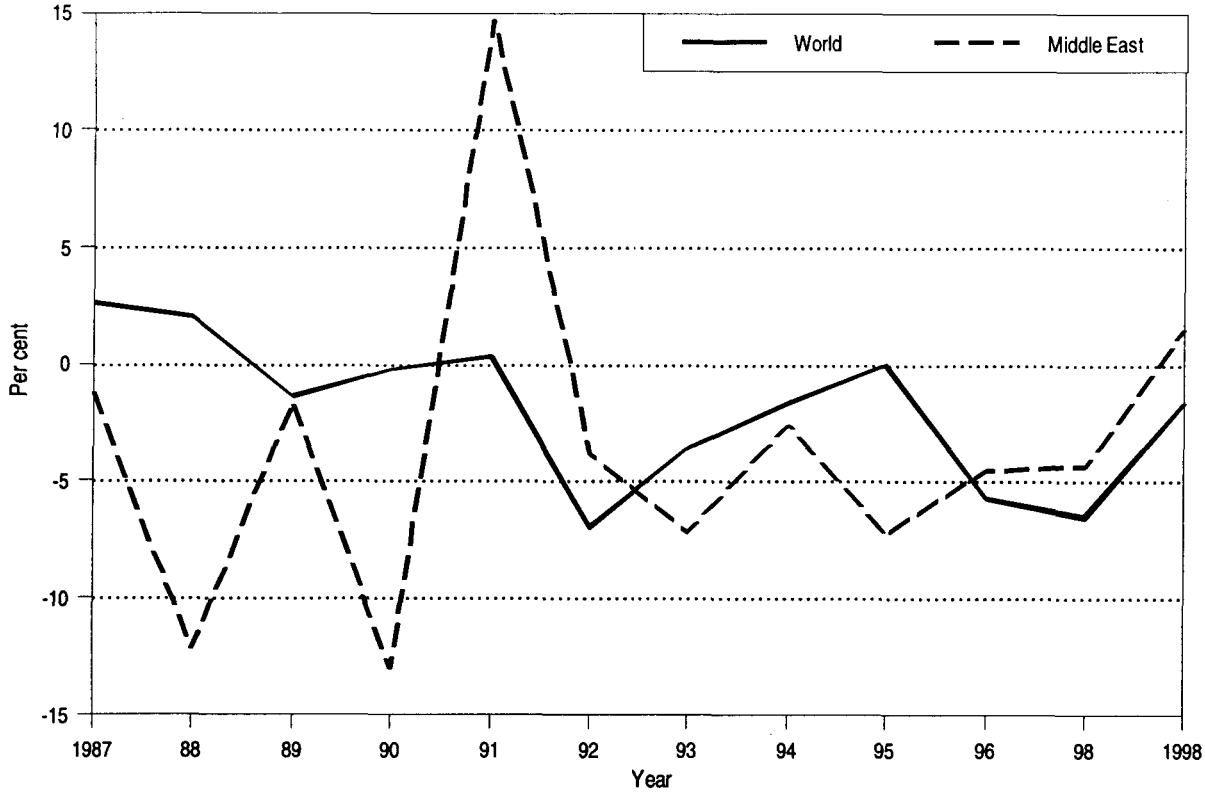
6.35 Over the 1987-1997 period, operating revenues of the scheduled airlines of the Middle East region increased at an average annual rate of 4.4 per cent (compared to the world annual average of 7.1 per cent). Operating expenses for the same period increased by 4.6 per cent per annum. As shown in Figure 6-14, since 1994 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. These resulted in an estimated operating surplus for 1998 of about $100 million.



Note.— 1998 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-14. Scheduled airline operating revenues and expenses — Middle East (1987-1998)



Notes.— 1998 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 (1987-1998)

6.36 For the 1987-1997 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 4.5 per cent in real terms (compared to a 2.5 per cent decline for the world), with an exceptional increase in 1991. It is estimated that real yield increased in 1998 accompanied by a moderate increase in traffic 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.

Airline passenger traffic trends and forecast

6.37 Over the 1987-1997 period, scheduled passenger traffic (in PKPs) of the airlines of the Middle East region increased at an average annual rate of 5.6 per cent. 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.

6.38 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 3.6 per cent per annum in 1999, 4.8 per cent in 2000 and 5.8 per cent in 2001. This rate reflects an expected good economic performance in the region.

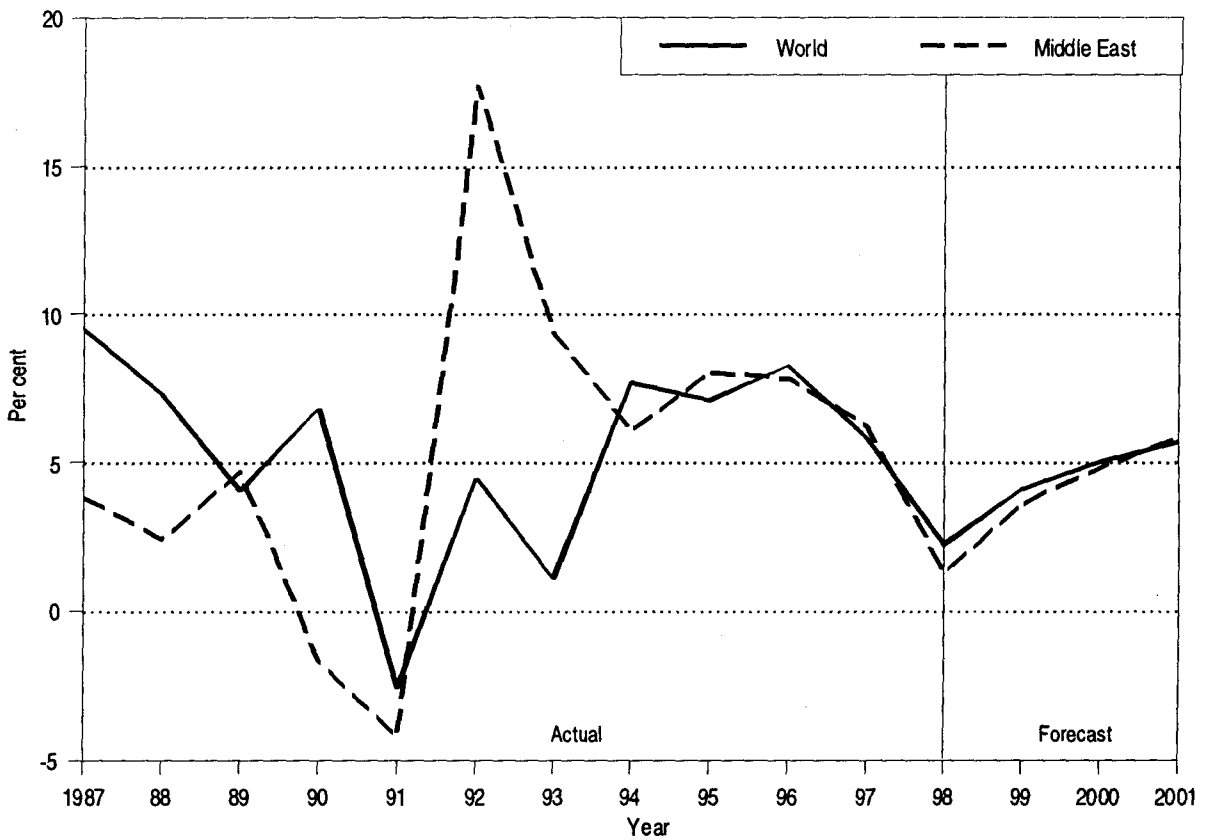


Figure 6-16. Scheduled passenger traffic growth (PKPs) — Middle East and World (1987-2001)

NORTH AMERICA

The Region in 1998

Table 6-5. Scheduled airline traffic — North America (1998/1997)

	INTERNATIONAL			TOTAL		
	1998	Increase over 1997 (%)	Share of world traffic (%)	1998	Increase over 1997 (%)	Share of world traffic (%)
Passengers carried (thousands)	71 500	2.8	15.8	610 590	-0.3	41.8
Passenger-kilometres performed (millions)	310 320	2.5	20.5	1 042 100	2.1	39.6
Freight and mail tonne-kms performed (millions)	17 780	1.8	19.8	30 920	-0.5	28.6

Source: ICAO Air Transport Reporting Form A-1.

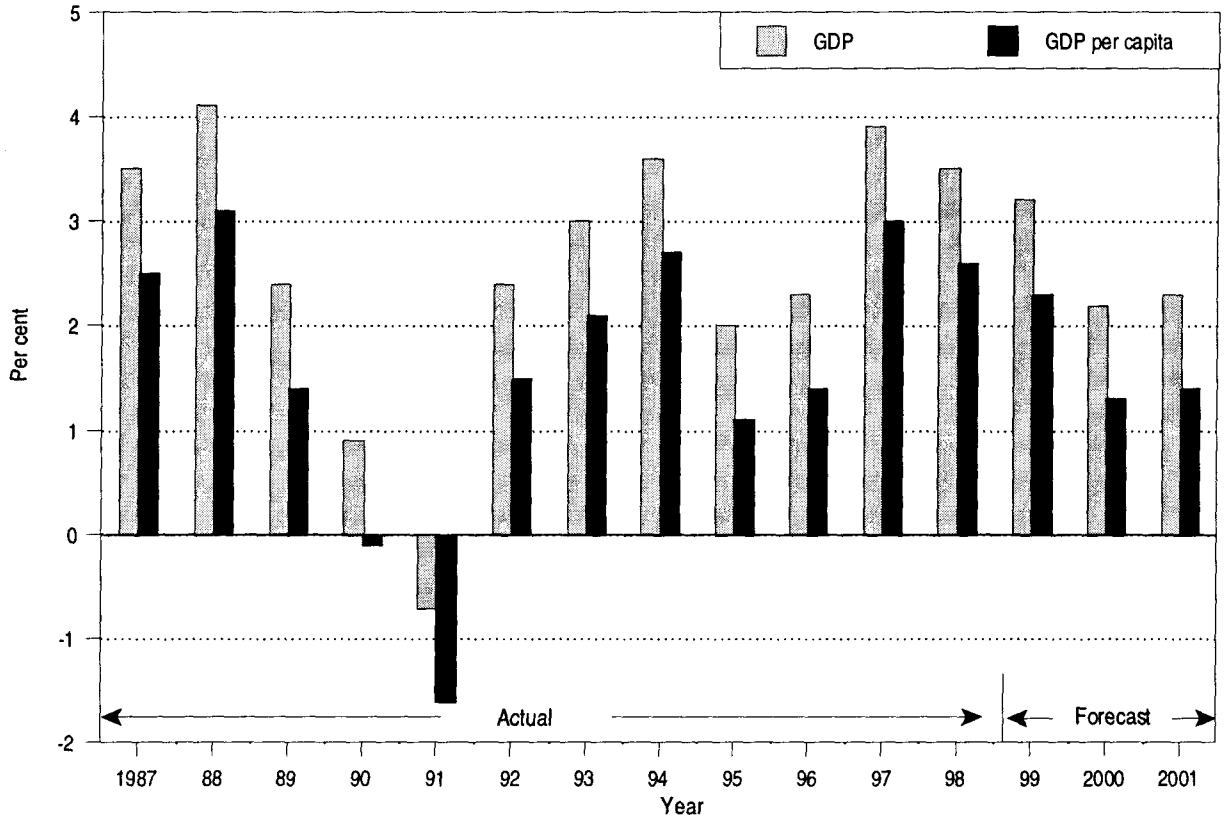
6.39 A number of bilateral air transport agreements were concluded providing for significant liberalization of air services between the United States and other countries. Such agreements were reached between the United States and Japan, France, Peru and the Republic of Korea. The Department of Transportation granted approval to a code-sharing arrangement between American Airlines and Transporte Aéreo Centroamericano (TACA), subject to restrictions including a ban on exclusivity deals that prevent either carrier from arranging code shares with other airlines.

6.40 Canadian regulations on international all-cargo charters were amended to allow multi-shipper sponsorship of flights and split charters. The amendment provides for increased choices for Canadian shippers and encourages exports for Canadian all-cargo charter operators.

Economic trends

6.41 Over the 1987-1997 period the aggregate North American economy (GDP) grew at an average annual growth rate of 2.4 per cent in real terms and GDP per capita increased at 1.5 per cent.

6.42 During 1998 the North American economy showed continued strength despite concerns that the widespread financial market turmoil which occurred during August-October could slow growth in many industrial countries. The GDP in 1998 was estimated to grow by 3.5 per cent. The year-to-year changes in the region's GDP and GDP per capita are illustrated in Figure 6-17.



Source: IMF, WEFA Group.

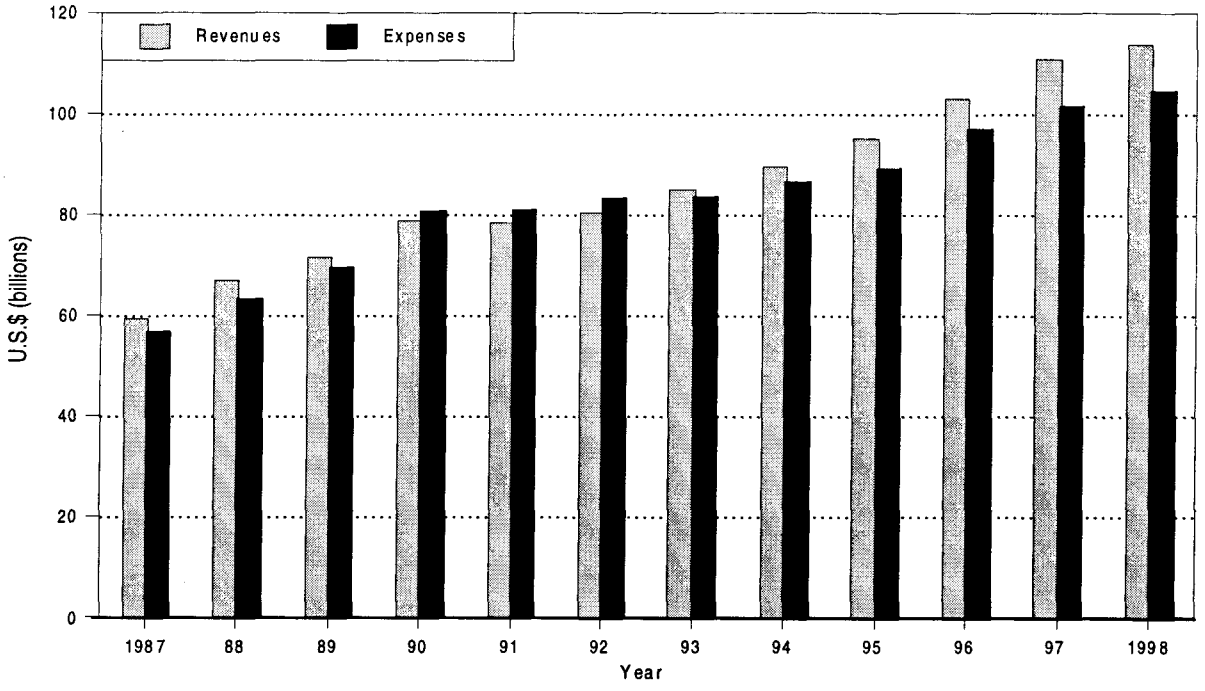
Figure 6-17. Annual change in real GDP and GDP per capita — North America (1987-2001)

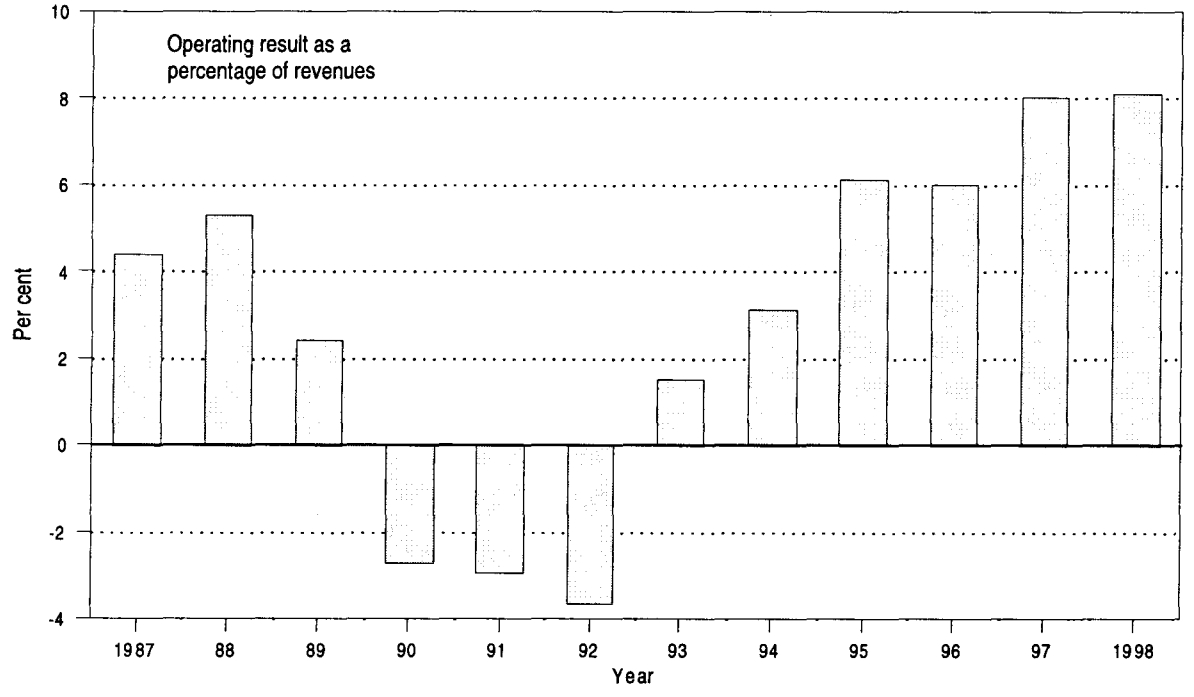
6.43 The economic expansion in the U.S. economy which began in 1991 has been the longest since the Second World War. In 1998 GDP grew by 3.9 per cent. While exports were influenced by slumping overseas markets, especially in Asia, strong domestic demand helped offset much of that softness. It is forecast that the growth of the U.S. economy will slow over the medium term to reach a level of just over 2 per cent by the end of the forecast period, while consumer price inflation will also accelerate slightly during the three years concerned.

6.44 In aggregate, the North American economy is expected to expand at rates of 3.2, 2.2 and 2.3 per cent in 1999, 2000 and 2001, respectively.

Airline financial trends

6.45 Over the 1987-1997 period, operating revenues of the scheduled airlines of the North American region increased at an average annual rate of 6.4 per cent (compared to the world





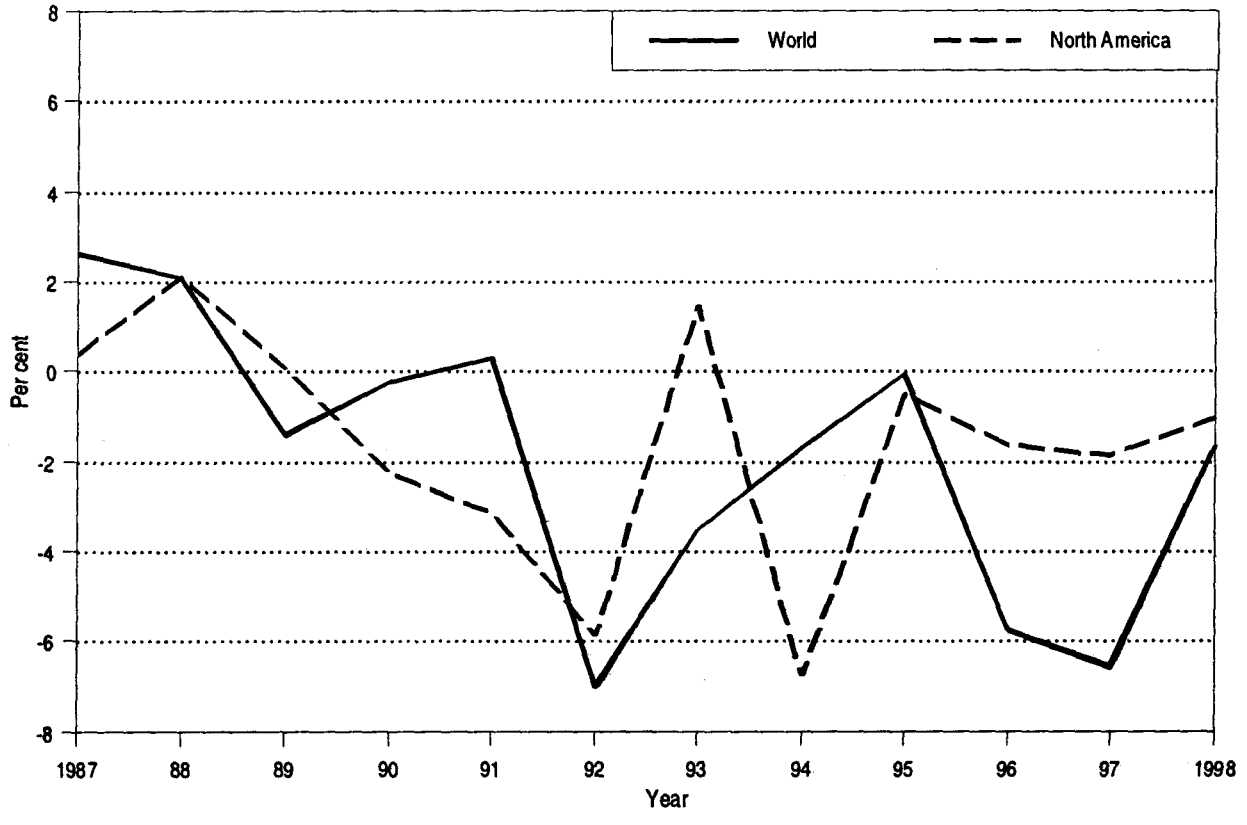
Note.— 1998 figures are from estimated data.

Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-18. Scheduled airline operating revenues and expenses — North America (1987-1998)

annual average of 7.1 per cent). Operating expenses for the same period increased by 6.0 per cent per annum. The string of operating surpluses in the 1986 to 1989 period gave way to a three-year period of serious deficits. Starting in 1993, operating surpluses have increasingly recovered and widened for six consecutive years as illustrated in Figure 6-18. For 1998 an operating surplus of $9.2 billion has been estimated.

6.46 For the 1987-1997 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 1.9 per cent in real terms (compared to a 2.5 per cent decline for the world). It is estimated that in 1998, industry-wide real yield further declined over the previous year. 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.



Notes.— 1998 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 (1987-1998)

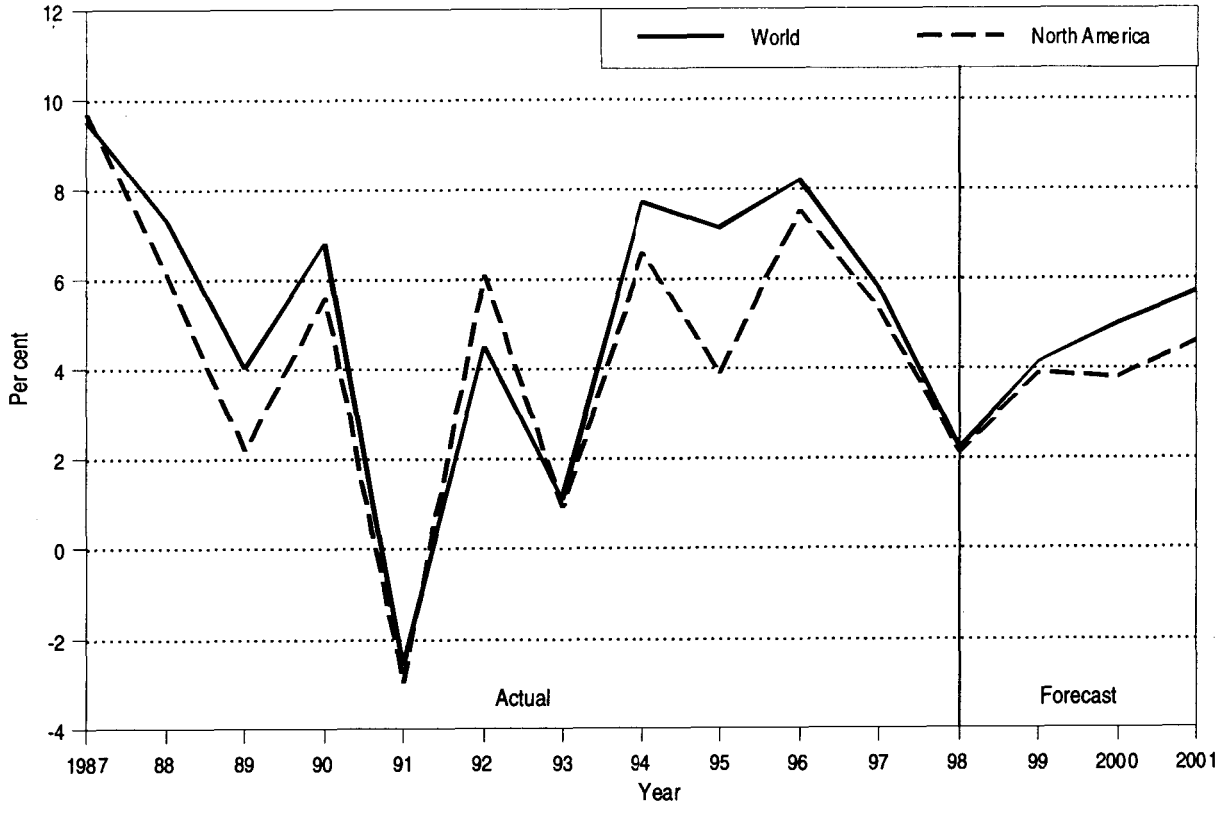


Figure 6-20. Scheduled passenger traffic growth (PKPs) — North America and World (1987-2001)

Airline passenger traffic trends and forecast

6.47 Over the 1987-1997 period, scheduled passenger traffic (in PKPs) of the airlines of the North American region increased at an average annual rate of 4.1 per cent (compared to the world average of 4.9 per cent). The increase in 1998 was 2.1 per cent, significantly lower than the average for the decade 1987-1997. The year-to-year traffic growth comparisons between world and North American airlines are shown in Figure 6-20.

6.48 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 3.9 per cent in 1999, 3.8 per cent in 2000 and 4.6 per cent in 2001. Although these forecast rates are below the expected growth pattern for the world as a whole (4.1, 5.0 and 5.7 per cent for the same three years), they represent impressive absolute growth considering the traffic volume of the region.

LATIN AMERICA AND THE CARIBBEAN

The Region in 1998

Table 6-6. Scheduled airline traffic — Latin America and the Caribbean (1998/1997)

	INTERNATIONAL			TOTAL		
	1998	Increase over 1997 (%)	Share of world traffic (%)	1998	Increase over 1997 (%)	Share of world traffic (%)
Passengers carried (thousands)	27 920	2.3	6.2	91 240	5.8	6.2
Passenger-kilometres performed (millions)	82 690	4.1	5.5	133 820	7.0	5.1
Freight and mail tonne-kms performed (millions)	4 060	7.1	4.5	4 940	6.5	4.6

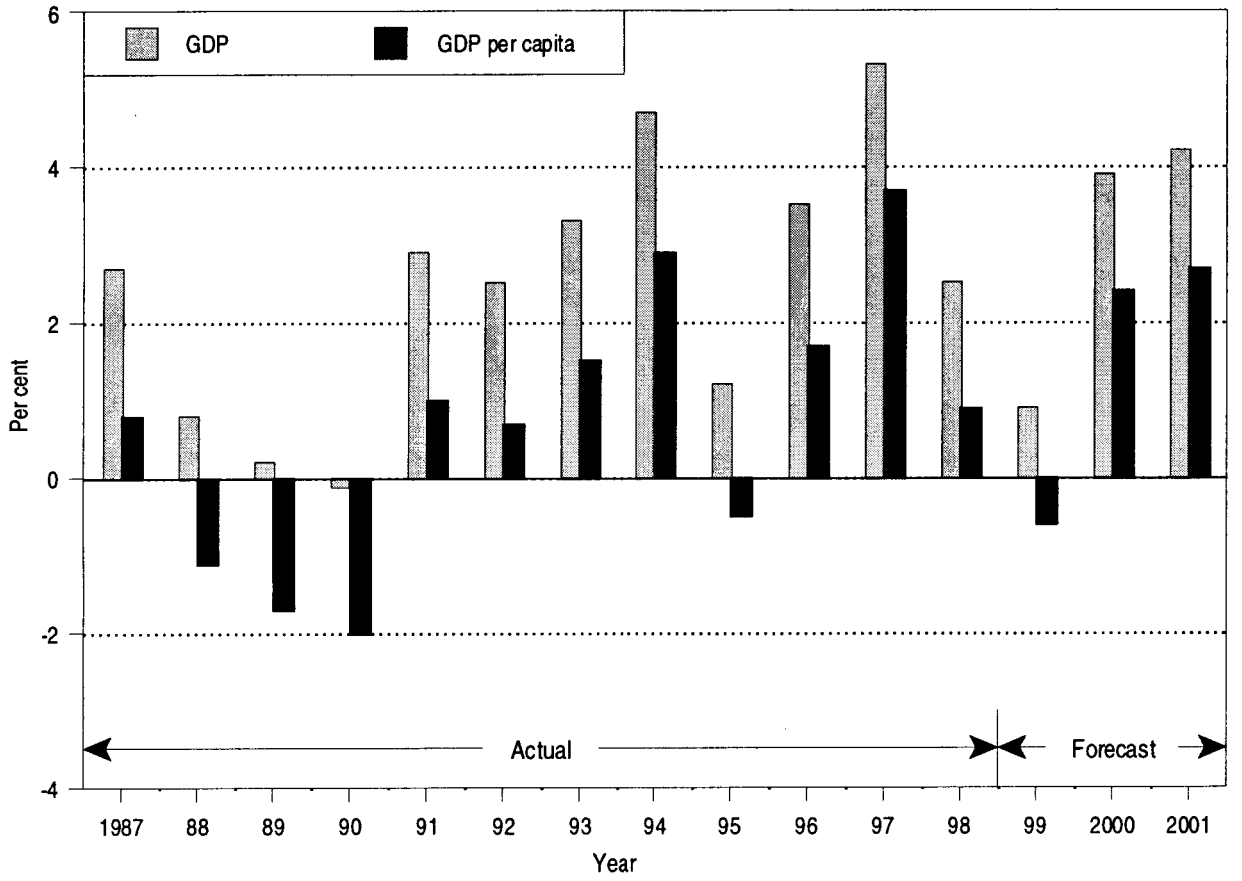
Source: ICAO Air Transport Reporting Form A-1.

6.49 Pursuant to the bilateral air transport agreements concluded with Latin American and Caribbean States during 1998, major airlines from the United States and Europe continued to expand their air services to Latin American and the Caribbean countries through direct investment, new joint initiatives, strategic alliances, code-share arrangements and frequent flyer programmes.

Economic trends

6.50 Over the 1987-1997 period, the aggregate Latin American and the Caribbean economy (GDP) grew at an average annual rate of 2.4 per cent in real terms, whereas GDP per capita grew at 0.6 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 After a record of 5.3 per cent growth in GDP in 1997, the economy experienced a significant slowdown resulting in an estimated growth of 2.5 per cent in 1998. In the latter part of 1998, financial market setbacks led Brazil to introduce severe austerity measures. Consequently, a sharp slowdown in the country's economic performance occurred. Some countries in the region such as Peru, Ecuador and El Salvador were adversely affected by El Nino earlier in the year which resulted in lowered growth and exports. Hurricane Mitch in November 1998 also had devastating effects in some Central American countries (especially Honduras and Nicaragua), especially on their agriculture sectors and industrial infrastructures.



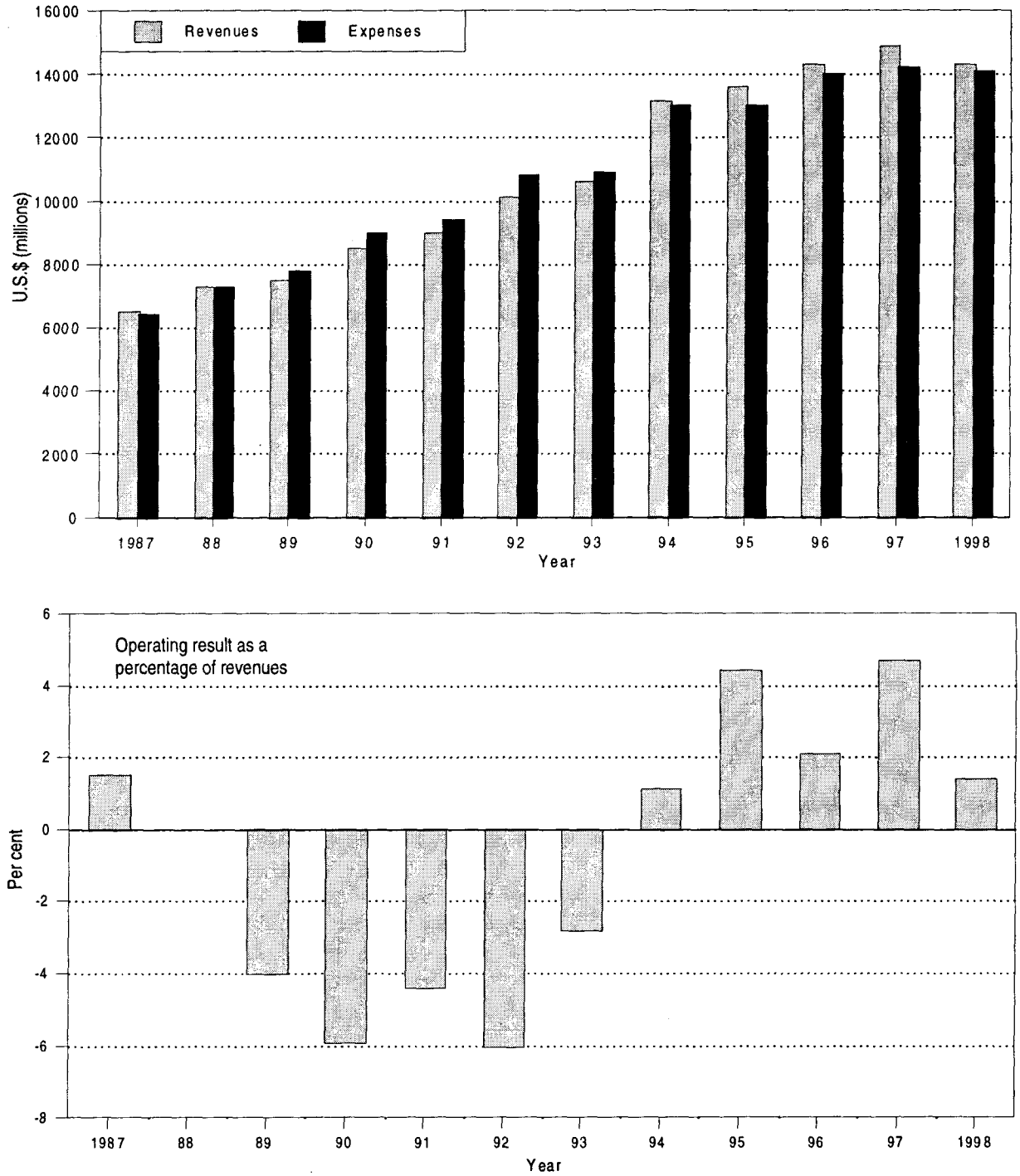
Source: IMF, WEFA Group.

Figure 6-21. Annual change in real GDP and GDP per capita — Latin America and the Caribbean (1987-2001)

6.52 The economic performance of the region is expected to slow further in 1999 to 0.9 per cent. The economy is expected to recover to growth rates of 3.9 and 4.2 per cent in 2000 and 2001, respectively.

Airline financial trends

6.53 Over the 1987-1997 period, operating revenues of the scheduled airlines of the Latin American and the Caribbean region increased at an average annual rate of 8.6 per cent (compared to the world annual average of 7.1 per cent). Operating expenses for the same period increased by 8.3 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. In 1998 the airlines of the region achieved an aggregate operating profit of about $200 million.



Note.— 1998 figures are from estimated data.

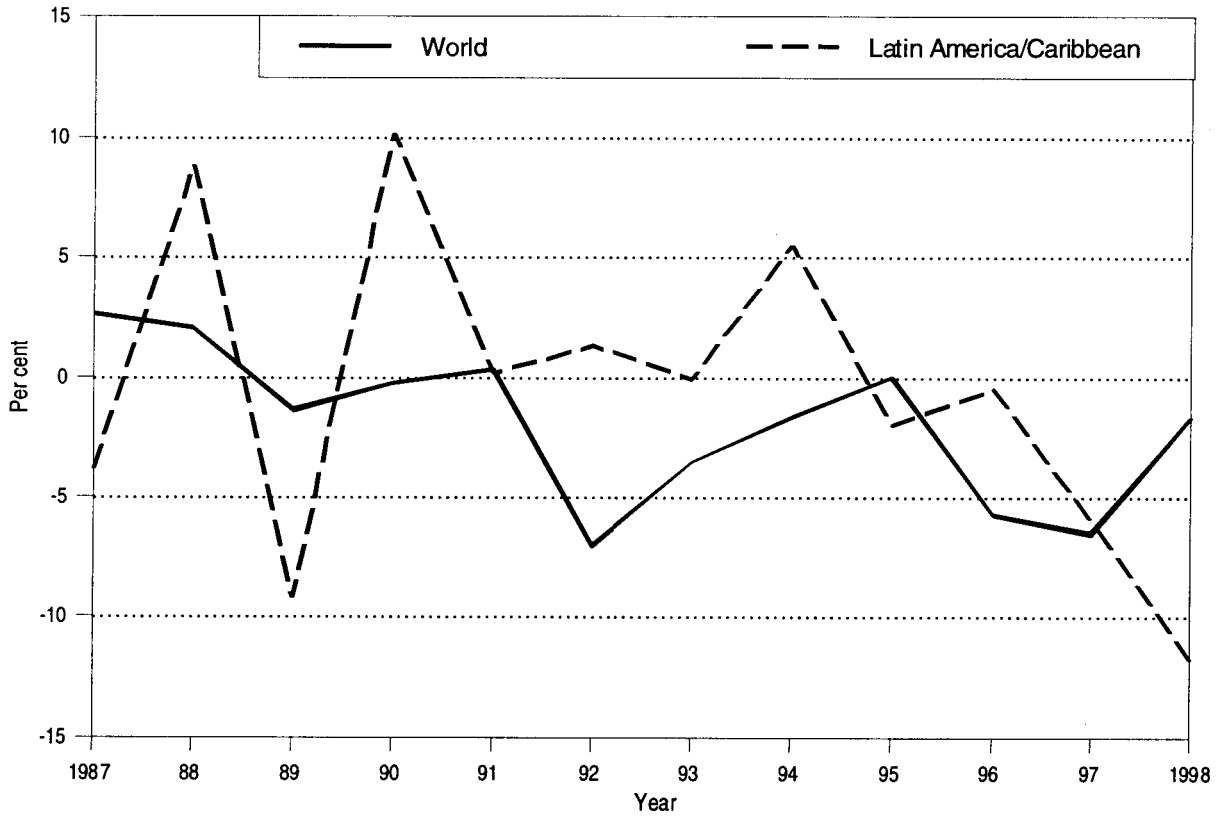
Source: ICAO Air Transport Reporting Form EF-1.

Figure 6-22. Scheduled airline operating revenues and expenses — Latin America and the Caribbean (1987-1998)

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 1987 and 1997. 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.

Airline passenger traffic and forecast

6.55 Over the 1987-1997 period, the scheduled passenger traffic (in PKPs) of airlines of the Latin American and the Caribbean region increased at an average annual rate of 5.0 per cent (compared to the world average growth rate of 4.9 per cent). In recent years, flag carrier privatization, intra-regional mergers and alliances along with extensive fleet and route



Notes.— 1998 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 (1987-1998)

rationalization were among 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. Intra-regional demand also contributed to the region's passenger traffic growth of 7.0 per cent in 1998, although this was significantly lower than the 9.2 per cent achieved in 1997. The year-to-year traffic growth comparison between world and Latin American and the Caribbean airlines is shown in Figure 6-24.

6.56 Traffic growth is expected to continue over the medium term although at rates significantly lower than those achieved by the region in recent years. 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 4.1, 5.7 and 6.5 per cent in 1999, 2000 and 2001, respectively, which exceeds the expected growth trend for the world (4.1, 5.0 and 5.7 per cent).

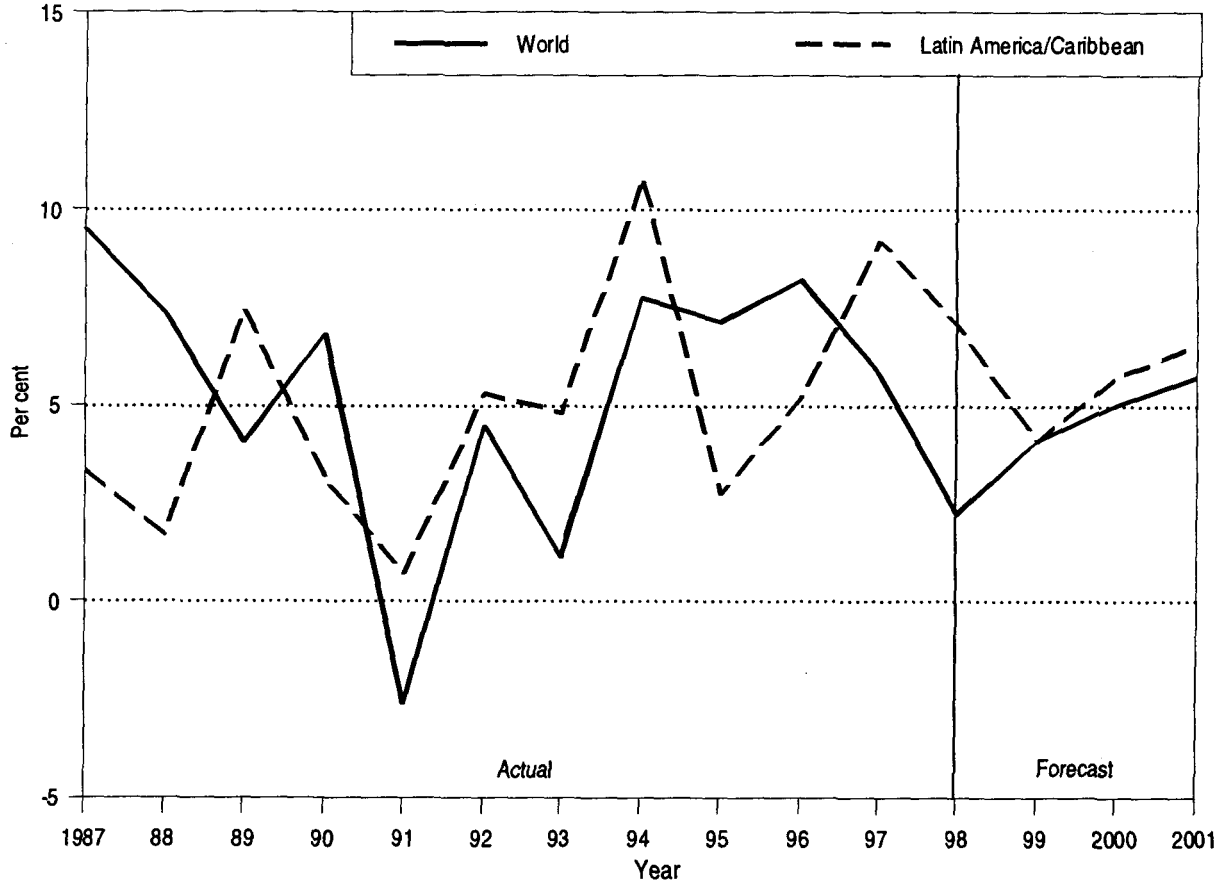


Figure 6-24. Scheduled passenger traffic growth (PKPs) — Latin America and the Caribbean and World (1987-2001)

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APPENDICES

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Appendix 1
Statistical Tables

Table A1-1. Regional distribution of scheduled traffic — 1998

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	5 810	5 430	365 200	691 480	70	29 560	97 060	150 740	64
Percentage of world traffic	26.1	28.0	25.0	26.3		28.9	27.8	25.8	
Africa	520	480	28 990	55 180	62	1 390	6 410	13 500	47
Percentage of world traffic	2.3	2.5	2.0	2.1		1.4	1.8	2.3	
Middle East	550	370	39 470	77 740	67	4 040	11 210	19 170	58
Percentage of world traffic	2.5	1.9	2.7	3.0		4.0	3.2	3.3	
Asia and Pacific	4 120	3 150	326 890	630 050	66	35 040	91 460	153 610	60
Percentage of world traffic	18.5	16.3	22.4	24.0		34.3	26.2	26.3	
North America	9 650	8 120	610 590	1 042 100	71	27 420	125 510	215 500	58
Percentage of world traffic	43.4	41.9	41.8	39.6		26.8	36.0	36.9	
Latin America and Caribbean	1 580	1 820	91 240	133 820	62	4 820	17 130	31 690	54
Percentage of world traffic	7.1	9.4	6.2	5.1		4.7	4.9	5.4	
Total	22 230	19370	1 462 380	2 630 370	69	102 270	348 780	584 210	60
International services of airlines of ICAO Contracting States									
Europe	4 400	2 980	215 590	572 080	71	28 810	85 160	129 950	66
Percentage of world traffic	41.9	56.5	47.6	37.9		33.0	36.8	34.7	
Africa	390	210	15 640	46 840	62	1 340	5 610	11 820	47
Percentage of world traffic	3.7	4.0	3.5	3.1		1.5	2.4	3.2	
Middle East	440	190	21 510	65 330	66	3 940	10 000	17 060	59
Percentage of world traffic	4.2	3.6	4.8	4.3		4.5	4.3	4.6	
Asia and Pacific	2 330	660	100 330	433 510	68	32 070	72 730	115 660	63
Percentage of world traffic	22.2	12.5	22.2	28.7		36.8	31.5	30.9	
North America	2 130	750	71 500	310 320	72	17 010	45 940	78 520	59
Percentage of world traffic	20.3	14.2	15.8	20.5		19.5	19.9	21.0	
Latin America and Caribbean	800	480	27 920	82 690	63	4 010	11 800	20 960	56
Percentage of world traffic	7.6	9.1	6.2	5.5		4.6	5.1	5.6	
Total	10 490	5 270	452 490	1 510 770	69	87 180	231 240	373 970	62

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 1998[1]

(excludes military and government-operated aircraft)

Type of aircraft	Before 1998	Delivered during 1998	Total as of 31/12/98	Ordered during 1998[2]	Remaining to be delivered as of 31/12/98[3]
TURBO-JETS					
Airbus Industrie A-300	465	13	478	32	39
Airbus Industrie A-310	251	1	252	0	6
Airbus Industrie A-319	65	52	117	177	430
Airbus Industrie A-320	611	80	691	199	415
Airbus Industrie A-321	76	35	111	36	141
Airbus Industrie A-330	64	23	87	22	161
Airbus Industrie A-340	122	23	145	60	113
Boeing 717				65	115
Boeing 737	2 940	281	3 221	354	959
Boeing 747	1 121	53	1 174	13	101
Boeing 757	780	50	830	50	130
Boeing 767	680	47	727	42	134
Boeing 777	104	74	178	70	250
British Aerospace - 146/RJ 85/100	310	20	330	10	31
Canadair Regional Jet	204	63	267	179	262
Dornier DO-328 Jet				27	44
Embraer EMB -145	34	60	94	86	158
McDonnell-Douglas MD-80/90	1 220	42	1 262	28	62
McDonnell-Douglas MD-11	172	12	184	13	14
Total of aircraft in production	9 219	929	10 148	1 463	3 565
Total of aircraft not in production[4]	6 286		6 286		
Total turbo-jets	15 505	929	16 434	1 463	3 565
TURBO-PROPS					
Aerospatiale/Aeritalia ATR-42/72	525	31	556	21	29
British Aerospace ATP	57	3	60	4	1
British Aerospace Jet Stream 41	95	1	96	0	0
DeHavilland Canada DHC-8	481	30	511	17	52
Dornier DO-328	77	13	90	12	26
Embraer EMB-120 Brasilia	329	14	343	20	6
SAAB SF-340	421	24	445	2	4
SAAB 2000	46	10	56	2	4
Total of aircraft in production	2 031	126	2 157	78	122
Total of aircraft not in production[4]	2 766		2 766		
Total turbo-props	4 797	126	4 923	78	122

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 1997.

Table A1-3. Aircraft accidents involving passenger fatalities on scheduled air services (1979-1998)

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.								
1979	31	877	0.10	0.15	0.36	0.57	0.22	0.30
1980	22	814	0.09	0.14	0.25	0.40	0.15	0.21
1981	22	466	0.05	0.08	0.25	0.40	0.15	0.22
1982	26	764	0.08	0.13	0.30	0.48	0.18	0.26
1983	20[1]	809	0.08	0.13	0.22	0.36	0.13	0.19
1984	16	223	0.02	0.03	0.16	0.27	0.10	0.14
1985	22	1 066	0.09	0.14	0.22	0.35	0.13	0.19
1986	18	337	0.03	0.04	0.16	0.26	0.10	0.14
1987	24	890	0.06	0.10	0.20	0.33	0.12	0.18
1988	26	707	0.05	0.08	0.21	0.33	0.13	0.19
1989	27	817	0.05	0.08	0.21	0.33	0.12	0.20
1990	22	440	0.03	0.04	0.16	0.26	0.10	0.15
1991	25[2]	510	0.03	0.05	0.18	0.29	0.11	0.18
1992	25	990	0.06	0.09	0.17	0.27	0.11	0.17
1993	32	805	0.04	0.07	0.21	0.33	0.13	0.22
1994	24	732	0.04	0.06	0.15	0.23	0.09	0.15
1995	22	557	0.03	0.04	0.13	0.20	0.08	0.13
1996	22	1 132	0.05	0.08	0.12	0.19	0.07	0.13
1997	26	868	0.03	0.05	0.13	0.21	0.08	0.14
1998	22	909	0.03	0.06	0.11	0.17	0.07	0.12
Including the USSR up to 1992 and the Commonwealth of Independent States thereafter.								
1986	23	552	0.04	0.06	na	na	na	na
1987	26	901	0.06	0.09	na	na	na	na
1988	29	737	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	1 097	0.06	0.09	na	na	na	na
1993	35	940	0.05	0.08	0.21	0.34	0.13	0.22
1994	28	941	0.04	0.07	0.16	0.25	0.10	0.17
1995	26	710	0.03	0.05	0.14	0.22	0.09	0.15
1996	23	1 135	0.05	0.07	0.11	0.19	0.07	0.12
1997	27	930	0.04	0.06	0.13	0.21	0.08	0.14
1998	22	909	0.03	0.05	0.10	0.16	0.06	0.11

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: ADREP and other reports.

Table A1-4. Aviation security (1979-1998)

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
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
1998	6	1	4	0	1	0	0

*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 1999, 2000 and 2001 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 39 years were used in the subsequent econometric (least squares regression) analysis, with the following results at the global level.

$$ln\ \text{PKP} = -0.003 + 2.20\ ln\ \text{GDP} - 0.50\ ln\ \text{PYIELD} \qquad R^2 = 0.999$$
$$(31.6) \qquad (-6.4) \qquad \text{S.E.} = .027$$

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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